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

In the Matter of)	
)	
FWCC Request for Declaratory Ruling on)	
Partial-Band Licensing of Earth)	IB Docket No. 00-203
Stations in the Fixed-Satellite Service)	RM-9649
That Share Terrestrial Spectrum)	
)	
FWCC Petition for Rulemaking to Set)	
Loading Standards for Earth Stations)	
In the Fixed-Satellite Service that)	
Share Terrestrial Spectrum)	
)	
Onsat Petition for Declaratory Order that)	
Blanket Licensing Pursuant to Rule 25.115 (c))	SAT-PDR-19990910-00091
is Available for Very Small Aperture)	
Terminal Satellite Network Operations at C-)	
Band)	
)	
Onsat Petition for Waiver of Rule 25.212(d))	
to the Extent Necessary to Permit Routine)	
Licensing of 3.7 Meter Transmit and Receive)	
Stations at C-Band)	
)	
<i>Ex parte</i> Letter Concerning Deployment of)	
Geostationary Orbit FSS Earth Stations in the)	
Shared Portion of the Ka-band)	

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NOTICE OF PROPOSED RULEMAKING

Adopted: October 13, 2000

Released: October 24, 2000

Comment Date: [45 days following publication in the Federal Register]
Reply Comment Date: [75 days following publication in the Federal Register]

By the Commission: Commissioner Furchtgott-Roth issuing a statement

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I. INTRODUCTION

1. The Commission herein considers a series of filings concerning the application of our Part 25 rules to Fixed-Satellite Service (FSS) earth stations in bands shared on a primary basis with the terrestrial Fixed Service (FS). The filings of Onsat Network Communications, Inc. (Onsat) relate specifically to operations in the C-band. The Hughes filing relates specifically to operations in the Ka-band. The Fixed Wireless Communications Coalition (FWCC) petitions for a declaratory ruling regarding partial-band licensing of FSS earth stations and a rulemaking to amend Part 25 of the Commission's Rules to set loading requirements.¹ Onsat petitions for a

¹ See Part 25 of the Commission's Rules, Satellite Communications, 47 C.F.R. §§ 25.101-25.601.

declaratory order that our Part 25 rules permit the licensing, under a single authorization, of small aperture terminal satellite earth station networks in the C-band.² Hughes seeks consideration of its proposal to deploy geostationary orbit FSS earth stations in the shared portion of the Ka-band.³ We defer taking action on Onsat's petition for waiver of Section 25.212(d) regarding routine licensing of 3.7 meter transmit and receive earth stations at C-band.⁴

2. In response to the FWCC filings, we hereby deny FWCC's request for a declaratory ruling requiring partial-band licensing of FSS earth stations. We propose, however, to adopt rules directed at addressing FWCC's concerns about effective and equitable use of spectrum in bands shared by the FS and FSS. In response to the Onsat filing, we deny Onsat's petition for declaratory order, but propose to amend our rules to permit the licensing, under a single authorization and with prior coordination, of a limited class of small aperture terminal earth station networks in the C-band to communicate with geostationary satellites. We will issue a separate licensing decision on the specific application for the Onsat system that Onsat filed several months after its Petition for Declaratory Order. We believe that these proposed rules will promote more efficient and equitable use of spectrum in bands shared by the FS and FSS. We also believe the proposal contemplated by this Notice, to permit the licensing of small aperture terminal earth station networks in the C-band, under a single authorization and with prior coordination, will provide for rapid delivery of earth station services, including broadband access, to rural Americans.

3. We seek comment on the recent *ex parte* pleading⁵ filed by Hughes in the *18 GHz Proceeding*, concerning the proposed deployment of earth stations for geostationary satellite orbit (GSO) FSS systems in the shared portion of the Ka-band without individual site-by-site licensing.⁶ We also invite alternative proposals to achieve the objectives of the Hughes proposal, within the scope and overall objectives of this proceeding.

² These C-band small aperture terminal earth station networks, or CSATs, are technically similar to the very small aperture terminal earth station networks, or VSATs, currently deployed in the Ku-band, *see infra* n. 111. The C-band generally refers to frequencies at 3700-4200 and 5925-6425 MHz.

³ Hughes filed its *Ex parte* Letter in IB Docket 98-172, RM-9005, and RM-9118, *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 (18 GHz Proceeding)*. See Letter from Joslyn Read, Assistant Vice President for Hughes Network Systems/Spaceway, and John P. Janka, Counsel to HNS/Spaceway, to Magalie Salas, Secretary of the FCC, dated May 19, 2000. The 18 GHz proceeding is now terminated. See *18 GHz Report and Order*, FCC 00-212 (released June 22, 2000), and we address Hughes' *ex parte* filing in this proceeding.

⁴ See *infra* note 13.

⁵ *Ex parte* filing of Hughes Network Systems in CC Docket No. 98-172. See Letter from Joslyn Read, Assistant Vice President, Hughes Network Systems/Spaceway and John P. Janka, Counsel for HNS/Spaceway to Magalie Roman Salas, Secretary of the FCC, dated May 19, 2000.

⁶ These shared bands are 18.3-18.58 GHz and 29.25-29.5 GHz. In the 18 GHz band, GSO FSS (downlink) and FS share portions of the band. In the 28 GHz band, GSO FSS (uplink) and NGSO MSS feeder links share portions of the band. See *18 GHz Proceeding*, *supra* n. 3, Report and Order, FCC 00-212 (released June 22, 2000).

II. EXECUTIVE SUMMARY

4. *The FWCC Petitions.* On May 5, 1999, FWCC⁷ filed a Request for Declaratory Ruling and Petition for Rulemaking (together, “FWCC Petitions”) asking the Commission to impose various conditions on FSS earth stations in bands that are shared on a co-primary basis with FS operations.⁸ FWCC states that its proposals seek to maximize efficient use of the radio spectrum for both satellite and point-to-point terrestrial fixed operations.

5. FWCC avers that, while Parts 25 and 101 of the Commission’s Rules provide for sharing on a co-primary basis in certain radio spectrum bands by the FSS and FS, in reality sharing has not occurred on an equitable basis. Rather, FWCC contends that, in actual practice, band sharing has been on terms disadvantageous to the FS.⁹ Thus, FWCC requests a declaratory ruling that would require FSS operators to demonstrate “actual need” for the spectrum requested at the time of licensing. Specifically, FWCC proposes that the Commission change its policy of authorizing earth stations to use the entire pertinent frequency bands and instead require that an FSS earth station using spectrum shared with point-to-point terrestrial services be licensed to use no more than twice the amount of spectrum for which it is able to demonstrate “actual need.”¹⁰ FWCC also petitions, pursuant to Section 1.401 of the Commission’s Rules, for amendments to Part 25 of the Commission’s Rules that would require FSS earth stations licensed for more than minimal amounts of spectrum shared with FS operators to meet minimum loading standards. Further, FWCC proposes to require all FSS earth stations to accept interference from new terrestrial facilities on the same basis as they accept any interference in the initial coordination. FWCC states that the objective of these rule changes would be the adoption of spectrum management standards that would achieve in practice the “co-equal” sharing specified in Parts 25 and 101 of the Commission’s Rules.¹¹

6. Numerous satellite and earth station licensees, users of these services, and industry associations representing the satellite industry oppose the FWCC Petitions. The Fixed Point-to-

⁷ FWCC is a coalition of microwave equipment manufacturers and users of terrestrial fixed microwave communications, including railroads, public utilities, petroleum and pipeline entities, public safety agencies, the broadcast industry, and communication service providers.

⁸ FWCC’s Petitions reference the following bands: 3700-4200, 5925-6425 and 6425-7125 MHz and 10.7-11.7, 12.7-13.25, 17.7-19.7, and 27.5-29.5 GHz. The Fixed-Satellite Service is a radiocommunication service between earth stations at given positions, when one or more satellites are used; the FSS also may include feeder links for other space radiocommunication services. The terrestrial fixed service (FS) is a radiocommunication service between fixed points. See 47 C.F.R. § 2.1.

⁹ See FWCC Petitions at 2-4. FWCC alleges that satellite earth station operators receive preferential access to shared spectrum because: (1) the Commission licenses earth stations for the entire allocated band and with no loading requirements, while point-to-point terrestrial operations are limited to frequencies actually needed and are subject to stringent spectrum efficiency requirements, and (2) the Commission licenses earth stations for all azimuths and thus earth stations can deny coordination to terrestrial stations. *Id.*

¹⁰ FWCC also includes, in Appendix C of its pleading, a parallel request for a rule that would require FSS earth station applicants to show demonstrated need for the spectrum they seek.

¹¹ FWCC Petitions at 2.

Point Section of the Wireless Communications Division of the Telecommunications Industry Association (TIA FS/WCD) filed reply comments supporting FWCC's requests. Appendix A lists the entities commenting in this proceeding.

7. Upon review of the record, we conclude that FWCC raises issues meriting further consideration. We propose specific rules to address the concerns of the Fixed Service community, and we seek comment as to whether the evolving requirements of both satellite and terrestrial systems necessitate a further revision of our current policies and rules to ensure efficient and equitable use of the radio spectrum in bands shared on a co-primary basis by the FSS and FS. We seek comment on the extent of the FS and FSS sharing problem and propose rules on the issues of loading and interference coordination. On the issue of demonstrating actual need, we deny FWCC's request for a declaratory ruling and its parallel request to amend Section 25.130 to limit the amount of spectrum the Commission would license to FSS earth stations to no more than twice the amount of spectrum for which the licensee has demonstrated "actual need." We do, however, incorporate into the proposed rules the related concept of a "demonstrated use" requirement triggered by the denial by an FSS operator of an FS applicant's request to coordinate spectrum. We believe that this proposal is a more effective and equitable approach for addressing the concerns FWCC has raised in its pleadings.

8. In particular, we propose to amend Section 25.203 to require an FSS earth station that has been licensed to operate in C- or Ku-band shared frequencies for 24 months or longer to demonstrate, in response to the denial of a request of an FS applicant to coordinate spectrum, that the FSS earth station denying coordination is using, has recently used, or has imminent plans to use the requested spectrum. If the FSS earth station licensee cannot make such a demonstration during the coordination, then the FS station may be successfully coordinated and the FSS earth station must not cause unacceptable interference to, nor is it protected from interference from, the FS station on that spectrum in the future. We propose to exempt from the rule those FSS earth stations that are licensed for 40 MHz or less of bandwidth in each direction. At the same time, we propose to amend Section 101.141 to shorten the loading period for FS licensees in the C- and Ku-bands from 30 to 24 months. Modification of the Part 25 and 101 rules in this manner would give both the FSS and FS licensees a comparable period of time in which to put their spectrum to use before it is susceptible to re-licensing to others. We ask for comment as to whether these Part 25 and 101 rules should apply in other bands where the FSS and FS share spectrum on a co-primary basis.

9. We also propose to amend Parts 25 and 101 to require that an FSS earth station or FS licensee accepting a particular interference analysis model in order to coordinate successfully the location of its station must accept use of the same model in subsequent coordinations. We propose that these rule changes to Parts 25 and 101 would apply across all frequency bands where the services share a primary service allocation. Further, we propose to amend Part 25 such that, if a C- or Ku-band FSS earth station licensee, during coordination, accepts a level of interference along a set of azimuths recognized to be below normally permissible interference objectives, the licensee may not subsequently claim protection from interference from future FS applicants on those same frequencies within that same set of azimuths. We ask for comment as to whether this Part 25 rule should apply at other bands where the FS and FSS share frequencies on a co-primary basis. *See infra* Appendix C and Section IV. We further propose that these

amended rules would apply to all FSS earth stations and FS stations upon the effective date of the Report and Order in this proceeding.

10. ***The Onsat Petition.*** On September 10, 1999, Onsat¹² filed a Petition for Declaratory Order that Section 25.115(c) of the Commission's Rules permits the licensing of Very Small Aperture Terminal (VSAT) satellite earth station networks, under a single authorization and with prior coordination, in the C-band. In the same filing, Onsat petitioned for a waiver to permit routine licensing of its proposed earth stations, which would have an antenna diameter smaller than those allowed to be routinely licensed under our existing rules.¹³ Onsat advocates such licensing of technically identical remote earth station terminals to permit operators to configure their C-band systems quickly without the expense and administrative effort involved in licensing individual earth stations. In support of its petition, Onsat contends that its proposal would further Commission objectives with regard to universal service and deregulation.

11. In its petition Onsat argues that small aperture terminal earth station technology is less expensive and more flexible than are other types of satellite technology, and that these types of earth stations can be coordinated easily to prevent interference with terrestrial and satellite operations in the C-band.¹⁴ Onsat proposes that, if granted a license for an earth station system consisting of a hub station and a specified number of technically identical remote earth stations, it would submit to the Commission a frequency coordination report for each station before placing it into operation.

12. FWCC initially opposed Onsat's petition on the ground that Onsat's proposed service would further exacerbate FS/FSS frequency coordination difficulties in the C-band, incorporating by reference a copy of its Petitions and arguing that the Commission should not act on Onsat's requests unless and until we acted favorably on FWCC's Petitions. FWCC later withdrew its opposition after Onsat agreed to modify its petition to limit both the amount of C-band spectrum its proposed system would use and the number of geostationary orbital positions toward which its remote earth stations would be directed.¹⁵

13. We deny Onsat's petition for a declaratory order, but hereby propose rules that include the elements of the Onsat proposal.¹⁶ One of the Commission's chief goals is to foster wide

¹² Onsat is a private company, founded in 1998 and headquartered in Salt Lake City, Utah, that provides satellite-based, wireless, broadband network services to schools, libraries, Internet Service Providers and other institutional customers in rural America and on tribal lands to facilitate high speed Internet and other data network access. Onsat's website is at <http://www.onsat.net>. See Onsat Petition at 2.

¹³ See 47 C.F.R. § 25.212(d). We will evaluate Onsat's particular antenna size waiver request in a separate licensing order. We expect to consider, in an earth station streamlining proceeding later this year, the more general issues of what antenna sizes and power densities may be licensed routinely under this rule.

¹⁴ See Onsat Petition at 10.

¹⁵ Letter from Mitchell Lazarus, Counsel for FWCC, to Magalie Salas, Secretary of the FCC, dated Feb. 14, 2000.

¹⁶ Although technically we deny the petition for declaratory order, we propose to adopt by rulemaking the substantive relief that Onsat seeks in its petition.

access to electronic commerce and data through the Internet and other networks, particularly in underserved rural areas. We have sought to ensure that multiple service providers bring broadband access to all Americans. The service proposed by Onsat is an innovative means for bringing high-speed data services to rural Americans much more rapidly than might be accomplished by wireline or terrestrial wireless service. We propose to amend Part 25 of the Commission's Rules to allow the licensing, under a single authorization and with prior coordination, of C-band small aperture terminal earth station networks, which we will term "CSATs" to distinguish these small aperture terminal earth stations from the VSAT operations in the Ku-band.

14. At the same time, we note the concerns of the fixed wireless community that the C-band is congested and that authorization of CSATs could add to coordination difficulties between the FS and FSS. We therefore seek comment on those aspects of CSAT service that affect the concerns and issues raised by FWCC. We tentatively conclude that the limitations proposed by Onsat in its modified petition are appropriate limitations that can be applied generally to other prospective CSAT applicants.¹⁷ Thus, we propose to limit CSAT networks to operations using no more than 20 MHz of C-band spectrum, and to limit their flexibility to three satellite locations within the visible geostationary satellite arc. We further request comment on whether our rules should limit this C-band service to rural areas, or, alternatively, whether our rules should permit CSAT network service wherever frequency coordination allows the installation of earth stations. Although certain characteristics of the proposed Onsat system are discussed in this NPRM, our focus is on generally-applicable policies, procedures and rules for the operation of this type of small aperture terminal system in the C-band. Because Onsat only recently filed an application to provide this service, we will decide the issue of whether to grant the request for the proposed Onsat system in a separate licensing order.

15. *The Hughes Ex Parte Letter.* We invite specific comment on a recent *ex parte* pleading¹⁸ filed by Hughes Network Systems (Hughes) in the *18 GHz Proceeding*¹⁹ proposing the deployment, without individual site-by-site licensing, of geostationary satellite orbit FSS earth stations in the shared portion of the Ka-band.

III. BACKGROUND

16. The terrestrial fixed service (FS) and fixed-satellite service (FSS) share frequencies on a co-primary basis in the C-, Ku- and Ka-bands.²⁰ These are important bands for both services.

¹⁷ Onsat agrees to coordinate only 20 MHz at three different orbital slots. See Letter from Ellen P. Goodman, Attorney for Onsat, to Magalie Salas, Secretary of the FCC, dated Feb. 10, 2000, at 2. See *infra* discussion at Section V.

¹⁸ See n. 131.

¹⁹ See n. 3.

²⁰ The bands 3700-4200 MHz, 5925-6425 MHz, 10.7-11.7 GHz, 12.7-13.25 GHz, 17.7-19.7 GHz, and 27.5-29.5 GHz are allocated on a co-primary basis to both the FS and FSS. See 47 C.F.R. § 2.106.

The spectrum above 2 GHz is fertile ground for advanced telecommunications applications. As Onsat's petition demonstrates, new service providers propose to use this spectrum to advance Commission policies like the deployment of communications services to tribal lands and other unserved areas. The instant FWCC and Onsat petitions, and the comments filed in response to them, concern the use of this shared spectrum by FSS earth stations and the impact of this use on the terrestrial FS.

17. **Current Policies.** In these shared bands, the Commission requires FS and FSS applicants to coordinate their proposed frequency use prior to filing their license applications with the Commission. In the FSS, this obligation is reflected in Section 25.203. In frequency bands shared with equal rights between terrestrial and space services, earth station applicants, to the extent practicable, must select sites and frequencies in areas where the surrounding terrain and existing frequency use are such as to minimize the possibility of harmful interference between the sharing services.²¹ An earth station applicant, prior to filing with the Commission, must coordinate its proposed frequency usage with existing terrestrial users and with applicants that have filed for terrestrial station authorizations. The FSS earth station applicant must perform an interference analysis for each terrestrial station for which the Commission has granted a license or construction permit or for which the Commission has accepted an application for filing, which is, or is to be, operated in a shared frequency band to be used by the proposed earth station and which is located within the great circle coordination distance contour(s) of the proposed earth station.²²

18. Part 101 has similar coordination requirements for the FS. In those bands shared with the satellite service, an FS applicant must ascertain in advance whether the station(s) involved lie within the great circle coordination distance contours of an existing earth station or one for which an application has been accepted for filing. The FS applicant must coordinate its proposal with each earth station operator or applicant and FS operator or applicant. For each potential interference path, the FS applicant must perform the computations required to determine that the expected level of interference to or from the terrestrial station does not exceed the maximum permissible interference power level.²³

²¹ 47 C.F.R. § 25.203(a). In establishing the policy permitting authorization of domestic communications satellite facilities to non-governmental entities in 1970, the Commission recognized that this band would be shared between the fixed-satellite service and the fixed service on a co-primary basis. The Commission further acknowledged that coordination between these two services might prove difficult in many cases, especially because the adopted coordination procedures assumed that "each earth station and each radio relay station within the coordination distance contours utilizes the entire pertinent frequency band or bands." See *Establishment of Domestic Communication-Satellite Facilities by Nongovernmental Entities*, Report and Order, 22 FCC 2d 86 ¶ 35 (1970). Thus, the Commission required earth station applicants to endeavor to find suitable earth station locations presenting the least amount of potential interference problems. Today, this obligation is reflected in Section 25.203(a).

²² See 47 C.F.R. § 25.203(c).

²³ 47 C.F.R. § 101.21(f). See also 47 C.F.R. § 101.103(d), which sets out frequency coordination procedures for the Fixed Microwave Services. This rule requires FS applicants to "prior coordinate" with existing licensees, permittees and applicants in the area, and with other applicants with previously-filed applications, whose facilities could affect or be affected by the new proposal in terms of frequency interference on active channels, applied-for channels, or channels coordinated for future growth. Coordination must be completed prior to filing an

19. The two services differ, however, in their approach to licensing. Part 25 provides for full-band licensing of FSS earth stations. In the C-band, for example, an earth station applicant may apply to operate within the entire allocated 1000 MHz of C-band spectrum.²⁴ This full-band policy is intended to provide earth stations the flexibility to change the communication paths to other satellite locations and transponder use assignments to meet operational requirements.²⁵ Not all frequencies on each satellite are available for the specific earth station application because: 1) the geostationary satellites must also complete coordination with adjacent satellite networks and usually must accept constraints on the use of frequencies; and 2) the frequencies for that particular application may already be used by another earth station network. Part 101, however, does not contemplate full-band licensing for terrestrial FS facilities. Rather, the Commission has established maximum bandwidth channel plans that are set out in the rules (for example, 20 MHz at 3700-4200 MHz, 30 MHz at 5925-6425 MHz, 220 MHz at 17.7-18.14 GHz, 850 MHz at 27.5-28.35 GHz).²⁶ Applicants may apply for channels of maximum bandwidth, although the Commission reserves the right to issue a license for less than the maximum bandwidth if it determines that less bandwidth would be sufficient to support an applicant's intended communications.²⁷ During the coordination process that precedes the filing of an FS application, the FS applicant also may seek to coordinate channels for future growth.²⁸ The private-sector frequency search companies performing frequency studies for FS applicants will "reserve," or protect, these coordinated growth channels in the databases of existing systems for the applicable geographic area. At some future date, when the FS operator needs these reserved channels, it will file applications with the Commission to be licensed on those channels.

20. Thus, FSS earth station and FS facility operators are not similarly situated with regard to the amount of frequency they coordinate prior to filing their license applications with the Commission.²⁹ Moreover, Part 101 requires that any frequency reserved for future use must be

application. Coordination involves notification to and response from the existing licensees, permittees, and applicants, and all applications must certify that coordination, including response, has been completed. Section 101.3 defines "prior coordination" as "a bilateral process conducted prior to filing applications which includes the distribution of the technical parameters of a proposed radio system to potentially affected parties for their evaluation and timely response." 47 C.F.R. § 101.3.

²⁴ This includes 500 MHz at 3700-4200 for downlinks and 500 MHz at 5925-6425 for uplinks.

²⁵ See, e.g., *Establishment of Domestic Communications-Satellite Facilities by Nongovernmental Entities*, Report and Order, 22 FCC 2d 86, 102 (1970). See also *American Satellite Corp.*, 72 FCC 2d 750, 754 (1978).

²⁶ See 47 C.F.R. §§ 101.109 and 101.147 (establishing maximum authorized bandwidths for the various frequency bands used by the fixed microwave services). See also 47 C.F.R. § 101.141 (establishing minimum payload and traffic loading payload requirements for the various nominal channel bandwidths).

²⁷ 47 C.F.R. § 101.109(c).

²⁸ See, e.g., 47 C.F.R. § 101.103(d).

²⁹ We note, however, that in bands shared by the FSS and FS, the relative positions of FSS and FS operators during the coordination process could be affected if the Commission were to adopt a recent proposal for the auctioning of geographic area licenses for fixed microwave facilities. See *Reorganization and Revision of Parts 1, 2, 21 and 95 of the Rules to Establish a New Part 101 Governing Terrestrial Microwave Fixed Radio Services*,

released for use by another licensee, permittee or applicant upon a showing by the latter that it requires an additional frequency and cannot coordinate one that is not reserved for future use.³⁰ Thus, a new full-band FSS earth station may coordinate with an existing FS operator and agree to accept interference on the active channels licensed to the FS operator in order to successfully coordinate the location of the earth station, and at the same time notify the FS operator that it requires use of the reserved growth channels for its FSS operations.³¹ Because the FS operator is not licensed to operate on the reserved channels, it has no recourse but to accept the use of these channels by the FSS earth station.

21. ***Growing Demand for Above-2 GHz Spectrum.*** Spectrum above 2 GHz, particularly below 20 GHz, is becoming increasingly encumbered, most significantly in urban areas. For example, the FSS and FS share spectrum at 3700-4200 MHz, one of the replacement bands for terrestrial fixed services vacating the 2 GHz band to make way for emerging technologies.³² The relocation of 2 GHz microwave licensees into the 6 GHz and 11 GHz bands has further burdened this spectrum.

22. Although spectrum above 2 GHz is becoming scarcer, demand for it is growing. The growing scarcity of spectrum and the respective growth in demand for both the FSS and FS have heightened questions about FSS/FS systems coordination in various shared bands and have led incumbent users in one service to oppose allocating and adding new spectrum bands to the list of frequency bands currently available to the other service. For example, in the C-band, incumbent users at 6700-7075 MHz have opposed allocating the band for NGSO MSS feeder downlinks, voicing concern that this will constrain future growth of terrestrial services.³³ FS users ask the

Memorandum Opinion and Order and Notice of Proposed Rulemaking, WT Docket No. 94-148, FCC 00-33 (released February 14, 2000).

³⁰ See 47 C.F.R. § 101.103(d)(2)(xii).

³¹ See, e.g., FWCC Petitions at 6.

³² See *Redevelopment of the Spectrum to Encourage Innovation in New Telecommunications Technologies*, ET Docket 92-2, First Report and Order, 7 FCC Rcd 6886 (1992), Second Report and Order, 8 FCC Rcd 6495 (1993), Third Report and Order, 8 FCC Rcd 6589 (1993)(*Emerging Technologies Proceeding*).

³³ In addition, broadcast interests have opposed sharing in the 6875-7075 MHz segment, which is used by the broadcast auxiliary service (BAS). For example, the Society of Broadcast Engineers (SBE), a group that coordinates use of these BAS channels, believes that terrestrial TV BAS operations could be an interference threat to MSS downlink receive sites and thus suggests such sites should be allowed only outside of major metropolitan areas where TV pickup station operations are unlikely to occur regularly. See SBE Comments at 1-3 in ET Docket No. 98-142, in response to *Amendment of Parts 2, 25 and 97 of the Commission's Rules with Regard to the Mobile-Satellite Service Above 1 GHz*, Notice of Proposed Rulemaking, 13 FCC Rcd 17107 (1998) (*Big Leo Feeder Links*). In the same proceeding, SBE further contends that NGSO MSS downlinks pose an interference threat to 7 GHz TV BAS links that convert from conventional FM video analog modulation to digital modulation so as to allow a station's studio-to-transmitter links to carry the station's new digital television signal. See SBE Reply Comments at 1.

Commission to adopt specific coordination criteria prohibiting NGSO MSS feeder link systems from interfering with existing or coordinated FS systems.³⁴

23. Similarly, in the Ku-band, terrestrial fixed service operators have suggested limitations on NGSO FSS operators like those proposed by FWCC in its instant petition. These operators propose that FS operators be required to coordinate only over the azimuths actually used by the NGSO FSS gateway, permitting subsequent coordinations to benefit from prior coordination agreements with higher-than-desired interference objectives.³⁵ Likewise, in the Ka-band, FS operators have suggested that terrestrial fixed service and FSS are not compatible services and should not be required to share the same frequency block.³⁶

24. *FS/FSS Negotiated Agreements.* In some instances, FS and FSS operators have reached negotiated agreements to resolve their differences over coordination and use of spectrum for specific facilities in shared bands. For example, FWCC withdrew its opposition to the grant of Onsat's instant petition after Onsat agreed to coordinate and limit its system use to only 20 MHz of spectrum at three different geostationary orbital locations.³⁷ As discussed, *infra* Section V, this Notice proposes to adopt the parameters of the Onsat/FWCC agreement as a limit on spectrum use for CSAT networks.³⁸

IV. DISCUSSION OF FWCC PROPOSALS

25. FWCC's petitions raise the issue of whether the FCC's current policies, as set out in Parts 25 and 101 of the Commission's Rules, ensure efficient and equitable use of spectrum in

³⁴ See TIA FS/WCD Comments at 6-8 in ET Docket No. 98-142 (seeking the adoption, in Part 25, of interference protection criteria like those in 47 C.F.R. § 101.105, and proposing that NGSO MSS feeder link applicants should apply for, justify, and be authorized to use only the bandwidth and arc required for immediate use, plus an additional amount not to exceed 50% of spectrum needed for immediate use).

³⁵ See, e.g., FWCC Comments at 20-21 in ET Docket No. 98-206, in response to *Amendment of Parts 2 and 25 of the Commission's Rules to Permit Operation of NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems in the Ku-Band Frequency Range*, Notice of Proposed Rulemaking, 14 FCC Rcd 1131 (1999) (*SkyBridge*).

³⁶ See, e.g., *Redesignation of the 17.7-19.7 GHz Frequency Band*, Notice of Proposed Rulemaking, IB Docket No. 98-172, 13 FCC Rcd 19923, ¶¶ 17-23 (1998) (*18 GHz Proceeding*), in which the Commission proposed to redesignate the band to separate terrestrial fixed services from most satellite earth station operations.

³⁷ See *supra* note 15.

³⁸ In a related proceeding in the Ku-band, FWCC withdrew its opposition to SkyBridge's petition asking the Commission to permit operation of NGSO FSS systems in the 10.7-11.7 GHz band, after negotiating an agreement with SkyBridge on appropriate rules to govern the shared use of the band by the FS and NGSO FSS. The FWCC-SkyBridge agreement calls for identifying FS "growth zones," within which NGSO FSS operators would assume certain obligations to protect the FS from interference. See, e.g., "Written *Ex Parte* Communication in ET Docket No. 98-206" filed by SkyBridge and FWCC on December 8, 1999 and supplemented on December 22, 1999. The parties propose that a growth zone would be defined as any county in which, based on a semi-annual determination, at least 30 FS frequencies were licensed to transmit in the 10.7-11.7 GHz band. *Ex parte* Communication of December 22, 1999, at 2. The Commission has not acted on the SkyBridge/FWCC proposal.

bands shared on a co-primary basis by the terrestrial FS and the FSS. The services provided by the FS and FSS are important to U.S. consumers and businesses, and consumers will benefit if these providers thrive and grow in innovative ways. In the past, FS and FSS operators have experienced some difficulties in coordinating the siting or modification of facilities.³⁹ Additionally, FS operators have expressed concern about the future course of coordination and whether existing coordination methods will be sufficient to satisfy point-to-point microwave requirements given the growth in demand for above-2 GHz spectrum.⁴⁰ At the same time, individual FS and FSS operators have achieved satisfactory coordination results through negotiated agreements,⁴¹ and these agreements may prove instructive as we assess whether to amend our current policies. In this Notice, we propose rule changes designed to further efficient and equitable use of spectrum in these shared FS/FSS frequency bands.

1. General Considerations

26. Because the radio spectrum is a limited resource, as a general principle, all Commission licensees should use spectrum in the most efficient manner possible. This is particularly true where different services share the same radio spectrum resource and inefficient use by one service could foreclose or severely limit use by another service. In this regard, Parts 25 and 101 recognize the importance of cooperation between the FSS and FS in the coordination of their respective facilities in shared bands.⁴²

27. FWCC asserts that, notwithstanding these rules, in practice satellite-terrestrial sharing of the spectrum has not been accomplished on an equitable or equivalent basis. FWCC argues that satellite earth station operators have a preference in access to spectrum because of a combination of two factors: 1) the Commission routinely licenses an earth station for the entire allocated satellite band while terrestrial operators generally are both limited to frequencies “actually needed” and subject to stringent spectrum efficiency and loading requirements; and 2) earth stations routinely are licensed for all azimuths at all elevations and can deny coordination

³⁹ See, e.g., FWCC Petitions at 10 n.17. See also Comsat Opposition at 14 n.12.

⁴⁰ FWCC’s instant petitions are a prime example. The FS community has raised similar concerns in the *Onsat*, *Big Leo Feeder Links*, and *SkyBridge* proceedings, see *supra*. See also *Reorganization and Revision of Parts 1, 2, 21, and 95 of the Rules to Establish a New Part 101 Governing Terrestrial Microwave Fixed Radio Services*, Memorandum Opinion and Order and Notice of Proposed Rulemaking, WT Docket No. 94-148, FCC 00-33 (released February 14, 2000), ¶ 77 (asking whether to restrict location of satellite earth stations to outside of major cities, where microwave routes are most valuable)(*Part 101 NPRM*).

⁴¹ See Background section, *supra*.

⁴² For example, Section 101.103(d)(1) states, “All applicants and licensees must cooperate fully and make reasonable efforts to resolve technical problems and conflicts that may inhibit the most effective and efficient use of the radio spectrum” and, “Applicants should make every reasonable effort to avoid blocking the growth of systems as prior coordinated.” See 47 C.F.R. § 101.103(d)(1). Additionally, Section 25.203(a) states, in part, “Sites and frequencies for earth stations, operating in bands shared with equal rights between terrestrial and space services, shall be selected ... as to minimize the possibility of harmful interference between the sharing services.” 47 C.F.R. § 25.203(a).

to terrestrial operators on that basis.⁴³ Thus, FWCC contends that earth stations are permitted to “warehouse” huge amounts of unused bandwidth over unlimited azimuths, even if the spectrum is needed by terrestrial operators.⁴⁴

28. Opposing parties disagree with FWCC’s allegation that satellite earth station operators are warehousing spectrum and have no incentive to operate efficiently.⁴⁵ SIA, for example, observes that the Commission has placed technical limitations on both services to ensure efficient inter-service sharing, noting that the fixed service has a traffic loading requirement while the geostationary FSS has a two degree spacing standard.⁴⁶ GE Americom adds that because transponder rates must be set to recover the huge sunk costs of a spacecraft, users of satellite service have a strong incentive to use bandwidth efficiently.⁴⁷

29. After weighing the arguments raised by Petitioner and commenters, we propose specific rules, *see infra*, to address the concerns of the Fixed Service community. We also seek comment as to whether evolving requirements of both satellite and terrestrial systems necessitate a further revision of our current policies and rules. For example, has the proliferation of ubiquitously-deployed satellite user terminals and point-to-multipoint fixed stations in certain frequency bands – as well as the implementation of NGSO satellite systems – affected the conduct of inter-service coordination? If so, would modification of the Commission’s rules, in addition to those we propose in this Notice, or changes to the procedures used by frequency coordinators, help to ensure that the principles of spectrum efficiency and equity among band-sharers are more fully realized in bands shared by the FS and FSS? We invite comment on these general questions.

30. We also seek comment on the extent of the FS and FSS sharing problem. We invite licensees, commercial frequency coordinators and others with experience in coordinating FSS earth station and FS station facilities in shared bands to comment on the breadth and nature of

⁴³ See FWCC Petitions at 2-4. In *ex parte* comments, FWCC refers to its filing as the “full-band/full-arc” petition. See Letter from Mitchell Lazarus, Counsel for FWCC, to Magalie Salas, Secretary of the FCC, Nov. 4, 1999, at attachment. The Fixed Point-to-Point Communications Section of the Wireless Communications Division of TIA supports FWCC’s petition. See TIA FS/WCD Reply Comments at 4. We note that, in frequency bands shared by the FSS and FS, the full-arc policy applies only in the 3700-4200 MHz and 5925-6425 MHz bands.

⁴⁴ FWCC Petitions at 4.

⁴⁵ The satellite industry and users of FSS services argue that FWCC’s petitions fail to appreciate the inherent operational differences between the FS and FSS. See, e.g., Iridium Opposition at 2; GE Americom Opposition at 3-8; Sprint Opposition at 3; TIA SCD Opposition at 2; McKibben letter at 2; Williams Opposition at 2; Americasky Reply Comments at 1-2; MCI Worldcom Reply and Opposition at 3; HBO Opposition at 2; SkyBridge Opposition at 7-8; Comsat Opposition at 10-12, 23; SIA Opposition at 3. In addition, Sprint suggests that a Notice of Inquiry, rather than a rule change or a declaratory ruling, would produce more effective rules to address the issue of efficient use of the spectrum. See Sprint Opposition at 2, 4-5

⁴⁶ SIA Opposition at 3. See also GE Americom Opposition at 5 (“The Commission’s two-degree licensing requirement ensures efficient use of FSS spectrum by permitting full re-use of the bandwidth by each spacecraft”).

⁴⁷ GE Americom Opposition at 5. See also TIA SCD Opposition at 5 (“It is important to note that space segment economics (transponder cost) precludes operating more bandwidth than is necessary at any given time”).

sharing difficulties. We ask for comment on the numbers of cases in which the FS and FSS have experienced sharing difficulties and whether the sharing difficulties have occurred in particular band segments and under which specific circumstances. For example, in its reply comments, FWCC argues that “an earth station using one transponder on one satellite should not be able to block an FS applicant over the entire band.”⁴⁸ We ask for specific comment on how frequently this blocking occurs, and invite comment on whether the sharing difficulties experienced by FS or FSS applicants and licensees are correlated to particular types of FSS earth stations or FS stations. We also seek comment on how our proposal, in a recent Part 101 NPRM, to consider auctioning of geographic area licenses for fixed microwave facilities would affect the nature and extent of the current FS and FSS sharing problem.⁴⁹ We specifically invite comment on whether the CSAT licensing we now propose, *see infra* Section V, would work in light of the earlier proposal to auction FS licenses in the C-band on a geographic area basis, as opposed to the current site-by-site basis. Further, we seek comment on whether geographic area licensing of FS facilities by means of auction leads to any conflict with the current licensing of C-band earth stations, or with the proposed licensing of CSATs, and how the C-band licensing of geographic area FS facilities and FSS earth stations could be fashioned to work compatibly?

31. We propose that the new Section 25.203(e)(2) and Section 101.103(d)(1) rules on interference analysis models apply across all bands where the FS and FSS share spectrum on a co-primary basis. The remaining rule changes we propose in this Notice, *see infra*, concerning coordination and sharing between FSS earth stations and FS stations, would apply in the C- and Ku-bands where the two services share a primary service allocation, and we ask whether these rules also should apply in other bands. FWCC has identified three specific band pairs – in the C-, Ku-, and Ka-bands⁵⁰ – where it particularly is concerned about FS access to co-shared spectrum. We recognize that differing FS and FSS applications within particular services may affect how the services share. For instance, some satellite bands are reserved for “feeder link” or “gateway” earth station use and others provide service links to user terminals. We have reserved one FSS band for international systems.⁵¹ We also have reserved bands for specific uses such as Mobile-Satellite Service or Broadcast-Satellite Service feeder links.⁵² We, therefore, ask for comment on whether there are reasons that the rules we are proposing in this Notice should be limited to particular frequency bands. We further propose that these amended rules apply to all

⁴⁸ FWCC Reply Comments at ii.

⁴⁹ In February the Commission released an NPRM proposing amendments to Part 101 to streamline processing of microwave applications. The NPRM specifically addresses issues concerning FS licensing above 2 GHz to ensure the consistency of our implementation of the Balanced Budget Act of 1997. In that NPRM, we seek comment on proposals for auctioning of geographic area licenses for fixed microwave facilities, in addition to the possibility of retaining the current approach of site-by-site licensing but with auctions to resolve mutually exclusive FS applications. *See supra* n. 40. We note that, subsequent to adoption of our *Part 101 NPRM*, Congress enacted the ORBIT Act, *see* ORBIT Act, Pub. L. No. 106-180, 111 Stat. 48 (2000)(to be codified at 47 U.S.C. §§ 701-769), which limits Commission authority to auction spectrum used for the provision of satellite services.

⁵⁰ *See supra* notes 8 and 20.

⁵¹ *See* 47 C.F.R. §2.106 note NG104.

⁵² *See, e.g.*, 47 C.F.R. § 2.106 notes US 271 and NG 166.

FSS earth stations and FS stations upon the effective date of the Report and Order in this proceeding.

2. Demonstrating “Actual Need”

32. *FWCC’s Petitions.* In its petitions, FWCC asserts, with respect to the spectrum conservation obligations of operators in the FS and FSS, that the Part 101 and Part 25 rules are asymmetrical, to the disadvantage of FS licensees and applicants. FWCC avers that whereas Part 101 requires point-to-point terrestrial operators to meet stringent requirements designed to ensure efficient use and loading of FS spectrum,⁵³ Part 25 contains no specific provisions requiring earth station operators to “minimize spectrum usage.”

33. FWCC states that, since at least 1967, the Commission has licensed earth stations to use the entire allocated band without inquiring into the amount of traffic to be carried. It argues that the Commission’s policy of imposing spectrum conservation obligations on terrestrial users but not on earth station operators unfairly burdens terrestrial systems.⁵⁴ FWCC asks the Commission to affirm by declaratory ruling that an earth station in the FSS, using spectrum shared with terrestrial services, may be licensed and coordinated to use only twice the amount of bandwidth for which the applicant demonstrates “actual need at the time of licensing.”⁵⁵ Alternatively, FWCC asks the Commission to amend Section 25.130 to require an earth station applicant to specify and justify *a priori* the amount of bandwidth actually needed to deliver the services described in an application for initial authorization, major modification, or renewal.⁵⁶ Under

⁵³ FWCC cites various requirements of 47 C.F.R. Part 101. FS equipment at 4, 6, 10 and 11 GHz is subject to payload requirements ranging from 2.46 to 4.47 bits/second/Hertz. 47 C.F.R. § 101.141(a)(3). The Commission reserves the right to issue a license for less than the maximum requested bandwidth if it determines that a lesser bandwidth would be sufficient to support the applicant’s intended communications. 47 C.F.R. § 101.109(c). Equipment at 4, 6, 10 and 11 GHz operating at bandwidths of 10 MHz or greater is required to be loaded to 50% of the specified payload standards within 30 months of licensing. 47 C.F.R. § 101.141(a)(3) note 3. Part 101 prohibits licensing for frequency diversity in the absence of a showing that the required communications are not otherwise achievable. 47 C.F.R. § 101.103(c). In the C-band, frequency diversity is limited to one protection channel, which will not be authorized without a minimum of three working channels in service or a showing that three working channels will be required within three years, subject to termination if the application for the third working channel is not filed within three years. *Id.*

⁵⁴ FWCC Petitions at 5-6. *See also* TIA FS/WCD Reply Comments at 3.

⁵⁵ FWCC Petitions at 8. FWCC suggests an applicant might demonstrate need by certifying it has appropriate contracts for transponder use or by certifying minutes of use per day, or by justifying the requested bandwidth in terms of the service proposed. For example, FSS users such as broadcast networks that require routine access to several transponders on multiple satellites might justify an actual need to license and coordinate spectrum for this purpose. *Id.* FWCC’s reply comments suggest additional circumstances under which an earth station applicant might demonstrate need. These include instances when: 1) the satellite or frequency is wholly at the discretion of the space segment provider; 2) the earth station operator’s business routinely requires ready access to multiple satellites; 3) an earth station complex has multiple antennas pointing at multiple and changing satellites; 4) the earth station operator provides service to independent third parties with unpredictable space segment needs; 5) the earth station coordinates to use satellites known to be nearing the end of useful life; and 6) an NGSO feeder link earth station requires access to multiple satellites in a system. FWCC Reply Comments at 12-13.

⁵⁶ FWCC Petitions at Appendix C.

both its request for declaratory ruling and petition for rulemaking, FWCC further proposes that an earth station operator seeking additional bandwidth beyond what FWCC proposes to impose as the limitation in the earth station's license (that is, twice demonstrated need) must file to modify its license, subject to satisfactory frequency coordination with other users.⁵⁷

34. **Oppositions.** FSS licensees, users, and industry associations oppose FWCC's proposal to establish demonstrated need requirements for earth station applicants because they maintain that each earth station must have the ability to switch from one channel to another based on transponder availability on the satellite with which it desires to transmit at a given time.⁵⁸ Further, they point out that FSS earth stations, particularly gateway/teleport earth stations, require full-band flexibility to accommodate changing space segment configurations and to meet existing and new market demands.⁵⁹ HBO states that in many cases the particular satellite and frequency that must be used are beyond the control of the earth station operator.⁶⁰ Opposing

⁵⁷ FWCC Petitions at Appendices B and C.

⁵⁸ Comsat Reply Comments at 3. *See also* SIA Opposition at 5 ("the potential transmission path for any satellite earth station necessarily includes any authorized space station that is within the portion of the geostationary arc that it "sees"); GE Americom Opposition at 11 ("the frequency allowance the FWCC proposes would be useful only in the unlikely event that an earth station's licensed frequencies happened to coincide with available alternate capacity"); HBO Opposition at 2 (proposal "fails to recognize the operational realities of major satellite uplink facilities that employ multiple antennas and communicate with a constantly changing mix of FSS satellites (both U.S. and non-U.S. licensed) over a wide range of orbital arc and frequencies [and] would make it difficult, if not impossible, to operate earth station facilities with the flexibility demanded in today's satellite service business environment"); Sprint Opposition at 2 (carriers at both ends of an international circuit must be able to accept a circuit assigned by Intelsat and failure to accept the assignment would result in the carrier losing the capacity); and MCI Worldcom Reply Comments at 2. HBO, in its Opposition at 4 and Attachment A, provides information showing that antennas at its Hauppauge facility have communicated with a total of 24 different satellites, operating at 18 different orbital locations in a range between 58W and 135W and have used a total of 34 separate frequencies, 24 in the C-band and 10 in the Ku-band. SIA, at 5, cites to earlier Commission decisions acknowledging the need for full-band/full-arc coordination to ensure the flexibility of the satellite operator to change satellite locations and transponder use assignments. *See, Public Notice on Processing Procedures for Domestic Earth Station Applications*, FCC 75-932, Attachment 2, *RCA Global Communications Inc.*, 56 F.C.C. 2d 660, 694 at n.32 (1975) and *Processing of Pending Space Station Applications in the Domestic Fixed-Satellite Service*, 93 F.C.C. 2d 832, 837-38, ¶ 17 (1983). Sprint, at 4, observes that it uses satellite service exclusively to serve nearly 50 countries.

⁵⁹ *See, e.g.*, Comsat Opposition at 11. Comsat states that a 100% excess bandwidth assignment allowance would not begin to satisfy needed frequency assignment flexibility. It observes that typical earth station carriers range from 0.5 to 36 MHz in occupied bandwidth and contends that the proposed demonstrated need rule would result in a tuning flexibility only on the order of 1 MHz for the narrowest, and 72 MHz for the widest, in this range, an amount of agility that would make carrier frequency relocation difficult because relocation often requires shifts of greater than 72 MHz. Comsat advises that it recently was able to make 72 MHz of bandwidth, an entire transponder, available on an Intelsat satellite at 174E (186W), to accommodate service needs of one of its largest customers, only through extensive relocation of almost 35 carriers over a period of a few weeks. Comsat further notes that, in cooperation with earth station operators, who are Comsat's customers, it relocates some 200 carriers each year with the objective of making the most efficient use of the satellite resource. *Id.* at 20. *See also* Williams Opposition at 2; ATC Reply Comments at 4-5.

⁶⁰ For example, when HBO transmits or receives programming produced by a third party, it must access the satellite and transponder arranged by the program producer, and, even when HBO has control over procurement of satellite capacity for a particular event, the satellite and transponder are dependent on technical specifications, market conditions, and transponder availability at a specific date and time. HBO Opposition at 4. HBO adds that

parties also note that a satellite transponder failure may require a particular earth station to switch to another transponder operating at a different frequency or on another geostationary satellite.⁶¹

35. Commenters further state that NGSO satellite system earth stations must be capable of operating over the entire allocated bandwidth so that they can switch to channels that are available on satellites in view within the NGSO constellation, to avoid both interference to other NGSO systems and intrasystem interference.⁶² SkyBridge avers that although an earth station operator may not use all available bandwidth at the start of service, it may augment its use as its business grows and must be coordinated and licensed from the start for all of the bandwidth ultimately needed by the projected traffic.⁶³ SkyBridge states that all such bands used by an earth station are needed.⁶⁴

36. Further, with respect to FWCC's proposal to use certifications of transponder contracts or minutes of usage per day, commenters contend that there are no general criteria for bandwidth

commercial teleports in the business of serving the varied requirements of hundreds of customers may have even greater need for spectrum flexibility than HBO has in meeting its own private transmission requirements. *Id.* at 5 n.4. *See also* McKibben Letter at 2.

⁶¹ SkyBridge Comments at 9 n.23. SkyBridge states that, unlike terrestrial facilities, satellite facilities generally cannot be repaired and therefore flexibility is required to maximize use of the satellite resources. Similarly, GSO earth stations often are coordinated for all pointing directions along the GSO arc, in case a satellite failure requires repointing earth stations to a different GSO satellite. *Id.* *See also* SIA Opposition at 5 (“the earth station operator will not know in advance on which frequencies it will be able to operate because of the potential for transponder outages, satellite failures, the deployment of new satellites, and the decommissioning of aging satellites”); GE Americom Opposition at 6-11 (“if a transponder fails and a spare transponder is not available, service can be restored only by re-routing transmissions to a different transponder or an entirely different spacecraft [and] this almost always requires a shift in the frequency band over which the service is carried...it is impossible for an earth station operator to predict in advance when it will require new capacity, much less what specific frequencies will be available when that capacity is needed...the end result [of FWCC's proposal] would be to significantly increase the time during which services are disrupted following a transponder or spacecraft failure”); HBO Opposition at 5 (“in the event of interruption to any one of HBO's network distribution feeds...HBO would be required to repoint antennas to different satellites and/or change to frequencies (that may or may not be known until the interruption event occurs) within minutes”); and McKibben Letter at 2 (discussing failure of Galaxy 4, effect on millions of nationwide paging systems, repositioning of antennas, and restoration of most services within 24 hours).

⁶² SIA Opposition at 5 n.10.

⁶³ SkyBridge Comments at 9.

⁶⁴ SkyBridge Comments at 9. *See also* SIA Opposition at 5 (“Absent full band coordination, changes in satellite transponder assignments could require shifts in the frequencies transmitted and/or received by such earth stations to frequencies outside the limited band segments requested in applications, and for which no operating rights could be granted until a new application was completed...If earth stations were restricted to operating in limited portions of the azimuth or only in limited sub-channels within a licensed band, then the Commission would lose two of its more important methods to coordinate space stations internationally: orbital reassignments and frequency use changes”).

usage that could be applied across the board to all satellite systems.⁶⁵ Finally, commenters suggest that the rules proposed by FWCC would reverse the Commission's clear trend toward simplification of licensing and decreased reporting requirements.⁶⁶

37. **FWCC Reply Comments.** In its reply comments, FWCC clarifies that it does not seek the adoption of identical rules for the FS and the FSS, but rather rules that would impose equitable requirements on both services. FWCC does not propose an FSS bits per Hertz efficiency standard,⁶⁷ and does not believe such an efficiency standard would be necessary for equitable FSS/FS sharing. Nor does FWCC seek the adoption of any measures that would infringe on the legitimate needs of earth station operators for flexible use of the spectrum.⁶⁸ FWCC posits, however, that its "actual need" proposal would promote efficient use of shared bands by allowing FS facilities access to frequencies that earth stations now keep idle.⁶⁹

38. **Discussion.** We acknowledge the concerns of the Fixed Service community that FS applicants and licensees are subject to specific efficiency standards⁷⁰ while FSS earth station operators in the same band are not subject to parallel or equivalent requirements. At the same time, we recognize that the two services have architectural and operational differences. The FS involves point-to-point or point-to-multipoint facilities that are authorized to communicate on discrete paths at specific frequencies. FSS earth stations, on the other hand, may not use the same frequencies, at the same angles and azimuths, over long periods of time. Rather, many FSS

⁶⁵ SkyBridge Comments at 9. SkyBridge adds that transponder usage and minutes per day are not easily applicable to new satellite systems, such as NGSO FSS systems, and a requirement that bandwidth be justified in terms of the services proposed leaves the door open for endless controversies. *Id.*

⁶⁶ GE Americom Opposition at 12, citing recent proceedings that substantially streamline Part 25. *See, e.g., Public Notice, "Commission Launches Earth Station Streamlining Initiative,"* DA 99-1259 (June 25, 1999) and *Streamlining the Commission's Rules and Regulations for Satellite Application and Licensing Procedures*, Report and Order, 11 FCC Rcd 21581 (1996). GE Americom also states, *id.* at 11, that, under FWCC's proposal, earth station operators needing access to new spectrum would have to pay for new coordination analyses and bear the costs of preparing and filing modification applications, costs that ultimately would have to be borne by satellite service users.

⁶⁷ FWCC Reply Comments at 6. "FWCC claims not inefficient use of occupied spectrum, but licensing of excessive amounts of *unoccupied* spectrum." *Id.* at n.11.

⁶⁸ FWCC Reply Comments at 12. FWCC contends that it supports a broad reading of the term "actual need." *Id.* at ii.

⁶⁹ *Id.* at 7.

⁷⁰ *See, e.g.,* Section 101.141(a)(3), 47 C.F.R. § 101.141(a)(3), which requires that FS equipment applied for, authorized, and placed in service after June 1, 1997 must meet specified minimum payload capacity and minimum traffic loading requirements in the 3700-4200 (4 GHz), 5925-6425 and 6525-6875 (6 GHz), 10.5-10.68 GHz (10 GHz) and 10.7-11.7 GHz (11 GHz) bands. *See also* Section 101.141(c), 47 C.F.R. § 101.141(c), which states that, for systems employing analog modulation techniques, the Commission will not grant (absent extraordinary circumstances) additional frequencies over existing routes unless the applicant demonstrates that the traffic load will shortly exhaust the capacity of the existing equipment, and Section 101.109(c), 47 C.F.R. § 101.109(c), which reserves the Commission's right to issue licenses at less than the maximum specified bandwidth if the Commission determines a lesser bandwidth would be sufficient to support the applicant's intended communications.

earth stations regularly change their orientations and frequencies to transmit to or receive information from a number of satellites and satellite transponders. Spectrum use by FSS earth stations also must be coordinated in paired bands, one band for receive frequencies and a second band for transmit frequencies.

39. Because of these differences, we have taken different approaches to ensuring spectrum efficiency in the respective services. As commenters observe, we have placed technical limits on both services to ensure efficient use of the spectrum. For example, while our Part 101 rules for the FS service employ a variety of payload and loading requirements, earth station operators, by default, must conform to the technical requirements for satellite space stations, in order to gain access to geostationary satellite orbit FSS satellites serving the United States and abroad.⁷¹ Indeed, FWCC itself recognizes that the two services differ, and states that it is not so much concerned about the efficiency of spectrum actually used by FSS earth stations but rather is concerned with what it sees as the non-use of some of the spectrum licensed to satellite earth stations.⁷² Thus, FWCC has proposed, in its request for declaratory ruling and in its parallel proposal for a rule amendment, that we change our policy of authorizing earth stations to access the full allocated band and declare instead that we will authorize earth stations to use no more than twice the amount of spectrum “actually needed.”

40. At this time, we do not believe it is necessary to change our policy of authorizing earth stations, subject to coordination with FS operators prior to licensing,⁷³ to use the entire pertinent frequency bands.⁷⁴ Our full-band licensing policy promotes important operational objectives in

⁷¹ The Commission requires geostationary satellite orbit FSS satellite operators to conform to a two-degree spacing policy, see *Licensing of Space Stations in the Domestic Fixed-Satellite Service and Related Revisions of Part 25 of the Rules and Regulations*, Report and Order, CC Docket No. 81-704, 54 Rad. Reg. 2d 577 (1983) (*Reduced Orbital Spacing*), and our Part 25 rules set out technical requirements for earth and space stations in the FSS. For example, space stations must be designed to derive the maximum capacity from the assigned orbit location by employing state-of-the-art full frequency reuse using both horizontal and vertical polarization. See 47 C.F.R. § 25.210(e). Part 25 also requires relatively stringent earth station antenna performance in order to protect from interference other FCC-licensed GSO FSS operators and the systems of other Administrations. See 47 C.F.R. §§ 25.209 and 25.210(k). These FSS technical and efficiency rules, requiring FSS earth stations to narrow their antenna beam widths and reduce their sidelobe energy, benefit the FS because they afford FS stations the ability to operate in closer proximity to FSS earth stations than they could before implementation of these stricter operating requirements. In addition, certain limitations are contained in the Commission’s Table of Allocations. For example, the 10.7-11.7 GHz band is limited to international operations only. See 47 C.F.R. § 2.106, Footnote NG 104. This limitation on the allocation was designed to minimize the number of GSO FSS earth stations in the band and has mitigated the impact of GSO FSS earth stations on terrestrial operations.

⁷² FWCC Reply Comments at ii and 5-6. FWCC is concerned that recent Commission decisions reallocate bands away from the FS for satellite use and increase sharing burdens on the FS to accommodate new satellite operations. See, e.g., *Emerging Technologies*, *supra* at note 32, *Big Leo Feeder Links*, *supra* at note 33, and *18 GHz Proceeding*, *supra* at note 38.

⁷³ We understand that the coordination process may in fact limit the actual frequencies and azimuths that the FSS earth station can use even though the FSS earth station applicant requests, and has been licensed for, the entire frequency band and visible geostationary arc.

⁷⁴ See, e.g., *Establishment of Domestic Communications-Satellite Facilities by Nongovernmental Entities*, Report and Order, 22 FCC 2d 86, 102 (1970). See also *American Satellite Corp.*, 72 FCC 2d 750, 754 (1978) (intent of

the FSS, in particular by providing earth station licensees the needed flexibility to change transponders or satellites on short notice, and without having to be re-licensed by the Commission, to meet changing operational requirements. As commenters observe, the potential transmission path for a satellite earth station can include any authorized space station within the portion of the geostationary satellite arc seen by the earth station.⁷⁵ Many satellite earth stations employ multiple antennas and regularly communicate with a constantly changing mix of FSS satellites, both domestic and foreign. This type of operation requires access over a wide range of orbital arc and frequencies. These stations include commercial gateway and teleport facilities that are in the business of providing third parties access to satellite services. They also include private facilities such as those operated by HBO to transmit and receive programming. As HBO observes in its pleadings, the antennas at its Hauppauge facility regularly communicate with multiple satellites on an array of frequencies. In sum, our full-band licensing policy provides all earth station operators the ability to conform to the constraints placed on the satellite operators and the flexibility to change channels to access available transponder capacity within a satellite network and available capacity on other satellite networks.

41. Moreover, we believe that FWCC's proposal would be impractical to implement. To obtain documentation to make an up-front showing of "actual need," an FSS earth station applicant, before it submitted its application, would be required to enter into contracts with those satellite operators whose satellites it proposed to access. To conclude such contracts, the FSS earth station applicant first would need to identify the specific frequencies and to pay reservation fees for these frequencies to the applicable satellite operators to ensure that the applicant had access to the spectrum it needed, although at that time it would be unclear whether the applicant in fact could coordinate the reserved spectrum with affected FS station licensees and applicants.

42. For these reasons, we deny FWCC's instant request for declaratory ruling and its parallel request to amend Section 25.130 to limit an earth station licensee's spectrum usage to the amount of bandwidth it can demonstrate *a priori* that it "actually needs" to deliver the services described in an application for initial authorization, major modification or renewal. At the same time, we take notice of FWCC's concern that, in fact, not all FSS earth stations may be using the full licensed band, and we propose to address FWCC's concerns in a different manner. FWCC states that coordinating new or expanded FS operations, particularly in the 4 GHz band but also in other shared bands, has become increasingly difficult.⁷⁶ FWCC also advises that, "We have no quarrel with any use of spectrum by any earth station. We object only to earth station privileges over *unused* spectrum."⁷⁷ FWCC seeks a remedy to the spectrum shortage it says FS applicants and licensees are experiencing, but "without significantly burdening satellite

full-band/full-arc policy is to protect the Commission's flexibility and that of the satellite operator to change satellite locations and transponder use assignments to best satisfy overall domestic satellite service requirements).

⁷⁵ This applies for most FSS earth stations in the 3700-4200 MHz and 5925-6425 MHz bands, which are co-shared with the FS, and also applies in the 11.7-12.2 GHz and 14.0-14.5 GHz bands, which in the United States are not shared on a co-primary basis with the FS.

⁷⁶ FWCC Reply Comments at 4.

⁷⁷ *Id.* at 5.

operations.”⁷⁸ We believe that FWCC’s “actual needs” rule would place an undue regulatory burden on FSS earth station applicants, and therefore propose to adopt a more targeted and less burdensome requirement to address FWCC’s concern.

43. In order to justify FWCC’s “actual needs” rule, FWCC points out that FSS earth stations can deny coordination of new or expanded FS stations even with respect to unused spectrum. We propose, as discussed below, to tailor a rule to address those instances where an FSS earth station denies a coordination request when the FSS earth station is not using – and has no imminent plans to use -- the requested spectrum. Although we would expect many FSS earth stations, particularly teleports and other FSS earth stations that communicate with a number of different satellites and transponders, to have records demonstrating use across most if not all of the relevant band, this may not be the case in all instances where coordination is denied. In those cases where FSS earth stations have chosen not to exercise their ability to change channels to access available transponder capacity within a satellite network and available capacity on other satellite networks, but yet have denied coordination, we believe that they should be required to coordinate the requested FS use.

44. As discussed below, we therefore incorporate this related concept of “demonstrated use” in our proposal, *see infra*, to require an FSS earth station operator to demonstrate to the frequency coordinator, at the time an FS operator requests and is denied coordination, that the FSS earth station is using, or has imminent plans to use, the spectrum in question. We believe that this proposal and a separate, additional proposal on FSS/FS frequency coordination, *see infra*, will ensure that spectrum in bands shared by the FSS and FS is being used efficiently and will help to alleviate congestion concerns when coordinated spectrum is not being used by FSS earth stations. We tentatively conclude that these proposals are the most effective and targeted means of addressing the concern of the FS community regarding access to spectrum at the time of coordination, without imposing unnecessary regulatory constraints on either service. We invite commenters disagreeing with our tentative conclusion to submit comments on this point. In particular, we ask for comment as to why our proposals, *see infra*, to adopt both a “demonstrated use” showing at the time coordination is denied and a separate rule on frequency coordination, but not to adopt FWCC’s “actual need” proposal, would not address adequately the concerns of the FS community. We invite commenters arguing that our proposals do not address adequately those concerns to propose alternative approaches that take into account the constraints under which an FSS earth station must operate when attempting both to secure spectrum on satellite networks and to meet coordination requirements for shared frequency bands.

3. Demonstrating “Use”

45. *FWCC’s Petitions.* In its petitions, FWCC has also requested that the Commission amend its rules so that earth stations using spectrum shared with the fixed services would be required to meet minimum loading standards, which the FWCC believes would help to make more spectrum available for terrestrial use without impinging on earth station operators.⁷⁹

⁷⁸ *Id.* at 10.

⁷⁹ FWCC Petitions at 9.

FWCC notes that spectrum shortage has become a fact of life in many parts of the country and that the Commission is attempting to ease congestion in most of the fixed and mobile services by requiring licensees to meet reasonably accessible levels of loading and spectrum efficiency.⁸⁰ Specifically, FWCC has asked that the following language be added to Part 25 of the Commission's rules:

An earth station licensee in the Fixed Satellite Service, in bands shared with point-to-point terrestrial services, must certify within 30 months after issuance of an initial license, major modification, or renewal that it is loaded to 50% of its licensed bandwidth. A licensee that cannot make this certification by the required date must instead, within 30 days of that date, notify the Commission pursuant to Section 25.118 of a reduced range of operating frequencies whose total bandwidth is no more than twice the actual load, and must disseminate such notice to the public in a manner reasonably calculated to reach other users of the band. This paragraph does not apply to earth stations authorized for total bandwidth of 40 MHz or less in each direction.⁸¹

46. FWCC notes that the first sentence of this provision would parallel the loading requirement applicable to terrestrial operations in the 4, 6, 10, and 11 GHz bands, operating at bandwidths of 10 MHz or greater.⁸² FWCC proposes the second sentence in lieu of outright cancellation of the earth station license for failure to load. The last sentence would provide an exemption for light users of the band.

47. **Oppositions.** Opposing parties object to loading standards for the same reasons that they oppose the "actual need" proposal. They argue that FSS loading rules are unnecessary because efficient loading of satellite carriers is inherent in satellite capacity economics.⁸³ They state further that loading standards are unworkable,⁸⁴ that loading data is commercially sensitive information,⁸⁵ and that a loading standard would increase administrative and regulatory costs.⁸⁶

⁸⁰ FWCC Petitions at 9.

⁸¹ FWCC Petitions at 10.

⁸² See 47 C.F.R. § 101.141(a).

⁸³ Comsat Opposition at 23 (the economic penalties of using excessively wide bandwidth carriers that are lightly loaded are too great because the relatively high cost of associated satellite power and bandwidth prohibits this type of operation by satellite systems). See also TIA SCD Opposition at 5.

⁸⁴ McKibben Letter at 2. See also ATC Opposition at 7; SkyBridge Opposition at 8 (loading requirements are not applicable to spread-spectrum systems); GE Americom Opposition at 12 (any snapshot view of loading of individual earth station would be inaccurate representation of use of facility).

⁸⁵ SkyBridge Opposition at 8.

⁸⁶ Comsat Opposition at 21; GE Americom Opposition at 10.

48. **FWCC Reply Comments.** In response, FWCC avers that loading standards do not raise policy issues separate from the demonstrated need proposal, but are merely an enforcement mechanism to prevent earth stations from routinely using only a small part of the spectrum they coordinate.⁸⁷ FWCC's proposal would acknowledge intermittent use toward loading if it would also be counted toward demonstrated need.⁸⁸ FWCC concurs with ATC and SkyBridge that loading standards make little sense for spread-spectrum systems,⁸⁹ and that licensees should not be required to disclose actual loading data.⁹⁰

49. **Discussion.** We wish to craft the most direct and straightforward rules possible to achieve our goals, and we solicit comment on whether the proposed rules can be streamlined to facilitate compliance, enforcement, and transparency. We are particularly interested in comments on whether we need to define "use" or whether we should look to the totality of the circumstances. That is, if it is appropriate to define use with specificity, how should we define it? We also seek comment on whether the factors listed below should be a part of the rule, or simply a portion of our assessment. We defer defining "use" until the record on these various points is more complete. Although we do not propose to adopt a specific spectrum efficiency standard for FSS earth stations, we seek comment on whether the Commission should develop and apply such a standard for FSS earth stations, especially in frequency bands shared with other radio services

50. Commenters in their oppositions to the FWCC proposal for "loading" standards raise legitimate questions as to how such a concept could be applied to satellite earth stations, particularly if we attempt to apply a general standard to all types of earth stations. What they have not done, however, is challenge the principle that all users of the radio spectrum bear a responsibility to ensure that it is used in an efficient manner. We believe the principle of efficient use of spectrum shared between satellite earth stations and terrestrial fixed stations is in the public interest and should be pursued.

51. We support the concept that licensed spectrum should be used or successfully coordinated with other primary services that require use of the shared spectrum. As FWCC has pointed out, the radio spectrum is a limited resource that must be shared by a wide variety of services and types of users within each service. The Commission must ensure that this resource is used in the most efficient manner possible, consistent with meeting the needs of its licensees. In shared bands, an earth station licensee should not be able to block indefinitely access to spectrum the earth station is not using.

52. The concept of loading, as proposed by FWCC and as discussed in the comments and reply comments, has two distinct components. First, licensed spectrum should be used and not

⁸⁷ FWCC Reply Comments at 14.

⁸⁸ *Id.*

⁸⁹ *Id.*

⁹⁰ *Id.* at 15. Rather, FWCC asks that earth station licensees be required to certify to the Commission that they have met loading criteria. *Id.*

warehoused by any licensee or licensees, and, in shared bands, every attempt should be made to successfully coordinate with other primary users. Second, when spectrum is used, it should be used in an efficient manner.

53. We propose to address the first component in this Notice, by proposing, for the C- and Ku-bands shared between FSS earth stations and FS stations, to adopt a new coordination procedure to increase efficient and equitable use of these bands. This new procedure would be initiated by the frequency coordinator only if an FSS earth station licensee denies an FS station applicant's request to coordinate spectrum. Pursuant to this new procedure, we propose to require that an FSS earth station operator denying a coordination request certify to the frequency coordinator: 1) its current and recent actual use of the requested spectrum, by identifying the applicable satellite locations, transponder frequency bands, and the timeframes they were in use; and (2) any imminent use of the requested spectrum. The frequency coordinator would determine, in the first instance, whether the requested spectrum is in "use," or whether it is not in "use" and thus is available for re-licensing to the requesting party. If a dispute arises over the coordinator's determination that the FSS earth station should reduce its licensed spectrum to accommodate the FS station request, or, alternatively, over the coordinator's determination that the coordination request should be denied because the requested spectrum is in "use," the disputing party may request Commission review. In a Commission review, the frequency coordinator would provide the Commission with all relevant information from the attempted coordination that led to the dispute, and the Commission might require, as needed, that the FSS earth station licensee and FS applicant supplement this record. We request comment on whether this proposal would provide for the equity in co-frequency sharing that the FWCC seeks and whether it would achieve the Commission's goal of promoting spectrum efficiency in shared bands. We request comment on whether this showing by the FSS earth station licensee should receive confidential treatment by the Commission.

54. Once the new coordination procedure is triggered, we would propose to require the FSS earth station to demonstrate "use" of the requested spectrum to the frequency coordinator, as follows: 1) for recent use, by identifying the timeframes during which each satellite transponder frequency band was "used" within the past 24 months; 2) for current use, by identifying each satellite transponder frequency band in "use" at the time of the coordination request; and 3) for imminent use, by certifying the availability of some form of detailed information on planned "use," e.g., use to be initiated within the next six months and supported by contract(s) or other documentation. We ask for comment on a number of questions on the concept of "use" as it is applied in the context of FSS earth stations. In particular, we ask whether we should define "use" and how FSS earth station licensees could demonstrate "use?" For example:

- Frequency Diversity: In the coordination and licensing process, how would the FCC and interested parties take into account the need of some FSS earth station operators for the flexibility to switch between different satellites or between multiple transponders on the same satellite? Would the routine or non-routine nature of the need for frequency diversity be relevant? Specifically, if the FSS earth station has a routine need to access multiple transponders or satellites, including multiple satellites in a non-geostationary orbit system, how would this operational requirement be factored into determining use? Similarly, would

the presence at an FSS earth station of multiple antennas pointing at multiple and changing satellites be relevant? How would “routine” and “multiple” be defined?

- Intermittent Use: If the spectrum licensed to an FSS earth station is not in use at all times, how much use would satisfy this criterion? Could factors such as total minutes of daily use be used to define use? In the context of a “wideband” data system, should a minimum threshold of data throughput be required to constitute use? If so, what should that minimum data throughput be?
- Transponder Usage: In the context of an FSS earth station that varies its transponder usage over time, how often would a particular transponder (or even a portion of a transponder) be required to be active to be considered in use?
- Future Use: Should the concept of use include contracts with the satellite operators for future use or to use certain transponders that could not be immediately brought into use due to international coordination difficulties or other circumstances such as satellite failure redundancy? What criteria should apply to determine whether an earth station licensee has imminent plans to use the spectrum in question? For example, should our definition of imminent use require a showing of firm financial commitments to lease satellite transponder time?
- Space Segment Assignment: If the satellite frequency is assigned solely at the discretion of the space segment provider, would this factor be relevant in demonstrating use?
- Equipment Failure: Could occasional, short-term events, coordination to use satellites known to be nearing the end of useful life, and planning as a precaution against transponder or satellite failure constitute factors in the demonstration of use?
- NGSO/MSS Feeder Links: For non-geostationary satellite orbit Mobile-Satellite System feeder links or non-geostationary-orbit Fixed-Satellite System gateway earth stations, spectrum use is a function of the frequency reuse efficiencies realized in the bands used to serve the end user. For these stations, how should use be demonstrated, for example, in the 6525-6875 MHz band?
- Balance of Current and Future: In the coordination process, how would “current” and “future” use be balanced in determining which spectrum should be considered in an FSS earth station/FS station coordination?

55. We propose that, if the FSS earth station denying coordination has been licensed for less than 24 months, it would be exempted from the new coordination procedure. This “initial loading period” would provide time for the FSS earth station to establish its business and build its customer base. At the same time, we propose to amend Section 101.141 to shorten the loading period for FS licensees in the C- and Ku-bands to 24 months. Currently, FS licensees in the C- and Ku-bands have 30 months from initial licensing in which to load their facilities to the

required capacity. Modifications of the Part 25 and 101 rules in this manner would give both the FSS and FS licensees a comparable period of time in which to put their spectrum to use before it is susceptible to re-licensing to others. We request comment on whether this initial loading period should vary depending on the type of FSS earth station or FS station involved and on the rationale for any recommended differences in treatment. We also seek comment as to whether Section 101.141 and Section 25.203(e)(1) should be amended to include other bands shared by the FS and FSS, in addition to the C- and Ku-bands.

56. Finally, we note that FWCC suggests exempting FSS earth stations licensed for less than 40 MHz of bandwidth from its proposed Section 25.118 rule change,⁹¹ and we propose a similar exemption for our new coordination rule. That is, FSS earth stations licensed for 40 MHz or less of bandwidth in any direction would not be required to demonstrate use in order to retain protection for that spectrum. We observe that this exemption would mean that, under the rules we are proposing in Section V to authorize CSAT services, CSATs would not be subject to the new coordination rule because they would be limited to 20 MHz of bandwidth in each direction. We seek comment on this proposed exemption.

57. This proposal is contained in Appendix C to this NPRM. We ask for comment on the procedural aspects of this proposal. For example, in the case where a terrestrial FS station has been successfully coordinated on spectrum not currently used by the FSS earth station, we seek comment on how the results of such a coordination could be recorded for future reference. Should frequency coordinators maintain such results and should the results be reported to the Commission?

58. We also seek comment on the most practicable means to apply the new rule to existing FSS earth station licensees. Because such frequencies may no longer be available to the FSS earth station licensee without restriction, would this constitute a modification to the FSS earth station license and, if so, what Commission procedures would be required before re-licensing could occur? Moreover, we ask whether our new coordination procedure would require us to undertake an administrative hearing in order to amend the license of an existing FSS earth station to delete frequencies currently authorized to the FSS earth station but not demonstrated to be in actual use. We further ask whether we should impose conditions, on a forward-looking basis, on FSS earth station licenses that would allow us to implement this new coordination rule. Additionally, we request comment on whether we should require an FSS earth station licensee to make a showing of actual use at the time of each license renewal in order to retain the full licensed bandwidth, in addition to imposing the requirement for a showing at the time of a coordination request.

59. The second component of “loading” is efficient use of the spectrum. While FWCC makes no specific proposal with respect to an “efficiency standard” for earth stations, it does specifically reference the spectrum efficiency standards of Section 101.141(a)(3) note 3 in drawing a parallel between the Part 101 rules and its proposed loading standard.⁹² Although we

⁹¹ FWCC Petitions at 10.

⁹² FWCC Petitions at 10.

do not propose in this Notice to adopt a specific spectrum efficiency standard for FSS earth stations, we do seek comment on whether the Commission should fashion a spectrum efficiency standard for FSS earth stations. For example:

- Type of Station: Recognizing that different kinds of earth stations (*e.g.*, end user terminals versus teleport operators) may have differing requirements for flexibility, and that they operate in different frequency bands, how would the distinctions between these different types of stations affect the definition of any loading standards? Would the number (large or small) of users served by FSS earth stations be relevant to the definition of loading? Should there be a tiered approach to applying a loading standard (*i.e.*, more stringent requirements in one band, or one portion of an FSS band, than in others)?
- Technology Employed: If a loading standard were to be adopted, should the standard vary based upon the type of technology involved? For example, if a particular satellite system used a Time Division Multiple Access (TDMA) wideband architecture, it would seem appropriate that individual user earth stations and gateway stations would have different loading standards. If so, what should those standards be?
- Timing: If loading standards were to be adopted, what would be an appropriate timeframe for meeting these standards? FWCC proposes 30 months. Would this 30-month timeframe be appropriate for all types of earth stations and for all times (*e.g.*, after initial license or after license renewal)?
- Bandwidth: Should loading standards be waived for stations that use only a small portion of the band of license? FWCC suggests a waiver of the requirement for stations that use 40 MHz of spectrum or less in each direction. Is this an appropriate value? We note that at C-band 40 MHz is the normal satellite transponder bandwidth, but at the Ku- and Ka-band, satellites have different (larger) transponder bandwidths.
- Functionality: The Fixed Service shares spectrum with a variety of satellite services (*e.g.*, FSS, BSS and MSS). With respect to the questions above, how do widely varying needs of these particular satellite services affect the determination of or need for loading standards? That is, are there specific amounts of spectrum routinely needed for different satellite uses and for differing functions (*e.g.*, service links, feeder links, and Telemetry, Tracking and Command (TT&C))? Are there other factors affecting an estimation of spectrum need, such as operational requirements, business considerations, emergency planning, and possible growth, and do they vary depending on the types of satellite use and earth station function?
- Other Factors: How do we address other factors such as the earth station operator's business routinely requiring ready access to multiple satellites, an earth station complex having multiple antennas pointing at multiple and changing satellites, and the earth station operator providing service to independent third parties with unpredictable space segment needs?

60. Finally, there are instances where the FSS is operating under unusual or unique circumstances. For instance, in the 10.7-11.7 GHz band, FSS systems are limited to providing

only international, intercontinental operations in accordance with footnote NG104 in order to limit the number of FSS earth stations operating in the band to permit more use by the Fixed Service. A second example is the 13.75-14.0 GHz band where FSS earth stations are required to share spectrum with Government services, and therefore are limited to certain corresponding shared downlink frequency bands. In this latter situation, a loss of frequency diversity might prevent implementation of satellite services in this band. We therefore seek comment on whether any spectrum use or efficiency standards are appropriate in situations where FSS earth station use already is substantially restricted and, if so, whether they should be tailored to the unique situations involved.

61. Although the efficiency requirements that we propose appear to be inconsistent with the Commission's general trend towards less intrusive regulation of the manner in which licensees use spectrum, we find that under the circumstances the proposals herein are better suited to meeting the needs of the industry and the general public. We note that the deregulatory approach has been particularly pronounced for spectrum purchased at auction. In this case, however, the users of the spectrum have obtained those rights free of charge. Given the current somewhat asymmetrical efficiency obligations on the co-primary licensees, absent an auction, we believe that exploring some efficiency requirement is the best way to further our spectrum management objectives.

4. Interference Coordination

62. **FWCC's Petitions.** The FWCC Petitions raise the issue of how prior coordinations should affect the conduct of subsequent coordinations. Specifically, FWCC asks the Commission to adopt rules requiring an earth station to accept from subsequently coordinated fixed stations the same level of interference that it accepted in its initial coordination.

63. FWCC also proposes a detailed procedure for implementing this concept. It proposes that if a satellite earth station applicant coordinating a new or modified earth station accepts cases of potential interference into the earth station from terrestrial users, it may at its option explain the basis for accepting each case (frequency offset, terrain, attenuation from buildings, etc.). Combinations of explanations would be acceptable, as well as incomplete explanations. If the explanation for acceptance of potential interference relies on frequency offset, then a terrestrial station would be able to coordinate at any level in the frequency ranges accepted by the earth station. If, however, the only explanation for acceptance of the potential interference is shielding by a local feature that would not appear on a topographical map, such as a building or berm, then its level of attenuation would be deemed to be the amount of the missed objective, even if this is different from the actual attenuation that would show up in measurements. This imputed attenuation would then apply over the entire azimuth subtended by the feature. For example, if the earth station accepts a 50 dB missed objective on the basis of a building, then the attenuation of that building would be deemed to be 50 dB for all azimuths passing through the building.

64. If, however, the only explanation for acceptance of the interference is terrain blockage, then FWCC proposes that the earth station applicant must evaluate the blockage using industry-