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	)	

REPORT AND ORDER

Adopted: June 8, 2000 Released: June 22, 2000

By the Commission: Commissioner Furchtgott-Roth approving in part, dissenting in part and issuing a statement.

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I. INTRODUCTION

1. With this *Report and Order*, we adopt rules that will permit the efficient use of spectrum for existing and future users, and will facilitate the deployment of new services in the 17.7-20.2 GHz band ("18 GHz band"). In particular, we adopt a band plan that designates how terrestrial fixed services, the Geostationary Satellite Orbit Fixed Satellite Service ("GSO/FSS"), the Non-Geostationary Satellite Orbit Fixed-Satellite Service ("NGSO/FSS"), and Mobile-Satellite Service feeder links ("MSS/FL") are to share this band. As a consequence of this designation, this *Report and Order* modifies the Table of Frequency Allocations found in Section 2.106 of the Commission's Rules.[1] This *Report and Order* also modifies service rules in the 18 GHz band and authorizes the blanket licensing of satellite earth stations in the bands where the Fixed Satellite Service ("FSS") is the sole primary designation. Finally, this *Report and Order* allocates the band 17.3-17.7 GHz to the Broadcasting-Satellite Service ("BSS") and the band 24.75-25.25 GHz to the FSS for BSS feeder links, as described below.

2. The 18 GHz band currently serves a variety of communications needs and has the potential to provide consumers, both business and residential, with exciting new services in the years to come. Our actions in this proceeding will allow for more efficient use of this spectrum. Previously, the entire 18 GHz band was allocated for shared use among various terrestrial fixed and mobile services, the FSS, and the mobile satellite service ("MSS").[2] We conclude that, in

[1] 47 C.F.R. § 2.106.

[2] *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 Service, *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*). The *28 GHz First Report and Order* established a band plan for the Ka-band. The "Ka-band" refers to the space-to-

general, separating terrestrial fixed service operations from ubiquitously deployed FSS earth stations in dedicated sub-bands would serve the public interest. We also conclude, however, that limited frequency sharing between satellite and terrestrial services is feasible and should continue to be permitted where it serves the requirements of these services. We have attempted to protect the existing fixed terrestrial operations in this band to the maximum extent possible, while at the same time providing for the growth of both satellite and terrestrial services. This *Report and Order* should assist both the satellite and terrestrial services in the analysis of future growth possibilities by providing certainty as to how these services may share the 18 GHz band and thereby enabling the affected industries to make informed business decisions.

II. EXECUTIVE SUMMARY

3. The band plan we adopt today is a result of an examination of the record, developed in response to our *18 GHz NPRM* (or "*NPRM*").[3] We have considered the concerns expressed in the parties' comments and have fashioned our decisions to resolve those concerns in as equitable a manner as possible.

4. In the band plan we adopt today, we designate the following spectrum for **terrestrial fixed service use**: (1) 17.7-18.3 GHz band on a primary basis; (2) 18.3-18.58 GHz band on a co-primary basis (with GSO/FSS); and (3) 19.3-19.7 GHz band on a co-primary basis (with MSS/FL). We designate the following spectrum for **GSO/FSS service use**: (1) 18.58-18.8 GHz band on a primary basis; and (2) 18.3-18.58 GHz band on a co-primary basis(with terrestrial fixed service), noting that the 19.7-20.2 GHz band is also allocated on a primary basis to the GSO/FSS. Furthermore, we designate the 18.8-19.3 GHz band to **NGSO/FSS service use** on a primary basis, and retain co-primary status for **MSS/FL** (with terrestrial fixed service) in the 19.3-19.7 GHz band. These designations will significantly reduce sharing in the 18 GHz band, and thereby eliminate the need for many existing coordination procedures,[4] leading to lower transaction costs and more efficient use of the band. 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 and that coordination between non-Government operations, both terrestrial and satellite, and these Government operations will continue to remain in effect. Nothing in this *Report and Order* purports to change the relationship between Government and non-Government systems.[5]

Earth (downlink) frequencies at 17.7-20.2 GHz and the corresponding Earth-to-space (uplink) frequencies at 27.5-30.0 GHz (the "28 GHz band").

[3] *See* Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, 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*, IB Docket No. 98-172, 13 FCC Rcd 19923 (1998) (*18 GHz NPRM*).

[4] *Cf.* 47 C.F.R. §§ 25.203, 101.103(d)(discussing coordination procedures).

[5] *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 9931 (1995)..

5. Recognizing the importance of existing terrestrial fixed service systems in the 18 GHz band, we will permit terrestrial fixed stations currently operating in spectrum being designated in this *Report and Order* for exclusive satellite use to continue to operate on a co-primary basis for a period of ten years, subject to the overriding right of satellite providers to require terrestrial fixed stations to relocate. During this ten-year period, existing terrestrial fixed stations can be compelled to relocate in accordance with relocation procedures adopted herein. If a terrestrial fixed station is required to relocate within ten years of the effective date of this *Report and Order*, the satellite provider must pay to relocate the terrestrial fixed station to comparable facilities. At the end of the ten-year period, existing terrestrial fixed stations may continue to operate on a non-interference basis. In the case of 19.26-19.30 GHz, the co-primary status of existing terrestrial fixed stations, as well as their entitlement to relocation costs, is permanent.

6. This *Report and Order* also authorizes a blanket licensing regime for satellite earth stations for segments of the 17.7- 20.2 GHz and 27.5-30.0 GHz frequency bands—bands not subject to sharing with other services. Specifically, we will accept such applications for blanket licensing in the 18.58-18.8 GHz, 18.8-19.3 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, 28.6-29.1 GHz, and 29.5-30.0 GHz frequency bands.[6] In all those bands designated as primary to the GSO/FSS, we adopt the specific technical conditions concerning space station and earth station performance recommended by the Blanket Licensing Industry Working Group to ensure that intra-system interference stays within acceptable levels. With respect to the blanket licensing of NGSO/FSS systems, we adopt an equation to determine the power-flux density (pfd) of space stations that, for low elevation angles, includes a consideration of the number of satellites in the NGSO system constellation, which was recommended by technical study groups of the Radiocommunications Sector of the International Telecommunication Union (ITU-R) for inclusion in the ITU's Radio Regulations. The blanket licensing regime adopted in this *Report and Order* describes the parameters within which earth stations may be operated under a blanket license, as well as the solutions for minimizing potential interference on both an intra- and inter-service basis.

7. This *Report and Order* also allocates 400 *MHz* of spectrum at 17.3-17.7 GHz for primary BSS uses, effective April 1, 2007, as specified in the ITU Radio Regulations. We allocate the 24.75-25.05 GHz band for primary GSO/FSS (Earth-to-space) use, limited to feeder links for the BSS in the 17.3-17.7 GHz band, and the GSO/FSS 25.05-25.25 GHz band for co-primary use between the FSS (Earth-to-space), limited to BSS feeder links, and the fixed service, comprised of the 24 GHz Service.[7]

[6] Existing Fixed Stations have, during the grandfathering period, a co-primary designation. This means that, as earth stations populate the satellite service area they must accept any interference received from these previously licensed stations, or pay for their relocation to another frequency (or an alternative media, such as fiber optics) with equivalent link performance..

[7] The 24 GHz Service in the 24 GHz band was formerly known as the Digital Electronic Messaging Service (DEMS).

III. BACKGROUND

8. In response to the *18 GHz NPRM*, we received numerous comments and reply comments from entities representing a broad cross-section of the communications industry.[8] The majority of the commenters recognized that sharing between terrestrial fixed service and satellite services in the 18 GHz band is not possible where satellite earth stations are ubiquitously deployed.[9] Thus, a majority of the commenters agreed with the Commission's tentative conclusion in the *18 GHz NPRM* 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.[10] Many of these same commenters, however, have requested that their respective services be designated a greater amount of spectrum than the spectrum allocated by this *Report and Order* today.

9. The 17.7-19.7 GHz frequency band is currently allocated for terrestrial fixed service, FSS downlinks (both Geostationary Orbit and Non-Geostationary Orbit), and for feeder links to the MSS.[11] In 1996, the Commission adopted a band designation plan for the 28 GHz band and the 18 GHz band to accommodate the needs of competing terrestrial fixed and satellite services.[12] In the *28 GHz First Report and Order*, the Commission concluded that "co-frequency sharing between either GSO/FSS or NGSO/FSS ubiquitously deployed terminals and LMDS (Local Multipoint Distribution Service) with its ubiquitously deployed subscriber terminals, is not feasible at this time."[13] As a result, the 28 GHz band plan eliminated co-frequency sharing

[8] A list of the commenters is provided in Appendix C.

[9] *See, e.g.*, Comments of the American Petroleum Institute at 6 ("Sharing spectrum with ubiquitously deployed satellite earth stations on a co-primary basis has proven unworkable in the past, and similar sharing in the 18 GHz band would result in further loss of spectrum for fixed services and exclusion of fixed services from large geographical areas") (API Comments); Comments of the Cellular Telecommunications Industry Association at 5-6 ("Unacceptable interference is likely to occur when microwave fixed services and satellite services operate in the same frequency bands") (CTIA Comments); Comments of the Fixed Point-to-Point Section of the Telecommunications Industry Association at app. A ("The Fixed Section does not believe it will be feasible for the FS and FSS to share the entire band, certainly not with blanket licensing of earth stations") (TIA-Fixed Section Comments).

[10] *See 18 GHz NPRM* at ¶ 1; *see also, e.g.*, Comments of SBC Communications, Inc. at 2 ("SBC agrees that sharing between these services is not possible and supports the separation of the services into discrete segments of [the] band") (SBC Comments); Comments of Winstar Communications, Inc. at 7 ("The Commission correctly recognized in its Notice that blanket-licensed, ubiquitously deployed earth station terminals and terrestrial fixed service facilities cannot share the same frequencies") (Winstar Comments).

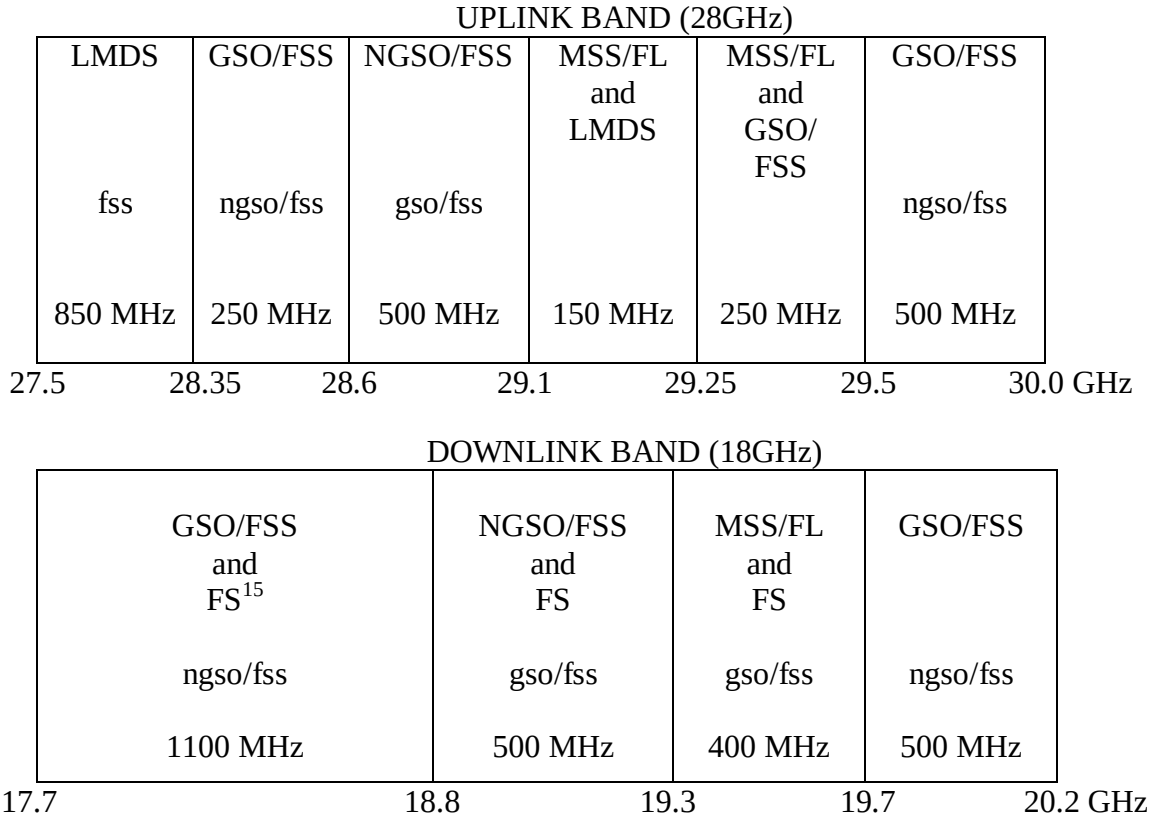
[11] *See* 47 C.F.R. § 2.106. It should be noted that United States Government systems are also authorized to operate in part of the 18 GHz band, specifically, in the 17.8-20.2 GHz band. *See id.* This *Report and Order*, however, concerns only non-Government operation in the 18 GHz band. Furthermore, the 18.6-18.8 GHz band is allocated for both Government and non-Government Earth Exploration Satellite (EES) (passive) and Space Research (SR) (passive). *See id*.

[12] *See 28 GHz First Report and Order*, *supra* note 1. Satellite uplinks in the 28 GHz band are paired with satellite downlinks in the 18 GHz band, which caused the Commission to act on both bands in the *28 GHz First Report and Order*.

[13] *Id.* ¶ 27, at 19015-16.

except for those segments where sharing was technically feasible. In addressing the 18 GHz band, however, the designation plan of the *28 GHz First Report and Order* mandated that terrestrial services and satellite services share segments of the band, though the Commission noted that the record demonstrates that such co-frequency sharing presents multiple challenges.

10. The band plan adopted in the *28 GHz First Report and Order* is as follows:[14]



As depicted above, prior to this rulemaking, the 18 GHz band was designated for use as follows: the 17.7-18.8 GHz band for co-primary use by GSO/FSS and terrestrial fixed service; the 18.8-19.3 GHz band for co-primary use by NGSO/FSS and terrestrial fixed service; the 19.3-19.7 GHz band for co-primary use by MSS/FL and terrestrial fixed service; and the 19.7-20.2 GHz band for primary use by GSO/FSS.

11. Since the adoption of the *28 GHz First Report and Order*, several factors have led us to conclude that co-frequency sharing between terrestrial fixed service and ubiquitously deployed

[14] *See id.* ¶¶ 42, 77, at 19024, 19036. Services designated for primary domestic licensing priority are specified by capital letters and services designated for secondary domestic licensing priority are specified by the use of lower case letters. We note that the *28 GHz First Report and Order* only adopted changes to Part 25 of the Commission's Rules, and did not modify the Allocation Table in Part 2, an action taken by this *Report and Order.*

[15] Terrestrial Fixed Service.

FSS earth stations in the 18 GHz band is generally infeasible. [16] For instance, we expect use of the 18 GHz band by both terrestrial fixed services and FSS systems to increase dramatically over the next few years. Currently there are approximately 179,000 terrestrial fixed links in the 18 GHz band. Use of the band is expected to increase as terrestrial fixed services migrate from congested lower bands and as 18 GHz band systems expand. Although there currently are no non-government[17] FSS systems in operation in the 18 GHz band, we have granted thirteen GSO/FSS licenses[18] and one NGSO/FSS license[19] to launch and operate Ka-band FSS systems in the near future. The expected increase in 18 GHz band use in the years to come, as well as the desire on the part of the FSS industry to implement blanket licensing of ubiquitously deployed satellite earth stations, led us to conclude in the *NPRM* that, under most circumstances, sharing between terrestrial fixed service and FSS operations will become increasingly difficult and is therefore not feasible on a going-forward basis.

12. In the *NPRM*, we tentatively concluded "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."[20] To this end, the *NPRM* proposed four band redesignation plans.[21] We recognized that redesignation of the 18 GHz band may have an adverse effect on existing terrestrial fixed service systems currently operating in the band. To alleviate any adverse effects on existing systems, the *NPRM* proposed to "grandfather" licensed terrestrial operations in the band, along with applications that were pending as of September 18, 1998.[22] The *NPRM* asked for comments on the proposed redesignation plans and the "grandfathering" provision. We also requested comments on conditions under which relocation of existing terrestrial fixed systems may be necessary notwithstanding such proposed "grandfathering," and the terms of such relocation.[23]

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[16] In the limited instances where co-frequency sharing is required, the ubiquitous deployment of earth stations will not be permitted.

[17] Government FSS systems have been coordinated for several years. *See supra* note 5.

[18] *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); Orion Network Systems, Inc. (DA 97-977); PanAmSat Licensee Corp. (DA 97-978); and VisionStar, Inc. (DA 97-980) (International Bureau, May 9, 1997). The Commission also assigned the thirteen GSO/FSS licensees orbital locations. *See* Assignment of Orbital Locations to Space Station in the Ka-band, *Order*, 12 FCC Rcd 13737 (1997).

[19] *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).

[20] *18 GHz NPRM* ¶ 1.

[21] *See* redesignation discussion, *infra.*

[22] *See 18 GHz NPRM* ¶ 40. The "grandfather" provision proposed that satellite earth stations would be required to coordinate with grandfathered terrestrial fixed services, however, grandfathered systems would not be permitted to modify their operations "in any manner that might increase interference to satellite earth stations." *See id.*

[23] *See id.* ¶ 41.

13. In early November 1998, as a response to the cut-off date for the grandfathering proposed in the *18 GHz NPRM*, the Fixed Point-to-Point Communications Section, Wireless Communications Division of the Telecommunications Industry Association ("TIA-Fixed Section") and the Independent Cable & Telecommunications Association ("ICTA") filed petitions for relief from implementation of the September 18, 1998 "cut-off" date.[24] TIA-Fixed Section argued that the cut-off date proposed in the *NPRM* constituted a *de facto* freeze on further development of affected terrestrial fixed service in the 18 GHz band, while ICTA argued that private cable operators ("PCOs") would not be able to survive should the cut-off date be adopted.

14. On February 5, 1999, the Commission adopted an *Order (18 GHz Relief Order)* in response to the two petitions,[25] modifying our proposal so that the PCO applications in the 18.3-18.55 GHz band would be considered co-primary with the FSS if filed before the release of this *Report and Order*.[26] We did not, however, change the proposed cut-off date for other non-PCO terrestrial fixed operations in the 18.3-18.55 GHz band and 18.8-19.3 GHz band. The *18 GHz Relief Order* left the final determination regarding the cut-off date and grandfathered status for all terrestrial fixed services for resolution in this *Report and Order*.[27]

15. In the *18 GHz NPRM*, we proposed to implement a blanket licensing procedure that would allow Ka-band FSS earth stations to operate under a single system license in bands that are designated for their primary use. The Commission tentatively concluded that such a blanket licensing procedure would provide an efficient means for licensing the vast number of small antenna FSS earth stations expected to be deployed in the Ka-band.[28] We also proposed that blanket license applicants be required to designate a point of contact to provide secondary users with a means to obtain information on the location and frequency use of satellite earth stations so that they could avoid causing harmful interference. Furthermore, the *NPRM* proposed a

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[24] *See Petition for Interim Relief*, filed by the Fixed Point-to-Point Communications Section, Wireless Communications Division of the Telecommunications Industry Association on November 2, 1998; *Emergency Request for Immediate Relief*, filed by the Independent Cable & Telecommunications Association on November 5, 1998.

[25] *See* Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.3 GHz Frequency Bands, 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, *Order*, IB Docket No. 98-172, 14 FCC Rcd 3086 (1999) (*18 GHz Relief Order*).

[26] *See id.* We reasoned that: (1) there was no other spectrum available at that time in the 18 GHz band or any other band for new or existing PCO operations; (2) PCOs would be unable to meet consumer needs for new services if relief was not granted; and (3) maintaining the proposed cut-off date for PCOs would be inconsistent with our expressed goal of increased competition in the provision of new video services.

[27] *Id.* ¶ 14. We also adopted several requirements to prevent warehousing of the spectrum involved.

[28] *See 18 GHz NPRM* ¶ 43. It should be noted that GSO/FSS and NGSO/FSS operators propose to blanket license small antenna satellite earth stations that are transmit/receive end user terminals; thus, we consider both the uplink and downlink portions of the Ka-band in our consideration of blanket licensing.

requirement for blanket licensees to report to the Commission on the number of satellite earth stations brought into service annually.[29]

16. In the *NPRM*, in response to a Petition for Rulemaking filed by DIRECTV Enterprises, Inc. ("DIRECTV"),[30] we proposed to allocate the 17.3-17.8 GHz band to BSS and the 24.75-25.25 GHz band for BSS feeder link use, with implementation of these allocations effective April 1, 2007.[31]

IV. DISCUSSION

17. The vast majority of commenters agreed with our tentative conclusion that co-frequency sharing between terrestrial fixed service and ubiquitously deployed FSS earth stations in the 18 GHz band is not feasible, and that the public interest would be best served by separating these operations into dedicated sub-bands.[32] We continue to believe that separation of these operations into different dedicated sub-bands is an effective frequency management technique to resolve problems of coordinating terrestrial fixed service links with ubiquitously deployed satellite earth stations.[33] As Teledesic notes, band segmentation, in conjunction with our blanket-licensing regime, "will allow for ubiquitous deployment of GSO and NGSO satellite earth terminals, and for much denser deployment of terrestrial fixed stations than would otherwise be possible."[34] While we generally agree with this principle, we have found it impossible to satisfy the full requirements of all of the services wishing to operate in the 18 GHz band through strict adherence to the principle of band segmentation. Although sharing between ubiquitously deployed FSS earth stations and terrestrial fixed stations clearly is not feasible, we have developed a band segmentation plan that would also provide for non-ubiquitously deployed FSS

[29] *See id.* ¶ 45.

[30] *See Public Notice*, Report No. 2208 (rel. July 1, 1997). The Commission placed the petition on public notice and assigned it rulemaking number RM-9118. *See id.* Although the petition also requested that the Commission adopt a 4.5º orbital spacing policy for use in the 17.3-17.8 GHz and 24.75-25.25GHz bands, the Commission concluded that it was premature to address this issue at the present time. *See 18 GHz NPRM* ¶ 82.

[31] These allocations conform to the International Telecommunication Union Region 2 BSS allocation. *See* ITU Radio Regulations Footnote S5.517 (stating that the Region 2 allocation to BSS in the 17.3-17.8 shall be afforded primary status as of April 1, 2007); ITU Radio Regulations Footnote S5.535 (stating that the 24.75-25.25 GHz band shall be designated for feeder links of BSS).

[32] *See supra* notes 8-9.

[33] *See* API Comments at 6 (noting that at recent meetings of the National Spectrum Managers Association and the Fixed Wireless Communications Coalition, there were reports of coordination difficulties in the 4 GHz frequency band, due to the deployment of satellite earth stations); CTIA Comments at 5 ("CMRS carriers raise serious concerns as to the feasibility of sharing in the 18 GHz band due to frequency coordination problems and the adverse impact on new or expanded microwave uses"); ICTA Reply Comments at 2 ("There is simply no viable method for private cable operators to coordinate with potentially tens of thousands of blanket-licensed GSO/FSS users deployed at unknown locations").

[34] Teledesic Reply Comments at 3; *see also* Comments of Pegasus Development Corporation at 6 (stating that segmentation "is necessary for consistently high quality reception of Ka-band FSS signals in urban areas and the achievement of a truly national ubiquitous satellite service").

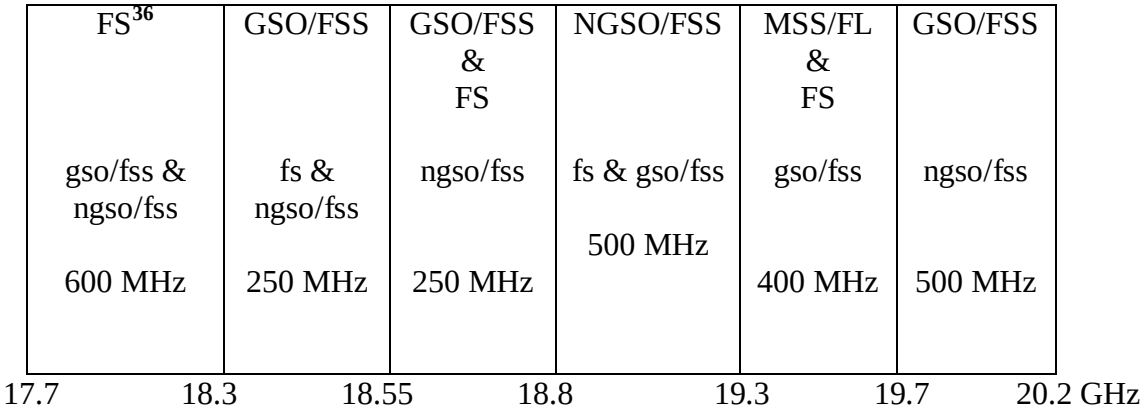
earth stations on a co-primary basis with the terrestrial fixed service on a coordinated basis. To that end, we have constructed a band plan that includes some co-primary designations. We find that this approach best serves the public interest, providing the various services with a form of access to the frequency spectrum that is both feasible and functional. We now discuss our initial redesignated band plan proposals and adopt a final band plan.

A. Band Plan

1. Initial Proposals

18. The band plans proposed in the *NPRM* resulted from extensive public comment that focused on the identification of the spectrum requirements of the different services authorized to operate in the 18 GHz band. In developing specific band redesignation proposals, we proceeded with the goal of striking a balance between meeting the spectrum requirements of the different services while best serving the public interest. In the *NPRM*, we tentatively concluded that the proposed band redesignation plans ensure continued development of terrestrial fixed service and FSS in the 18 GHz band and efficient use of this spectrum.[35]

19. Primary Proposal. The *18 GHz NPRM* proposed the following band plan:



20. As shown above, the Commission proposed in the *NPRM* to designate to terrestrial fixed service 600 *MHz* of spectrum for primary use at 17.7-18.3 GHz. The Commission also proposed designation for the terrestrial fixed service of 650 *MHz* of spectrum for co-primary use at 18.55-18.8 GHz (with GSO/FSS) and 19.3-19.7 GHz (with MSS/FL).[37] The Commission further proposed to designate to GSO/FSS 250 *MHz* of spectrum at 18.3-18.55 for primary use

[35] *See 18 GHz NPRM* at ¶ 24.

[36] We proposed that, effective April 1, 2007, the 17.3-17.8 GHz frequency segment be designated for co-primary use by both terrestrial fixed service operations and BSS downlink use.

[37] *See 18 GHz NRPM* ¶ 30. We tentatively concluded that this 1250 MHz of primary use spectrum could accommodate the needs of terrestrial fixed services. We noted that the 17.7-18.3 GHz band could be used to accommodate CARS, terrestrial fixed video operators, and broadcast auxiliary services. Moreover, we noted that this spectrum, along with the 650 MHz of co-primary spectrum, should allow for the creation and implementation of a new channelization plan for terrestrial fixed services operating in the 18 GHz frequency band. *See id.* ¶ 31.

and an additional 250 *MHz* of spectrum for co-primary use at 18.55-18.8.[38] The Commission also proposed to designate 500 *MHz* of spectrum at 18.8-19.3 GHz for primary use by NGSO/FSS.[39] Finally, the *NPRM* proposed that MSS/FL would retain the 400 *MHz* of spectrum at 19.3-19.7 on a co-primary basis.[40]

21. Although most of the commenters supported our tentative conclusion that redesignation of the 18 GHz band into dedicated sub-bands is generally desirable, few commenters supported our primary proposal. The terrestrial fixed service industry generally argued that the primary proposal significantly reduced the spectrum available to their services and threatened their continued viability.[41] The FSS commenters argued that the proposed band plan failed to provide the necessary 1000 *MHz* of unencumbered, primary spectrum.[42] We fully discuss the primary proposal in our adoption of the final band plan below. We first, however, discuss the modified proposals put forth in the *18 GHz NPRM*.

22. Alternative Proposal. Along with the primary proposal, we requested that interested parties comment on the desirability of modifying our primary proposal by designating an additional 100 *MHz* at 18.3-18.4 GHz to be shared by terrestrial fixed service and GSO/FSS on a co-primary basis.[43] We stated that such a designation would give terrestrial fixed service 700

[38] *See id.* ¶ 30. We stated that the primary proposal's designation of this 500 MHz of spectrum to GSO/FSS, in addition to the 500 MHz of spectrum currently already allocated to GSO/FSS on a primary basis at 19.7-20.2 GHz, would provide GSO/FSS with 1000 MHz of downlink spectrum. We tentatively concluded that these designations would adequately accommodate the needs of GSO/FSS Ka-band satellite service. *See id.* ¶ 32.

[39] *See id.* ¶ 30. We tentatively concluded that this 500 MHz should satisfy NGSO/FSS spectrum requirements. *See id.* ¶ 32.

[40] *See id.* ¶ 30. We tentatively concluded that co-primary sharing in this band between MSS/FL and terrestrial fixed service operations should continue because of the limited number of MSS/FL earth stations expected to be deployed. *See id.* ¶ 32.

[41] *See, e.g.*, Comments of Tadiran Microwave Networks at attachment ("This *NPRM* SIGNIFICANTLY reduces the frequencies available to the FS, continuing the trend of erosion of FS spectrum by the Commission over the last several years"); TIA-Fixed Section Comments at 2-3. TIA-Fixed Section contends that the primary proposal reduces fixed service spectrum by 53.3%. It also points out that the remaining 46.7% must be shared between fixed service point-to-point services with fixed service point-to-multipoint service, and coordination between these service would be difficult, thus reducing the spectrum further. *See id.*; Comments of the Fixed Wireless Communications Coalition at 3-4 (arguing that our primary proposal reduces terrestrial fixed service use of the 18 GHz band by 53.3%, and that the inability of terrestrial fixed point-to-point licensees to coordinate effectively with terrestrial point-to-multipoint systems to avoid interference would reduce available spectrum for terrestrial fixed service users) (FWCC Comments).

[42] *See, e.g.*, Comments of GE American Communications, Inc. at 4-9 (arguing that the primary proposal "would reduce the amount of downlink spectrum realistically available to GSO/FSS systems to less than 1000 MHz") (GE Americom Comments); Comments of Hughes Electronics, Inc., at 2, 4-8 (stating that while Hughes supports band segmentation, GSO/FSS satellite systems require access to, at a minimum, 1000 MHz of primary spectrum) (Hughes Comments); Comments of PanAmSat Corporation at 2-4 (PanAmSat Comments). PanAmSat, however, recognizes that "it may be difficult to develop a band plan that both designates 1000 MHz for primary use by GSO/FSS and satisfies all other licenses." *Id.*

[43] *See 18 GHz NPRM* at ¶ 35.

MHz of contiguous spectrum (17.7-18.4), possibly making it easier to design a more flexible channelization plan for terrestrial fixed service.

23. Most of the comments addressing this modified proposal argue against its adoption. The Spectrum & Orbit Utilization Section of the Satellite Communications Division of the Telecommunications Industry Association (TIA-SOUS) argues that the Commission should reject this proposal because it goes against the basic premise of this proceeding.[44] TIA-SOUS cites consensus among terrestrial fixed service, FSS, and the Commission to support the assertion that sharing is not feasible. Loral Space & Communications Ltd. ("Loral") also strongly opposes designating an additional 100 *MHz* of spectrum in the 18.3-18.4 GHz band.[45] SBC Communications Inc. ("SBC") argues that an additional 100 MHz of spectrum may provide relief for terrestrial fixed service; SBC, however, does not sufficiently support how this would be the case.[46] We agree with the assessment of both TIA-SOUS and Loral, that adding an additional 100 MHz of co-primary spectrum to terrestrial fixed service in the 18.3-18.4 GHz segment would frustrate the desire to separate terrestrial fixed service from ubiquitously deployed satellite earth stations.[47] This designation under the modified proposal is moot, however, considering our decision to designate the entire 280 MHz of spectrum at 18.3-18.58 GHz to be shared among terrestrial fixed service and non-blanket-licensed GSO/FSS, on a co-primary basis.[48] Therefore, we reject our modified proposal that would have designated an additional 100 MHz of spectrum on a co-primary basis to terrestrial fixed service and GSO/FSS in the 18.3-18.4 GHz band.

24. The *18 GHz NPRM* also sought comment on designating the entire 17.7-18.8 GHz band to be shared on a co-primary basis by terrestrial fixed service and GSO/FSS.[49] We proposed this band plan on the assumption that it may be possible for GSO/FSS to use gateway type terminals throughout the 17.7-18.8 GHz band, allowing for continued sharing.

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[44] *See* Comments of Spectrum & Orbit Utilization Section of the Satellite Communications Division of the Telecommunications Industry Association at 2-3 (TIA-SOUS Comments).

[45] *See* Comments of Loral Space & Communications Ltd. at 3-4 (Loral Comments). Loral's objection to this modified proposal, like that of TIA-SOUS, is based on the belief that sharing between the services is not feasible. Loral states that "[t]his proposal fundamentally conflicts with the Commission's observations that FS/FSS sharing is not feasible in these bands." *Id.* at 4.

[46] *See* Comments of SBC Communications, Inc. at 6-7 (SBC Comments). SBC makes an unsupported, general statement that the additional 100 MHz would help terrestrial fixed services.

[47] Under our primary proposal, the 18.3-18.55 GHz band would house ubiquitous blanket-licensed satellite earth stations; thus, under this modified proposal, these FSS systems would have to share the 18.3-18.4 GHz band with terrestrial fixed service. This proposal would therefore reduce the amount of spectrum that could be blanket licensed for the FSS.

[48] *See infra.*

[49] *See 18 GHz NPRM* at ¶ 36. We asked whether continued sharing in this segment of the 18 GHz band would better meet the needs of GSO/FSS and terrestrial fixed service licensees.

25. Although none of the commenters directly supported this band plan or our assumptions about the use of gateways throughout the 17.7-18.8 GHz band, Comsearch articulated a similar sharing proposal. Specifically, Comsearch proposed that the Commission allocate the 17.7-18.55 GHz band on a co-primary basis to GSO/FSS and terrestrial fixed service.[50] Comsearch argued that maintaining a co-primary designation in the 17.7-18.55 GHz band allows for the continued viability of those systems currently utilizing the existing 1560 MHz frequency separation for wideband two-way terrestrial fixed service operations and Cable Television Relay Service ("CARS") or Private Cable 6 MHz channels.[51]

26. Airtouch argues that the Comsearch proposal is unacceptable because it requires terrestrial operations to lose the only primary allocation to terrestrial fixed services provided by the Commission in our primary proposal.[52] Airtouch correctly points out that if adopted, the Comsearch proposal would result in the loss of access to 750 MHz of previously co-primary spectrum for terrestrial fixed service operations, with no primary designation for FS.[53] FWCC also rejects the proposal put forth by Comsearch.[54] FWCC argues that the co-primary allocation at 17.7-18.55 GHz proves to be a serious defect in Comsearch's proposed band plan because the record in this proceeding generally reflects the notion that terrestrial fixed service operations cannot share spectrum with ubiquitously deployed GSO/FSS earth stations. In fact, Comsearch admits this much to be true.[55] We agree with Airtouch and FWCC. Mandating terrestrial fixed service operations to continue to share the entire 17.7-18.55 GHz band, as proposed by Comsearch, is inequitable, as it allows FSS systems full use of the band while taking 750 MHz of co-primary spectrum from the terrestrial fixed service. We also have concerns about the feasibility of sharing between the services in parts of this band. The record clearly reflects that sharing between ubiquitously deployed satellite earth stations and terrestrial fixed service is not technically or operationally feasible because fixed stations would constrain the locations at which earth stations could be successfully operated; thus, under the Comsearch proposal, satellite

[50] *See* Comsearch Comments, at 4.

[51] *See id.* at 4-5. Comsearch further contends that this allocation provides alternative spectrum for displaced narrowband split channels operating on a 5 MHz bandwidth. *See id.* The current frequency separation provisions for CARS use in the 18 GHz band can be found at 47 C.F.R. § 78.18 (4). Other terrestrial fixed service systems operate according to a channeling plan defined in the Commission's Rules. *See* 47 C.F.R. §§ 74.402, 78.18, 101.147.

[52] *See* Reply Comments of Airtouch Communications, Inc. at 10-11 (Airtouch Reply Comments). Airtouch also contends that "[s]hared use of spectrum will significantly degrade the ability of terrestrial fixed service users to deploy new systems and provide important services." *Id.* at 8. "Accordingly, Comsearch's proposal fails to serve the public interest and should be rejected." *Id.*

[53] *See id.* at 10-11. Airtouch notes that, under the Comsearch proposal, FSS operations maintain the full 2000 MHz of spectrum in the 18 GHz band, of which 750 MHz is a primary designation, while terrestrial services would have no unshared primary spectrum.

[54] *See* Fixed Wireless Communications Coalition Reply Comments at 6 (FWCC Reply Comments).

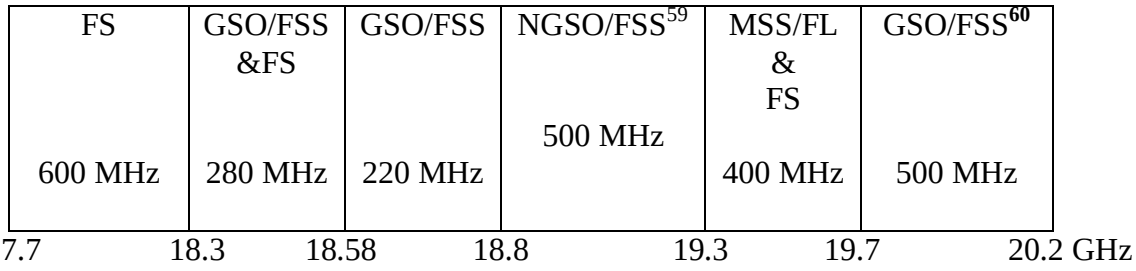
[55] *See* Comsearch Comments at 6 (stating that they "agree with the Commission's tentative conclusion that sharing between ubiquitously deployed earth stations and terrestrial fixed microwave is impractical"). Comsearch, however, proposed that FSS use in this band would be non-ubiquitous. *See id.* at 5. Comsearch recommends that service rules be implemented to solve any possible sharing problems that would result from its proposal. *See id.* at 7-8.

users would not be able to use this band for blanket-licensed earth stations.[56] For the aforementioned reasons, and due to insufficient support in the record for either our modified proposal or the Comsearch proposal, we reject both proposals to maintain a co-primary allocation for FSS and terrestrial fixed service in the 17.7-18.8 GHz band as inconsistent with the public interest.

27. Finally, we requested comment on the feasibility of retaining our current band plan, which would provide for continued sharing in the entire 17.7-19.7 band.[57] As previously stated, the overwhelming majority of commenters believe that segmenting the 18 GHz band between terrestrial fixed service and FSS operations is necessary.[58] We agree with the wealth of commenters that supported segmentation and for the reasons stated above we reject this proposal.

2. Adopted Band Plan

28. This *Report and Order* adopts the following band plan and amends the Table of Frequency Allocations accordingly:



Under the band plan the Commission is adopting, 600 MHz at 17.7-18.3 GHz is designated for primary use by terrestrial fixed service operations and 680 MHz of co-primary spectrum from the 18.3-18.58 GHz band (with GSO/FSS) and 19.3-19.7 GHz band (with MSS/FL), for a total of 1280 MHz of available spectrum for FS. We designate 220 MHz to GSO/FSS for primary use in the 18.58-18.8 GHz band, and 280 MHz for co-primary use in the 18.3-18.58 GHz band (with terrestrial fixed service), for a total of 500 MHz of available spectrum for GSO/FSS.[61] We designate 500 MHz of primary spectrum to NGSO/FSS at 18.8-19.3 GHz. Finally, we retain the allocation of 400 MHz of spectrum at 19.3-19.7 GHz to MSS/FL on a co-primary basis (with terrestrial fixed service). We further note that NTIA has stated that the Government currently

[56] *See* ICTA Comments.

[57] *See 18 GHz NPRM* ¶ 38.

[58] *See supra* notes 8-9 and accompanying text.

[59] Low power point-to-multipoint terrestrial fixed systems may continue to be licensed and operate on a co-primary basis with NGSO/FSS in the 18.82-18.87 GHz and 19.16-19.21 GHz bands.

[60] We show the band 19.7-20.2 GHz in this spectrum table merely to illustrate the total spectrum available to the GSO/FSS.

[61] GSO/FSS licensees also have 500 megahertz of primary downlink spectrum at 19.7-20.2 GHz.

operates both GSO and NGSO satellite networks in the band 17.8-20.2 GHz and that they plan for these operations to continue in this band indefinitely.[62]

29. The band plan we adopt today differs from the primary proposal articulated in the *18 GHz NPRM* in several ways intended to address the concerns expressed in the record. First, to ensure the continued viability of many existing terrestrial systems, we upgrade the secondary allocation proposed for terrestrial fixed service in the 18.3-18.58 GHz band to co-primary status. Thus, the CARS, PCO and other services now using a contiguous block of spectrum in the 18.14-18.58 GHz band will continue to be able to use this spectrum without dividing their operations into two band segments, as proposed in the *NPRM*. Second, to further the needs of GSO/FSS licensees in the 18 GHz band, we eliminate the co-primary allocation to terrestrial fixed service in the 18.58-18.8 GHz band, resulting in a primary, albeit smaller, designation for GSO/FSS in this band segment. Finally, we decline to allow new secondary operations on a non-interference basis, by either the terrestrial fixed service or the FSS, throughout the 17.7-19.7 GHz band, as discussed further below.

30. A review of the record leads us to conclude that this redesignated band plan results in an equitable and balanced approach to meeting the needs of the various existing and future operations in the 18 GHz band. We recognize that the adopted band plan does not provide a full 1000 Megahertz of unshared Ka-band downlink spectrum for GSO/FSS operations, as has been requested by many GSO/FSS licensees. Nevertheless, we believe that the 720 MHz of unshared downlink spectrum at 18.58-18.8 GHz and 19.7-20.2, plus the flexible rules that permit sharing of 280 megahertz at 18.3-18.58 GHz, should provide a reasonable basis for GSO/FSS operations to be undertaken. While we realize the some GSO/FSS systems have already been designed, we expect that the current system designs of the GSO/FSS systems can proceed with some modification or that sharing agreements can be reached to permit the use of these designs. Moreover, we note that the same total capacity for GSO/FSS services is still available in locations where coordination can be achieved. We conclude that this plan will, through the judicious choice of band segments subject to co-primary sharing, significantly lower any consequential administrative costs of coordination. Furthermore, this plan goes a long way toward facilitating the deployment of new services by designating different dedicated sub-bands for ubiquitously deployed FSS earth stations and nearly ubiquitous terrestrial fixed services in the 18 GHz band, thereby serving the public interest.[63] A brief discussion on the designation of each band follows.

[62] See letter from William T. Hatch of the NTIA to to Dale M. Hatfield of the FCC, dated March 29, 2000.

[63] Throughout the 18 GHz band there are a number of existing terrestrial fixed service channelization plans. These channelization plans include paired channels that can be used for either expanded one-way or two-way communications. While not modifying any of these channelization plans at this time, the revised band designations have been designed to have a minimal impact on the existing channel structure, in order to balance the spectrum requirements of existing operations and the requirements of new and innovative services. Although we could adopt revised channelization plans consistent with the redesignations adopted in this *Report and Order*, we choose not to do so at the present time, preferring instead to continue to monitor implementation developments in the 17.7-19.7 GHz band.

31. 17.7-18.3 GHz Frequency Band. We designate the 17.7-18.3 GHz frequency band to terrestrial fixed service for primary use. Prior to this rulemaking, this segment of the 18 GHz band was designated for shared co-primary use between GSO/FSS and terrestrial fixed service operations. Currently, the 17.7-18.3 GHz band is used for a wide variety of common carrier, mass media, and private fixed terrestrial point-to-point or point-to-multipoint services, as described in Parts 74, 78 and 101 of the Commission's Rules. In designating the 17.7-18.3 GHz band for primary use by terrestrial fixed service operators, we recognize that this is an important segment of the 18 GHz band for existing and future terrestrial fixed service operations. We achieve our stated goal of ensuring the continued viability of the terrestrial fixed service by avoiding any future interference from space stations and the need to relocate stations to protect future earth stations. The redesignation of this band to primary status will also generally facilitate the relocation of terrestrial fixed service operations from other parts of the 17.7-19.7 MHz or other frequency bands by eliminating the need for coordination with satellite earth stations. It will also facilitate the deployment of new terrestrial fixed stations by eliminating coordination requirements between the fixed and fixed satellite services, thereby lowering transaction costs for terrestrial fixed operators.

32. Commenters generally agreed that this part of the spectrum should be allocated to terrestrial fixed service on a primary basis. ABC, Inc. was especially supportive of this designation in stating that the allocation "properly recognizes the importance of existing terrestrial fixed service operations."[64] Other commenters either expressly requested a primary designation to terrestrial fixed service in the 17.7-18.3 GHz band or implicitly did so by failing to suggest that we modify this portion of the band while specifically requesting that we change other segments of the 18 GHz band.[65]

33. Comsearch and Hughes request that we designate portions of the 17.7-18.3 GHz band for services other than terrestrial fixed service on a primary basis.[66] Comsearch's proposal would make no change from the current service designations and Hughes' proposal would redesignate spectrum currently used for several types of fixed service, including PCO's operating in the 18.14-18.58 GHz band. We reject both proposals in part, noting that a primary designation to the fixed service below 18.3 GHz is necessary to ensure that terrestrial fixed stations, including those 18 GHz stations that may be required to relocate pursuant to this *Report and*

[64] Comments of ABC, Inc. at 2 (ABC Comments).

[65] *See* Comments of Pegasus Development Corp. at 4-7 (proposing two alternative band plans to our primary proposal, both of which expressly propose to designate the 17.7-18.3 GHz segment to terrestrial fixed service for primary use) (Pegasus Comments); Comments of Tadiran Microwave Networks at 3 (requesting that the Commission designate spectrum, including the 17.3-18.3 GHz band, for primary use by terrestrial fixed service operators); TIA-Fixed Section Comments at 12 (urging the Commission to designate the 17.7-18.58 GHz segment to terrestrial fixed service on a primary basis); TIA-SOUS Comments at 4 ("The 17.7-18.3 GHz portion of the Ka-band should be designated FS point-to-point links").

[66] *See* Comsearch Comments at 4 (asking that the Commission adopt a band plan that retains a co-primary status in the 17.7-18.55 GHz band for terrestrial fixed service and GSO/FSS shared use); Hughes Reply Comments at 7-11 (proposing that we adopt a band plan that designates the 17.8-18.6 GHz band to terrestrial fixed service on a primary basis and thus grant primary status to GSO/FSS in the 18.1-18.6GHz segment). Their proposal overlaps the band under discussion in this section of this *Report and Order*.

Order, will have access to a sufficient amount of spectrum. The Hughes proposal fails to recognize the increasing demand the terrestrial fixed service will place upon this part of the spectrum as well as the vast numbers of wideband CARS, PCO and other services already operating in the 18.14-18.58 GHz band. We believe that this portion of the 18 GHz band is vital to the success of fixed station relocation efforts and the continued viability of wireless cable providers that provide direct competition to traditional cable operators. Furthermore, we have previously recognized that there is currently no other spectrum available either in the 18 GHz band or any other band at the present time to accommodate adequately existing or future PCO operations needed to meet consumer demand.[67] For these reasons, we designate the 17.7-18.3 GHz band for primary terrestrial fixed use and reject Comsearch and Hughes' proposals to designate portions of the 17.7-18.3 band to anything other than terrestrial fixed service on a primary basis. .

34. 18.3-18.58 GHz and 18.58-18.8 GHz Frequency Bands. We designate the 18.3-18.58 GHz frequency band for co-primary shared use by terrestrial fixed service and GSO/FSS operations. In revising our band plan as discussed above, we decline to adopt the portion of our *18 GHz NPRM* proposal that would designate 250 MHz of spectrum at 18.3-18.55 GHz to GSO/FSS on a primary basis. We conclude that the proposal would place in jeopardy the viability of the extremely large number of fixed stations, CARS, wireless PCOs and other links[68] operating in this band. We also conclude that GSO/FSS licensees would have a difficult time implementing ubiquitous earth stations in this segment due to the large number of terrestrial fixed services currently operating in this band.[69] To help meet the spectrum needs of GSO/FSS, we designate the 220 MHz of spectrum at 18.58-18.8 GHz for primary use by GSO/FSS. In adopting this redesignation, we eliminate the co-primary terrestrial fixed service allocation present before this *Report and Order* and proposed in the *18 GHz NPRM*. We revisit the designation as put forth in our primary proposal as a result of compelling arguments from some of the commenters from both the terrestrial fixed service industry and the FSS industry, as discussed below.

35. In addressing the portion of our *18 GHz NPRM* primary proposal that designated the 18.3-18.55 GHz band to GSO/FSS on a primary basis, ICTA argued this designation would cause CARS and PCOs to lose the 440 MHz of contiguous spectrum currently being employed to

[67] *See 18 GHz Relief Order, supra.* We note that the Commission is currently considering in a pending rulemaking whether to open the 12 GHz band to PCOs and multichannel video program distributors (MVPD). *See* Petition for Rulemaking to Amend Eligibility Requirements in Part 78 Regarding 12 GHz Cable Television Relay Service, *Notice of Proposed Rulemaking*, CSB Doc. No. 99-250, (1999). Nothing in this *Report and Order* is intended to prejudge that rulemaking.

[68] While definitions of "link" may vary, we define a link as one point-to-point or point–to-multi-point channel, as specified in one of our applicable channelization plans. Using that definition, there are approximately 170,000 fixed links in the 18.142-18.580 GHz band.

[69] ICTA contends that there are currently 2,400 PCO links in the 18.142-18.58 GHz band throughout the United States. ICTA notes that "[b]ecause the configuration of most private cable links follows a hub and spoke architecture where a single transmit site will serve multiple receive sites, each link creates its own exclusion zone (that can extend as far as 45 miles from the cable transmit site) where satellite receivers will be unable to operate." ICTA Comments at 14. ICTA further states that their systems would be virtually useless without the full block of bandwidth available. ICTA comments at 27.

serve subscribers.[70] If we were to designate the 18.3-18.55 GHz frequency band to GSO/FSS on a primary basis, cable operators would be unable to reasonably expand operations in this band to compete effectively with existing coaxial cable systems.[71] The detrimental effect on PCOs from such a loss of spectrum is increased by the fact that there is currently no other spectrum available for such systems. GE American Communications, Inc. (GE Americom), in arguing that GSO/FSS should be designated 500 MHz of spectrum in the 18.1-18.8 GHz range, also proposes that terrestrial services operating in these bands would be required to relocate.[72] GE Americom, however, fails to recognize that there is currently no other available spectrum for PCOs. TIA-Fixed Section argues that requiring these point-to-multipoint one way video distribution services to relocate to the contiguous allocation for terrestrial fixed service in the 17.7-18.3 band would not work. Specifically, TIA-Fixed Section contends that relocating Multi-channel Video Programming Distribution services (MVPDs) into the 17.7-18.3 GHz band would require that these services share spectrum with fixed point-to-point links, a proposition that in reality is "virtually impossible due to the coordination difficulties between these services in the metropolitan areas where these services both reside."[73] We agree. In fact, we have acknowledged that this difficulty in coordination is the primary reason that we have traditionally licensed point-to-multipoint operations and point-to-point terrestrial fixed service operations in separate portions of the 18 GHz band.[74]

36. Furthermore, as KaStar notes in its comments, designating the 18.3-18.55 GHz band to GSO/FSS on a primary basis would be unworkable for GSO/FSS as well. KaStar argues that GSO/FSS operators would have a difficult time deploying ubiquitous earth stations in this band because there are a large number of existing terrestrial fixed services that currently use this band

[70] *See* ICTA Comments at 6. As previously stated, CARS and PCOs use channels in the 18.142-18.58 GHz band.

[71] AESCO Systems, Inc. correctly notes that many coaxial cable systems have been upgraded to 550 MHz and 750 MHz systems, allowing those cable operators to offer consumers more channels. Eliminating the use of 280 MHz of contiguous spectrum, as proposed in the *18 GHz NPRM*'s primary proposal, would inhibit PCOs operating in the 18 GHz band from effectively competing with these upgraded coaxial cable systems. *See* Comments of AESCO Systems, Inc. at 3. The proposed plan to limit terrestrial fixed service in this band would have the effect of rendering these terrestrial services non-competitive with wired cable service, since the systems operate in a block conversion mode (using existing analog 6 MHz channels) and need to carry as many channels as possible. *See* ICTA comments Engineering Statement at 4. The remaining spectrum available to PCOs under our primary proposal equals 158 MHz (18.142-18.3 GHz band) plus another 30 MHz at 18.55-18.58. At 6 MHz per channel, this would equate to at most 31 channels, and that assumes that equipment can be designed to overcome the proposed spectrum separation (18.14-18.3 GHz and 18.55-18.8 GHz).

[72] *See* GE Americom Comments at 6-7.

[73] TIA-Fixed Section Comments at 2; *see also* Comments of RCN Telecom Services, Inc. at 7-9 (arguing that under our primary proposal, the primary allocation of the 17.7-18.3 GHz and co-primary allocation of the 18.55-18.8 GHz band do not provide viable alternatives for private video providers) (RCN Comments); ICTA Comments at 7 ("The assumption that the 17.7-18.3 GHz band provides a viable alternative for the private cable industry is fundamentally flawed").

[74] *See 18 GHz NPRM* ¶ 27.

in urban areas. [75] These existing services would be maintained under the rules we adopt today. PanAmSat concurs and states that if we conclude that 750 MHz of spectrum is sufficient to meet the spectrum needs of GSO/FSS, we should not designate the 18.3-18.55 GHz band to fulfill 250 MHz of those needs.[76] PanAmSat reasons that the reported wide deployment of CARS systems in that band would make it virtually impossible for the GSO/FSS industry to deploy ubiquitous small earth stations in the band, unless CARS systems were forced to relocate. Under the relocation rules we adopt today, such a mass relocation would prove costly to the GSO/FSS operators, possibly making it an unattractive band for such services and possibly slowing deployment of the advanced services such systems may bring to the public. We agree with this assessment of KaStar and PanAmSat. One of the goals of this proceeding is to limit the number of necessary, and possibly difficult, coordinations that must take place between ubiquitously deployed blanket licensed earth stations and terrestrial fixed service operations. We believe, however, that we should leave it to the satellite licensees to decide how the GSO/FSS service can best be deployed in shared bands, where only their stations are subject to interference. Furthermore, Teledesic argues that "both GSO FSS operators and FS operators would appear to benefit if the 250 MHz of GSO FSS 'gateway' spectrum ran from 18.3-18.55 GHz, rather than from 18.55-18.8 GHz."[77] Teledesic correctly states that terrestrial fixed services would benefit from the maintenance of 250 MHz of spectrum at 18.3-18.55 GHz, resulting in a larger contiguous block of spectrum than was proposed in the *NPRM*. Such a redesignation eliminates the possible need to relocate the numerous CARS and PCO operations currently using the 18.3-18.58 GHz band. It also affords PCOs the ability to maintain and upgrade their existing systems to compete effectively against franchised cable systems. In exchange for giving up primary status in the 18.3-18.55 GHz band, Teledesic proposes that we designate the 18.55-18.8 GHz band to GSO/FSS for primary status.[78] This "swap" of band allocations is supported by several of the commenters.[79]

37. Airtouch argues that foreclosing the fixed service in the 18.55-18.8 GHz band is acceptable, due, in part, to the fact that the NGSO/FSS primary allocation at 18.8-19.3 GHz will be rendered unusable for future CARS services because the fixed service channels in the 18.58-18.82 GHz band are paired with those in the 18.8-19.3 GHz band.[80] Specifically, the

[75] *See* KaStar Satellite Communications Corporation Comments at 7-8 (arguing that coordination in this band will be extremely difficult, "resulting in indefinite delays or, worse yet, the inability [of FSS operators] to utilize the spectrum in a meaningful way") (KaStar Comments).

[76] *See* PanAmSat Comments at 3.

[77] Teledesic Comments at 7.

[78] *See id.*

[79] *See, e.g.*, Airtouch Reply Comments at 5 (recommending that we "modify the band plan to allow terrestrial FS and Geostationary Orbit Fixed Satellite Service shared use of the 18.3-18.55 GHz band, in lieu of 18.55-18.8 GHz, in order to maintain, as closely as possible, current terrestrial uses of the 18 GHz band); KaStar Comments at 7-10 (urging the Commission to modify the band plan by "[d]esignat[ing] 250 MHz from 18.3-18.55 GHz for GSO FSS and FS use on a co-primary basis; [and] [d]esignat[ing] 250 MHz from 18.55-18.8 GHz for GSO FSS use on a primary basis"); Lockheed Comments at 3-5; TIA-Fixed Section Comments at 3-4 (requesting that we modify our band plan to give terrestrial fixed service co-primary status in the 18.3-18.58 GHz band and a primary allocation to GSO/FSS at 18.58-18.8 GHz).

narrowband allocation at 18.58-18.82 GHz is paired for go/return use with the 18.92-19.16 GHz band, a band that, pursuant to this *Report and Order* is now designated for NGSO/FSS operations on a primary basis. AT&T Wireless similarly states that "[I]f the Commission reallocates the upper half of this go/return frequency band to secondary status, it eliminates the pairing capability and effectively eliminates the ability of fixed terrestrial service providers to use the lower half as well."[81]

38. For this reason, inter alia, we see no need to maintain the co-primary status for terrestrial fixed services in the 18.58-18.8 GHz band. Although this eliminates many, if not all, of the narrowband channels for terrestrial fixed services, we note that permitting continued operation on a short-term basis[82] and rechannelization and relocation on a long-term basis should provide for the continued viability of these services. We discuss the issue of secondary designation later in this *Report and Order.*

39. Lockheed observes that we based our proposal to designate the 18.55-18.8 GHz band for co-primary use by GSO/FSS and terrestrial fixed service on two factors. First, we noted that Lockheed and other GSO/FSS licensees planned to operate gateway earth stations utilizing large antennas that would allow sharing with terrestrial fixed service operations to continue; and second, we stated that the strict pfd limit applicable in the 18.6-18.8 GHz band to protect Earth Exploration-Satellite Service (EESS) and SR services would require the use of higher gain antennas, making sharing a possibility.[83] Since the release of the *18 GHz NPRM*, however, Lockheed modified its initial application and in the Astrolink-Phase II™ System application expresses its intention to employ ubiquitously deployed small user terminals in the 18 GHz band.[84] Furthermore, Lockheed notes that "the strict p.f.d. limit applicable to FSS operations in the 18.6-18.8 GHz band is under review within the United States and the ITU, and Lockheed Martin understands that it may become less stringent pursuant to an agreement reached among GSO FSS operators, the EESS community, and the U.S. government."[85]

40. Both Bellsouth and TIA-Fixed Section argue that, should we designate the 18.3-18.55 GHz band for co-primary use by GSO/FSS and terrestrial fixed services, we should consider

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[80] *See* Airtouch Comments at 8.

[81] Comments of AT&T Wireless Services, Inc. at 3. By "lower half," we believe they are referring to paired channels in the 18.5-18.8 GHz band.

[82] *See* discussion of continued co-primary use by existing fixed stations infra.

[83] *See 18 GHz NPRM* ¶ 32.

[84] *See* Lockheed Martin Corporation Application for Authority to Modify its Authorization for a Global Ka-band Satellite Communications System in Geostationary Orbit, File No. 35-SAT-MP/ML-98, 2, 9 (filed Dec. 22, 1997); Lockheed Martin Corporation Application for a Global Ka-band Satellite Communications System in Geostationary Orbit, File Nos. 39 through 43-SAT-P/LA-98, 37 (filed Dec.22, 1998). We note that this system proposes to use 125 MHz channels extending down to 18.55 GHz, which would require coordination with the FS if we were to extend the co-primary FS allocation by 30 MHz up to 18.58 GHz.

[85] *See* Lockheed applications, note 91, and ITU-R Document WP-4A/29, *Proposed Recommendation to Change the Power-flux Density Limits in the 18.6 GHz-18.8 GHz Band* (1998). We note that this recommendation was adopted at the World Radio Conference 2000 (WRC-2000) and will become effective internationally on January 1, 2002.

extending that designation 30 MHz to 18.58 GHz to maintain all of the available channels for CARS, PCO, and other MVPD use.[86] Bellsouth states that "[while] MVPDs would retain co-primary status in the 18.3-18.5 GHz portion, and would face somewhat fewer interference concerns, the 18.5-18.58 GHz band would still be lost to MVPDs under this alternative. Such a result is untenable."[87] We agree. Multichannel video operators in the 18.142-18.58 GHz band are typically licensed for the full 440 megahertz of bandwidth and have the capability to provide 72 channels of video programming to all of their customers. These systems continue to require this capacity if they are to remain competitive with traditional cable systems and DBS. Additionally, when these systems eventually begin a transition to digital technologies, they will require the flexibility provided by this full bandwidth to make that transition with minimal impact on analog subscribers. Because these systems are providing essentially a "consumer" service, the transition to digital technologies will have to be phased in over time, requiring access to the full spectrum for some significant time into the future. Prior to and during this transition, existing multichannel video operators contend they require the ability to provide the full menu of programming if they are to be able to build their customer base and remain competitive with other providers of multi-channel video services. While the expansion of the band shared by terrestrial fixed and GSO/FSS systems from 18.3-18.55 GHz to 18.3-18.58 GHz will impose additional operational or design constraints on the licensees of GSO/FSS systems operating in the 18.3-18.58 GHz band, we believe that opportunities exist for the operators of FSS and terrestrial systems to reach private commercial agreements that will allow each service to meet its needs.[88] We encourage such private agreements as the best method to accurately balance the various commercial interests in these bands. We find that ensuring the continued viability of the competitive multi-channel video systems in this portion of the spectrum necessitates providing for shared use of the spectrum up to 18.58 GHz. Furthermore, we believe that a commercial approach to resolving sharing in the 18.55-18.58 GHz band may allow for more innovative, spectrally-efficient solutions to be employed than would be possible if we provided sole primary access to this band to either the terrestrial fixed or GSO/FSS services.

41. In consideration of the above comments and industry agreement as noted *infra*, we conclude the following: (1) PCOs using the 18 GHz band, for both current and future operations, will not be able to compete effectively against franchised cable operators if we redesignate the 18.3-18.55 GHz band for primary use by GSO/FSS operations; (2) GSO/FSS will be unable to effectively blanket license ubiquitously deployed earth stations in the 18.3-18.55 GHz band due to the large numbers of CARS and PCO operations currently using this band, especially in metropolitan areas; (3) relocation of CARS and PCO operations from the 18.3-18.55 GHz band, pursuant to the relocation procedures adopted in this *Report and Order*, would prove costly to GSO/FSS operators entering the band due to the vast number of terrestrial operations in this band, possibly slowing deployment of satellite systems in the band; (4) GSO/FSS will be unable

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[86] *See* BellSouth Reply Comments at 7; TIA-Fixed Section Comments at 3-4.

[87] Bellsouth Reply Comments at 7.

[88] For example, PCOs might be willing to relinquish their operating rights within the 18.55-18.58 GHz band if the GSO/FSS operator provided 30 MHz of satellite programming directly to each PCO receiving site. Another option might be for the GSO/FSS operator to help PCO operators install new equipment that is more spectrally efficient.

to use spectrum in the 18.6-18.8 GHz band for ubiquitously deployed satellite earth stations if the pfd limits that exist in this band are not relaxed. We note, in this regard, that the U.S. made a proposal to the WRC-2000 that would establish a world-wide primary allocation to the Earth Exploration-Satellite Service (EESS) service in the 18.6-18.8 GHz band, as well as a relaxed pfd limit in the 18.6-18.8 GHz band of -95 (dBW/m^2) across the 18.6-18.8 GHz band for all angles of arrival. This proposal, which was adopted by WRC-2000, balances the need for a world-wide primary allocation for the EESS with the need for a more workable FSS pfd limit. Recognizing that the relaxed pfd limit would benefit FSS operators in the 18.6-18.8 GHz band, and after coordination with NTIA, we hereby adopt the WRC-2000 relaxed pfd limit within new section 25.208 (e) and appropriately modify FN US 255 of Section 2.106 of the Commission's Rules. Future use of narrowband terrestrial fixed service operations in the 18.55-18.8 GHz band, specifically the 18.58-18.82 GHz band, will be unavailable due to the inability to access its paired spectrum at 18.92-19.16 GHz.[89] Finally, we conclude that the public interest is best served by designating the 18.3-18.58 GHz band for co-primary use by the terrestrial fixed service operations and GSO/FSS, and the 18.58-18.8 GHz band to GSO/FSS on a primary basis.

42. Further, we note that there is evidence in the record that a Joint Working Group, consisting of members of the FSS and terrestrial fixed service industries, worked "to define allocations to produce an (FS-Free) 250 MHz band for GSO/FSS use by swapping the FS services out of the 18.55-18.8 GHz band and moving the GSO/FSS primary assignment from 18.3-18.55 GHz to the free band."[90] This effort is consistent with our decision, but does not exactly mirror it. Therefore, we modify our *18 GHz NPRM* designation plan and designate 280 MHz of co-primary spectrum to terrestrial fixed service operations and GSO/FSS in the 18.3-18.58 GHz segment, and 220 MHz of primary spectrum at 18.58-18.8 GHz to GSO/FSS.

43. Additionally, we note that co-frequency sharing requires two modes of sharing: FSS space station with terrestrial fixed service and terrestrial fixed service with FSS earth stations. Currently, FSS space stations do not coordinate with terrestrial fixed service stations. The space stations must operate below a specified pfd limit that was designed to protect the fixed service. Because the record of this proceeding has established that such interference is nevertheless possible in certain circumstances, we need to ensure that interference to existing terrestrial fixed station receivers will not occur if the FS receivers are pointed at the FSS satellite.[91]

44. We recognize that there may be existing terrestrial fixed service links that have receiving antennas physically pointed toward the arc of the sky comprising the geostationary

[89] While we note this loss of narrowband channel pairs due to our redesignations, we expect that such losses could be recouped by the development of new narrowband channelizations, which could be overlaid within the remaining Fixed Service designations. FWCC made such a proposal in its comments at 5.

[90] Comments of Capital Broadcasting Co., Inc., *et al.* at 3.

[91] *See* CTIA Comments at 5 ("Unacceptable interference is likely to occur when microwave fixed services and satellite services operate in the same frequency bands, regardless of whether satellite co-primary operations are expected to be ubiquitously or non-ubiquitously deployed"); ICTA Comments at Appendix (noting that some existing terrestrial fixed systems will receive harmful interference from GSO/FSS systems because they point at the orbit).

satellite[92] orbit and therefore may be subject to interference from new GSO/FSS operations. These co-primary terrestrial links enjoy primary status in the frequency they occupy due to the "first-come, first-served" principle. Because terrestrial fixed services operating in the 18.3-18.8 GHz band were first to occupy this co-primary spectrum and there are currently no antenna pointing restrictions, they are recognized to have a right to point at the geostationary satellite orbit.[93] Maintaining such a right would result in the failure of sharing in the band, once the satellite systems actually begin operation. Therefore, another approach is needed. At the same time, we note that, subsequent to the adoption of this *Report and Order*, if future fixed station receivers in the band 18.3-18.58 GHz point at the geostationary-satellite orbit, they do so at their own risk, because this *Report and Order* clearly states that interference from space stations under such circumstances would be possible. We first address space-to-Earth sharing to establish the specific conditions for these relationships.

45. We conclude that the conditions for ensuring successful space-to-Earth sharing between the terrestrial fixed service and the GSO/FSS may not be present if any new terrestrial fixed service link receivers are pointed within 2 degrees of the geostationary satellite orbit.[94] If such receivers are pointed more than 2 degrees away from that Orbit, such pointing generally will provide approximately 18 dB of isolation, which should result in protection from space-borne interference. The potential for existing fixed links to be interfered with will be determined according to the following standard: we will consider any receiving existing terrestrial fixed stations pointed within 2 degrees of the orbit to be subject potentially to interference, and therefore establish this condition as a space station coordination trigger.[95] We see this licensee-based process as taking place in two phases: first, an evaluation of the actual potential for interference would be performed and the results considered by both the fixed station and the FSS station licensees; second, a method of resolution would be agreed upon and implemented.

46. Thus, we establish a coordination process referenced to a "Legacy List" of such terrestrial fixed service stations.[96] The appropriate GSO/FSS station licensee (the one towards

[92] This arc is from horizon to horizon, reaching its highest elevation angle for positions in the geostationary orbit at the longitudinal position of the observer.

[93] In the case of Fixed Stations in the 18.58-18.8 GHz band, the right to interference protection does not extend beyond the applicable period of continued co-primary status.

[94] While we do not require such pointing, we emphasize that such designs are to be undertaken at the fixed station licensee's own risk, and future space stations will not be subject to any additional coordination requirements. We limit the protection of such future receivers to the requirement for the space station pfd to meet the limits specified in § 25.208.

[95] Considering the nature of the fixed service deployment in these bands, we believe that the actual number of fixed service receive antennas that will be pointing within 2 degrees of the usable portion of the geostationary-satellite orbit will be quite small, with a correspondingly small impact on fixed-satellite service licensees.

[96] We refer to existing terrestrial fixed services licensed in the 18.3-18.8 GHz band with receivers that point within two degrees of the GSO as "Legacy Systems." All such existing systems must be protected from interference during the applicable period of continued co-primary status, including those operating in the 18.58-18.8 GHz band. Only after the end of the applicable period of continued co-primary status would the protection of Legacy Systems be limited to the 18.3-18.58 GHz band. This means that any satellite system implementations during the applicable

which the FS station is pointed) would be responsible for paying any associated modification costs.[97] We recognize that determining which terrestrial fixed service stations point at the orbit may be difficult, and that, because information may be unreliable, using the currently specified location and relative height of send-and-receive locations may not provide accurate results.[98]

47. We recognize that the development of an accurate Legacy List will be critical to the success of FS/FSS coordination efforts, and that such a list can be developed with reference to a database containing the geographic location and relative height of the FS send and receive antennas. While we recognize that such information is currently available in the Commission's Database, this is the first time we expect the information to be used to establish FS receiver pointing for coordination purposes. Therefore, we provide in this *Report and* Order the opportunity for existing FS licensees in the 18.3-18.8 GHz band to update their location and height parameters and to inform the Commission in such cases where their receive sites in this shared band point within two degrees of the GSO and at which position.[99] This update will not be considered a modification of fixed service facilities, although the compatibility of the "new" location will need to be assessed by interested parties.

48. We are equally concerned about ensuring successful sharing between FSS receiving earth stations and transmitting FS stations. Noting that such earth stations would transmit in the 28/29 GHz band and would need to be coordinated in that band, a common location would, of course, also be used for the reception of GSO/FSS signals in this shared band. This means that the same site must also be available in the downlink band. Such downlink sharing would also have two aspects. In this co-primary band, future FSS receive earth stations would need to ensure that the coordinated location would also not receive interference from transmitting existing FS stations. We expect that the availability of an earth station site at the downlink frequency may place a greater constraint on earth station location than that of the uplink, due to the wide distribution of co-primary fixed links in this band, compared to that of the uplink bands. The chosen location should then be communicated to the Commission to ensure that future terrestrial stations will coordinate their transmitting FS operations. Clearly, the fewer earth stations required, the easier the FSS earth station site selection process will be and the more useable the 18.3-18.58 GHz band will be for the fixed service.[100]

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period of continued co-primary status must coordinate their space stations with Legacy Systems prior to launch, but only to the end of the applicable period of continued co-primary status if they operate in the 18.58-18.8 GHz band.

[97] The need for FS modification will be determined in the space-to-Earth coordination process discussed above.

[98] The Commission has not established requirements for accuracy of transmitting and receiving site information, opening the possibility of inaccurate calculations in some cases.

[99] This information will be compiled by an outside party into a database to be used for both space station and earth coordination purposes and to assist the Commission in any future decision making regarding this band. The Commission will identify that party in a Public Notice issued subsequent to the release of this Order, after consultations with generally established frequency coordination houses. By compiling information in this fashion, we provide an opportunity for independent calculation of pointing direction. If the licensee wishes to modify its license to reflect the corrected information, it should file a separate application.

[100] While we generally expect that, as a result of this rulemaking, satellite operators will use all or part of the 18.3-18.58 GHz spectrum for gateway type earth stations to provide connectivity of their systems to and from the Internet and the Public Switched Telephone Network (PSTN), we do not define and mandate such use because we are aware

49. We believe these actions will provide an equitable approach to sharing because both the terrestrial fixed service and the FSS stations must assume burdens, based upon this *Report and Order,* not presently in the Commission's existing rules: the FSS space stations must coordinate their space stations with those FS stations pointed at their satellites and must accept limitations on the location of their receiving earth stations, a new process. Concomitantly, future terrestrial fixed service stations may point at the orbit only at their own risk, a condition not previously stated and must coordinate with any prior FSS earth stations. Both services collectively assume the responsibility for making this process work, subject to the continuing oversight of the Commission.

50. 18.8-19.3 GHz and 19.3-19.7 GHz Frequency Bands. In the *18 GHz NPRM*, we proposed to designate the 18.8-19.3 GHz band to NGSO/FSS on a primary basis. Teledesic urged us to adopt this proposal and, by doing so, protect the decisions made at WRC-95 and WRC-97 (World Radiocommunication Conferences) to allocate internationally the 18.8-19.3 GHz band to NGSO/FSS.[101] TIA-Fixed Section, on the other hand, requests that we allocate the 19.26-19.3 GHz for terrestrial fixed service use in order to maintain the existing paired channels at 17.7-17.74 GHz,[102] a proposal that was also discussed in the Teledesic Reply.[103] Lockheed contends that we should provide a primary designation of 500 MHz at 18.8-19.3 GHz for NGSO/FSS "to allow for ubiquitous deployment of NGSO FSS user terminals."[104] Teledesic recently entered into the record of this proceeding a detailed statement[105] about the sensitivity of its system to interference from fixed stations operating within the 18.8-19.3 GHz band. Teledesic's statement has implications for both the primary and secondary designation of this band. We discuss secondary designations in the next section of this *Report and Order*.

51. We have fashioned a primary designation solution that resolves the concerns of both the fixed and NGSO/FSS licensees in a balanced fashion, while providing the full requested service designation to the NGSO/FSS. The terrestrial fixed commenters are concerned that they will lose channels at 19.26-19.3 GHz that are paired with 17.7-17.74 GHz. While those channel pairs

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that some GSO/FSS systems would not easily adapt to such a requirement. Because our over-arching objective is to render the band available to both the fixed service and the GSO/FSS service, we will merely require the GSO/FSS to make a judicious effort to find locations where satellite reception is possible in this band. We will monitor implementation and, if it appears that the fixed service is being excessively precluded in the establishment of future links, we will revisit this decision on our own motion. We also note that a request for a declaratory ruling and petition for rulemaking relating to this issue was filed by the FWCC on May 5, 1999.

[101] *See* Teledesic Reply Comments at 9-10 ("The history of the 18.8-19.3 GHz band makes it imperative for the Commission to designate this full band for NGSO FSS use").

[102] *See* TIA-Fixed Section Comments at 3-4.

[103] *See* Teledesic Reply at 10-13.

[104] *See* Lockheed Comments at 7-8. Other commenters submitting band plans also recognized the need to designate 500 MHz to NGSO/FSS on a primary basis. *See* KaStar Comments at 6; Pegasus Comments at 4-6.

[105] *See* Ex Parte Letter from Mark A. Grannis on behalf of Teledesic, to Donald S. Abelson, Chief, International Bureau, FCC dated November 30, 1999, which details Teledesic's concern about this issue and explores the implications of four options in this regard.

will be lost in the adopted redesignation plan, it will happen in a way that should not cause difficulty to the fixed service. We have decided to permit existing fixed stations to continue using those channel pairs subject only to the overriding right of satellite providers to require them to be relocated. In practice, this means that stations in the NGSO/FSS service must accept the interference these stations would present or must pay to relocate the fixed stations to another band. While fixed service licensees are concerned that this may prove difficult, they will not be required to shut down until, under the relocation rules we adopt in this *Report and Order*,[106] a facility providing comparable performance has been coordinated, built and proven to be of equivalent performance.. NGSO/FSS licensees wishing to eliminate FS interference to their earth stations will be fully responsible for relocating the fixed stations. This ensures both that the interference to the NGSO/FSS will not occur and gives the satellite licensees some control over relocation cost.[107] While we note that Teledesic has stated in both their comments and their *ex parte* statement of November 30, 1999 that they are willing to pay to relocate the fixed stations that will cause interference to their earth stations in the 19.26-19.3 GHz band, they have proposed a different compensation method than the one adopted in this *Report and* Order.[108] As both Teledesic and Lockheed point out, the 500 MHz of spectrum at 18.8-19.3 is the only downlink spectrum available for Ka-band NGSO/FSS systems.[109] We take this action because of the unique international status of the 18.8-19.3 GHz band, and because it is fashioned in such a manner to avoid any adverse impact on existing fixed service licensees. We also recognize that NGSO/FSS systems are likely to use the entire 500 MHz of spectrum, as pointed out by Teledesic, currently the only Commission NGSO FSS licensee in this band.[110] Designing equipment to make locally varying adjustments to earth station receiving equipment would be extremely difficult and a costly project, possibly delaying the deployment of NGSO/FSS service in the band and certainly reducing the available service capacity. We conclude that designating the 18.8-19.3 GHz band to NGSO/FSS for primary use best serves the public interest.

52. Therefore, we concur with Teledesic and Lockheed that they will need a full 500 MHz primary designation, and thus, designate the 18.8-19.3 GHz band on a primary basis to NGSO/FSS. We reject the request to maintain a primary allocation to terrestrial fixed service operations in the 19.26-19.3 GHz segment, recognizing that future fixed stations wishing to use these channel pairs must find alternative spectrum. We recognize that this solution does not

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[106] *See* the appropriate section in each rule part of Appendix A, e.g. section 101.91b for the full specification of "comparable facilities." Since these specifications comprise an engineering specification which corresponds to the common English meaning of the word "comparable" meaning the same, they are not discussed further in this text.

[107] Clearly, the location of earth stations in certain areas will have a great associated cost. NGSO/FSS licensees can judge these costs/benefits at the time of acceptance of new subscribers.

[108] *See also* discussion of relocation cost. infra

[109] *See* Lockheed Comments at 8 ("Because there is no alternative downlink spectrum for Ka-band NGSO FSS systems, the Commission should redesignate the 18.8-19.3 GHz band for primary NGSO FSS use"); Teledesic Reply Comments at 10 (arguing that the 18.8-19.3 GHz frequencies "are still the only frequencies in which NGSO FSS need not protect the geostationary arc").

[110] *See* Teledesic Reply Comments at 10 ("There is no practical way for an NGSO FSS system using any reasonable number of downlink carriers to use, for example, the full 500 MHz in rural areas but only a 460 MHz sub-band near an FS station").

directly address the provision of new fixed links that would have used spectrum in the 17.7-17.74 GHz and 19.26-19.3 GHz bands. While not prejudging future Commission action, we note that the development of new channelizations could significantly improve this situation.

53. In the *18 GHz NPRM*, we proposed to retain the designation of a co-primary allocation for terrestrial fixed service and MSS/FL in the 19.3-19.7 GHz band. We tentatively concluded that sharing in this band was feasible due to the limited number of MSS/FL expected to be deployed. Most commenters agreed with our proposal. Pegasus proposed a segmentation of the 19.3-19.7 band that would allocate the 19.3-19.45 GHz segment to MSS/FL and terrestrial fixed service on a co-primary basis, and the 19.45-19.7 GHz band to MSS/FL and GSO/FSS on a co-primary basis.[111] We reject Pegasus' plan to segment the 19.3-19.7 GHz band as an effort to get more spectrum for GSO/FSS users in the 18 GHz band, at the expense of upsetting the overall equity and balance achieved in this *Report and Order*. Motorola argues that this proposal "would create a mixture of GSO/FSS-MSS/FL earth stations in a narrow band segment adjacent to an even narrower segment dedicated to MSS/FL-FS operations." [112]

54. SBC argues that we should not place MSS/FL as a co-primary licensee in the 19.3-19.7 GHz segment[113] because there are serious sharing concerns with such a designation, and proposes that we give terrestrial fixed services primary status in the 19.3-19.7 GHz segment. We reject SBC's request. Instead, we are retaining the designation which was adopted in the *28 GHz Report and Order* and under which, as Motorola points out, the Iridium System was successfully coordinated under Part 25 of the Commission's Rules and operated gateway earth stations in this band in the U.S.[114] We note that given the number of MSS feeder links anticipated in this band, there is little material difference between this shared designation and a primary FS designation. We find no valid support in the record to dismiss our previous tentative conclusion that terrestrial fixed service and MSS/FL should retain their designations in the 19.3-19.7 GHz band. Thus, we conclude the public interest is served by maintaining this designation.

3. Secondary Use

55. In the *18 GHz NPRM*, we proposed to allow secondary use of the entire 18 GHz band by terrestrial fixed services, GSO/FSS, and NGSO/FSS (in bands where the particular service did not enjoy either a primary or co-primary allocation) to provide flexibility throughout the band.[115] We conclude that secondary use of the

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[111] *See* Pegasus Comments at 4-6 (arguing that this segmentation would allow MSS/FL gateways to share the lower portion of the band with terrestrial services and would give GSO/FSS more usable downlink spectrum).

[112] Motorola Reply Comments at 18-19 (arguing that Pegasus' proposed designation provides no benefit to any service and is "counterproductive and inconsistent with the public interest").

[113] SBC Comments at 4-5.

[114] *See* Motorola Reply Comments at 19 (arguing that "SBC's comments appear to be woefully outdated").

[115] *See 18 GHz NPRM* ¶ 33. Under the Commission's Rules, services utilizing spectrum on a secondary basis must not cause harmful interference to primary users to which frequencies are already assigned or to which frequencies may be assigned at a later date. Secondary systems cannot claim protection from harmful interference from stations

18 GHz band is not viable because it would unreasonably inhibit ubiquitous deployment of these services and limit the use of spectrum by primary users of the bands. However, the continued operation of existing fixed stations in primary satellite bands on a non-interference basis would not limit the use of the bands by satellite earth stations; rather it would provide for the continuation of existing services to the public until new satellite earth stations are built. We discuss two different aspects of this issue below: Should we adopt secondary fixed designations and permit continued licensing of stations in bands designated on a primary basis to satellite services? Should we adopt secondary satellite designations in bands designated on a primary basis to the fixed service? We reject a third possibility, proposed by VisionStar.[116] VisionStar proposed the adoption of a temporary secondary allocation for the terrestrial fixed service in bands that are assigned to GSO/FSS systems. They propose that this temporary secondary allocation would be limited to small businesses that would use the spectrum to provide GSO/FSS-like services to consumers through a terrestrial fixed network before 18 GHz GSO/FSS systems are launched and operating. We reject their proposal because we expect it would interfere with the intended application of the fixed service relocation procedure adopted in this *Report and Order*.

56. Regarding secondary fixed operations in primary satellite designations, we conclude that terrestrial fixed services generally should not be designated for secondary use in either primary GSO/FSS or primary NGSO/FSS bands subject to blanket licensing. We find that the continued licensing of these fixed stations, with the exception of indoor low power operations, is incompatible with the ubiquitous placement of earth stations in the primary satellite service, because they may interfere with FSS reception if located close enough to such stations. We would, literally, be encouraging the extension of a condition that we have determined to be incompatible with the ubiquitous distribution of primary satellite services. Regarding the low power fixed systems mentioned in the *NPRM,* in the 18.82-18.87 and 19.16-19.21 GHz bands, such stations have been licensed on a primary basis and will continue to be so licensed, given the proposal in the *NPRM* and the lack of significant comments.[117] They will not be subject to the same transition rules as the full power stations in their band. In addition, they will not be subject to the same relocation requirement, since they will be co-primary with the FSS. They will be permitted to continue to operate, and new stations will be licensed subject only to the limitation that they operate indoors.[118] The restriction to indoor use will, of necessity, place some signal attenuating barrier between low power fixed stations and FSS earth stations, which are always located outdoors. While interference could still be possible, the probability of interference is significantly, and acceptably, reduced as the interfering signal is so diminished. Several commenters urged us to eliminate secondary terrestrial fixed service designations in primary FSS

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of a primary user to which frequencies are already assigned or may be assigned at a later date. Secondary users can claim protection, however, from harmful interference caused by other secondary services to which frequency may be assigned at a later date. *See* 47 C.F.R. §§ 2.104 (d), 2.105(c)(3).

[116] *See* VisionStar Comments at 4.

[117] *See* Section 101.147(r)(10).

[118] *See Section* 101.147 (r)(10) of Appendix A to this *Report and Order.*

bands.[119] TIA-SOUS argued that the "proposal to license FS stations on a secondary basis in satellite spectrum would undercut the Commission's segmentation proposal by reintroducing the cost and delay associated with frequency coordination."[120] TIA-SOUS reasons that a new coordination regime would have to be set up to determine whether new terrestrial fixed service stations could operate under secondary conditions. Lockheed asserts that we should not allow secondary terrestrial operations in the primary FSS band because of interference concerns.[121] We agree with the assessment of TIA-SOUS and Lockheed. With the anticipated deployment of millions of satellite earth stations, we believe that it would be virtually impossible to implement an effective dispute-solving regime to discover terrestrial causes of interference to primary FSS earth stations. The difficulty in identifying the source of interference could have a substantial practical impact on FSS licensees, an impact that they are only responsible to evaluate when they are sharing the band with a primary designated fixed service. For example, attempting to identify the cause of interference and then fixing that problem may take time, causing a significant interruption in service. Such delays would raise operating costs for FSS users and would degrade the reliability of the company's service.[122] We believe such circumstances are avoidable by rejecting our proposal to allow terrestrial fixed service operations to use primary FSS spectrum for secondary use services. The statement of Teledesic referenced above[123] underscores this decision with respect to primary NGSO/FSS service allocations that are blanket licensed, by describing the severe impact that a fixed station of at least 39 dB e.i.r.p. would have on an earth station in this band.

57. We now consider whether the GSO/FSS service can be secondary in primary NGSO/FSS bands. In principle, such designations would only be feasible if the stations of the secondary service could be designed to operate without impact on the primary service. This result could be achieved if the NGSO receiver avoided pointing at the Geostationary Orbit. However, because the 18.8-19.3 and 28.6-29.1 GHz primary NGSO designations are the only bands that do not restrict NGSO systems from pointing at the orbit, this fact greatly increases the capacity of satellites in this band, since fewer satellites will be required if a larger part of the sky

[119] *See, e.g.*, Lockheed Comments at 8-9 ("Lockheed Martin does not support the secondary FS use of spectrum designated for FSS use on a primary basis"); Loral Comments at 7-8 ("Loral does not believe that the Commission's proposal to allow secondary operations on a non-interference basis by both terrestrial fixed service and FSS is feasible"); TIA-SOUS at 3-4 ("The Commission should not permit secondary FS operations in FSS bands"); Hughes Reply Comments at 13 (arguing that "there is no reason to allow secondary terrestrial uses of the FSS primary bands").

[120] TIA-SOUS Comments at 3; *see also* Teledesic Reply Comments at 12-13 (arguing that secondary allocations to terrestrial fixed services in FSS primary bands would result in increased costs and delayed deployment of satellite service without providing corresponding benefits to terrestrial fixed service).

[121] *See* Lockheed Comments at 8 (stating that because terrestrial fixed service operations transmit, and FSS earth stations only receive in the 18 GHz band, secondary terrestrial fixed services transmitting in an FSS primary band can cause significant interference to a receiving FSS earth station).

[122] *See* TIA-SOUS Comments at 3-4. (noting that possible delays caused by secondary terrestrial licensees would not be tolerated by prospective customers); Teledesic Reply Comments at 13 (arguing that secondary terrestrial use would cause increased costs and an undesired quality of service).

[123] *See* Ex Parte letter from Mark A. Grannis on behalf of Teledesic, to Donald S. Abelson, Chief, International Bureau, FCC, dated November 30, 1999, also cited above.

is available for service. To avoid pointing at the orbit would require more satellites to achieve the same system capacity, increasing the cost of providing NGSO/FSS services at the same level. It would be a great constraint on the NGSO service to require such orbit avoidance, and would appear to be unwarranted to avoid interference from a secondary service. We, therefore, do not designate a secondary GSO/FSS service in the downlink NGSO band.

58. Finally, we consider whether the FSS service can be permitted to operate on a secondary basis in terrestrial fixed service primary bands, as we proposed in our *NPRM*. Under such primary/secondary sharing scenarios, primary operations must be able to determine which station is causing harmful interference, should such interference result from any secondary operation. Secondary FSS operations would have to protect new primary terrestrial fixed satellite users. As a result, terrestrial fixed users face raised costs through either coordination with secondary users before beginning service or delays in service while trying to find causes of interference. Furthermore, under such a scenario, the FSS user would be at the mercy of new terrestrial links that may cause significant interference, which they must accept, and disruption of service. Based on these considerations, we reject the proposal to allow secondary FSS service in bands designated for primary use by terrestrial fixed service.

4. Conclusions Regarding the Band Plan

59. We believe the band plan adopted herein generally meets the spectrum needs of the respective services designated to operate in the 18 GHz band. We note that, like our *NPRM* proposal, the band plan we adopt herein provides GSO/FSS with 1000 MHz of spectrum, 720 MHz of which is primary and 280 MHz of which is co-primary. Several satellite commenters desire to obtain a minimum of 1000 MHz of unshared downlink spectrum in the Ka-band. These commenters seem to base their arguments, in part, on the fact that we designated 1000 MHz of uplink spectrum to GSO/FSS in the *28 GHz First Report and Order*. The *28 GHz First Report and Order*, however, designated 750 MHz of primary uplink spectrum for GSO/FSS systems, and 250 MHz of co-primary uplink spectrum shared with NGSO/FSS systems. We are adopting a similar approach in the downlink band. We generally designate equal amounts of spectrum to GSO/FSS, taking into account systems for uplink and downlink use, and this *Report and Order* provides just that, when considering both primary and co-primary spectrum.

60. We adopt this Band Plan acknowledging that many existing terrestrial fixed services operating in parts of the 18 GHz band that currently serve the public will be forced to relocate their facilities to serve these customers. As previously discussed, terrestrial fixed operators are losing use of 720 MHz of previously usable spectrum due to this designation. Furthermore, the 500 MHz we designate for NGSO/FSS services represents the only block of downlink spectrum in which these services can currently operate. Moreover, satellite commenters failed to demonstrate how existing consumer demand would justify the designation of 1000 MHz of spectrum for exclusive primary use by them. We conclude that the 500 MHz of downlink spectrum (280 MHz co-primary at 18.3-18.58 and 220 MHz primary at 18.58-18.8) in conjunction with the 500 MHz of downlink spectrum at 19.7-20.2 GHz designated to GSO/FSS satisfies the near-term spectrum requirements of GSO/FSS. We also conclude that the 500 MHz primary spectrum designated to NGSO/FSS at 18.8-19.3 GHz and the 400 MHz of co-primary spectrum at 19.3-19.7 GHz to MSS/FL meets the spectrum requirements of the respective services.

B. Continued Rights of Existing Stations to Operate

61. In the *NPRM* we proposed to grandfather terrestrial fixed service operations that have been either licensed or for which applications are pending, as of the release date of th[e] *NPRM*, for any band that is proposed to be designated for fixed satellite service use on a primary basis.[124] Based on the tentative conclusion that satellite operators will be able to design systems and locate facilities to avoid unwanted interference from terrestrial fixed operations, we proposed in the *NPRM* to grant indefinite grandfathered status to existing terrestrial fixed operators. Under the *NPRM* proposal, these grandfathered systems, however, "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."[125] We requested comment on this grandfathering proposal.

62. We also requested comment on the relocation of some or all of the grandfathered terrestrial facilities if, in fact, satellite operators are unable to design their systems to avoid harmful interference from grandfathered systems.[126] We requested comment on whether the terrestrial relocation principles discussed in the *Emerging Technologies* proceeding (ET Doc. No. 92-9),[127] and other proceedings implementing similar concepts, such as the Mobile-Satellite Service at 2 GHz allocation proceeding (ET Doc. No. 95-18)[128] should be applied to the 18 GHz band.

63. Recognizing the importance of providing continuity of service to the public, as well as the need to reasonably protect investments in existing terrestrial fixed service operations and fixed service operations at an advanced stage of planning, we will permit terrestrial fixed stations currently operating in spectrum being designated in this *Report and Order* for exclusive satellite use (18.58-19.3 GHz) to continue to operate on a co-primary basis, but subject to the overriding

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[124] *See 18GHz NPRM* ¶ 40. We do not need to consider or grant grandfather status to FSS operations, for there are currently no satellite operations deployed in the 18 GHz band. Under this proposal, terrestrial fixed service operators that filed and were granted after the "cut-off" date would have to operate on a secondary basis. As previously mentioned, TIA-Fixed Section and ICTA filed petitions for relief from the "cut-off" date of September 18, 1998. *See supra*. In acting on these petitions, we ruled that the proposed cut-off date would be extended to the date of this *Report and Order* for PCOs; and we required that all non-PCO terrestrial fixed service operations housed in bands where terrestrial fixed services would lose primary status must comply with the September 18, 1998 cut-off date. That decision is now moot. *See supra* note 23.

[125] *See 18 GHz NPRM* ¶ 40.

[126] *See id.* ¶ 41.

[127] *See* Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, *First Report and Order and Third Notice of Proposed Rulemaking*, 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 Rcd 6589 (1993) (Redevelopment *Third R&O*); *Memorandum Opinion and Order*, 9 FCC Rcd 1943 (1994); *Second Memorandum and Order*, 9 FCC Rcd 7797 (1994).

[128] *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 Rulemaking*, 12 FCC Rcd 7388, 7396-7407; 7414-21 (1997) (subsequent history omitted).

right of satellite providers to require them to relocate. In consideration of the record, we adopt the following:

(a) those terrestrial fixed services in the 18.58-19.3 GHz band that have been either licensed or for which applications are pending as of the adoption date of this *Report and Order* are granted permission to continue to operate on a co-primary basis, subject to the overriding right of satellite providers to require them to relocate. As of the effective date of this *Report and Order*, such terrestrial fixed stations in this portion of the 18 GHz band can be compelled to relocate in accordance with the relocation rules we adopt herein. However, during the applicable period of continued co-primary status, the satellite providers requiring relocation must pay for all relocation costs, as described below:

(1) the co-primary status of terrestrial fixed service operations in the 18.58-19.26 GHz band will terminate ten (10) years from the date of the adoption of this *Report and Order*. Upon the conclusion of this ten-year period, existing terrestrial fixed stations in the 18.58-19.26 GHz band may continue to operate on a non-interference basis vis-a-vis the primary service in the band. If these operations are required to relocate after that date, they must bear all costs of relocation themselves.

(2) the co-primary status for stations in the 19.26-19.30 GHz band will be permanent; if certain links in the 19.26-19.3 GHz can not operate without interference to NGSO FSS, then those links will be relocated at the expense of the NGSO/FSS licensee;

(b) co-primary fixed service operations in the 18.58-19.3 GHz band may make limited modifications[129] to their systems, as long as those modifications do not increase the amount of spectrum used in this portion of the 18 GHz band by that system or do not increase interference to satellite earth stations;

(c) Co-primary terrestrial fixed service operations in the 18.58-19.3 GHz band will be subject to new Rules Sections in Parts 74, 78 and 101, all containing the text of new Section 101.85, which will govern transition of the 18.58-19.3 GHz band from the terrestrial fixed services to the fixed-satellite service (FSS). These new rules are based upon the concepts used in the existing Section 101.75 for the PCS service transition. The relocation rules we adopt in this *Report and Order* define when the relocation is considered completed, depending, in part, on the confirmation by the fixed station, after a 12-month trial period, that the new facilities are comparable.

64. Generally, commenters focused their remarks on three aspects of our grandfathering proposal: which stations should be grandfathered (the "cut-off" date); the length of time grandfathered systems should enjoy this status; and, whether grandfathered systems should be allowed to modify their systems. We address the "cut-off" date, the sunset provision, and modifications to these systems below.

[129] The full specification of permissible modifications are given in each rule part as shown in Appendix A, *e.g.* section 101.97.

1. Cut-off Date

65. Lockheed took exception to our proposal to grandfather pending applications. According to Lockheed, "operators who merely have filed an application or who have not yet expended any significant sums of money on constructing their systems" do not deserve grandfathered status.[130] We disagree. We consider the filing of an application before the cut-off date to be an expression of immediate need, and thus worthy of being able to continue to operate subject to the relocation rights established herein. Accordingly, we will provide continued co-primary status for terrestrial fixed service operations that have been either licensed, or for which applications are pending, in the 18.8-19.3 GHz frequency band, as of September 18, 1998, as proposed in our *18 GHz NPRM*, which proposed that terrestrial fixed services operating and pending in the 18.8-19.3 GHz band be subject to the September 18, 1998 cut-off date. Furthermore, we provide continued co-primary status for terrestrial fixed service operations that have either been licensed, or for which applications are pending, in the 18.58-18.8 GHz frequency band, as of the adoption date of this *Report and Order*.

66. We are extending the "cut-off" date for the 18.58-18.8 GHz band because the *18 GHz NPRM* stated that the cut-off date would apply in "any *band that is proposed to be designated* for fixed satellite use on a primary basis."[131] We note that none of the proposed band plans put forth in the *18 GHz NPRM* discussed redesignating the 18.58-18.8 GHz band for primary use by GSO/FSS. Therefore, we believe it is appropriate to move the "cut-off" date forward to coincide with the adoption of the *Report and Order*, recognizing that applications for terrestrial fixed stations in the 18.58-18.8 GHz band may have been filed since the adoption of the *NPRM* without specific indication that this band would no longer be available for such use. We note that pursuant to the band plan adopted today, any extension of the "cut-off" date in the 18.3-18.58 GHz band is moot, because the 18.3-18.58 GHz band is designated to terrestrial fixed service and GSO/FSS on a co-primary basis.

2. Sunset Provision`

67. In the *18 GHz NPRM*, we proposed that existing terrestrial fixed services operating in bands redesignated to reflect primary status for FSS operations would be grandfathered on a permanent basis. Several commenters oppose permanent grandfathering and urge that there be a sunset date.[132] In making a decision to sunset the co-primary status of stations, except in 19.26-

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[130] Lockheed Comments at 10. Lockheed points to the Commission's *28 GHz Second Report and Order* to point out correctly that we have dismissed pending applications in the 31 GHz band to promote local multipoint distribution 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 29.5-30.0 GHz Frequency Band, to Establish Rules and Procedures for Local Multipoint Distribution Service and for Fixed Satellite Services, *Second Report and Order, Order on Reconsideration, and Fifth Notice of Proposed Rulemaking*, 12 FCC Rcd 12545, 12588-89 (1997) (*28 GHz Second Report and Order*).

[131] *See 18 GHz NPRM* ¶ 40 (emphasis added).

[132] *See, e.g.*, Hughes Comments at 11-12; Lockheed Comments at 13; Loral Comments at 4; Pegasus Comments at 7-8; Teledesic at 13-15; TIA-SOUS Comments at 8-9; GE Americom Reply Comments at 9-10; KaStar Reply Comments at 9-11; PanAmSat Reply Comments at 5-6.

19.30 GHz, we are deciding that at some point the financial burden of our redesignation decision should be shifted from satellite to terrestrial licensees. Initially, we believe those costs should be shouldered by the satellite licensees if they choose to require existing terrestrial fixed licensees to move to new frequencies in order to accommodate new satellite operations. As discussed in adopting the Emerging Technologies decision, our policy of permitting reimbursement to incumbent licensees for relocation costs is based on the premise that such reimbursement might help new services to be deployed more quickly than if reimbursement was not otherwise provided.[133] However, we also believe that this reimbursement obligation generally should be limited to a reasonable transition period. Such an approach is consistent with our assessment that the public interest would be better served in the long run by these new uses.

68. Commenters favoring a sunset date for grandfathered terrestrial licensees argue that permanent grandfathering "appears inconsistent with the premise of the *NPRM*,"[134] where we tentatively concluded that the public interest is best served by separating terrestrial from ubiquitous FSS earth stations. TIA-SOUS argues that permanent grandfathering will "preclud[e] a significant portion of the public from receiving innovative FSS services—even though the Commission finds it in the public interest for the incumbent to relocate to another band so that the public can have both."[135]

69. Commenters also differ on the appropriate sunset period, with suggestions ranging from three [136] to fifteen years.[137] GE Americom argues that setting a three year sunset for grandfathered status "allows terrestrial services time to move, but creates certainty as to the time satellites will be able to use their entire range of dedicated spectrum."[138] Teledesic proposes that we set January 1, 2004 as an appropriate sunset.[139] The Teledesic plan would make

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[133] *See Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies,* ET Docket No. 92-9, *First Report and Order and Third Notice of Proposed Rulemaking, 7* F.C.C.R. 6886,6889-90 (1992); *Second Report and Order, 8* F.C.C.R. 6495 (1993); Third Report and Order and Memorandum Opinion and Order, 8 F.C.C.R. 6589 (1993); Memorandum Opinion and Order, 9 F.C.C.R. 1943 (1994); Second Memorandum Opinion and Order, 9 F.C.C.R. 7797 (1994).

[134] *See* Teledesic Comments at 11-15. In arguing for a sunset date of January 1, 2004 (the date by which incumbent terrestrial fixed services should become secondary users in the band and be financially responsible for relocation), Teledesic states that the grandfathering proposal requires continued sharing and coordination with permanently grandfathered terrestrial systems. *See id.* at 11.

[135] *See* TIA-SOUS Comments at 8-9. TIA-SOUS contends further, that "[p]ermanent grandfathering therefore frustrates, rather than fosters, the public interest." *See id.*

[136] *See* GE Americom Reply Comments at 9-10 (requesting that we "set December 31, 2002 as the deadline for frequency relocation of FS systems. After that date, all remaining FS systems in GSO/FSS-specified bands will have only secondary allocations").

[137] *See* American Petroleum Institute Reply Comments at 6.

[138] GE Americom Reply Comments at 9.

[139] *See* Teledesic Comments at 14-15 (arguing that efficiencies resulting from such a sunset date will make "both satellite and terrestrial service available to more of the public sooner, with lower transaction costs").

grandfathered terrestrial users secondary on this sunset date, meaning that after January 1, 2004, formerly grandfathered terrestrial fixed service operations would be responsible for any relocation costs. Pegasus contends that a sunset of ten (10) years following the release of this *Report and Order* "represents an appropriate compromise between GSO FSS and FS interests, and is necessary for consistently high quality reception of Ka-band FSS signals in urban areas and the achievement of a truly national ubiquitous satellite service."[140] We agree with Pegasus and adopt a ten year sunset, noting that a balance must be struck between burdens on satellite licensees and terrestrial licensees that provides an adequate transition period while giving effect to our redesignation decision. As discussed previously, this *Report and Order* grants co-primary status to existing terrestrial fixed stations in the 18.58-19.3 GHz band.[141] As a general rule, we agree that the co-primary status should be limited by a sunset period. However, we have found it necessary to permanently grant co-primary status to existing terrestrial fixed stations in the 19.26-19.3 GHz band because the channels in this band are paired with channels that are being retained for primary terrestrial fixed use at 17.7-17.74 GHz, thus magnifying the impact of this redesignation on the fixed service. If we were to impose a ten year sunset period, users of these pairings would likely be required because of equipment availability to relocate not only their transmissions in the 19.26-19.30 GHz band but also their paired transmissions in the 17.7-17.74 GHz even though the 17.7-17.74 GHz transmissions are not in a band that would be shared with FSS operations. Because of the significant impact on terrestrial fixed licensees, and since there are few existing fixed stations in this band, we do not believe it is appropriate to sunset the co-primary status, and associated relocation reimbursement rights, of existing terrestrial stations in this band.

70. In all other bands we conclude that sunsetting after ten years would best serve the public interest. Allowing terrestrial fixed services to operate in the 18.58-18.8 GHz and 18.8-19.3 GHz bands on a permanent basis is inconsistent with the basic premise of this *Report and Order*, which has been accepted by a majority of the commenters to this proceeding: that the public interest is best served by separating terrestrial fixed service operations from ubiquitously deployed FSS earth stations.[142] The sunset date will allow existing terrestrial systems to continue to operate on an interim basis and to plan for transition to an alternative frequency.

71. We believe that a sunset period of ten (10) years for continued co-primary status of existing terrestrial fixed stations in the 18.58-18.8 GHz and 18.8-19.26 GHz frequency band is an appropriate compromise that will allow these systems to continue to operate in these bands, while giving FSS interests the option to pay the cost of relocating such systems if FSS interests want to deploy operations in those areas. We stress that the significance of the ten-year period is limited to who will pay for the relocation of existing terrestrial fixed stations when it is found that they would, due to the interference they would present, preclude the establishment of FSS

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[140] Pegasus Reply Comments at 6.

[141] *See* "Continued Rights of Existing Stations to Operate" section *supra*.

[142] *See* TIA-SOUS Comments at 8 ("Because the Commission and all interested parties agree that ubiquitous FSS earth stations cannot operate on a co-frequency with the terrestrial FS, the Commission's grandfathering proposal should include a sunset provision that eventually will permit the ubiquitous deployment of blanket-licensed FSS earth stations").

stations. In the absence of an FSS earth station in their vicinity, they may continue to operate beyond the ten-year period. Recognizing this, the fundamental issue here is how long constitutes an adequate period during which the FSS station should pay. Some FSS commenters urged us to adopt a relatively short sunset period. As mentioned above, GE Americom requested that we set December 31, 2002 as a sunset date,[143] while Teledesic, Hughes, KaStar, and PanAmSat ask that we adopt a five (5) year sunset date for grandfathering terrestrial fixed service operations.[144] Although these commenters are correct in arguing that permanent grandfathering would frustrate the basic premise of this *Report and Order*, we believe that either a three or five-year sunset would be insufficient because, as FWCC correctly notes, a relatively short sunset period could be viewed as an attempt to avoid relocation costs, even though there might be significant impacts from relocating fixed services after such a proposed sunset. We believe that it is contrary to the public interest and not conducive to a stable investment environment to make terrestrial fixed operators, who currently serve the public, pay for relocation costs after such a short period of time.[145] Thus, we reject the proposal of Teledesic and other satellite operators urging a five-year or less sunset period for grandfathered terrestrial fixed services.

72. API urges that we adopt a sunset of fifteen years, arguing that this period is appropriate "given the normal depreciation of microwave equipment, the long period of time before satellite systems will be fully deployed, and the uncertainty that market demand for 18 GHz satellite services will ever develop."[146] Although it may be true that the market for satellite systems in the 18 GHz band is in its nascency, a fifteen year sunset may frustrate our desire to segment the band in an efficient manner in order to bring exciting new services to the American people. Furthermore, because our relocation policies are not premised on depreciation scheduled equipment, we decline to consider this further. We believe that ten years is an appropriate compromise that will protect investment in existing terrestrial fixed service operations in the 18 GHz band, and allow for an orderly transition. Furthermore, nothing in this *Report and Order* precludes a satellite operator from reaching a voluntary agreement with a fixed service licensee prior to the sunset date, in order to speed the transition to operating in the segmented bands. Therefore, we adopt a ten-year sunset on co-primary status for terrestrial fixed service operations in the 18.58-18.8 GHz and 18.8-19.26 GHz bands.

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[143] *See* GE Americom Comments at 9-10 (arguing that this 3-year sunset "makes the most economic and common sense, as it allows terrestrial services time to move, but creates certainty as to the time satellites will be able to use their entire range of dedicated spectrum").

[144] *See* Teledesic Comments at 13-15 (discussing the efficiencies of a January 1, 2004, sunset date); *see also* Hughes Reply Comments at 11-12 (stating that "this roughly five-year phase out period provides a reasonable accommodation for both terrestrial users and satellite systems"); KaStar Reply Comments at 9 (urging the Commission to adopt the January 1, 2004, sunset date, a date in which incumbents terrestrial services would become secondary and no longer entitled to relocation compensation); PanAmSat Reply Comments at 5-6 (arguing against any permanent grandfathering, and for a five-year phase out period).

[145] *Cf.* Assn. of American Railroads Reply Comments at 8-9 (arguing that because we, as well as the industries, have concluded that sharing is impracticable, grandfathered terrestrial systems will have to be relocated, and with satellite operators not likely to deploy their systems until the end of 2003, they should be absolved from paying any relocation costs).

[146] API Reply Comments at 6 (arguing that satellite services may not need this spectrum for 10-15 years).

3. Modifications

73. In the *18 GHz NPRM*, we proposed to give grandfathered terrestrial fixed service interference protection from satellite operations, and proposed that satellite earth stations must accept interference received from grandfathered terrestrial systems.[147] However, "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."[148]

74. Terrestrial fixed service operators disagreed with our system modification proposal.[149] These commenters present two arguments to support allowing more modifications. First, commenters claim that modifications are necessary to maintain the viability of grandfathered terrestrial fixed service operations;[150] and second, they point to past Commission actions providing different treatment of this issue.[151]

75. In response to these comments, we clarify our *18 GHz NPRM* proposal. We adopt rules in this *Report and Order* that specify that terrestrial fixed services may perform the modifications approved in past Commission actions (acceptable modifications include: minor modifications, changes in antenna azimuth, antenna beamwidth, antenna height, authorized power, channel loading, emission, station location, and ownership or control; reduction in authorized frequencies; or addition of frequencies not in the 18 GHz band[152]); however, such modifications may not increase interference to satellite earth stations, or result in a facility that would be more costly to relocate. We fear that allowing for continuous upgrades would continue

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[147] *See 18 GHz NPRM* at ¶ 40. Under this proposal new satellite earth stations would have to coordinate with grandfathered terrestrial fixed service operations.

[148] *Id.*

[149] *See, e.g.*, AirTouch Comments10-12; API Comments at 12-13; CTIA Comments at 4-5; GTE Comments at 6-7; Winstar Comments at 11-12.

[150] *See* CTIA Comments at 4 (arguing that the inability to modify existing systems "will require CMRS carriers to abandon their existing grandfathered facilities…"); GTE Comments at 7 ("Grandfathered licensees must have the ability to expand their networks to meet normal growth in a cost effective manner and to realize the maximum efficiency of their existing radio equipment"); Winstar Comments at 12 ("Reasonable modifications must also be permitted to grandfathered systems so as to facilitate growth and other changes").

[151] *See* Airtouch Comments 11-12 (citing 2 GHz Licensing Policy Statement, Public Notice, Mimeo No. 23115, May 14, 1992); Winstar Comments at 12 (citing In the Matter of Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, *Third Report and Order and Memorandum Opinion and Order*, ET Doc. No 92-9, 8 FCC Rcd 6589 (1993)). The "2 GHz Licensing Policy Statement", and the Emerging Technologies *Third Report and Order* (which reaffirmed the Policy Statement) found that "[a]cceptable modifications include: minor modifications, changes in antenna azimuth, antenna beamwidth, antenna height, authorized power, channel loading, emission, station location, and ownership or control; reduction in authorized frequencies; or addition of frequencies not in the 2 GHz band." In the Matter of Redevelopment of Spectrum to Encourage Innovation and Use of New Telecommunications Technologies, *Third Report and Order and Memorandum Opinion and Order*, ET Dock. No. 92-9, 8 FCC 6589, at ¶ 53, n.72 (1993).

[152] *See* infra.

to cause interference to ubiquitously deployed satellite earth stations and would frustrate our desired band plan and the related public interest benefits.[153] Allowing for modifications that would increase interference to satellite operators that designed their systems to avoid a certain level of interference from existing terrestrial fixed service operations would be unfair and costly to satellite operators operating on a primary designation.[154] Furthermore, we believe that by prohibiting modifications that increase interference to deployed satellite systems we will promote full consideration of relocation to a different frequency band, in the event a modification should become necessary.

C. Relocation

76. In the *18 GHz NPRM*, we acknowledged that satellite operators may be unable to design their systems to avoid interference from grandfathered terrestrial fixed service operations, and that relocation of some terrestrial fixed stations may be desirable.[155] It is a central aspect of our decisions in this proceeding that stations of the new primary service must be able to establish their operations without significant interference from existing stations of any other service. At the same time, such a right must be accompanied by the obligation on the part of the new satellite entrant to provide for the relocation of any existing fixed stations operating in spectrum being designated for exclusive satellite use (18.58-19.3 GHz) which they determine is necessary. The prompt commencement of satellite services may depend upon the speedy relocation of existing fixed stations in some areas. We recognize that the successful completion of the relocation process will take significant effort and commitment on the part of both the space and terrestrial communities. To facilitate this effort and commitment, the relocation process adopted herein affords reasonable flexibility to FSS licensees to roll out their operations in a timely and economic manner. We asked for comments on relocation rules and procedures. Many of the commenters urged us to base relocation rules on the rules adopted in ET Docket 92-9 (Emerging Technologies proceeding)[156] for the 2 GHz band.[157] In general, we have adopted that approach.

77. Teledesic argues that we "should require relocation payments to incumbents based on the un-amortized cost of the replaced equipment, plus 2% of these 'hard costs' to help cover engineering expenses and installation costs."[158] Teledesic also asserts that basing relocation cost

[153] *See* Airtouch Reply Comments at 9 (recognizing that modifications to existing systems may raise sharing concerns).

[154] Again, we note that it is a goal of this proceeding to separate the different services into dedicated sub-bands. Allowing modifications that increase capacity and cause increased interference to satellite operations may delay the achievement of true segmentation.

[155] *See 18 GHz NPRM* at ¶ 41.

[156] *See* Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, *First Report and Order and Third Notice of Proposed Rulemaking*, 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 Rcd 6589 (1993); *Memorandum Opinion and Order*, 9 FCC Rcd 1943 (1994); *Second Memorandum Opinion and Order*, 9 FCC Rcd 7797 (1994); *see also* 47 C.F.R. §§ 101.67-101.81.

[157] *See, e.g.*, API Comments at 13-14; BellSouth Comments at 8; FWCC Comments at 7-8; UTC Comments at 5; Winstar Comments at 13-25; APCO Reply Comments at 2.

payments on anything other than the un-amortized cost of the replaced equipment would be inefficient.[159] Teledesic reasons that basing relocation on un-amortized costs prevents incumbent terrestrial services from receiving a windfall for new equipment. Teledesic correctly points out that "[e]very FS operator carries the cost of equipment on tax deductions over time to recover for the depreciation of the equipment."[160] Teledesic argues that if new equipment is needed to relocate terrestrial fixed services to new bands, this will result in satellite operators paying for the cost that has already been deducted, and thus recovered.

78. We reject Teledesic's proposal. The Commission's policy has been to place the cost of an involuntary relocation to comparable facilities on the shoulders of the new entrant.[161] We reaffirm this as our policy. As we have stated, "[B]ecause replacement equipment must be provided at no cost to existing licensees, concerns for amortizing or recouping investment in existing equipment are misplaced. Such replacement equipment will operate during the original amortization periods that would have applied to the old equipment."[162] In fact, we have recently reaffirmed the application of the Emerging Technologies proceeding relocation policies to Mobile-Satellite Services.[163]

79. While the new rules we are adopting are based upon the concepts adopted in the Emerging Technologies proceeding and contained in Section 101.75 for the PCS service transition, there are some differences between the situations at 2 GHz and 18 GHz that warrant some changes in the relocation rules for 18 GHz. We note that the rules adopted in Emerging Technologies proceeding were developed at the time solely based on the specifics of the sharing issues at 2 GHz. While we strive for consistency in our rules whenever appropriate, we need not adhere to the specifics of the existing 2 GHz relocation policy at 18 GHz if it is inappropriate.

80. In developing the Part 101 relocation rules for the PCS service at 2 GHz, we were displacing incumbent licensees through the introduction of an entirely new terrestrial service that would be gradually rolled out in various locations over time. In the case of the instant proceeding, we are modifying the way in which two existing services are to share spectrum in which both services are currently licensed on a co-primary basis. Additionally, in the spectrum that we are designating as exclusively for use by the Fixed-Satellite Service, FSS licensees are expected to roll out their service rapidly on a nation-wide basis, often to ubiquitously deployed end-user terminals. Such service will require expedited access to the spectrum. The current Part 101 relocation rules that provide for a lengthy voluntary negotiating period, followed by another mandatory negotiating period, are not well-suited to this required expedited access. We believe

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[158] *See* Teledesic comments at 16.

[159] *See id.* at 17.

[160] *Id.* at 17.

[161] *See* Redevelopment *Third Report and Order*, 8 FCC Rcd. at 6589-95; *see also* 47 C.F.R. § 101.75.

[162] Redevelopment *Third Report and Order*, 8 FCC Rcd. at n.18.

[163] *See* Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, ET Docket No. 95-18, *Memorandum Opinion and Order and Third Notice of Proposed Rulemaking and Order*, 13 FCC Rcd 23949 (1998).

the relocation rules for the 18 GHz services should rather focus on ensuring that the relocated terrestrial fixed stations are guaranteed comparable replacement facilities in a reasonably expedited fashion. In addition, we note that many of the existing 18 GHz terrestrial fixed stations are likely to be able to be relocated elsewhere in the 18 GHz band, and that such relocation is likely to be accomplished quickly and relatively inexpensively through the re-tuning of existing equipment.

81. Accordingly, we are not requiring a voluntary negotiating period as we previously established for the PCS transition in Section 101.69(c). Under our 18 GHz transition rules, FSS licensees may enter into negotiations with co-primary terrestrial fixed services in the 18.58-19.3 GHz band for the purpose of agreeing to terms under which the terrestrial licensees would either relocate or accept a sharing arrangement.[164] If no agreement is reached within two years for non-public safety incumbents and three years for public safety incumbents, an FSS licensee may initiate involuntary relocation pursuant to Section 101.91 of the rules we are adopting today. We believe these time periods provide a reasonable balance between the needs of new FSS operators to gain access to spectrum and the needs of existing FS operators to ensure that relocated facilities are provided that meet their needs. We are providing additional mandatory negotiations time for public safety operations, noting comments by the Association of Public-Safety Officials-International, Inc. about the special need of public safety systems to be able to continue to operate reliably during any transition period.

82. In the event that agreement is not reached in any negotiation period, the FSS licensee will have the option of invoking involuntary relocation. In such a case, FSS licensees would be obligated to relocate only the specific links that cause the interference problem. Under involuntary relocation, a terrestrial fixed station must relocate provided that the FSS licensee guarantees payment of relocation costs,[165] completes all activities necessary for implementing the replacement facilities,[166] and builds and tests the replacement system for comparability.[167] Terrestrial fixed service operators are not required to relocate until the alternative facilities are available for a reasonable time to make adjustments, determine comparability, and ensure a seamless handoff. It would not be in the public interest to allow a right of return to relocated incumbents, as was provided in the Emerging Technologies proceeding. The disruption to national, or potentially region-wide or world-wide, satellite systems for the benefit of relatively few terrestrial fixed incumbents is infeasible. We will therefore allow involuntarily relocated

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[164] *See* 47 C.F.R §§ 101.69, 101.71.

[165] Relocation costs that FSS licensees must pay include: all engineering, equipment, site and FCC fees, and any legitimate and prudent transaction expenses incurred by the terrestrial licensee that are directly attributable to an involuntary relocation (subject to a cap of 2% of the hard costs involved). We adopt the definition of "hard costs" provided in 47 C.F.R. § 101.75(a)(1). FSS licensees are not responsible for transaction costs incurred during the negotiation period or for fees that cannot be tied legitimately to the provision of comparable facilities.

[166] These include all engineering and cost analyses of the relocation procedure and, identifying and obtaining, on the incumbent's behalf, new microwave frequencies and frequency coordination. *See* 47 C.F.R. § 101.75(a)(2).

[167] Replacement systems for involuntarily relocated facilities must be at least equivalent to the existing facility with respect to throughput, reliability, and operating costs.

terrestrial fixed incumbents to petition the Commission for additional modification to or replacement of their equipment in any case where the incumbent believes it has not received comparable performance from its retuned or replaced equipment. Upon proof shown, we will order the FSS licensee in question to further modify or replace the incumbent terrestrial fixed licensee's equipment. We believe that these safeguards to ensuring comparable terrestrial facilities obviate the need for more lengthy negotiating periods. We note that pursuant to the sunset provisions adopted above, FSS operators will generally no longer be responsible for relocation costs incurred by terrestrial incumbents after ten (10) years from the adoption date of this *Report and Order*.[168] By adopting these relocation rules, we put into place a proven system that should lead to efficient relocation and ultimately to the band segmentation that we conclude serves the public interest. We also believe that the relocation rules provide reasonable flexibility to FSS licensees to establish their operations in a timely and economic manner.

83. We are also adopting, within our negotiation rules, criteria for comparable facilities. Both the existing 2 GHz rules and the rules we proposed in this proceeding include general criteria that must be met for facilities that are provided under involuntary relocation procedures to be considered comparable.[169] In a separate proceeding on the allocation of spectrum at 2 GHz for use by the Mobile-Satellite Service, ET Docket No. 95-18, ICO Services Limited (ICO) suggested that these criteria be included in the section of the rules that governs mandatory negotiations. We believe that this change is appropriate for the negotiation rules we are adopting at 18 GHz, as it would be useful to define the target of negotiations. For this reason, we are including these criteria in Section 101.89 of the rules we are adopting.

84. As a final note on relocation, we recognize that this *Report and Order* puts into place a process that will affect a significant number of fixed microwave links. We urge the affected parties to find ways to minimize the cost and facilitate the introduction of new satellite services. We believe it should be possible to realize very significant economies of scale if many of the necessary relocations of fixed microwave services could be contracted and the necessary equipment purchased in blocks larger than single facilities. While the Commission should play no direct role in such an effort, we stand ready to offer whatever guidance or encouragement is sought by the central parties involved.

D. Blanket Licensing

85. In the *18 GHz NPRM*, we tentatively concluded that blanket licensing of satellite earth stations in bands designated for primary use by either GSO/FSS or NGSO/FSS operations in the Ka-band is in the public interest.[170] We declined, however, to propose to implement blanket licensing in shared bands. We also proposed requirements to ensure that Ka-band GSO/FSS systems did not cause harmful interference to GSO/FSS systems in adjacent orbital slots. However, due to a lack of information, we did not propose specific blanket licensing criteria.[171]

[168] Except in the 19.26-19.30 GHz band where the obligation is permanent, as discussed *supra*.

[169] *See* existing §101.75(b).

[170] *See 18 GHz NPRM* ¶ 43.

[171] *See id.* ¶ 67.

We now note that an industry technical group has reached a consensus on appropriate technical criteria for GSO blanket licensing and has submitted a report detailing that consensus.[172] We have reviewed this report and generally adopt the group's recommendations, as specified in the attached rules. Pursuant to the rules we are adopting in this *Report and Order*, all applications for the blanket licensing of GSO/FSS earth stations that meet the requirements of Section 25.138 will be processed on a routine basis.

86. With respect to NGSO/FSS systems, we note that the technical study of ITU Working Part 4-9S on NGSO/FSS interference to fixed stations has been completed and an equation has been adopted that can be used to specify the space station pfd that provides interference protection to fixed stations.[173] Therefore we adopt this equation for determining the maximum allowed pfd of NGSO/FSS space stations as a function of the number of satellites in the NGSO system constellation, as recommended by technical study groups of the ITU-R for inclusion in the International Radio Regulations. However, while a decision on the space station pfd is required for the proper design of earth stations, we have not been able to develop a consensus on the criteria to be used for the blanket licensing of NGSO/FSS earth stations and defer decisions on the conditions for the blanket licensing of earth stations pending further evaluation.

1. GSO/FSS

87. Blanket Licensing in Unshared Bands. We adopt a blanket licensing procedure for GSO/FSS earth stations in the unshared 18.58-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz, and 29.5-30.0 GHz bands. Applicants in these bands may apply for a blanket authorization under which each licensee can construct and operate specified numbers and types of qualified earth stations.[174] The license term for a blanket authorization will coincide with the underlying space station operating license.

88. In the *18 GHz NPRM*, we proposed that blanket license applicants would be required to designate a point of contact where records on location and frequency use of satellite earth stations will be maintained, in order to ensure that secondary users in these bands have the information necessary to avoid causing harmful interference to GSO/FSS earth stations. As a result of our decision to prohibit secondary use throughout the 18 GHz band, we decline to require satellite operators to designate a point of contact.[175] Moreover, in an environment where

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[172] *See* the Second Report of the GSO FSS Ka-band Blanket licensing Industry Working Group, submitted September 27, 1999 (Second Blanket Licensing Report). This Report has been made a part of the record of this proceeding.

[173] The equation was originally recommended by ITU-R WP 4-9S. It is now included in the Report of the CPM to WRC-2000 and is currently a draft proposal of the United States to WRC-2000. We note that several major terrestrial fixed service companies participated actively in the development of the final pfd equation.

[174] At this time, we do not place a limit on the number or the type of earth stations that may be blanket authorized. Applicants, however, must specify such a number and the type of earth station at the time of filing.

[175] *See* discussion regarding secondary use in the 18 GHz band, supra. *Cf.* Loral Comments at 8-9 ("Loral does not support the Commission's proposal to require satellite operators to provide the location of each ubiquitously-deployed satellite earth terminal"); Pegasus Comments at 9-10 ("Pegasus opposes the Commission's proposal that GSO FSS licensees make available records on location of earth stations and frequencies used by their systems");

there will be no secondary use in the band, requiring satellite operators to monitor the specific location and frequency usage of ubiquitously deployed earth stations could prove expensive and difficult.[176] We also proposed that satellite operators obtaining a blanket license would be subject to an annual reporting requirement.[177] Under this proposal, licensees would be required to include the number of earth stations actually brought into service in a yearly report to the Commission, so that we can monitor the development of this service. This policy is consistent with the requirements initially placed on Very Small Aperture Terminal ("VSAT") blanket licensed earth station licensees in the 12/14 GHz frequency bands (Ku-band).[178]

89. Both Loral and TIA-SOUS asserted that they did not object to the proposed annual reporting requirement. Pegasus, on the other hand, opposed our proposed annual reporting requirement, indicating that "[w]hile the *NPRM* suggests that this information would permit secondary users to avoid causing interference to GSO FSS earth stations, Pegasus believes that such avoidance is not possible in a situation where the primary service is truly ubiquitous."[179] We believe Pegasus' concerns are moot since we are not adopting any secondary designations. As stated above, the adoption of the annual reporting requirement would allow the Commission to monitor the development of GSO/FSS services in primary bands and is in the public interest. Therefore, we adopt our proposal to require an annual reporting requirement on blanket licensees. Licensees are required to include the number of earth stations actually brought into service in a yearly report to the Commission. This annual report will be due to the Commission no later than the first day of April of each year, for the deployment figures of the preceding calendar year.

90. In the *18 GHz NPRM*, we also proposed several technical requirements for intra-service sharing.[180] In the *NPRM*, we noted that our existing GSO/FSS licensing policy in other bands is based upon uniform 2-degree spacing between adjacent satellites operating in the same frequency bands. For example, to implement 2-degree spacing for GSO/FSS systems in the 4/6 GHz and 12/14 GHz frequency bands, we established rules that define uplink and downlink

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TIA-SOUS Comments at 9("TIA-SOUS opposes the Commission's additional proposal to require satellite operators to provide the location of each ubiquitously-deployed satellite earth terminal).

[176] *See* Loral Comments at 8; TIA-SOUS Comments at 10(arguing that this requirement may prove difficult and "would deny satellite companies some of the cost and efficiency advantages that blanket licensing is intended to provide").

[177] *See 18 GHz NPRM* ¶ 46.

[178] *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). We have eliminated the annual reporting requirement for Ku-band licensees, instead mandating that a single report 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 (1996). We decided to streamline this procedure in recognition that the Ku-band VSAT industry had matured sufficiently to the point where the need to monitor growth on an annual basis was no longer necessary. We anticipate that a similar streamlining would take place at some point in the future, upon maturation of the FSS markets.

[179] Pegasus Comments at 9.

[180] *See 18 GHz NPRM* ¶¶ 47-62.

power densities[181] and antenna performance standards.[182] Specifically in the *18 GHz NPRM*, we proposed uplink transmit Equivalent Isotropically Radiated Power ("EIRP") density limits and downlink pfd limits that provided, in the case of the pfd values, for values that were bandwidth dependent, i.e. one over a 1 MHz and one over a 40 MHz bandwidth.[183] These proposals initially proved controversial within the GSO/FSS industry, resulting in an initial failure to achieve consensus within the GSO/FSS Ka-Band Blanket Licensing Industry Working Group.[184] We also proposed that applicants for earth station blanket licensing authorization submit to the Commission a technical description of how they will comply with the requirement that all Ka-band FSS earth stations employ adaptive uplink power control or other methods of fade compensation.[185] Furthermore, we sought comment on whether some type of antenna pointing requirement for Ka-band GSO/FSS earth stations is necessary, and on procedures for the licensing of non-compliant earth stations, and the effect such licensing would have on present and future licensees in the band. Additionally, noting that the *18 GHz NPRM* proposed pfd 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 requested 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 or could adversely affect the ability of the domestic licensee to effect a workable coordination agreement. The comments received do not indicate that such a disparity between commercial and government pfd limits will have a significant adverse impact on non-Government satellite systems. However, to resolve any significant problems, the record has supported a solution based upon the use of non-conforming earth stations. In cases where a non-Government GSO satellite is located in an orbit nearby a Government GSO satellite, the non-Government satellite may be authorized to exceed the pfd limits adopted in this *Report and Order* provided it meets the conditions of Section 25.138(b). This rule section requires that applicants provide specified information and certify that they have coordinated their operations with all satellite systems located within +/- 6 degrees of its orbit. In the bands 18.3-18.6 GHz and 19.7-20.2 GHz, NTIA has stated that the Government GSO and NGSO networks are presently operating and plan to continue to operate in accordance with the pfd limits contained in the current ITU Radio Regulations. These pfd limits are -115/-105 dB (W/m^2) in any 1 MHz depending upon the angle

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

[182] *See* 47 C.F.R. § 25.209. Together, the 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.

[183] *See 18 GHz NPRM* ¶¶ 48-56, 59. Two-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 of 0.2° for an earth station along the equator, and decreases for earth stations at higher latitudes.

[184] *See* Report of the GSO Ka-Band Blanket Licensing Industry Working Group, Conditions for Compatibility with 2" Orbital Spacing (filed Nov. 19, 1998), an informal group to which all GSO/FSS licensees were invited.

[185] *See* 47 C.F.R. § 25.204; *28 GHz First Report and Order*, 11 FCC Rcd. at 19005 (amending 47 C.F.R. § 25.204).

of arrival in the band 18.3-18.6 GHz. There are currently no PFD limits in the band 19.7-20.2 GHz.[186]

91. The record in this proceeding has been supplemented by the filing of the Second Report of the GSO/FSS Ka Band Licensing Industry Working Group[187] (*BLWG Second Report)*. A consensus was ultimately reached by the participants of the BLWG, detailing consensus technical parameters that would allow GSO/FSS blanket licensing.

92. The *BLWG Second Report* made recommendations on the adoption of a downlink pfd at the Earth's surface to protect downlinks in the United States, and EIRP spectral density from transmitting earth stations as a function of off-axis angle to protect uplinks. The *BLWG Second Report* also indicated that it does not intend that the Commission apply these blanket licensing rules to U.S. licensed satellite systems operating outside the United States.[188] In any event, it is beyond the scope of this proceeding to consider such international application. The BLWG has addressed earth station pointing accuracy and uplink power control, but was not prepared to make detailed recommendations on those issues. We are adopting the final recommendations of the *BLWG Second Report* as detailed in the revised Rules.[189]

93. In the *18 GHz NPRM*, we proposed that earth stations that did not comply with our adopted technical criteria would be subject to coordination with adjacent orbital slots. In this *Report and Order*, however, in recognition of a consensus that developed in the *BLWG Second Report* we adopt specific technical conditions for uplink and downlink operations, which obviate the need for coordination between non-government GSO/FSS systems in the Ka Band. However, coordination will continue to be required between non-government and government or foreign systems.

94. Shared Bands. In the *18 GHz NPRM*, we proposed not to implement blanket licensing in bands designated for shared co-primary use between GSO/FSS and MSS/FL (29.25-29.5 GHz), as well as shared for GSO/FSS and terrestrial fixed service use (18.3-18.58 GHz), in accordance with this *Report and Order*. In an ex parte presentation, Hughes suggests, however, that blanket licensing would be appropriate for the 29.25-29.5 MHz uplink frequency bands, since they are not shared with terrestrial services.[190] Hughes also suggests a streamlined method for licensing downlinks in the 18.3-18.58 GHz bands, by which the Commission would first approve the basic technical characteristics of a large number of identical terminals.[191] Subsequently, a licensee

[186] *See* Letter from William T. Hatch of the NTIA to to Dale M. Hatfield Of the FCC, dated March 29, 2000.

[187] See Second Report of the GSO/FSS Ka-Band Licensing Industry Working Group, submitted as an *ex parte* comment on September 27, 1999, and made a part of the record of this proceeding.

[188] BLWG Second Report at 2.

[189] *See* Appendix A of this *Report and Order*, Section 25.208.

[190] Hughes Ex Parte Filing, dated May 4, 2000.

[191] Our rules do not require prior authorization to deploy a receive-only terminal that receives signals from a U.S. licensed satellite. However, such terminals operate on an unprotected basis. Based on current deployment of

could register the specific locations of terminals through a streamlined method. Terminals registered with the FCC would receive protection from interference from new terrestrial fixed operations. Hughes argues that this method would facilitate offering of GSO/FSS to consumers. Further exploration of this proposal is warranted. We decline, however, to do so in this proceeding based on the lack of a sufficient record that: 1) describes in adequate detail how such an expedited licensing process would work; and 2) addresses the potential consequences of implementing an expedited licensing process in bands that are shared between services. Instead, we will address these issues in connection with an appropriate future proceeding in which the full range of public interest issues, including benefits to consumers and impact on other services, such as fixed terrestrial and MSS feeder links, can be fully assessed.[192]

2. NGSO/FSS

95. In the *18 GHz NPRM*, we proposed to implement a blanket licensing regime for NGSO/FSS systems in the 18.8-19.3 and the 28.6-29.1 GHz band. However, we stated that we lacked sufficient information to propose specific blanket licensing criteria for NGSO systems, and requested comment on what type of technical criteria should be used.[193] Commenters generally supported this proposal.[194] Therefore, we will adopt our proposal made in the *18 GHz NPRM* and will authorize earth station blanket licensing for NGSO/FSS systems in the bands in which NGSO/FSS is designated primary status, specifically the 18.8-19.3 GHz and 28.6-29.1 GHz frequency bands. The pfd limits for this band are specified in Section 25.208 (f) in Appendix A of this *Report and Order*. We recognize that we are not adopting specific blanket licensing rules at this time, and instead will address specific blanket licensing requirements in these bands in a future proceeding.

E. BSS Allocation

96. In the *18 GHz NPRM*, we requested comment on the allocation of spectrum for the BSS at the 17.3-17.8 GHz frequency band and at the 24.75-25.25 GHz frequency band for FSS services providing feeder links to the BSS. We made this proposal to conform the Commission's

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terrestrial services in the 18.3-18.58 GHz band, we anticipate that terminals receiving in this band could be deployed throughout much of the United States without experiencing interference from terrestrial services.

[192] *See, e.g.*, Onsat Petition for Declaratory Order, Waiver and Request for Expedited Action, File No. SAT-PDR-19990910-00091, Public Notice Report No. SA-00026, released September 23, 1999; FWCC Requests Concerning Licensing and Loading Standards for Earth Stations in the Fixed-Satellite Service, RM-9649, Public Notice Report No. 2334, released June 11, 1999; Public Notice, "Commission Launches Earth Station Streamlining Initiative," DA 99-1259, released June 25, 1999;

[193] *See 18 GHz NPRM* ¶ 68.

[194] *See* KaStar Comments at 15-16 (urging the Commission to authorize blanket licensing in those bands where NGSO/FSS has primary status); Hughes Comments at 25-26 ("Hughes agrees with the Commission that blanket licensing in the NGSO FSS bands is clearly a critical and necessary step for deployment of those systems and should be addressed at the earliest possible date"); Motorola Comments at 18; Teledesic Comments at 8; Lockheed Reply Comments at 12-13.

Rules to the ITU Region 2 allocation that will take effect on April 1, 2007.[195] We also sought comment as to the timing of the allocation.[196] In response to our request, interested parties requested primary BSS use[197] and some requested no BSS use.[198] Many terrestrial fixed commenters argued that a BSS allocation is premature,[199] and that such an allocation would mean further erosion of FS spectrum.[200] At the same time, FSS operators argued that current BSS spectrum was insufficient to meet a growing demand.[201] We also expressed uncertainty in the *NPRM* as to whether sharing would be feasible among the BSS, FSS, and terrestrial fixed service operations in these bands and specified that appropriate sharing criteria would have to be developed before such an allocation could be used.[202] Most of the commenters voiced skepticism that sharing would be possible,[203] but none offered specific evidence that sharing was infeasible under any conditions. Finally, some commenters requested an orbital spacing policy of 4.5º in the BSS allocation,[204] though some suggested that such a policy be reserved for a later proceeding.[205] In recognition of the fact that the international allocation is not effective for approximately seven years, we adopt the following allocation and designation decisions, to take effect April 1, 2007: in the downlink band, we allocate 400 MHz of spectrum at 17.3-17.7 GHz for primary BSS use. In the uplink band, we allocate 300 MHz of spectrum at 24.75-25.05 GHz for primary FSS Earth-to-space use, limited to feeder links for the BSS allocation in the 17.3-17.7 GHz band. We allocate 200 MHz of spectrum at 25.05-25.25 GHz for co-primary sharing between FSS and the 24 GHz Service, requiring coordination between these services. Given our experience in the other bands shared between satellite and terrestrial services, we believe that the requirement for coordination in the uplink band will accomplish, with minimal regulation, our objective of providing maximum flexibility of use while ensuring a workable sharing

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[195] *See 18GHz NPRM* ¶¶ 73-82. Specifically we proposed to add a footnote to Section 2.106 of the Commission's Rules which reads: "The allocation to the broadcasting-satellite service in the band 17.3-17.8 GHz shall come into effect on 1 April 2007." *Id.* ¶ 79.

[196] *Id.* ¶ 20 and ¶ 74.

[197] *See, e.g.*, DIRECTV Comments at 7; Hughes Reply Comments at 7-8.

[198] *See, e.g.*, AirTouch Comments at 9; BP Communications Alaska, Inc. Comments at 5; FWCC Comments at 9.

[199] *See* SkyBridge Comments at 2-4. *C.f.* API Comments at 11, Reply at 3 (requesting that the Commission seek comment on whether BSS even needs spectrum).

[200] *See* TIA-Fixed Section Comments Appendix at 10. We note that much of these concerns refer to losing the 18.145-18.58 GHz used for PCOs and CARS among others as was proposed at that time. *See, e.g.*, RCN Comments at 8; ICTA Comments at 294. Because this *Report and Order* preserves that spectrum, those commenters' concerns are now moot.

[201] *See* Pegasus Comments at 15; Lockheed Martin comments at 24.

[202] *See 18 GHz NPRM* ¶ 79.

[203] *See, e.g.*, FWCC Comments at 9; DIRECTV Comments at 7-8.

[204] *See* DIRECTV Comments at 6, n.12.

[205] *See* Pegasus Comments at 15; Lockheed Martin reply comments at 14-15.

environment, as discussed below. While we note that there is a difference of 100 megahertz of spectrum between the BSS downlinks and the feeder links, we are reluctant to reduce the amount of spectrum available for the feeder links at this time. The flexibility that this additional spectrum provides might prove quite useful to BSS system operators as they tackle the issues of local-into-local and regional programming, as well as any occasional difficulties that might be encountered during coordination.[206]

97. In making these allocation and designation decisions, we strive to attain a balance that best serves the public interest. Our objective is to provide for new satellite services without compromising on our intentions to provide adequate, albeit reduced, continuing spectrum for the FS. We note that BSS is a rapidly growing service, and that additional spectrum will be needed for BSS within the next decade.[207] We also recognize: (1) the importance of preserving terrestrial fixed service spectrum to continue supporting important existing terrestrial fixed service operations in the 17.7-17.8 GHz band; (2) the need to provide spectrum for the migration of terrestrial fixed services into that band; and (3) the need to provide for the growth of the 24 GHz Service.

98. In order to provide for maximum availability of all these services to the public, we conclude that a band segmentation approach will ensure that the BSS will be able to provide downlink service to the general public in an exclusive allocation and the fixed service will similarly be able to maintain existing services in the 17.7-17.8 GHz band. We recognize that the ubiquitous nature of BSS services (such services are defined as links from the satellite to the general public) [208] preclude successful coordination with a terrestrial service that is similarly widespread.[209] In this *Report and* Order, we also adopt a co-primary allocation to the GSO/FSS at 25.05-25.25 GHz, limited to BSS feeder links, in order to give full accommodation of spectrum needs to all services. We note that the successful implementation of this allocation will require the development of sharing criteria that will be considered in a future rulemaking proceeding.

99. In the *18 GHz NPRM*, we recognized that allocating spectrum at 17.3-17.8 GHz and 24.75-25.25 GHz will conform this band plan to the ITU Region 2 allocation of BSS spectrum at 17.3-17.8 GHz.[210] ITU footnote S5.517 provides that the international Region 2 allocation for

[206] *See* letter from William T. Hatch of the NTIA to to Dale M. Hatfield Of the FCC, dated March 29, 2000.

[207] *See* DIRECTV Comments at 6, Reply Comments at 5 (citing News Release, "Commission Adopts Fifth Annual Report on Competition in Video Markets" (rel. Dec. 17, 1998) ("Competition Report News Release")) ("Just days ago, the Commission observed that cable operators continue to dominate some 85% of the multichannel video programming distribution ("MVPD") market, and correspondingly, that DBS operators are the best hope of diminishing cable's market power.").

[208] Because BSS services are provided to the general public, they are by definition ubiquitously licensed, a condition clearly incompatible with sharing the band with another widely distributed service.

[209] We also note that the U.S. government plans to eventually remove its radiolocation systems that currently operate in the 17.3-17.7 GHz band. In the event that all of these stations are not relocated prior to the implementation of the BSS service, the Commission will work with the NTIA to ensure an orderly transition. *See* letter from "Hatch to Hatfield."

[210] *See 18 GHz NPRM* at n. 116.

BSS will not take effect until April 1, 2007.[211] 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 further constrain the use of the band prior to that date.[212] While we do not believe that implementing the allocation immediately would be prudent,[213] we agree to make the decision now to make an allocation that will be effective April 2007, so as to provide all parties with sufficient notice and time to design their systems to use this spectrum in the most efficient manner. Therefore, within this context, we decide now to make the downlink BSS and GSO/FSS allocations effective April 1, 2007. We are, however, stopping the allocation for the BSS at 17.7 GHz. This will provide 400 MHz of spectrum to the BSS at 17.3-17.7 GHz. Considering the amount of spectrum being lost by the fixed service as a result of this proceeding, we believe it is important to keep as much spectrum available to the terrestrial fixed service as possible, for as long as possible, to help in the relocation of displaced facilities. If, as we proceed with the terrestrial fixed service relocation efforts at 18 GHz and begin the process of developing service rules for the 17 GHz BSS, we determine that terrestrial fixed relocation spectrum requirements are not as demanding as predicted, we may re-examine the availability of all or a part of the 17.7-17.8 GHz band for BSS applications. Given the record of this proceeding, however, we must at this time ensure that this spectrum is available for terrestrial fixed service operations.

F. 4.5 Degree Spacing

100. In its comments, DIRECTV proposes a 4.5º spacing environment in the 17.3-17.7 GHz band.[214] We find that it is premature to adopt 4.5º spacing because these allocations will not become effective for some time and because such spacing might unduly restrict the ability to share the band.[215] Additionally, there could be significant changes in technology during this period. Thus, we will address orbital spacing in a future proceeding that relates to service rules for this new allocation.[216]

101. Further, we defer any decision on a pfd for this primary downlink band pending a future BSS rulemaking.

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[211] *See id.* at ¶ 79.

[212] *See 18 GHz NPRM* ¶ 79; *see also* DIRECTV Comments at 12.

[213] Current U. S. Government operations of radiolocation systems in this band make the implementation of BSS service problematic prior to the year 2007.

[214] *See* DIRECTV Comments at 12, n.31.

[215] Because we have decided that fixed station receivers may be pointed within 2 degrees of a space station, the greater the number of permissible space station locations the greater the number of cases where a fixed station would need to balance the potential costs and benefits of pointing at the orbit.

[216] Because the problem of interference increases when the orbital spacing is reduced to 4.5º from 9º , more existing terrestrial fixed systems will potentially be pointing at the orbit, which in turn would result in greater expense to the BSS operator to repoint or relocate those systems. *See supra* ¶¶ 12-13.

G. 24.75-25.25 GHz Uplink

102. In the *18 GHz NPRM*, we proposed a primary sub-band at 24.75-25.05 GHz and a co-primary sub-band at 25.05-25.25 GHz. In this *Report and Order*, we adopt these allocations to provide the spectrum necessary for this service. We limit the FSS allocation at 24.75-25.25 GHz to feeder links to the BSS. As in the case of the 18.3-18.58 GHz bands, in order to ensure successful sharing and an interference-free environment, we have decided to adopt an allocation structure that ensures such success. The success of sharing depends upon the prudent design and placement of earth stations and future 24 GHz Service stations, and the pointing of fixed station receivers with respect to transmitting earth stations. Because interference can only be experienced at the receiver, and the only terrestrial receivers in the shared band are at the 24 GHz Service station hubs, and not at the locations of the 24 GHz Service users,[217] we will resolve this situation with a requirement for coordination rather than limiting the number of earth stations.

103. Because the location of earth stations is not known at this time 24 GHz Service receivers can not be set up now to avoid them. While we will require coordination for both services, we cannot specify the coordination trigger at this time. While we believe we should make a decision on the allocation to the FSS feeder link now, we do not make it effective until April 1, 2007, to correspond to the downlink allocations that the service will feed. It is our further goal to minimize the impacts on both services in a sharing environment.

104. We believe that the operational characteristics of the 24 GHz Service may provide solutions to potential interference received from earth station transmitters and that avoiding the pointing of fixed station transmitters at the orbit should eliminate space station interference.[218] The nature of these characteristics is deferred to a future service rules proceeding for the FSS feeder links.

105. The Commission also recognizes the parallel events affecting the 24 GHz Service operations at 24 GHz and notes that an NPRM concerning service rules for the 24 GHz Service has just been released.[219] We also note that the rules relevant to 24 GHz Service stations in this proceeding are subject to the outcome of the 24 GHz Service rules proceeding.

106. We stress that while the full extent of interference between the 24 GHz Service and FSS stations providing feeder links for BSS is not known at this time, we believe sharing is feasible because of the limited number of expected BSS feeder link stations and the fact that potential interference to the 24 GHz Service would be experienced only at the hub receivers and not by the 24 GHz Service subscribers.[220] Therefore, by adopting a shared allocation we establish

[217] 24 GHZ SERVICE user receivers are in primary spectrum at 24.25-24.45 GHz, a band that is not the subject of this proceeding.

[218] This proceeding deals only with allocation issues for these new BSS and FSS services. We must establish service rules before these services may be implemented.

[219] *See 24 GHz Service Notice of Proposed Rulemaking*, 64 FR 71088, dated December 20, 1999.

[220] 24 GHz Service subscribers receive signals from the 24 GHZ SERVICE hubs on frequencies outside of the band this *Report and Order* adopts for BSS feeder links.

the basis for both services to provide service to the public in this band, a balance that can be struck between the competing interests of BSS/FSS and fixed services.[221] We find it in the public interest to give each industry a large part of the whole rather than barring either service completely from a given allocation. Because sharing is possible, we implement a sharing environment so as to provide the most efficient use of the spectrum, thereby ensuring the greatest possibility of public choice and resultant competition between services.

V. PROCEDURAL INFORMATION

107. *Final Regulatory Flexibility Analysis.* The Final Regulatory Flexibility Analysis for this *Report and Order*, pursuant to the Regulatory Flexibility Act, 5 U.S.C. § 604, is contained in Appendix B.

108. For further information concerning this proceeding, contact Steve Selwyn at (202) 418-2160, internet: sselwyn@fcc.gov, International Bureau, Federal Communications Commission, Washington, DC 20554.

VI. ORDERING CLAUSES

109. IT IS ORDERED that, pursuant to Sections 1, 4(i), 4(j), 301, 302, 303(c), 303(e), 303(f), 303(r) and 403 of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 154(i), 154(j), 301, 302, 303(c), 303(e), 303(f), 303(r), and 403, this *Report and Order* IS ADOPTED and that Parts 2, 25, 74, 76, and 101 of the Commission's Rules ARE AMENDED, as specified in Appendix A, effective 30 days after publication in the Federal Register.

110. IT IS FURTHER ORDERED that the Regulatory Flexibility Analysis, as required by Section 604 of the Regulatory Flexibility Act and as set forth in Appendix B, IS ADOPTED.

111. IT IS FURTHER ORDERED that the Commission's Consumer Information Bureau SHALL SEND a copy of this *Report and Order*, including the Final Regulatory Flexibility Analysis to the Chief Counsel for Advocacy of the Small Business Administration.

[221] The precise conditions for sharing between these two services will be established in a future rulemaking implementing the 17.3-17.7 GHz BSS service and associated feeder links.

112. IT IS FURTHER ORDERED that this proceeding is terminated pursuant to Sections 4i and 4j of the Communications Act of 1934, as amended, 47 U.S.C. Sections 154(i) and 154(j).

FEDERAL COMMUNICATIONS COMMISSION

Magalie Roman Salas
Secretary

APPENDIX A: Final Rules

For the reasons set forth in the preamble, parts 2, 21, 25, 74, 78, and 101 of title 47 of the Code of Federal Regulations are amended as follows:

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

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

AUTHORITY: 47 U.S.C. 154, 302, 303, 307, 336, and 337, unless otherwise noted.

2. Amend § 2.106 as follows:

a. Revise pages 67, 68, 69, 70, 71, and 72 of the Table of Frequency Allocations.
b. In the list of United States footnotes, revise footnotes US 255 and US334.
c. In the list of non-Federal government footnotes, revise footnote NG144 and add footnotes NG163, NG164, NG165, NG166, and NG167 .

The additions and revisions read as follows:

§ 2.106 Table of Frequency Allocations.

14.5-18.3 GHz (SHF) Page 67

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
14.5-14.8 FIXED FIXED-SATELLITE (Earth-to-space) S5.510 MOBILE Space research			14.5-14.7145 FIXED Mobile Space research	14.5-15.1365	
			14.7145-15.1365 MOBILE Fixed Space research US310	14.7145-15.1365 US310	
14.8-15.35 FIXED MOBILE Space research S5.339			15.1365-15.35 FIXED Mobile Space research S5.339 US211	15.1365-15.35 S5.339 US211	
15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340 S5.511			15.35-15.4 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
15.4-15.43 AERONAUTICAL RADIONAVIGATION S5.511D			15.4-15.7 AERONAUTICAL RADIONAVIGATION US260		Aviation (87)
15.43-15.63 FIXED SATELLITE (space-to-Earth) (Earth-to-space) S5.511A AERONAUTICAL RADIONAVIGATION S5.511C					
15.63-15.7 AERONAUTICAL RADIONAVIGATION S5.511D			733 797 US211		
15.7-16.6 RADIOLOCATION S5.512 S5.513			15.7-16.6 RADIOLOCATION US110 G59	15.7-17.2 Radiolocation US110	Private Land Mobile (90)

16.6-17.1 RADIOLOCATION Space research (deep space) (Earth-to-space) S5.512 S5.513			16.6-17.1 RADIOLOCATION US110 G59 Space research (deep space) (Earth-to-space)		
17.1-17.2 RADIOLOCATION S5.512 S5.513			17.1-17.2 RADIOLOCATION US110 G59		
17.2-17.3 EARTH EXPLORATION-SATELLITE (active) RADIOLOCATION SPACE RESEARCH (active) S5.512 S5.513 S5.513A			17.2-17.3 RADIOLOCATION US110 G59 Earth exploration-satellite (active) Space research (active)	17.2-17.3 Radiolocation US110 Earth exploration-satellite (active) Space research (active)	
17.3-17.7 FIXED-SATELLITE (Earth-to-space) S5.516 Radiolocation S5.514	17.3-17.7 FIXED-SATELLITE (Earth-to-space) S5.516 BROADCASTING-SATELLITE Radiolocation S5.514 S5.515 S5.517	17.3-17.7 FIXED-SATELLITE (Earth-to-space) S5.516 Radiolocation S5.514	17.3-17.7 Radiolocation US259 G59	17.3-17.7 FIXED-SATELLITE (Earth-to-space) US271 BROADCASTING-SATELLITE NG163 US259	Satellite Communications (25) Direct Broadcast Satellite (100)
17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) S5.484A (Earth-to-space) S5.516 MOBILE	17.7-17.8 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-to-space) S5.516 BROADCASTING-SATELLITE Mobile S5.518 S5.515 S5.517	17.7-18.1 FIXED FIXED-SATELLITE (space-to-Earth) S5.484A (Earth-to-space) S5.516 MOBILE	17.7-17.8	17.7-17.8 FIXED FIXED-SATELLITE (Earth-to-space) US271 NG144	Satellite Communications (25) Auxiliary Broadcasting (74) Cable TV Relay (78) Fixed Microwave (101)
	17.8-18.1 FIXED FIXED-SATELLITE (space-to-Earth) S5.484A (Earth-to-space) S5.516 MOBILE		17.8-18.3 FIXED-SATELLITE (space-to-Earth) G117 S5.519 US334	17.8-18.3 FIXED S5.519 US334 NG144	Auxiliary Broadcasting (74) Cable TV Relay (78) Fixed Microwave (101)
18.1-18.4 FIXED FIXED-SATELLITE (space-to-Earth) S5.484A (Earth-to-space) S5.520 MOBILE S5.519 S5.521			See next page for 18.3-18.6 GHz	See next page for 18.3-18.58 GHz	See next page for 18.3-18.58 GHz

18.3-22.5 GHz (SHF) Page 69

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
See previous page for 18.1-18.4 GHz			18.3-18.6 FIXED-SATELLITE (space-to-Earth) G117	18.3-18.58 FIXED FIXED-SATELLITE (space-to-Earth) NG164 US334 NG144	Satellite Communications (25) Auxiliary Broadcast. (74) Cable TV Relay (78) Fixed Microwave (101)
18.4-18.6 FIXED FIXED-SATELLITE (space-to-Earth) S5.484A MOBILE			US334	18.58-18.6 FIXED-SATELLITE (space-to-Earth) NG164 US334 NG144	Satellite Communications (25)
18.6-18.8 FIXED FIXED-SATELLITE (space-to-Earth) S5.523 MOBILE except aeronautical mobile Earth exploration-satellite (passive) Space research (passive) S5.522	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED FIXED-SATELLITE (space-to-Earth) S5.523 MOBILE except aeronautical mobile SPACE RESEARCH (passive) S5.222	18.6-18.8 FIXED FIXED-SATELLITE (space-to-Earth) S5.523 MOBILE except aeronautical mobile Space research (passive) S5.522	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 G117 SPACE RESEARCH (passive) US254 US334	18.6-18.8 EARTH EXPLORATION-SATELLITE (passive) FIXED-SATELLITE (space-to-Earth) US255 NG164 SPACE RESEARCH (passive) US254 US334 NG144	
18.8-19.3 FIXED FIXED-SATELLITE (space-to-Earth) S5.523A MOBILE			18.8-20.2 FIXED-SATELLITE (space-to-Earth) G117	18.8-19.3 FIXED-SATELLITE (space-to-Earth) NG165 US334 NG144	
19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) (Earth-space) S5.523B S5.523C S5.523D S5.523E MOBILE				19.3-19.7 FIXED FIXED-SATELLITE (space-to-Earth) NG166 US334 NG144	Satellite Communications (25) Auxiliary Broadcast. (74) Cable TV Relay (78) Fixed Microwave (101)
19.7-20.1 FIXED-SATELLITE (space-to-Earth) S5.484A Mobile-satellite (space-to-Earth) S5.524	19.7-20.1 FIXED-SATELLITE (space-to-Earth) S5.484A MOBILE-SATELLITE (space-to-Earth) S5.524 S5.525 S5.526 S5.527 S5.528 S5.529	19.7-20.1 FIXED-SATELLITE (space-to-Earth) S5.484A Mobile-satellite (space-to-Earth) S5.524		19.7-20.1 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.525 S5.526 S5.527 S5.528 S5.529 US334	Satellite Communications (25)

20.1-20.2 FIXED-SATELLITE (space-to-Earth) S5.484A MOBILE-SATELLITE (space-to-Earth) S5.524 S5.525 S5.526 S5.527 S5.528			US334	20.1-20.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) S5.525 S5.526 S5.527 S5.528 US334	
20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) S5.524			20.2-21.2 FIXED-SATELLITE (space-to-Earth) MOBILE-SATELLITE (space-to-Earth) Standard frequency and time signal-satellite (space-to-Earth) G117	20.2-21.2 Standard frequency and time signal-satellite (space-to-Earth)	
21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive)			21.2-21.4 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE SPACE RESEARCH (passive) US263		Fixed Microwave (101)
21.4-22 FIXED MOBILE BROADCASTING-SATELLITE S5.530	21.4-22 FIXED MOBILE	21.4-22 FIXED MOBILE BROADCASTING-SATELLITE S5.530 S5.531	21.4-22 FIXED MOBILE		
22-22.21 FIXED MOBILE except aeronautical mobile S5.149			22-22.21 FIXED MOBILE except aeronautical mobile S5.149		
22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) S5.149 S5.532			22.21-22.5 EARTH EXPLORATION-SATELLITE (passive) FIXED MOBILE except aeronautical mobile RADIO ASTRONOMY SPACE RESEARCH (passive) S5.149 US263		

22.5-27.5 GHz (SHF) Page 71

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
22.5-22.55 FIXED MOBILE			22.5-22.55 FIXED MOBILE US211		Fixed Microwave (101)
22.55-23.55 FIXED INTER-SATELLITE MOBILE S5.149			22.55-23.55 FIXED INTER-SATELLITE MOBILE S5.149 US278		Satellite Communications (25) Fixed Microwave (101)
23.55-23.6 FIXED MOBILE			23.55-23.6 FIXED MOBILE		Fixed Microwave (101)
23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive) S5.340			23.6-24 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive) US246		
24-24.05 AMATEUR AMATEUR-SATELLITE S5.150			24-24.05 S5.150 US211	24-24.05 AMATEUR AMATEUR-SATELLITE S5.150 US211	ISM Equipment (18) Amateur (97)
24.05-24.25 RADIOLOCATION Amateur Earth exploration-satellite (active) S5.150			24.05-24.25 RADIOLOCATION US110 G59 Earth exploration-satellite (active) S5.150	24.05-24.25 Radiolocation US110 Amateur Earth exploration-satellite (active) S5.150	ISM Equipment (18) Private Land Mobile (90) Amateur (97)
24.25-24.45 FIXED	24.25-24.45 RADIONAVIGATION	24.25-24.45 RADIONAVIGATION FIXED MOBILE	24.25-24.45	24.25-24.45 RADIONAVIGATION FIXED	Aviation (87) Fixed Microwave (101)

24.45-24.75 FIXED INTER-SATELLITE	24.45-24.65 INTER-SATELLITE RADIONAVIGATION S5.533	24.45-24.65 FIXED INTER-SATELLITE MOBILE RADIONAVIGATION S5.533	24.45-24.65 INTER-SATELLITE RADIONAVIGATION S5.533		Satellite Communications (25)
	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SAT-ELLITE (Earth-to-space)	24.65-24.75 FIXED INTER-SATELLITE MOBILE S5.533 S5.534	24.65-24.75 INTER-SATELLITE RADIOLOCATION-SATELLITE (Earth-to-space)		
24.75-25.25 FIXED	24.75-25.25 FIXED-SATELLITE (Earth-to-space) S5.535	24.75-25.25 FIXED FIXED-SATELLITE (Earth-to-space) S5.535 MOBILE S5.534	24.75-25.05 RADIONAVIGATION	24.75-25.05 FIXED-SATELLITE (Earth-to-space) NG167 RADIONAVIGATION	Satellite Communications (25) Aviation (87)
			25.05-25.25	25.05-25.25 FIXED-SATELLITE (Earth-to-space) NG167 FIXED RADIONAVIGATION	Satellite Communications (25) Aviation (87) Fixed Microwave (101)
25.25-25.5 FIXED INTER-SATELLITE S5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)			25.25-25.5 FIXED MOBILE Standard frequency and time signal-satellite (Earth-to-space)	25.25-27 Standard frequency and time signal-satellite (Earth-to space) Earth exploration-satellite (space-to-space)	Note: In its *Manual*, NTIA has added a primary inter-satellite service allocation to the band 25.25-27.5 GHz, limited the use of this allocation by adopting footnote S5.536, and has changed the directional indicator for the Earth exploration-satellite service allocation in the band 25.5-27 GHz from space-to-space to space-to-Earth.
25.5-27 EARTH EXPLORATION-SATELLITE (space-to-Earth) S5.536A S5.536B FIXED INTER-SATELLITE S5.536 MOBILE Standard frequency and time signal-satellite (Earth-to-space)			25.5-27 FIXED MOBILE Standard frequency and time signal-satellite (Earth-to-space) Earth exploration-satellite (space-to-space)		
27-27.5 FIXED INTER-SATELLITE S5.536 MOBILE	27-27.5 FIXED FIXED-SATELLITE (Earth-to-space) INTER-SATELLITE S5.536 S5.537 MOBILE		27-27.5 FIXED MOBILE	27-27.5 Earth exploration-satellite (space-to-space)	

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United States (US) Footnotes

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US255 In addition to any other applicable limits, the power flux-density across the 200 MHz band 18.6-18.8 GHz produced at the surface of the Earth by emissions from a space station under assumed free-space propagation conditions shall not exceed -95 dB(W/m2) for all angles of arrival. This limit may be exceeded by up to 3 dB for no more than 5% of the time.

* * * * *

US334 In the band 17.8-20.2 GHz, Government space stations in both geostationary (GSO) and non-geostationary satellite orbits (NGSO) and associated earth stations in the fixed-satellite service (space-to-Earth) 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 West Longitude to 120 West Longitude. Coordination between Government fixed-satellite systems and non-Government space and terrestrial systems operating in accordance with the United States Table of Frequency Allocations is required.

(a) In the sub-band 17.8-19.7 GHz, the power flux-density at the surface of the Earth produced by emissions from a Government GSO space station or from a Government space station in a NGSO constellation of 50 or fewer satellites, for all conditions and for all methods of modulation, shall not exceed the following values in any 1 MHz band:

(1) -115 dB(W/m^2) for angles of arrival above the horizontal plane (δ) between 0° and 5°,

(2) $-115 + 0.5(\delta - 5)$ dB(W/m^2) for δ between 5° and 25°, and

(3) -105 dB(W/m^2) for δ between 25° and 90°.

(b) In the sub-band 17.8-19.3 GHz, the power-flux density at the surface of the Earth produced by emissions from a Government space station in an NGSO constellation of 51 or more satellites, for all conditions and for all methods of modulation, shall not exceed the following values in any 1 MHz band:

(1) $-115 - X$ dB(W/m^2) for δ between 0° and 5°,

(2) $-115 - X + ((10 + X)/20)(\delta - 5)$ dB(W/m^2) for δ between 5° and 25°, and

(3) -105 dB(W/m^2) for δ between 25° and 90°; where X is defined as a function of the number of satellites, n, in an NGSO constellation as follows:

For $n \leq 288$, $X = (5/119)(n - 50)$ dB; and

For $n > 288$, $X = (1/69)(n + 402)$ dB.

* * * * *

Non-Federal Government (NG) Footnotes

* * * * *

NG144 Stations authorized as of September 9, 1983 to use frequencies in the bands 17.7-18.58 GHz and 19.3-19.7 GHz may, upon proper application, continue operations. Fixed stations authorized in the band 18.58-19.3 GHz that remain co-primary under the provisions of §§

21.901(e), 74.502(c), 74.602(g), 78.18(a)(4), and 101.174(r) may continue operations consistent with the provisions of those sections.

* * * * *

NG163 The allocation to the broadcasting-satellite service in the band 17.3-17.7 GHz shall come into effect on 1 April 2007.

NG164 The use of the band 18.3-18.8 GHz by the fixed-satellite service (space-to-Earth) is limited to systems in the geostationary-satellite orbit.

NG165 The use of the band 18.8-19.3 GHz by the fixed-satellite service (space-to-Earth) is limited to systems in non-geostationary-satellite orbits.

NG166 The use of the band 19.3-19.7 GHz by the fixed-satellite service (space-to-Earth) is limited to feeder links for the mobile-satellite service.

NG167 The use of the fixed-satellite service (Earth-to-space) in the band 24.75-25.25 GHz is limited to feeder links for the broadcasting-satellite service operating in the band 17.3-17.7 GHz. The allocation to the fixed-satellite service (Earth-to-space) in the band 24.75-25.25 shall come into effect on 1 April 2007.

* * * * *

PART 21--DOMESTIC PUBLIC FIXED RADIO SERVICES

3. The authority citation for part 21 continues to read as follows:

AUTHORITY: Secs. 1, 2, 4, 201-205, 208, 215, 218, 303, 307, 313, 403, 404, 410, 602, 48 Stat. as amended, 1064, 1066, 1070-1073, 1076, 1077, 1080,1082, 1083, 1087, 1094, 1098, 1102; 47U.S.C. 151, 154, 201-205, 208, 215, 218, 303, 307, 313, 314, 403, 404, 602; 47 U.S.C. 552, 554.

4. Section 21.901 is amended by revising paragraph (e) to read as follows:

§ 21.901 Frequencies

* * * * *

(e) Frequencies in the band segments 18,580-18,820 MHz and 18,920-19,160 MHz that were licensed or had applications pending before the Commission as of September 18, 1998 may continue those operations for point-to-point return links from a subscriber's location on a shared co-primary basis with other services under Parts 25, 74, 78 and 101 of the Commission's rules until (date 10 years from adoption of this R&O). Prior to this date, such stations are subject to relocation by licensees in the fixed-satellite service. Such relocation is subject to the provisions of §§ 101.85 through 101.97. After this date, such operations are not entitled to protection from fixed-satellite service operations and must not cause unacceptable interference to fixed-satellite service station operations. No new licenses will be granted in these bands after (date of the adoption of the R&O).

* * * * *

PART 25--SATELLITE COMMUNICATIONS

5. 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.

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

§ 25.115 Application for earth station authorizations.

* * * * *

(e) *Earth stations operating in the 20/30 GHz Fixed-Satellite Service with U.S.-licensed or non-U.S. licensed satellites:* Applications to license individual earth stations operating in the 20/30 GHz band shall be filed on FCC Form 312, Main Form and Schedule B, and shall also include the information described in §25.138. Earth stations belonging to a network operating in the 18.58-18.8 GHz, 19.7-20.2 GHz, 28.35-28.6 GHz or 29.5-30.0 GHz bands may be licensed on a blanket basis. Applications for such blanket authorization may be filed using FCC Form 312, Main Form and Schedule B, and specifying the number of terminals to be covered by the blanket license. Each application for a blanket license under this section shall include the information described in §25.138.

7. A new section 25.138 is added to read as follows:

§ 25.138 Blanket Licensing Provisions of GSO FSS Earth Stations in the 18.58-18.8 GHz (space-to-Earth), 19.7–20.2 GHz (space-to-Earth), 28.35-28.6 GHz (Earth-to-space) and 29.5–30.0 GHz (Earth-to-space) bands.

(a) All applications for a blanket earth station license in the GSO FSS in the 18.58-18.8 GHz, 19.7–20.2 GHz, 28.35-28.6 GHz and 29.5–30.0 GHz bands that meet the following requirements shall be routinely processed:

(1) GSO FSS earth station antenna off-axis EIRP spectral density for co-polarized signals shall not exceed the following values, within ±3° of the GSO arc, under clear sky conditions:

$18.5 - 25\log(\theta) - 10\log(N)$	dBW/40kHz	for $2.0° \le \theta \le 7°$
$-2.63 - 10\log(N)$	dBW/40kHz	for $7° \le \theta \le 9.23°$
$21.5 - 25\log(\theta) - 10\log(N)$	dBW/40kHz	for $9.23° \le \theta \le 48°$
$-10.5 - 10\log(N)$	dBW/40kHz	for $48° < \theta \le 180°$

where θ is the angle in degrees from the axis of the main lobe; for systems where more than one earth station is expected to transmit simultaneously in the same bandwidth, e.g., CDMA systems, N is the likely maximum number of simultaneously transmitting co-frequency earth stations in the receive beam of the satellite; N=1 for TDMA and FDMA systems.

(2) GSO FSS earth station antenna off-axis EIRP spectral density for co-polarized signals shall not exceed the following values, for all directions other than within ±3° of the GSO arc, under clear sky conditions:

$21.5 - 25\log(\theta) - 10\log(N)$	dBW/40kHz	for $3.5° \le \theta \le 7°$
$0.37 - 10\log(N)$	dBW/40kHz	for $7° < \theta \le 9.23°$
$24.5 - 25\log(\theta) - 10\log(N)$	dBW/40kHz	for $9.23° < \theta \le 48°$
$-7.5 - 10\log(N)$	dBW/40kHz	for $48° < \theta \le 180°$

where θ is the angle in degrees from the axis of the main lobe; for systems where more than one earth station is expected to transmit simultaneously in the same bandwidth, e.g., CDMA systems,

N is the likely maximum number of simultaneously transmitting co-frequency earth stations in the receive beam of the satellite; N=1 for TDMA and FDMA systems.

(3) The values given in (1) and (2) above may be exceeded by 3 dB, for values of $\theta > 10°$, provided that the total angular range over which this occurs does not exceed 20° when measured along both sides of the GSO arc.

(4) GSO FSS earth station antenna off-axis EIRP spectral density for cross-polarized signals shall not exceed the following values, in all directions relative to the GSO arc, under clear sky conditions:

$8.5 - 25\log(\theta) - 10\log(N)$ dBW/40kHz for $2.0° \leq \theta \leq 7°$
$-12.63 - 10\log(N)$ dBW/40kHz for $7° < \theta \leq 9.23°$

where θ is the angle in degrees from the axis of the main lobe; for systems where more than one earth station is expected to transmit simultaneously in the same bandwidth, e.g., CDMA systems, N is the likely maximum number of simultaneously transmitting co-frequency earth stations in the receive beam of the satellite; N=1 for TDMA and FDMA systems.

(5) For earth stations employing uplink power control, the values in (1), (2), and (4) above may be exceeded by up to 20 dB under conditions of uplink fading due to precipitation. The amount of such increase in excess of the actual amount of monitored excess attenuation over clear sky propagation conditions shall not exceed 1.5 dB or 15 % of the actual amount of monitored excess attenuation in dB, whichever is larger, with a confidence level of 90 percent except over transient periods accounting for no more than 0.5% of the time during which the excess is no more than 4.0 dB.

(6) Power-flux density (PFD) at the Earth's surface produced by emissions from a space station for all conditions, including clear sky, and for all methods of modulation shall not exceed a level of –118 dBW/m^2/MHz for the band 19.7-20.2 GHz.

(b) Each applicant for earth station license(s) that proposes levels in excess of those defined in (a) above shall submit link budget analyses of the operations proposed along with a detailed written explanation of how each uplink and each transmitted satellite carrier density figure is derived. Applicants shall also submit a narrative summary which must indicate whether there are margin shortfalls in any of the current baseline services as a result of the addition of the applicant's higher power service, and if so, how the applicant intends to resolve those margin short falls. Applicants shall certify that all potentially affected parties (i.e., those GSO FSS satellite networks that are 2, 4, and 6 degrees apart) acknowledge and do not object to the use of the applicant's higher power densities.

(c) Licensees authorized pursuant to paragraph (b) of this section shall bear the burden of coordinating with any future applicants or licensees whose proposed compliant operations at 6 degrees or smaller orbital spacing, as defined by paragraph (a) of this section, is potentially or actually adversely affected by the operation of the non-compliant licensee. If no good faith agreement can be reached, however, the non-compliant licensee shall reduce its earth station and

space station power density levels to be compliant with those specified in paragraph (a) of this section.

(d) The applicant shall provide for each earth station antenna type, a series of radiation patterns measured on a production antenna performed on a calibrated antenna range and, as a minimum, shall be made at the bottom, middle, and top frequencies of the 30 GHz band. The radiation patterns are:

(1) Co-polarized patterns for each of two orthogonal senses of polarizations in two orthogonal planes of the antenna.

(i) In the azimuth plane, plus and minus 10 degrees and plus and minus 180 degrees.

(ii) In the elevation plane, zero to 30 degrees.

(2) Cross-polarization patterns in the E- and H-planes, plus and minus 10 degrees

(3) Main beam gain.

(e) Protection of receive earth stations from adjacent satellite interference is based on either the antenna performance specified in §25.209 (a) and (b), or the actual receiving earth station antenna performance, if actual performance provides greater isolation from adjacent satellite interference. For purposes of insuring the correct level of protection, the applicant shall provide, for each earth station antenna type, the antenna performance plots for the 20 GHz band, including the format specified in subsection (d)(1-3) of this section.

(f) The earth station licensee shall not transmit towards a GSO FSS satellite unless it has prior authorization from the satellite operator or a space segment vendor authorized by the satellite operator. The specific transmission shall be conducted in accordance with the operating protocol specified by the satellite operator.

(g) A licensee applying to renew its license must include on FCC Form 405 the number of constructed earth stations.

8. Section 25.145 is amended by adding a new subparagraphs (g)(4) and new paragraphs (h) and (i) to read as follows:

§ 25.145 Licensing conditions for the Fixed-Satellite Service in the 20/30 GHz bands

* * * * *

(g) * * * * *

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(4) Licensees shall submit to the Commission a yearly report indicating the number of earth stations actually brought into service under its blanket licensing authority. The annual report is due to the Commission no later than the first day of April of each year and shall indicate the deployment figures for the preceding calendar year.

(h) Policy governing the relocation of terrestrial services from the 18.58 to 19.3 GHz band: Frequencies in the 18.58-19.3 GHz band listed in Parts 21, 74, 78, and 101 of this chapter have been reallocated for primary use by the Fixed-Satellite Service, subject to various provisions for the existing terrestrial licenses. In accordance with procedures specified in §§ 101.85 through 101.97 of this chapter, Fixed-Satellite Service licensees are required to relocate the existing co-primary terrestrial licensees in these bands if interference to those operations would occur during the period that the terrestrial stations remain co-primary and the terrestrial antenna is pointing within 2 degrees of the GSO satellite. Additionally, Fixed-Satellite Service operations are not entitled to protection from the co-primary operations until after that period has expired. (see §§ 21.901(e), 74.502(c), 74.602(g), 78.18(a)(4), and 101.147(r))

(i) Protection of fixed services receivers in the 18.3-19.3 GHz band

For purposes of this section, FSS space stations operating in accordance with the power-flux density limits of § 25.208 are considered not to cause unacceptable interference to fixed service receivers that are pointed more than 2 degrees from the FSS space station.

(1) 18.3-18.58 GHz: FSS space stations transmitting in the 18.3-18.58 GHz band may not cause unacceptable interference to fixed service receive stations that were licensed or for which an application was pending prior to (date of adoption of R&O)

(2) 18.58-18.8 GHz: FSS space stations transmitting in the 18.58-18.8 GHz band may not cause unacceptable interference to fixed service receive stations that were licensed or for which an application was pending prior to September 18, 1998. After (date 10 years from adoption of R&O), such fixed station receivers are no longer afforded protection from FSS space stations operating in accordance with § 25.208 and the fixed station transmitters shall not cause harmful interference to the GSO FSS receiving earth stations.

(3) 18.8-19.3 GHz: FSS space stations transmitting in the 18.8-19.3 GHz band may not cause unacceptable interference to fixed service receive stations that were licensed or for which an application was pending prior to [adoption date of R&O]. After (date 10 years from adoption of R&O), such fixed station receivers (except those operating in 19.26-19.3 GHz) are no longer afforded protection from FSS space stations operating in accordance with § 25.208.

9. Section 25.202(a)(1) is amended to read as follows:

§ 25.202 Frequencies, frequency tolerance and emission limitations.

(a)(1) Frequency bands. The following frequencies are available for use by the fixed-satellite service. Precise frequencies and bandwidths of emission shall be assigned on a case-by-case basis.

Space-to-Earth (GHz)	Earth-to-space (GHz)
3.7-4.2 [1]	[1]5.925-6.425
10.95-11.2[1]	[4]13.75-14.0
11.45-11.7[2]	[5]14.0-14.2
11.7-12.2[3]	14.2-14.5
	[9]17.3-17.8
18.3-18.58[1,10]	
18.58-18.8[6,10,11]	
18.8-19.3[7,10]	
19.3-19.7[8,10]	[1]27.5-29.5
19.7-20.2[10]	29.5-30.0

[1] This band is shared coequally with terrestrial radiocommunication services.
[2] Use of this band by the fixed-satellite service is limited to international systems, i.e., other than domestic systems.
[3] Use of this band by the fixed-satellite service in Region 2 is limited to national and subregional systems. Fixed-satellite transponders may be used additionally for transmissions in the broadcasting-satellite service.
[4] This band is shared on an equal basis with the Government radiolocation service, grandfathered space stations in the Tracking and Data Relay Satellite System, and until January 1, 2000, spaceborne sensors.
[5] In this band, stations in the radionavigation service shall operate on a secondary basis to the fixed-satellite service.
[6] The band 18.58-18.8 GHz is shared co-equally with existing terrestrial radiocommunications systems until (a date 10 years after the release of the R&O)
[7] The band 18.8-19.3 GHz is shared co-equally with terrestrial radiocommunications services until [10 years after adoption date of R&O]. After this date, the sub-band 19.26-19.3 GHz is shared co-equally with existing terrestrial radiocommunications systems.
[8] The use of the band 19.3-19.7 GHz by the Fixed-Satellite Service (space-to-Earth) is limited to feeder links for the Mobile-Satellite Service
[9] The use of the band 17.3-17.8 GHz by the Fixed-Satellite Service (Earth-to-space) is limited to feeder links for broadcasting-satellite service, and the sub-band 17.7-17.8 GHz is shared co-equally with terrestrial fixed services.
[10] This band is shared co-equally with the Federal Government Fixed-Satellite Service.
[11] The band 18.6-18.8 GHz is shared co-equally with the non-Federal Government and Federal Government Earth Exploration-Satellite (passive) and Space Research (passive) Services.

* * * * *

10. Section 25.208 is amended by modifying paragraph (c) and adding new paragraphs (d), (e) and (f) to read as follows:

§ 25.208 Power-flux density limits.

* * * * *

(c) In the 19.3-19.7 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:

(1) -115 dB (W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane.
(2) -115+0.5 (d-5) dB (W/m^2) in any 1 MHz band for angles of arrival d (in degrees) between 5 and 25 degrees above the horizontal plane.
(3) -105 dB (W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

(d) In the 18.3-18.8 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:

(1) -118 dB (W/m^2) in any 1 MHz band for angles of arrival between 0 and 5 degrees above the horizontal plane.
(2) -118+0.65 (d-5) dB (W/m^2) in any 1 MHz band for angles of arrival d (in degrees) between 5 and 25 degrees above the horizontal plane.
(3) -105 dB (W/m^2) in any 1 MHz band for angles of arrival between 25 and 90 degrees above the horizontal plane.

(e) In addition to the limits specified in subparagraph (d) of this section, the power flux-density across the 200 MHz band 18.6-18.8 GHz produced at the Earth's surface by emissions from a space station under assumed free-space propagation conditions shall not exceed -95 dB(W/m^2) for all angles of arrival. This limit may be exceeded by up to 3 dB for no more than 5% of the time.
(f) In the 18.8-19.3 GHz frequency band, 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:

$-115 - X$ dB($W/m^2 \cdot MHz$)	for $0° \le \delta < 5°$
$-115 - X + ((10 + X)/20)(\delta - 5)$dB($W/m^2 \cdot MHz$)	for $5° \le \delta < 25°$
-105 dB($W/m^2 \cdot MHz$)	for $25° \le \delta < 90°$

where δ is the angle of arrival above the horizontal plane and X is defined as a function of the number of satellites in the non-GSO FSS constellation, n, as follows:

for $n \le 50$ $X = 0$ (dB)

for $50 < n \leq 288$ $X = (5/119)(n - 50)$ (dB)
for $n > 288$ $X = (1/69)(n + 402)$ (dB)

11. Section 25.251(a) is modified to read as follows:

§ 25.251 Special requirements for coordination

(a) The administrative aspects of the coordination process are set forth in §§ 101.103(d) of this chapter in the case of coordination of terrestrial stations with earth stations and in § 25.203 in the case of coordination of earth stations with terrestrial stations.

* * * * *

PART 74—EXPERIMENTAL RADIO, AUXILIARY, SPECIAL BROADCAST AND OTHER PROGRAM DISTRIBUTIONAL SERVICES

12. The authority citation for Part 74 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, 303, 307, and 554.

13. Section 74.502(c) is amended to read as follows:

§ 74.502 Frequency assignment.

* * * * *

(c) Aural broadcast STL and intercity relay stations that were licensed or had applications pending before the Commission as of September 18, 1998 may continue those operations in the band 18,760-18,820 and 19,100-19,160 MHz on a shared co-primary basis with other services under Parts 21, 25, and 101 of the Commission's rules until (date 10 years from adoption of this R&O). Prior to this date, such stations are subject to relocation by licensees in the fixed-satellite service. Such relocation is subject to the provisions of §§ 101.85 through 101.97. After this date, such operations are not entitled to protection from fixed-satellite service operations and must not cause unacceptable interference to fixed-satellite service station operations. No new licenses will be granted in these bands after (date of the adoption of the R&O).

(1) 5 MHz maximum authorized bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)

340 MHz Separation

18762.5	19102.5
18767.5	19107.5
18772.5	19112.5
18777.5	19117.5
18782.5	19122.5
18787.5	19127.5
18792.5	19132.5
18797.5	19137.5
18802.5	19142.5
18807.5	19147.5
18812.5	19152.5
18817.5	19157.5

Licensees may use either a two-way link or one frequency of a frequency pair for a one-way link and shall coordinate proposed operations pursuant to the procedures required in Sec. 101.103(d).

* * * * *

14. Section 74.551 is amended by adding a new paragraph (d) to read as follows:

§ 74.551 Equipment changes.

* * * * *

(d) Permissible changes in equipment operating in the bands 18.76-18.82 GHz and 19.1-19.16 GHz:
Notwithstanding other provisions of this section, licensees of stations that remain co-primary under the provisions of Sec. 74.502(c) may not make modifications to their systems that increase interference to satellite earth stations, or result in a facility that would be more costly to relocate.

15. Section 74.602(g) is amended to read as follows:

§ Sec. 74.602 Frequency assignment.

* * * * *

(g) The following frequencies are available for assignment to television STL, television relay stations and television translator relay stations. Stations operating on frequencies in the sub-band 19.26-19.3 GHz that were licensed or had applications pending before the Commission as of September 18, 1998 may continue those operations on a shared co-primary basis with other services under Parts 21, 25, 78, and 101 of the Commission's rules. Such stations, however, are subject to relocation by licensees in the fixed-satellite service. Such relocation is subject to the

provisions of §§ 101.85 through 101.97. No new licenses will be granted in the 19.26-19.3 GHz band after (date of the adoption of the R&O). The provisions of Section 74.604 do not apply to the use of these frequencies. Licensees may use either a two-way link or one or both frequencies of a frequency pair for a one-way link and shall coordinate proposed operations pursuant to procedures required in Sec. 101.103(d).

(1) * * * * *

* * * * *

16. Section 74.638(b) is amended to read as follows:

§ 74.638 Frequency coordination.

* * * * *

(b) Coordination of assignments in the 6425-6525 MHz and 17.7-19.7 GHz bands will be in accordance with the procedure established in Sec. 101.103(d) except that the prior coordination process for mobile (temporary fixed) assignments may be completed orally and the period allowed for response to a coordination notification may be less than 30 days if the parties agree.

17. Section 74.651 is amended by adding a new paragraph (e) to read as follows:

§ 74.651 Equipment changes.

* * * * *

(e) Permissible changes in equipment operating in the band 19.26-19.3 GHz: Notwithstanding other provisions of this section, licensees of stations that remain co-primary under the provisions of Sec. 74.602(g) may not make modifications to their systems that increase interference to satellite earth stations, or result in a facility that would be more costly to relocate.

PART 78—CABLE TELEVISION RELAY SERVICE

18. The authority citation for Part 78 continues to read as follows:

AUTHORITY: Secs. 2, 3, 4, 301, 303, 307, 308, 309, 48 Stat., as amended, 1064, 1065, 1066, 1081, 1082, 1083, 1084, 1085; 47 U.S.C. 152, 153, 154, 301, 303, 307, 308, 309.

19. Section 78.18(a)(4) is amended to read as follows:

§ 78.18 Frequency assignments.

(a) * * * * *

* * * * *

(4) The Cable Television Relay Service is also assigned the following frequencies in the 17,700-19,700 MHz band. These frequencies are co-equally shared with stations in other services under Parts 25, 74, and 101 of the Commission's rules. Cable Television Relay Service stations operating on frequencies in the sub-band 19.26-19.3 GHz that were licensed or had applications pending before the Commission as of September 18, 1998 may continue those operations on a shared co-primary basis with other services under Parts 25, 74, and 101 of the Commission's rules. Such stations, however, are subject to relocation by licensees in the fixed-satellite service. Such relocation is subject to the provisions of §§ 101.85 through 101.97. No new Part 78 licenses will be granted in the 19.26-19.3 GHz band after (date of the adoption of the R&O). Licensees may use either a two-way link or one or both frequencies of a frequency pair for a one-way link and shall coordinate proposed operations pursuant to procedures required in Sec. 101.103(d). These bands may be used for analog or digital modulation.

(i) * * * * *

* * * * *

20. Section 78.36(b) is amended to read as follows:

§ 78.36 Frequency coordination.

* * * * *

(b) 6425-6525 MHz and 17.7-19.7 GHz. Coordination of fixed and mobile assignments will be in accordance with the procedure established in Sec. 101.103(d), except that the prior coordination process for mobile (temporary fixed) assignments may be completed orally and the period allowed for response to a coordination notification may be less than 30 days if the parties agree.

21. Section 78.109 is amended by adding a new paragraph (d) to read as follows:

§ 78.109 Equipment changes.

* * * * *

(d) Permissible changes in equipment operating in the band 19.26-19.3 GHz: Notwithstanding other provisions of this section, licensees of stations that remain co-primary under the provisions of Sec. 78.18(a)(4) may not make modifications to their systems that increase interference to satellite earth stations, or result in a facility that would be more costly to relocate.

PART 101—FIXED MICROWAVE SERVICES

22. The authority citation for Part 101 continues to read as follows:

AUTHORITY: 47 U.S.C. 154, and 303.

23. Section 101.57 is amended by adding a new paragraph (f) to read as follows:

§ 101.57 Modification of station license

* * * * *

(f) Permissible changes in equipment operating in the band 18.58-19.3 GHz: Notwithstanding other provisions of this section, stations that remain co-primary under the provisions of Sec. 101.147(r) may not make modifications to their systems that increase interference to satellite earth stations, or result in a facility that would be more costly to relocate.

24. A new heading is added immediately following section 101.81 to read as follows:

POLICIES GOVERNING FIXED SERVICE RELOCATION FROM THE 18.58-19.30 GHZ BAND

25. A new section 101.85 is added to read as follows:

§ 101.85 Transition of the 18.58-19.3 GHz band from the terrestrial fixed services to the fixed-satellite service (FSS)

Fixed services (FS) frequencies in the 18.58-19.3 GHz bands listed in Secs. 21.901(e), 74.502(c), 74.602(g), 78.18(a)(4), and 101.147(a) and (r) have been allocated for use by the fixed-satellite service (FSS). The rules in this section provide for a transition period during which FSS licensees may relocate existing FS licensees using these frequencies to other microwave bands.

(a) FSS licensees may negotiate with FS licensees authorized to use frequencies in the 18.58-19.30 band for the purpose of agreeing to terms under which the FS licensees would:
(1) Relocate their operations to other fixed microwave bands or other media; or alternatively,
(2) Accept a sharing arrangement with the FSS licensee that may result in an otherwise impermissible level of interference to the FSS operations.

(b)FS operations in the 18.58-19.30 GHz band that remain co-primary under the provisions of §§ 21.901(e), 74.502(c), 74.602(d), 78.18(a)(4), and 101.147(r) will continue to be co-primary with the FSS users of this spectrum until (10 years after date of adoption of R&O) or until the relocation of the fixed service operations, whichever occurs sooner. After this date, only FS operations in the band 19.26-19.3 GHz will continue to be co-primary with the FSS users. Notwithstanding this continued co-primary status, FS users in the 19.26-19.3 GHz band remain

subject to the relocation procedures of §§ 101.85-101.95. If no agreement is reached during the negotiations, an FSS licensee may initiate relocation procedures. Under the relocation procedures, the incumbent is required to relocate, provided that the FSS licensee meets the conditions of Sec. 101.91.

(c) Negotiation periods are defined as follows:
(1) Non-public safety incumbents will have a two-year negotiation period.
(2) Public safety incumbents will have a three-year negotiation period.

26. A new section 101.89 is added to read as follows:

§ 101.89 Negotiations.

(a) The negotiation is triggered by the fixed-satellite service (FSS) licensee, who must contact the fixed services (FS) licensee and request that negotiations begin.

(b) Once negotiations have begun, an FS licensee may not refuse to negotiate and all parties are required to negotiate in good faith. Good faith requires each party to provide information to the other that is reasonably necessary to facilitate the relocation process. In evaluating claims that a party has not negotiated in good faith, the FCC will consider, inter alia, the following factors:
(1) Whether the FSS licensee has made a bona fide offer to relocate the FS licensee to comparable facilities in accordance with Section 101.91(b);
(2) If the FS licensee has demanded a premium, the type of premium requested (e.g., whether the premium is directly related to relocation, such as system-wide relocations and analog-to-digital conversions, versus other types of premiums), and whether the value of the premium as compared to the cost of providing comparable facilities is disproportionate (i.e., whether there is a lack of proportion or relation between the two);
(3) What steps the parties have taken to determine the actual cost of relocation to comparable facilities;
(4) Whether either party has withheld information requested by the other party that is necessary to estimate relocation costs or to facilitate the relocation process.

(c) Any party alleging a violation of our good faith requirement must attach an independent estimate of the relocation costs in question to any documentation filed with the Commission in support of its claim. An independent cost estimate must include a specification for the comparable facility and a statement of the costs associated with providing that facility to the incumbent licensee.

(d) Negotiations will commence when the FSS licensee informs the FS licensee in writing of its desire to negotiate. Negotiations will be conducted with the goal of providing the FS licensee with comparable facilities, defined as facilities possessing the following characteristics:
(1) *Throughput.* Communications throughput is the amount of information transferred within a system in a given amount of time. If analog facilities are being replaced with analog, the FSS licensee is required to provide the FS licensee with an equivalent number of 4 kHz voice channels. If digital facilities are being replaced with digital, the FSS licensee must provide the FS licensee with equivalent data loading bits per second (bps). FSS licensees must provide FS

licensees with enough throughput to satisfy the FS licensee's system use at the time of relocation, not match the total capacity of the FS system.

(2) *Reliability*. System reliability is the degree to which information is transferred accurately within a system. FSS licensees must provide FS licensees with reliability equal to the overall reliability of their system. For digital data systems, reliability is measured by the percent of time the bit error rate (BER) exceeds a desired value, and for analog or digital voice transmissions, it is measured by the percent of time that audio signal quality meets an established threshold. If an analog voice system is replaced with a digital voice system, only the resulting frequency response, harmonic distortion, signal-to-noise ratio and its reliability will be considered in determining comparable reliability.

(3) *Operating costs*. Operating costs are the cost to operate and maintain the FS system. FSS licensees must compensate FS licensees for any increased recurring costs associated with the replacement facilities (e.g., additional rental payments, increased utility fees) for five years after relocation. FSS licensees may satisfy this obligation by making a lump-sum payment based on present value using current interest rates. Additionally, the maintenance costs to the FS licensee must be equivalent to the 18 GHz system in order for the replacement system to be considered comparable.

27. A new section 101.91 is added to read as follows:

§ 101.91 Involuntary relocation procedures.

(a) If no agreement is reached during the negotiations period, an FSS licensee may initiate relocation procedures under the Commission's rules. FSS licensees are obligated to pay to relocate only the specific microwave links from which their systems may receive interference. Under these procedures, the FS licensee is required to relocate, provided that the FSS licensee:

(1) Guarantees payment of relocation costs, including all engineering, equipment, site and FCC fees, as well as any legitimate and prudent transaction expenses incurred by the FS licensee that are directly attributable to the relocation, subject to a cap of two percent of the hard costs involved. Hard costs are defined as the actual costs associated with providing a replacement system, such as equipment and engineering expenses. FSS licensees are not required to pay FS licensees for internal resources devoted to the relocation process. FSS licensees are not required to pay for transaction costs incurred by FS licensees during the negotiations once the negotiation is initiated, or for fees that cannot be legitimately tied to the provision of comparable facilities;

(2) Completes all activities necessary for implementing the replacement facilities, including engineering and cost analysis of the relocation procedure and, if radio facilities are used, identifying and obtaining, on the incumbents' behalf, new microwave frequencies and frequency coordination; and

(3) Builds the replacement system and tests it for comparability with the existing 18 GHz system.

(b) Comparable facilities. The replacement system provided to an incumbent during a relocation must be at least equivalent to the existing FS system with respect to the following three factors:

(1) *Throughput.* Communications throughput is the amount of information transferred within a system in a given amount of time. If analog facilities are being replaced with analog, the FSS licensee is required to provide the FS licensee with an equivalent number of 4 kHz voice

channels. If digital facilities are being replaced with digital, the FSS licensee must provide the FS licensee with equivalent data loading bits per second (bps). FSS licensees must provide FS licensees with enough throughput to satisfy the FS licensee's system use at the time of relocation, not match the total capacity of the FS system.

(2) *Reliability*. System reliability is the degree to which information is transferred accurately within a system. FSS licensees must provide FS licensees with reliability equal to the overall reliability of their system. For digital data systems, reliability is measured by the percent of time the bit error rate (BER) exceeds a desired value, and for analog or digital voice transmissions, it is measured by the percent of time that audio signal quality meets an established threshold. If an analog voice system is replaced with a digital voice system, only the resulting frequency response, harmonic distortion, signal-to-noise ratio and its reliability will be considered in determining comparable reliability.

(3) *Operating costs*. Operating costs are the cost to operate and maintain the FS system. FSS licensees must compensate FS licensees for any increased recurring costs associated with the replacement facilities (e.g., additional rental payments, increased utility fees) for five years after relocation. FSS licensees may satisfy this obligation by making a lump-sum payment based on present value using current interest rates. Additionally, the maintenance costs to the FS licensee must be equivalent to the 18 GHz system in order for the replacement system to be considered comparable.

(c) The FS licensee is not required to relocate until the alternative facilities are available to it for a reasonable time to make adjustments, determine comparability, and ensure a seamless handoff.

(d) If the FS licensee demonstrates to the Commission that the new facilities are not comparable to the former facilities, the Commission may require the FSS licensee to further modify or replace the FS licensee’s equipment.

28. A new section 101.95 is added to read as follows:

§ 101.95 Sunset provisions for licensees in the 18.58-19.26 GHz band.

(a) FSS licensees are not required to pay relocation costs after the relocation rules sunset (see §§ 74.502(c), 74.602(g), 78.18(a)(4), and 101.147(a) and (r)). Once the relocation rules sunset, an FSS licensee may require the incumbent to cease operations, provided that the FSS licensee intends to turn on a system within interference range of the incumbent, as determined by TIA Bulletin 10-F or any standard successor. FSS licensee notification to the affected FS licensee must be in writing and must provide the incumbent with no less than six months to vacate the spectrum. After the six-month notice period has expired, the FS licensee must turn its license back into the Commission, unless the parties have entered into an agreement which allows the FS licensee to continue to operate on a mutually agreed upon basis.

(b) If the parties cannot agree on a schedule or an alternative arrangement, requests for extension will be accepted and reviewed on a case-by-case basis. The Commission will grant such extensions only if the incumbent can demonstrate that:

(1) It cannot relocate within the six-month period (e.g., because no alternative spectrum or other reasonable option is available), and;

(2) The public interest would be harmed if the incumbent is forced to terminate operations (e.g., if public safety communications services would be disrupted).

29. A new section 101.97 is added to read as follows:

§ 101.97 Future licensing in the 18.58-19.30 MHz band.

After (date of adoption of the R&O), all major modifications and extensions to existing FS systems in the 18.58-19.30 band (with the exception of certain low power operations authorized under Sec. 101.147(r)(10)) will be authorized on a secondary basis to FSS systems. All other modifications will render the modified FS license secondary to FSS operations, unless the incumbent affirmatively justifies primary status and the incumbent FS licensee establishes that the modification would not add to the relocation costs for FSS licensees. Incumbent FS licensees will maintain primary status for the following technical changes:
(a) Decreases in power;
(b) Minor changes (increases or decreases) in antenna height;
(c) Minor location changes (up to two seconds);
(d) Any data correction which does not involve a change in the location of an existing facility;
(e) Reductions in authorized bandwidth;
(f) Minor changes (increases or decreases) in structure height;
(g) Changes (increases or decreases) in ground elevation that do not affect centerline height;
(h) Minor equipment changes.

The provisions of § 101.57 are applicable, notwithstanding any other provisions of this section.

30. Section 101.101 is amended to read as follows:

§ 101.101 Frequency availability

Frequency band (MHz)	Radio Service				
	Common carrier (Part 101)	Private radio (Part 101)	Broadcast auxiliary (Part 74)	Other (Parts 15, 21, 24, 25, 74, 78, 100)	Notes
* ** * *					
14,200 – 14,400	LTTS			SAT	
17,700 – 18,580	CC	OFS	TV BAS	SAT CARS	
19,300 – 19,700	CC	OFS	TV BAS	CARS SAT	
* * * * *					

* * * * *

31. Section 101.147(a) is amended to read as follows:

§ 101.147 Frequency assignments

(a) Frequencies in the following bands are available for assignment for fixed microwave services.
* * * * *
14,200-14,400 MHz (24)
17,700-18,300 MHz (10) (15)
18,300-18,580 MHz (5) (10) (15)
19,300-19,700 MHz (5) (10) (15)
21,200-22,000 MHz (4) (11) (12) (13) (24) (25) (26)
* * * * *
Notes
* * * * *

32. Section 101.147(r) is amended to read as follows:

§ 101.147 Frequency assignments

* * * * *

(r) *17,700 to 19,700 and 24,250 to 25,250 MHz*: Stations operating on the following frequencies in the band 18.58-18.8 GHz that were licensed or had applications pending before the Commission as of (date of adoption of this R&O) may continue those operations on a shared co-primary basis with other services under Parts 21, 25, and 74 of the Commission's rules until (date 10 years from adoption of this R&O). Those stations operating on the following frequencies in the band 18.8-19.3 GHz that were licensed or had applications pending before the Commission as of September 18, 1998 may continue those operations on a shared co-primary basis with other services under Parts 21, 25, and 74 of the Commission's rules until (date 10 years from adoption of this R&O). After this date, operations in the 18.58-19.26 GHz band are not entitled to protection from fixed-satellite service operations and must not cause unacceptable interference to fixed-satellite service station operations. No new Part 101 licenses will be granted in the 18.58-19.3 GHz band after (date of the adoption of the R&O), except for certain low power operations authorized under Sec. 101.147(r)(10), which may continue to operate on a co-primary basis. Licensees may use either a two-way link or one frequency of a frequency pair for a one-way link and must coordinate proposed operations pursuant to the procedures required in Sec. 101.103. (Note, however, that stations authorized as of September 9, 1983, to use frequencies in the band 17.7-19.7 GHz may, upon proper application, continue to be authorized for such operations, consistent with the above conditions related to the 18.58-19.3 GHz band)

* * * * *

33. Section 101.147(r)(10) is amended by adding a new subsection (iv) to read as follows:

§ 101.147 Frequency assignments

* * * * *

(r) (10) * * * **

* * * * *

(iv) Low power stations authorized in the band 18.8-19.3 GHz after June 8, 2000 are restricted to indoor use only.

APPENDIX B
Final Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act (RFA)[1], an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities was incorporated in the *18 GHz NPRM*.[2] The Commission sought written public comments on the proposals in the *NPRM* including comment on the IRFA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.[3]

A. Need for, and Objectives of, the Rules

In this *Report and Order*, the Commission provides a band plan that should go a long way in facilitating the deployment of new services by designating different dedicated sub-bands for ubiquitously deployed FSS earth stations and near-ubiquitous terrestrial fixed services in the 18 GHz band. Additionally, this plan will, through the judicious choice of band segments subject to co-primary sharing, significantly lower any consequential administrative costs of coordination.

B. Summary of Significant Issues Raised by Public Comments in Response to the IRFA.

No comments were submitted in direct response to the IRFA. However VisionStar made a specific proposal for the treatment of FSS licensees that are small businesses (see ¶ 55 of this *Report and Order*) and several commenters provided licensee data for sub-bands of the spectrum concerned, incorporated below for the specific services involved. We were unable to act on VisionStar's proposal for the provision of an "Early Service" for FSS licensees that are small businesses, because we do not collect annual revenue information from space station or earth station licensees, which would be necessary to determine if they are small businesses (see C below) and because of the potential interference impact of such "temporary secondary " operations on other FSS licensees, as discussed in the Secondary Use section of this *Report and Order*.

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

[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).

[2] *See* Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 GHz Frequency Bands, 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*, IB Docket No. 98-172, 13 FCC Rcd 19923 (1998) (*18 GHz NPRM*).at Appendix B.

[3] 5 U.S.C. § 604.

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 adopted rules.[4] The RFA generally defines the term "small entity " as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[5] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[6] 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).[7] A small organization is generally "any not-for- profit enterprise which is independently owned and operated and is not dominant in its field."[8] Nationwide, as of 1992, there were approximately 275,801 small organizations.[9] "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."[10] As of 1992, there were approximately 85,006 such jurisdictions in the United States.[11] This number includes 38,978 counties, cities, and towns; of these, 37,566, or 96 percent, have populations of fewer than 50,000.[12] 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 adopted rules.

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

[4] 5 U.S.C. § 603(b)(3).

[5] *Id.* § 601(6).

[6] 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 the 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).

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

[8] 5 U.S.C. § 601(4).

[9] 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).

[10] .5 U.S. C. § 601(5).

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

[12] *Id.*

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).[13] This definition provides that a small entity is expressed as one with $11.0 million or less in annual receipts.[14] 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.[15] The Census report does not provide more precise data.

2. Fixed Satellite Transmit/Receive Earth Stations. Currently there are no operational fixed satellite transmit/receive earth stations authorized for use in the 17.7-20.2 GHz and 27.5-30 GHz band. However, with 12 GSO/FSS licensees and 1 NGSO/FSS licensee, and our decision to adopt blanket licensing, we expect applications for FSS earth station licenses to be filed in the near future. We do not request or collect annual revenue information, and thus are unable to estimate the number of earth stations that would constitute a small business under the SBA definition.

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

[14] 13 C.F.R. § 120.121, SIC code 4899.

[15] *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 Small Business Administration).

3. Mobile Satellite Earth Station Feeder Links. We have granted one license for MSS earth station feeder links. We do not request or 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 12 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, or apply any rules providing special consideration for Space Station (Geostationary) licensees that are small businesses.

5. Space Stations (Non-Geostationary). There is one Non-Geostationary Space Station licensee and that licensee 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). At the frequencies under consideration in this proceeding there are no transmissions of this type directly to the public. 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. The numbers of these stations are very small. 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 of these types of services 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 modify these reporting requirements to eliminate duplicative costs of filing multiple applications. In addition, we 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 of small antenna earth stations actually brought into service.

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

The 18 GHz NPRM solicited comment on several alternatives for spectrum sharing, blanket licensing, and band segmentation. This *Report and Order* considered comments offering alternatives, and has acted in response to stated concerns and suggestions, particularly those representing significant agreement or consensus by commenters. The decisions of this *Report and Order* should positively impact both large and small businesses by providing a faster, more efficient, and less economically burdensome coordination and licensing procedure, as well as providing an alternative band plan that better meets these concerns. The blanket licensing service rules provide for consolidation of licensing for small antenna earth stations and a new balanced requirement designed to ensure that new satellite services will not cause interference to existing terrestrial services. These rules substitute a single requirement to annually l report the number of satellite earth stations brought into service in the last year, compared to the current requirement for individual licensing of such stations. This change, discussed further above, should minimize the impact on Small entities.

F. Report to Congress

The Commission will send a copy of this *Report and Orde*r including this FRFA, in a report to be sent to Congress pursuant to the Small Business Regulatory Enforcement Fairness Act of 1966, s*ee* 5 U.S.C. § 801 (a)(1)(A). In addition, the Commission will send a copy of the Report and Order, including this FRFA, to the Chief Counsel for Advocacy of the Small Business

Administration. A copy of this *Report and Order* and FRFA (or summaries thereof) will also be published in the Federal Register. *See* 5 U.S.C. § 604(b).

Appendix C

List of Comments

IB Doc. 98-172, RM-9005, RM-9118

ABC, Inc.
AESCO Systems, Inc.
Airtouch Communications, Inc.
American Petroleum Institute
Association of American Railroads
Association for Maximum Service Television, Inc.
Association of Public-Safety Communications Officials-International, Inc.
AT&T Wireless Services, Inc.
BellSouth Corporation
Boeing Company
BP Communications of Alaska, Inc.
Capitol Broadcasting Co., Inc.
Cellular Telecommunications Industry Association
Comsearch
County of Los Angeles
DirecTV Enterprises, Inc.
Fixed Wireless Communications Coalition
GE American Communications, Inc. (GE Americom)
GTE Service Corporation
Hughes Electronics, Inc.
Independent Cable & Telecommunications Association
Iridium LLC
KaStar Satellite Communications Corporation
Lockheed Martin Corporation
Loral Space & Communications Ltd.
Motorola, Inc.
PanAmSat Corporation
Pegasus Development Corporation
RCN Telecom Services, Inc.
SBC Communications, Inc.
SkyBridge LLC
State of California
Taridan Microwave Networks
Teligent, Inc.
Teledesic LLC
Telecommunications Industry Association (FPTP)
Telecommunications Industry Association (SOUS)
TRW, Inc.
UTC
WinStar Communications, Inc.

Wireless Communications Association International, Inc.
VisionStar, Inc.

List of Reply Comments
IB Docket No. 98-172

Airtouch Communications, Inc.
American Petroleum Institute
Association of American Railroads
APCO
BellSouth Corporation
BP Communications Alaska, Inc.
Celsat America, Inc.
County of Los Angeles
City of Long Beach
DirecTV Enterprises, Inc.
Fixed Wireless Communications Coalition
GE American Communications, Inc. (GE Americom)
Hughes Electronics, Inc.
Independent Cable & Telecommunications Association
KaStar Satellite Communications Corp.
Lockheed Martin Corporation
Loral Space and Communications, Ltd.
Motorola, Inc. and Iridium LLC
PanAmSat Corporation
Pegasus Development Corporation
RCN Telecom Services, Inc.
SBC Communications, Inc.
SkyBridge LLC
Teledesic LLC
Teligent, Inc.
Watson Communications Systems, Inc.
WinStar Communications, Inc.

SEPARATE STATEMENT OF COMMISSIONER HAROLD FURCHTGOTT-ROTH, APPROVING IN PART, DISSENTING IN PART

Re: *Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 Frequency Bands, et al.* IB Docket No. 98-172, RM-9005, RM-9118.

I support much of today's item. The International Bureau has done a good job of balancing the interests of terrestrial and satellite service providers in developing today's Order.[1] These are complex and difficult issues, and the Bureau should be applauded for its hard work in bringing this item to closure.

I do fear, however, that this decision represents a lost opportunity to further improve our Emerging Technologies relocation policy[2] prior to the application of these bands.[3]

There appears to be some sense that the Emerging Technologies' relocation policy worked well for PCS. Therefore, the argument goes, we should apply this successful policy in other bands as well.

Although I believe there were some under-publicized bumps in that PCS road,[4] it may well be true that the Emerging Technologies relocation policy "worked" for those bands. A number of factors, however, may have obscured the actual efficiency of the Commission's Emerging Technologies relocation policy. First, PCS providers were about to enter into an almost certainly lucrative marketplace. Second, PCS could offer regional or even local service, therefore permitting only partial band clearing before revenues could flow. Third, PCS could viably use only a portion of its spectrum in the initial stages of deployment, thus sidestepping intransigent incumbents. These factors created more flexibility for PCS to make the rules "work" – regardless of whether or not they optimized efficient relocation.

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[1] Of course, in retrospect it would have been far easier to segment this band sixteen years ago, when the FSS industry first requested such a plan. *See* Establishment of Spectrum Utilization Policy and Amendment to Commission Rules Regarding Digital Termination Systems, 49 Fed. Reg. 37760, ¶ 41 (Sept. 26, 1984) (declining to segment the band). Unfortunately, our delay will impose costs on all parties.

[2] *See* Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, *First Report and Order and Third Notice of Proposed Rulemaking*, 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 Rcd 6589 (1993); *Memorandum Opinion and Order*, 9 FCC Rcd 1943 (1994); *Second Memorandum Opinion and Order*, 9 FCC Rcd 7797 (1994); *see also* 47 C.F.R. §§ 101.67-101.81.

[3] *See Re: Redesignation of the 17.7-19.7 GHz Frequency Band, Blanket Licensing of Satellite Earth Stations in the 17.7-20.2 GHz and 27.5-30.0 Frequency Bands, et al.*, IB Docket No. 98-172, RM-9005, RM-9118 at ¶¶ 76-84 (rel. June -- , 2000) (18 GHz Order).

[4] *See e.g.*, Rick Brand "Making Way for Wireless Telephones/ County Radio Frequencies Sold to Sprint Spectrum," Newsday, at A35 (February 25, 1997) (reporting that Sprint Corporation paid Suffolk County, New York a $4.2 million premium in order to move two of the county's microwave radio frequencies earlier than the five-year period provided for under the rules. Suffolk County originally requested a little more than $18 million for all five of its links).

In my view, however, "working" is not enough. We need to get the right answer on relocation policy.

Why is relocation policy so significant?

Current FCC relocation policy implicitly sets the entry price for new providers. Just as a business plan must incorporate an auction price, the plan must also consider the costs of incumbent relocation.[5] This is particularly true in the satellite context. Unlike PCS, satellite providers must consider the national – or even international – costs of relocation before they can make a rational assessment of the viability of their business plans. Furthermore, unlike PCS, satellite providers must evaluate relocation costs as a condition precedent to providing any revenue-producing service.[6] Thus, with a national scope and the lack of early revenue to offset subsequent relocation costs, satellite service providers face particularly high stakes in the relocation debate.

The consequences of crafting a faulty relocation policy are enormous. If the FCC sets relocation costs too high, artificially high entry costs may prevent the offering of economically efficient services. Alternatively, if relocation costs are set too low, the Commission may essentially be funding new entrants on the backs of terrestrial incumbents.

These factors legitimately prompted the Commission to take a particularly close look at relocation policy in this specific proceeding. Apart from the case-specific facts in this Order, however, the FCC must develop a generally applicable relocation policy that facilitates efficient relocation transactions in all spectrum bands and for all types of business models. The agency should not be lured into making different policies for different services based on the different business models.

The Emerging Technologies Precedent

Our current relocation rules for emerging technologies are codified in Part 101.[7] Those rules establish three "periods" for the relocation process: voluntary negotiation, mandatory negotiation, and involuntary relocation.[8] Public safety incumbents are entitled to a three-year

[5] *See* Testimony of Ronald T. LeMay, COO of Sprint Corporation, Senate Commerce Committee (March 27, 1996) (arguing that the high relocation costs facing new licensees significanty reduces the value of new and auctionable spectrum, resulting in the government losing between $930 million and $1.9 billion in revenues in the next round of PCS auctions. LeMay further suggests that "the impact on auctions for spectrum that is reallocated in the future could be dramatically higher"); *see e.g.*, Letter from Mark Golden, Vice President, PCIA to Reed Hundt, Chairman of the FCC, September 22, 1995 (describing premiums demanded by some incumbents in PCS relocation process).

[6] In this regard, it is also important that new entrants only be required to clear as much spectrum as is necessary to provide their service. Only when spectrum-clearing costs are tied to a particular service can licensees assess whether it is economical for them to proceed with their business plans.

[7] *See* 47 C.F.R. §§ 101.67-101.81.

[8] *See* 47 C.F.R. §§ 101.69 (c) and 101.75.

voluntary period, followed by a two-year mandatory period. Non-public safety licensees are subject to a one-year voluntary period followed by a one-year mandatory period. Parties are required to engage in "good faith" negotiations only during the mandatory negotiation period.[9] If the parties fail to reach agreement by the end of the voluntary and mandatory negotiation periods, the new entrant may force incumbent licensees into involuntary relocation.

Under involuntary relocation, incumbents are entitled to a new system that is "comparable" to the old one.[10] The "replacement system" must be "at least equivalent to the existing system" with respect to three variables: throughput, reliability, and operating costs. Involuntary relocation disputes are to be resolved through a Commission proceeding.

Not a single transaction has ever made it to the involuntary relocation phase; thus, the Commission has never been called upon to spell out exactly what is required under our "comparability" standard.[11]

Common Goals

The fundamental basis of any relocation policy is that incumbent relocation and prompt entry by new service providers best serve both the public interest and efficient spectrum management.[12] This public interest assessment is not unlike the use of eminent domain powers by government entities to make room for a new highway or civic building.[13] Here the Commission has determined that the new services in a specific band of spectrum (like the highway or the civic building) are more valuable to the public than the old services (like the prior uses of the land). In implementing this policy, there is very little debate about the Commission's goals. The terrestrial incumbents must be relocated and made whole as promptly and efficiently as possible.[14]

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[9] *See* 47 C.F.R. § 101.73.

[10] *See* 47 C.F.R. 101.75 (a)(3).

[11] In part this is no doubt a function of the long negotiating periods: new entrants cannot afford to wait years until the involuntary relocation phase to clear out the incumbents.

[12] This determination assumes, at least implicitly, that the new entrant cannot share with the incumbent service providers.

[13] *See* Jan Paul Acton, Stanley M. Besen, Charles River Associates Inc., An Economic Analysis of Regulatory Takings and Just Compensation with an Application to Mobile Satellite Services (June 18, 1999) (asserting relocation policy parallels regulatory takings); *see e.g., Olson v. United States*, 292 U.S. 246, 255 (1934) (property holder must be placed "in as good a position pecuniarily as if his property had not been taken. He must be made whole but is not entitled to more."); *United States v. 564.54 Acres of Land*, 99 S.Ct. 1854 (1979) (holding that a property holder should recover "the fair market value of its property, rather than the cost of substitute facilities."). *See also* Letter from Norman P. Levanthal, Counsel for the ICO USA Service Group, to Ms. Magalie Roman Salas, Secretary, FCC, ET Docket 95-18 (dated June 21, 1999).

[14] *See e.g.,* Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation, 11 FCC Rcd 8825, ¶ 32 (1996) ("…our goal is to ensure that incumbents are no worse off than they would be if relocation were not required…").

However, our current rules and procedures simply do not lend a sufficient degree of clarity to the negotiating parties. Clear expectations reduce transaction costs and would expedite incumbent relocation.[15] Below, I describe some possible improvements to our relocation policy.

A Streamlined Procedure

I support today's decision to eliminate the voluntary negotiation period and shorten the negotiation period for public safety licensees. Eliminating the voluntary negotiation period requires the parties immediately to begin negotiations to resolve these relocation issues. In addition, the "comparability" criteria, formerly relegated to the involuntary relocation period, are now applicable to the mandatory negotiation period.[16] These comparability criteria should assist the negotiating parties in reaching agreements sooner.[17] Today's order also eliminates the burdensome requirement that incumbents have one year to assess the comparability of their new and relocated equipment. Now an incumbent is entitled to a "reasonable time" to assess comparability.[18] Each of these decisions is a step in the right direction.

I am still concerned, however, about the government's central role at the involuntary relocation phase. The parties would be well served by a process that is reliably prompt and provides incentives for good faith negotiations. Alternative dispute resolution procedures, such as binding arbitration, may provide the answer.

Congress has strongly supported the use of alternative dispute resolution in administrative law contexts.[19] In following this lead, the Commission has previously adopted similar

[15] *See* Peter Crampton, Evan Kwerel and John Williams, Efficient Relocation of Spectrum Incumbents, Paper presented at the Telecommunications Policy Research Conference, Solomons, Maryland, at 26 (1996) (on file with authors); Gregory L. Rosston and Jeffrey S. Steinberg, Using Market-Based Spectrum Policy To Promote The Public Interest, 50 Fed. Comm. L.J. 87, at 93-94 (December 1997).

[16] There is little doubt that these valuation questions are quite difficult. For an interesting examination of these issues, see Crampton, *supra note* 15.

[17] The comparability criteria today are hopelessly complex and provide little clarity or predictability of outcome. All parties would be better served by simpler rules that take into account not only reliability, throughput, and operating costs (47 C.F.R. § 101.75), but also technological neutrality and depreciation. *See e.g.*, Letter from Mark Grannis, Counsel for Teledesic Corporation, to Commissioner Harold Furchtgott-Roth, Federal Communications Commission (dated May 1, 2000) (discussing potential windfall from effectively requiring new equipment to replace incumbents older equipment). Although simpler rules may be less precise, the diminished transaction costs may well result in a net gain for all parties concerned. Moreover, these valuation criteria only serve to set a floor price for the negotiation period. It should thus be set at the minimum value that makes incumbents whole.

[18] *See* 18 GHz Order, *supra note* 3, at ¶ 82.

[19] *See* Pub. L. 101-552, 104 Stat. 2739 (Nov. 15, 1990), reauthorized under Pub. L. 104-320, 110 Stat. 3870 (Oct. 19, 1996). (expressing Congressional intent to encourage ADR through federal agencies). 5 U.S.C. § 571 et seq. provides the guidelines whereby ADR is to take place. See e.g. § 575(a)(1) ("Arbitration may be used as an alternative means of dispute resolution whenever all parties consent. Consent may be obtained either before or after an issue in controversy has arisen"); § 577(a) ("The parties to an arbitration proceeding shall be entitled to participate in the selection of the arbitrator"); § 579(c)(1) ("The parties to the arbitration are entitled to be heard, to present evidence material to the controversy, and to cross-examine witnesses appearing at the hearing"); § 580(c)

alternative dispute resolution approaches.[20] For example, recently the Commission encouraged alternative dispute resolution for SMR relocation under Part 90 of our rules: "[d]isputes arising out of the costs of relocation, such as disputes over the amount of reimbursement required, will be encouraged to use expedited ADR procedures. ADR procedures provide several alternative methods such as binding arbitration, mediation, or other ADR techniques."[21] I believe a similar approach would benefit the parties in all relocation proceedings.

Binding arbitration would create an efficient "end game" for parties that cannot reach an agreement during the negotiation phase. Today, these parties would face a potentially lengthy and uncertain Commission proceeding to assess comparability. If at the end of an unsuccessful negotiation phase, however, a new entrant could choose binding arbitration, the results would be more prompt and certain.[22] Under binding arbitration, the parties would face the prospect of submitting alternative proposals to an arbitrator who would simply choose one or the other. Such a process would presumably encourage the parties to be reasonable in their relocation proposals and would largely remove the Commission from the transaction. Moreover, binding arbitration could and should be completed in a short time frame, perhaps within sixty days. Such a process would both encourage agreements and resolve any remaining disputes with minimal transaction costs.[23]

Conclusion

Relocation policy is one of the greatest challenges facing this Commission. In the years to come, we will increasingly be forced to rely on spectrum clearing as a method of freeing up spectrum for new services. This challenge creates a corresponding historic opportunity: to get relocation policy right. Only with an efficient relocation policy can the telecommunications marketplace function properly for incumbents and new entrants alike. I believe today's Order is a step in that direction. I am hopeful, however, that in future proceedings the Commission will move towards a relocation policy that provides greater certainty along with more efficient procedures.

("A final award is binding on the parties to the arbitration proceeding, and may be enforced pursuant to sections 9 through 13 of title 9").

[20] *See* Redevelopment of Spectrum to Encourage Innovation in the Use of New Technologies, 8 FCC Rcd 6589, ¶ 38 (1993); Use of Alternative Dispute Resolution Procedures in Commission Proceedings and Proceedings in which the Commission is a Party, 6 FCC Rcd 5669 (1991) (stating that the Commission encourages the use of ADR in proceedings between parties under a Commission rule where the Commission is not a party); *see also* 47 C.F.R. § 76.804; 47 C.F.R. 76.1513(b).

[21] *See* 47 C.F.R. § 90.699(f)(6).

[22] Presumably an incumbent would not chose arbitration, since the default outcome is that the incumbent is permitted to maintain its facilities.

[23] It may be legally required for the Commission to play a role in these proceedings. The Office of the Administrative Law Judges may provide the needed expertise for any Commission role.