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]

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[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 4.5° 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

[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 4.5° spacing environment in the 17.3-17.7 GHz band.[214] We find that it is premature to adopt 4.5° 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 4.5° from 9°, 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

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[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

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)

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	
14.8-15.35 FIXED MOBILE Space research			14.7145-15.1365 MOBILE Fixed Space research US310	14.7145-15.1365 US310	
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)

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.

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Non-Federal Government (NG) Footnotes

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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.

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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.

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