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

In the Matter of	)	
Amendment of Part 101 of the Commission's Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees	)	WT Docket No. 10-153
Request for Interpretation of Section 101.141(a)(3) of the Commission's Rules Filed by Alcatel-Lucent, Inc., *et al.*	)	WT Docket No. 09-106
Petition for Declaratory Ruling Filed by Wireless Strategies, Inc.	)	WT Docket No. 07-121
Request for Temporary Waiver of Section 101.141(a)(3) of the Commission's Rules Filed by Fixed Wireless Communications Coalition	)	

NOTICE OF PROPOSED RULEMAKING AND NOTICE OF INQUIRY

Adopted: August 5, 2010 **Released: August 5, 2010**

Comment Date: [60 days after date of publication in the Federal Register]
Reply Comment Date: [90 days after date of publication in the Federal Register]

By the Commission: Chairman Genachowski and Commissioners Copps, McDowell, and Clyburn issuing separate statements.

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I. INTRODUCTION

1. In this *Notice of Proposed Rulemaking and Notice of Inquiry* (*NPRM/NOI*), we commence a proceeding to remove regulatory barriers to the use of spectrum for wireless backhaul and other point-to-point and point-to-multipoint communications. This proceeding will surface ways to increase efficient use of spectrum for backhaul, especially by updating regulatory classifications that may not have kept pace with the evolution of converged digital technologies. Providing for the more flexible use of microwave frequencies for backhaul may help promote access to backhaul solutions that are critical to the deployment of wireless broadband and other services. Our proposed rule changes may be particularly beneficial to rural areas, where wireline alternatives may not exist. Our proposed rules should increase opportunities for all users of point-to-point and point-to-multipoint services, while protecting established license holders who are already using these bands. As an initial matter, we believe 750 megahertz in the 13 gigahertz range and below can be made flexibly usable for broadband backhaul.

2. As noted in the 14th CMRS Competition Report, backhaul costs currently constitute a significant portion of a mobile wireless operator's network operating expense, and the demand for backhaul capacity is increasing.[1] Cost-efficient access to adequate backhaul thus will be a key factor in promoting robust competition in the wireless marketplace. And while copper circuits currently serve as

[1] Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993; Annual Report and Analysis of Competitive Market Conditions With Respect to Mobile Wireless, Including Commercial Mobile Services, WT Docket No. 09-66, *Fourteenth Report*, FCC 10-81 (May 20, 2010) (*14th CMRS Competition Report*) at 160 ¶ 296.

the predominant choice for backhaul, fixed wireless (including microwave) solutions are gaining popularity. Moreover, microwave may be the only practical high-capacity backhaul solution available to serve certain rural and remote locations.

3. By enabling more flexible and cost-effective microwave services, the Commission can help increase deployment of fourth-generation (4G) mobile broadband networks across America. Most wireless providers have announced planned upgrades to 4G technologies.[2] Several studies suggest that within the next five years, the amount of mobile data traffic in North America will increase by a factor of twenty to over forty times the level of data traffic in 2009.[3] As mobile data traffic increases, carriers will need to increase their backhaul capacity, including microwave backhaul, to accommodate that traffic. For example, AT&T has expressed concern that "[t]he amount of open spectrum . . . available for high capacity long distance links is quickly shrinking, particularly near major population centers."[4] We also anticipate that demand for microwave spectrum for other uses will increase.[5]

4. Consistent with the recommendations of the National Broadband Plan, this proceeding will explore ways to increase the flexibility, capacity, and cost-effectiveness of the microwave bands located below 13 GHz, while protecting incumbent licensees in these bands. We note that carriers are increasingly relying on wireless for their backhaul needs.[6] Current regulations designate different "silos" of microwave spectrum for different services. This proceeding proposes rule changes that will help integrate separate microwave spectrum designations into a larger pool that can be used for backhaul. By increasing the supply of available spectrum for wireless backhaul, we can help ensure that wireless backhaul will be a viable and cost-effective option for meeting increased demand for backhaul services. Furthermore, by reviewing our rules to determine whether it is appropriate to allow licensees to use adaptive modulation, technologies that allow greater reuse of spectrum, and smaller antennas, we work to ensure that licensees are allowed to provide wireless backhaul as efficiently and cost effectively as possible. Additionally, the proposed rule changes will benefit broadcasters and cable television providers through increased and more flexible access to microwave spectrum. Finally, more flexible rules should also facilitate networks that depend on microwave transmission to provide mission critical services, such as public safety, coordination of railroad train movements, control of natural gas and oil pipelines, and regulation of electric grids.[7]

II. SUMMARY

5. In this *NPRM/NOI*, we seek comment on several proposals. In the *Notice of Proposed Rulemaking* portion of this document, we offer specific proposals for increasing utilization of and providing increasing flexibility with respect to microwave spectrum. In the *Notice of Inquiry*, we ask more general questions and solicit other proposals for more cost-effective and intensive use of microwave spectrum. The proposals are:

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[2] *See* National Broadband Plan at Section 5.1 p. 77, Exhibit 5-B.

[3] *Id.*, at Section 5.1 pp. 76-77 and Exhibit 5-A.

[4] *See* Reply Comments of AT&T, Inc., RM-11417 (filed Apr. 30, 2008) at 2.

[5] *See* Reply Comments of Utilities Telecom Council, RM-11417 (filed Apr. 30, 2008) at 2 ("the need for data capacity across utility networks is accelerating quickly and is likely to continue for the next ten to twenty years.")

[6] In 2005, 8.7 percent of backhaul traffic was sent by fixed wireless. *See 14th CMRS Competition Report* at 160 ¶ 294. By 2009, that figure increased to 12.3 percent. *Id.*

[7] *See* Fixed Wireless Communications Coalition Petition for Rulemaking, RM-11417 (filed Feb. 4, 2008) at 4.

Notice of Proposed Rulemaking

- *Permitting Greater Sharing Between FS Operations in Certain BAS and CARS Frequencies*: We propose to allow Fixed Service (FS) operations to share certain spectrum bands currently used by the Broadcast Auxiliary Service (BAS) and the Cable TV Relay Service (CARS). We also propose to more fully accommodate broadcasters' spectrum needs by permitting greater access to spectrum by eliminating the "final link" rule that prohibits broadcasters from using FS stations as the final radiofrequency (RF) link in the chain of distribution of program material to broadcast stations.
- *Permitting Adaptive Modulation*: The Part 101 rules contain a minimum payload capacity rule intended to ensure that FS links are operated efficiently. We propose to allow temporary operations below the minimum capacity under certain circumstances, which will enable FS links – particularly long links in rural areas – to maintain critical communications during periods of fading.
- *Permitting "Auxiliary" Fixed Stations*: We seek comment on a proposal to permit greater reuse of scarce microwave resources, which may permit more efficient use of the spectrum at substantially reduced cost. Specifically, we seek comment on permitting FS licensees to coordinate and deploy multiple links – a primary link and "auxiliary" links.

Notice of Inquiry

- *Modification of Efficiency Standards in Rural Areas:* We seek comment on whether lowering the current efficiency standards in rural areas would lower costs associated with providing backhaul service.
- *Review of Part 101 Antenna Standards*: We seek comment on whether to review the antenna standards in any particular band to allow smaller antennas, to identify opportunities to facilitate increased deployment of FS facilities without subjecting other licensees to increased interference.
- *General Review of Rules.* We seek comment on whether we should examine any additional modifications to the Part 101 rules, or other policies or regulations, to promote flexible, efficient and cost-effective provisions of wireless backhaul service.

III. BACKGROUND

6. The Commission has licensed spectrum for microwave uses for most of its history.[8] In 1996, the Commission consolidated its rules for most microwave point-to-point and point-to-multipoint services into a new Part 101 of the Commission's Rules.[9] Part 101 includes the point-to-point Private Operational Fixed Service (POFS)[10] and the Common Carrier Operational Fixed Service.[11] The

[8] For an extensive discussion of issues the Commission faced in allotting microwave spectrum, *see* Allocation of Frequencies in the Bands Above 890 Mc., Docket No. 11866, *Report and Order*, 27 FCC 359 (1959).

[9] Reorganization and Revision of Parts 1, 2, 21, and 94 of the Rules to Establish a New Part 101 Governing Terrestrial Microwave Fixed Radio Services, WT Docket No. 94-148, *Report and Order*, 11 FCC Rcd 13449 (1996).

[10] *See* Part 101, Subpart H.

[11] *See* Part 101, Subpart I. Part 101 also includes services licensed on a geographic area basis that allow both point-to-point and point-to-multipoint operations. *See* Part 101, Subparts G (24 GHz Service and Digital Electronic Messaging Service); L (Local Multipoint Distribution Service), and M (38.6-40.0 GHz Band). Part 101 also includes the Local Television Transmission Service (Part 101, Subpart J), the Multiple Address Service (Part 101,

(continued....)

Commission's licensing regime for these two services requires frequency coordination and the filing of an application for each microwave link or path containing detailed information concerning the proposed operation.[12]

7. The frequency coordination process consists of giving prior notice to nearby licensees and applicants of the proposed operations, making reasonable efforts to avoid interference and resolve conflicts, and certifying that the proposed operation has been coordinated.[13] In order to secure such authorizations, applicants must specify the latitude and longitude of the transmitter in their applications to an accuracy of one second,[14] coordinate each operation specifying the transmitter location to an accuracy of one second,[15] and modify the license and coordinate any change to the location of the transmitter of more than five seconds in latitude or longitude or both.[16] Thus, if additional transmitters are added, the Commission's current rules require additional coordination and modification of the license.[17]

8. Microwave operations have an extensive history of sharing spectrum with other services. Two specialized microwave services - the Broadcast Auxiliary Service (BAS) and the Cable TV Relay Service (CARS) – have not been consolidated into Part 101. In the bands that BAS and CARS share with Part 101 fixed services, they engage in the same frequency coordination process required of Part 101 services.[18] That includes the filing of an application for each microwave link or path containing detailed information concerning the proposed operation.[19] Additionally, in several bands, Part 101 licensees share spectrum with the Fixed Satellite Service (FSS) licensed under Part 25 of the Commission's Rules.[20] Both FSS and Part 101 licensees use frequency coordination to prevent interference.[21] Other Part 101 frequencies are shared by federal and non-federal users, and use of those frequencies must be cleared by the Interdepartment Radio Advisory Radio Committee.[22]

9. In general, spectrum below 13 GHz is preferred for long-link backhaul because signals can overcome the rain fading effects that limit transmission distances at higher frequencies. Over time, a considerable amount of spectrum in this range that had been allotted for microwave use has been reallotted for mobile wireless services.[23]

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Subpart O), the Multichannel Video Distribution and Data Service (Part 101, Subpart P), and service rules for the 70/80/90 GHz Bands (Part 101, Subpart Q).

[12] *See* 47 C.F.R. §§ 101.21(e), (f), 101.103.

[13] *See* 47 C.F.R. § 101.21(f).

[14] 47 C.F.R. § 101.103(d).

[15] *Id*.

[16] 47 C.F.R. § 1.929(d)(1)(i).

[17] 47 C.F.R. §§ 1.929(d)(1)(i), 1.947(a).

[18] *See* 47 C.F.R. §§ 74.638, 78.36.

[19] *See* 47 C.F.R. §§ 74.638, 78.36, 101.21(e), (f), 101.103.

[20] *See* 47 C.F.R. § 101.101.

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

[22] *See* 47 C.F.R. § 2.106 (United States Table of Frequency Allocations).

[23] *See* 47 C.F.R. §§ 101.69-101.83, 101.85-101.97. Bands formerly used by microwave include the 1850-1990 MHz, 2110-2150 MHz, and 2160-2200 MHz bands.

IV. NOTICE OF PROPOSED RULEMAKING

10. Our review has three main parts. First, consistent with prior Commission actions, we offer proposals to increase sharing among broadcasters, cable television systems, and other fixed users to make additional spectrum available to these users. Second, we review certain Part 101 service rules and offer proposals to provide licensees with additional flexibility as well as to allow more reliable and intensive utilization of Part 101 spectrum. Finally, in the *Notice of Inquiry* that follows this section, we solicit further ideas for revising our Part 101 rules to provide additional flexibility for efficient use of scarce spectrum resources.

A. Making Additional Spectrum Available for Part 101 FS Operations

11. One avenue for meeting the increasing demand for FS for backhaul and other vital services is to permit FS operations in certain bands that have been reserved for specialized microwave services. In this *NPRM*, we believe it is vital to allow existing bands to be used for backhaul and other FS uses where possible. We propose to make 750 additional megahertz of spectrum available for FS uses by maximizing the opportunity for FS to share existing bands reserved for BAS and CARS, while fully protecting those incumbent operators, and increasing the flexibility of BAS operations. We emphasize that we are not proposing to modify existing licenses, and that any new licenses in this band will need to provide full protection for existing licensees. We also propose to provide BAS licensees with additional flexibility by allowing them to choose among a variety of channel bandwidths.

1. Background

12. Two services used by the mass media industry, BAS and CARS, share frequencies with Part 101 fixed services. BAS stations, licensed under Part 74 of the Commission's rules,[24] make it possible for television and radio stations and networks to transmit program material from the site of a breaking news story or a major event to the studio for inclusion in a broadcast program.[25] CARS stations, licensed under Part 78 of the Commission's Rules, are point-to-point or point-to-multipoint microwave systems used by cable systems to receive signals from remote locations or to distribute programming to microwave hubs where it is impossible or too expensive to run cable to those hubs.[26] As shown in Chart 1 below, Part 101, BAS and CARS already share the 6425-6525 MHz, 13.2-13.25 GHz, 17.7-18.3 GHz and 19.3-19.7 GHz bands.[27] Frequency coordination procedures have helped to minimize interference concerns among the services.

[24] *See* Revisions to Broadcast Auxiliary Service Rules in Part 74 and Conforming Technical Rules for Broadcast Auxiliary Service, Cable Television Relay Service and Fixed Services in Parts 74, 78 and 101 of the Commission's Rules, ET Docket No. 01-75, *Notice of Proposed Rulemaking*, 16 FCC Rcd 10556, 10557 ¶ 1 (2001).

[25] *Id.*

[26] *See* Revisions to Broadcast Auxiliary Service Rules in Part 74 and Conforming Technical Rules for Broadcast Auxiliary Service, Cable Television Relay Service and Fixed Services in Parts 74, 78 and 101 of the Commission's Rules, ET Docket No. 01-75, *Report and Order*, 17 FCC Rcd 22979, 22980 n.1 (2002) (*BAS Service Rules Update R&O*).

[27] The Commission's Table of Frequency Allocations is codified at 47 C.F.R. § 2.106. We note that several bands listed in Chart 1 have important limitations. Part 101 use in the 2450-2500 MHz band is limited to certain grandfathered facilities. *See* 47 C.F.R. § 101.147(f)(2). The 6425-6525 MHz band lacks a fixed allocation. *See* 47 C.F.R. § 101.101 and 101.147(j). The 12.2-12.7 GHz band is allotted on a primary basis to the Direct Broadcast Satellite Service. *See* 47 C.F.R. § 25.202(a)(7). For limitations on the 17.7-19.7 GHz band, *see* 47 C.F.R. §

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13. In 2000, the Commission determined that seven analog BAS and CARS channels, each occupying between 16.5 and 18 megahertz of bandwidth, could be replaced with seven digital channels that each occupied only 12 megahertz and created a compressed channel plan in the 2025 – 2110 MHz band onto which existing BAS and CARS operations were relocated.[28] The recovered spectrum would then become available for new satellite and, later, terrestrial services.[29] In 2002, the Commission amended Parts 74 and 78 of its rules to accommodate digital transmission in the Broadcast Auxiliary Service (BAS) and the Cable Television Relay Service (CARS).[30] In doing so, the Commission harmonized many of the rules governing BAS and CARS with rules that already applied to FS licensees under Part 101.

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101.147(r). In light of the important limitations in these bands, which are necessary in order to accommodate other services, we do not propose to offer new services in those bands.

[28] Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile Satellite Service, ET Docket No. 95-18, *Second Report and Order and Second Memorandum Opinion and Order*, 15 FCC Rcd 12315 at ¶¶ 6, 12, 20 (2000) (*MSS Second R&O*).

[29] In the Matter of Improving Public Safety Communications in the 800 MHz Band, WT Docket 02-55, *Report and Order, Fifth Report and Order, Fourth Memorandum Opinion and Order, and Order*, 19 FCC Rcd 14969, 14999-15001 ¶¶ 55-57 (2004).

[30] *BAS Service Rules Update R&O*, *supra*.

Chart 1
Frequencies Available to TV Broadcast Auxiliary, CARS & Part 101 Fixed Services
That Are Not Auctioned and Have 10 MHz or More Maximum Authorized Bandwidth

Band	Common Carrier Fixed Point-to-Point (Part 101, Subparts C & I)	Local TV Transmission (Part 101, Subpart J)	Private Operational Fixed Point-to-Point (Part 101, Subparts C & H)	TV Broadcast Auxiliary (Part 74, Subpart F)	Cable TV Relay (Part 78)	Maximum Authorized Bandwidth (§§101.109 & 74.602)
2025-2110 MHz				X	X	12 MHz
2450-2500 MHz	X		X	X		Varies
3700-4200 MHz	X	X	X			20 MHz
5925-6425 MHz	X	X	X			30 MHz
6425-6525 MHz	X	X	X	X	X	25 MHz
6525-6875 MHz	X		X			30 MHz
6875-7125 MHz				X	X	25 MHz
10.55-10.68 GHz	X		X			
10.7-11.7 GHz	X		X			40 MHz
12.2-12.7 GHz			X			500 MHz
12.7-13.2 GHz				X	X	25 MHz
13.2-13.25 GHz	X	X	X	X	X	25 MHz
17.7-18.58 GHz	X		X	X	X	220 MHz
18.580-18.820 GHz	X		X			20 MHz
18.820-18.920 GHz	X		X			10 MHz
18.920-19.160 GHz	X		X			20 MHz
19.160-19.260 GHz	X		X			10 MHz
19.260-19.700 GHz	X		X	X	X	220 MHz
21.2-23.600 GHz	X		X			50 MHz

2. Discussion

14. One way to potentially increase the availability of microwave spectrum would be to allow FS operations to share spectrum in several bands at 13 GHz and below that are currently assigned to BAS and CARS, but not FS. As shown in Chart 1, there are three such bands: 2025-2110 MHz, 6875-7125 MHz, and 12700-13200 MHz. We tentatively conclude that the 2025-2110 MHz band would not be a good candidate for FS at this time because BAS incumbents have only recently been relocated to the 2025-2110 MHz band.[31] The recent repacking of the 2025-2110 MHz band was necessary to achieve important policy objectives, but the stresses and disruptions of that process, and the extensive number of BAS licensees in the band, do not make the 2025-2110 MHz band a good candidate for additional sharing among fixed services. Instead, we seek comment on introducing FS systems into 750 megahertz located in the 6875-7125 MHz and 12700-13200 MHz bands.

15. First, we propose to permit FS operations in the 6875-7125 MHz band, which is adjacent to existing FS operations in the 6525-6875 MHz band and well suited for backhaul and other microwave

[31] *See* July 15, 2010 *ex parte* filing of Sprint Nextel in WT Docket 02-55 and ET Dockets 00-258 and 95-18 announcing completion of BAS transition.

applications. In particular, we seek comment on sharing between mobile (temporary fixed) operations and fixed operations in the 6875-7125 MHz band where frequency coordination is not as formalized.[32] How will allowing fixed operations in this band affect the flexibility of broadcasters in arranging their ENG (Electronic News Gathering) operations? We note that in 2008, the Wireless Bureau modified ULS to allow BAS TV Pickup licensees the option to identify their stationary, receive-only sites on ULS to aid coordination with other services.[33] In light of the additional sharing proposed by this rulemaking, we also seek comment on whether we should make the identification of receive-only sites associated with TV pickup stations mandatory in the 6875-7125 MHz band.

16. Second, we propose to introduce FS systems into the 12700-13200 MHz band. This band is well suited for short to medium length backhaul microwave applications and in fact prior to 1988 was available to certain relocated FS systems.[34] Today, the 12700-13200 MHz band is primarily used by cable systems to deliver both video and broadband services.[35] It appears to be used mostly by less urban and smaller systems.[36] Though it is not used as extensively as it was previously, it is still critical to those systems that employ it. We seek comment on whether introduction of FS operations in this band, with the additional latitude proposed in this proceeding, will have an adverse impact on cable system operations and whether it will have an effect on future use of the spectrum by cable system operators.

17. Both the 6875-7125 MHz and 12700-13200 MHz bands are currently assigned to television pickup, television studio-transmitter links, television relay stations, television translator relay stations, and CARS.[37] We emphasize that we are not proposing to modify existing licenses and that any new licenses in this band will need to be frequency coordinated with existing licensees. We believe these uses would be compatible with FS operations with use of frequency coordination. The frequency coordination process has been highly successful in allowing maximum utilization of shared bands and eliminating potential interference problems. We therefore propose to require frequency coordination for new FS, BAS, and CARS stations in the 6875-7125 MHz and 12700-13200 MHz bands in accordance with our existing frequency coordination procedures. Commenters that believe that relying on our existing frequency coordination processes would not adequately address all necessary requirements should propose modifications to that process or alternative processes.

18. We seek comment on the best approach to channelization for the various bands under consideration. We note that existing operations in the 6875-7125 MHz and 12700-13200 MHz bands both use 25 megahertz bandwidth channels.[38] We note that this channelization scheme has been in existence for over 40 years.[39] Existing BAS operations in the 12700-13200 MHz band also use 25 MHz bandwidth

[32] *See, e.g.* 47 C.F.R. § 74.638(a) (oral coordination with less than 30 days' notice).

[33] See Wireless Telecommunications Bureau Announces ULS Upgrade, Licensees of Television Pick-Up Stations Now Have the Option of Identifying Their Stationary, Receive-Only Sites on ULS to Aid Coordination with Other Services, *Public Notice*, RM-11308, 23 FCC Rcd 6521 (WTB 2008).

[34] See 47 C.F.R. §101.147(a) n.22.

[35] *See* 47 C.F.R. § 78.11 for permissible uses of CARS stations.

[36] Based on staff review of COALS Electronic Filing System data.

[37] *See* 47 C.F.R. §§ 74.602(a), 78.18(a)(7). Licensees in the Local Television Transmission Service may use these frequencies to provide service to television broadcast stations, television broadcast network-entities, cable system operators, and cable network-entities. *See* 47 C.F.R. § 101.803(b).

[38] *See* 47 C.F.R. §§ 74.602(a), 78.18(a)(7).

[39] *See* Amendment of Parts 2, 21, 87, 89, 91, and 93 of the Commission's Rules to Reallocate, in Hawaii Only, the 6525-6575 Mc/s Band from the Mobile to the Fixed Service and to Permit Access to the Frequency Bands 6525-

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channels, while CARS operations in the band use 25 MHz, 12.5 MHz and 6 MHz channels. In recent years, we have generally assigned a variety of overlapping bandwidths within each Part 101 FS band so that applicants can choose a channel width appropriate for their needs.[40] As detailed in the rules appendix, we seek comment on a channelization scheme that would likewise provide applicants with a variety of channel widths to maximize flexibility and utilization of the 6875-7125 MHz and 12700-13200 MHz bands. Consistent with our recent action allowing 30 megahertz channels in the Upper 6 GHz Band,[41] we seek comment on alternative channelization schemes.

19. In addition, we propose to facilitate use of the 6875-7125 MHz and 12700-13200 MHz bands by BAS operators by making additional channel bandwidths available for their use. Such action would provide BAS licensees with additional flexibility and provide additional opportunities for using modern digital equipment.[42]

20. With respect to the remaining proposed technical rules for FS operation, we propose to apply the same technical parameters that currently apply to the Upper 6 GHz band to the adjacent 6875-7125 MHz band, because those bands are contiguous and should be able to use similar equipment. We believe that applying the rules currently applicable to the Upper 6 GHz Band to the 6875-7125 MHz band will facilitate equipment development and provide consistency to FS licensees. The specific rules that we propose are: (1) applying a maximum frequency tolerance of 0.005 percent;[43] (2) applying a maximum transmitter power of +55 dBw;[44] (3) applying the antenna standards currently applicable to Upper 6 GHz Band stations authorized after June 1, 1997 to the 6875-7125 MHz band;[45] (4) applying the capacity and loading requirements contained in Section 101.141(a)(3) of the Commission's Rules to this band;[46] and, (5) confirming that the 17 kilometer minimum path length requirement of Section 101.143 of the Commission's Rules would apply in the 6875-7125 MHz band.[47] We propose to retain the rules that are already applicable to the 12700 - 13000 MHz band,[48] with one exception. There is no minimum payload

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6575 and 6575-6875 Mc/s By Stations in the Domestic Public Radio Service in That State, Docket No. 16406, RM-836, *Report and Order*, 4 FCC 2d 1, 2 ¶ 8 (1966) (discussing allotment of 6875-7125 MHz band for Broadcast Auxiliary Service).

[40] *See* 47 C.F.R. § 101.147.

[41] *See* Amendment of Part 101 of the Commission's Rules to Accommodate 30 Megahertz Channels in the 6525-6875 MHz Band, *et al.*, WT Docket No. 09-114, RM-11417, *Report and Order*, FCC 10-109 (2010) (*6/23 GHz R&O*).

[42] In contrast, because CARS operations already have the opportunity to choose among a variety of channel bandwidths (*see* 47 C.F.R. § 78.18(a)), it does not appear necessary to propose different channel bandwidths for CARS operations in the 12700-13200 MHz band.

[43] *See* 47 C.F.R. § 101.107(a).

[44] *See* 47 C.F.R. § 101.113(a).

[45] *See* 47 C.F.R. §101.115(b)(2).

[46] 47 C.F.R. §101.141(a)(3).

[47] 47 C.F.R. §101.143.

[48] We note that prior to September 9, 1988 the 12700 – 13200 MHz band was available to the POFS service to accommodate stations that were licensed in the 12200 – 12700 MHz band prior to September 9, 1983. Part 101 already contains technical rules with respect to the 12700 – 13200 MHz band and we do not propose to alter those rules. We also note that private cable operators who use FS spectrum are also eligible to obtain CARS licenses in the 12700-13200 MHz band. *See* Amendment of Eligibility Requirements in Part 78 Regarding 12 GHz Cable Television Relay Service, CS Docket No. 99-250, *Report and Order*, 17 FCC Rcd 9930 (2002).

capacity applicable to the 12700-13200 MHz band. We propose to apply the minimum payload capacity and loading requirements that are currently applicable to the 11 GHz band to the 12700-13200 MHz band.[49] We seek comment on these proposals and any possible alternatives to them. We also seek comment on any special technical rules that might be necessary in that band.

B. Elimination of "Final Link" Rule

21. At the same time that we propose greater sharing of certain BAS and CARS bands with FS, we also propose to eliminate the "final link" rule, which will provide the broadcast industry with additional flexibility in using Part 101 spectrum for point-to-point communications. While broadcasters are allowed to obtain private fixed service licenses under Part 101 of the Commission's Rules, Section 101.603(a)(7) of the Commission's Rules prohibits broadcasters from using Part 101 stations as the final radiofrequency (RF) link in the chain of distribution of the program material to broadcast stations.[50] In light of recent technological and regulatory developments, we believe that the "final link" rule may no longer serve a useful purpose and, in fact, may inhibit the full use of Part 101 spectrum.

1. Background

22. In 1996, we simplified and streamlined the Part 101 rules to "encourage more efficient use of the microwave spectrum by permitting more intensive use of microwave equipment,"[51] and to "lead to economies of scale in microwave equipment production and lower equipment prices to licensees."[52] Section 101.603(a)(7) of the Commission's rules ensures that private operational fixed stations will be used only for private, internal purposes and prevents broadcasters from causing congestion when Part 74 Broadcast Auxiliary Service frequencies are available.

23. In recent years, the Wireless Telecommunications Bureau has granted a series of waivers of the "final link" rule to broadcasters.[53] In those cases, the applicants demonstrated that there were no BAS frequencies available that could accommodate their proposed operations and that use of Part 101 frequencies was necessary to establish a reliable link between the stations' main studios and transmitter sites.[54] Furthermore, successful waiver applicants also demonstrated that they intended to use the FS

[49] Our efficiency rules usually were not imposed on frequency bands above 12 GHz because of the higher amounts of fading on these frequencies compared to the lower bands, mostly due to oxygen and water vapor. However, in other parts of this rulemaking, we are proposing to allow flexible modulation schemes during anomalous weather events. We believe that the relaxation of the efficiency standards we are proposing due to anomalous weather events, such as rain fade, therefore, make it reasonable to impose the same efficiency standards for the 12.7-13.2 GHz band that we have for the 11 GHz frequency bands.

[50] 47 C.F.R. § 101.603(a)(7).

[51] Common Carrier and Private Operational Fixed Services, *Report and Order*, WT Docket No. 94-148, CC Docket No. 93-2, and RM-7861, 11 FCC Rcd 13449, 13452 (1996).

[52] *Id.* at 13453.

[53] *See* Denver Educational Broadcasting, Inc., *Memorandum Opinion and Order*, 24 FCC Rcd 14301 (WTB BD 2009); Greater Boston Radio, Inc., *Memorandum Opinion and Order*, 24 FCC Rcd 8661 (WTB BD 2009); Baybridge Communications, *Memorandum Opinion and Order*, 24 FCC Rcd 8653 (WTB BD 2009); AM/FM Radio Licenses, LLC, *Memorandum Opinion and Order*, 24 FCC Rcd 8649 (WTB BD 2009); Maryland Public Broadcasting Commission, *Memorandum Opinion and Order*, 21 FCC Rcd 1647 (WTB BD 2006).

[54] *See* Denver Educational Broadcasting, Inc., *supra*, 24 FCC Rcd at 14303 ¶ 5; Greater Boston Radio, Inc., *supra*, 24 FCC Rcd at 8663 ¶ 5; Baybridge Communications, *supra*, 24 FCC Rcd at 8655 ¶ 5; AM/FM Radio Licenses, LLC, *supra*, 24 FCC Rcd at 8651 ¶ 8.

station for purposes other than transmitting programming to the transmitter site, including data network services, emergency alert system warnings, ancillary connectivity, and control services.[55] In the case of Maryland Public Broadcasting Corporation, the waiver permitted MPBC to join a statewide microwave system, hastening by almost two years the provision of 911 and other emergency state services.[56]

2. Discussion

24. As broadcasters and other microwave users move to digital-based systems, we question whether it makes sense to maintain regulatory restrictions based on the type of content that the digital data transmitted by the system represents. As BAS and CARS move to digital and the technical rules have converged with those in Part 101, it has become difficult to distinguish video content from any other digital content or to distinguish a microwave link used for BAS and CARS from those licensed under Part 101. Indeed, broadcasters have shown increasing interest in using integrated microwave systems for data network services, real-time traffic information, and for transmitting an increasing amount of programming and other data to transmitter sites.[57]

25. Retaining the "final link" rule appears to be spectrally inefficient and places an unnecessary burden on broadcasters. Retaining the "final link" rule could force broadcasters to build unnecessarily redundant systems in the same locations: one system using reserved BAS frequencies for the sole purpose of delivering programming to a transmitter site and a second system using FS frequencies for other purposes. Especially in view of the increased sharing of BAS bands with FS stations we propose above, we believe it is appropriate to provide broadcasters with additional flexibility to use the FS bands.

26. We do not believe that eliminating the final link rule will crowd other FS licensees out of the band. Other rules require all FS licensees, including broadcasters, to build out their spectrum promptly[58] and to comply with minimum payload capacities.[59] These requirements serve to ensure productive use of the spectrum and to prevent noneconomic overuse. We note that FS licensees have argued in other contexts that these rules are sufficient to protect the efficient use of microwave spectrum.[60]

27. Accordingly, we seek comment on eliminating the "final link" rule. In considering this proposal, we encourage broadcasters to provide specific data on the efficiencies and cost savings that could result from eliminating this rule. FS licensees who oppose this change should identify the harms they believe would be caused by eliminating this rule and explain why they believe other rules are

[55] *Id.*

[56] Maryland Public Broadcasting Commission, *supra*, 21 FCC Rcd at 1648, 1650 ¶¶ 3, 7.

[57] *See*, *e.g.*, Waiver Request of Greater Boston Radio, Inc., File No. 0003242058 (filed Nov. 27, 2007) at 2-3; Waiver Request of Baybridge Communications, File No. 0003193277 (filed Oct. 8, 2007) at 2.

[58] 47 C.F.R. § 101.63(a) requires that each FS station (except for certain upper microwave services not at issue here) must be constructed within 18 months of the date of grant.

[59] *See* 47 C.F.R. §101.141(a)(3).

[60] *See* Comments of the Fixed Wireless Communications Coalition, WT Docket No. 09-114 (filed Aug. 21, 2009) at 2-3, *citing* 47 C.F.R. § 101.141(a); Comments of AT&T, Inc., WT Docket No. 09-114 (filed Aug. 21, 2009) at 3-4; Comments of Clearwire Corporation, WT Docket No. 09-114 (filed Aug. 17, 2009) at 1; Comments of National Spectrum Managers Association, WT Docket No. 09-114 (filed Aug. 21, 2009) at 2; Comments of Tier One Converged Networks, Inc., WT Docket No. 09-114 (filed Jul. 24, 2009) at 1; Comments of Cielo Networks, Inc., WT Docket No. 09-114 (filed Jul. 27, 2009) at 1.

insufficient to prevent those harms. We also seek comment on whether there are alternatives that could facilitate broadcaster access to FS spectrum while retaining that prohibition under certain circumstances.

C. Adaptive Modulation

28. In this section, we propose changes to our rules to allow FS licensees to maintain communications when adverse propagation characteristics would otherwise force communications to be terminated. Specifically, we propose to amend our rules to allow licensees to temporarily drop below minimum payload capacity requirements specified by the rules in certain limited circumstances. These proposed rule changes have the potential to reduce operational costs and increase reliability, which could be particularly important in facilitating the use of wireless backhaul in rural areas.

1. Background

29. Section 101.141(a)(3) of the Commission's Rules establishes minimum payload capacities (in terms of megabits per second) for various channel sizes in certain Part 101 bands.[61] The underlying purpose of the rule is to promote efficient frequency use.[62] Although the Commission has never quantified the time period over which licensees must comply with those standards, the industry has generally construed the payload requirements as applying whenever the link is in service.[63]

30. On May 8, 2009, Alcatel-Lucent, Dragonwave, Inc. Ericsson, Inc., Exalt Communications, Fixed Wireless Communications Coalition (FWCC), Harris Stratex Networks and Motorola, Inc. ("Petitioners") filed a request for interpretation of the Commission's Rules.[64] Petitioners ask the Bureau to interpret Section 101.141(a)(3) of the Commission's Rules to permit data rates to drop for brief periods below the minimum payload capacity specified in the rules, instead of temporarily having a link go completely out of service, so long as the values mandated by the rules were maintained both in normal operation and on average.[65] Petitioners assert that fixed service links, especially long links, are subject to atmospheric fading: a temporary drop in received power caused by changes in propagation conditions.[66] Fading leads to an increase in bit errors, and sometimes to a complete loss of communications.[67] According to Petitioners, one way to combat fading is by briefly reducing the data rate, which requires a temporary change in the type of modulation, a process called "adaptive modulation."[68] Petitioners acknowledge that the use of adaptive modulation may reduce the minimum payload capacity below the value specified in the rule for a short time, although this still represents an increase over the otherwise zero level during the fade.[69] Petitioners further allege that, in a properly designed system, fading

[61] 47 C.F.R. §101.141(a)(3).

[62] *See* Reorganization and Revision if Parts 1, 2, 21 and 94 of the Rules to Establish a New Part 101 Governing Terrestrial Microwave Fixed Radio Service, *Report and Order*, WT Docket No. 94-148, 11 FCC Rcd 13449, 13476 ¶ 77 (1996).

[63] *See* Request of Alcatel-Lucent, et al. for Interpretation of 47 C.F.R. §101.141(a)(3) To Permit Use of Adaptive Modulation Systems, WT Docket No. 09-106 (May 8, 2009) (FWCC Request) at 2.

[64] *Id.*

[65] *Id. at* 2.

[66] *Id.* at 3. Because water vapor is one of the primary causes of that fading, the fading is often referred to as "rain fading."

[67] *Id.*

[68] *Id.*

[69] *Id.*

conditions that might trigger adaptive modulation occur well under one percent of the time, and thus, even under pessimistic assumptions, a system employing adaptive modulation will comfortably achieve the minimum on average.[70] They assert that the proposed reading of the rule fully maintains the rule's purpose by enhancing spectrum efficiency.[71] Finally, Petitioners also state that the interpretation would allow for the continued handling of critical traffic when the link would otherwise be inoperative and that the use of adaptive modulation could preserve network synchronization during fading which could eliminate several additional minutes of outage.[72]

31. The Bureau sought comment on the FWCC Request on June 25, 2009.[73] Most commenters supported the request. Supporters argue that adaptive modulation can significantly improve the performance and reliability of microwave systems,[74] ensure that links remain operational when they would otherwise be out of service,[75] and ensure more efficient spectrum use by maximizing the data carrying capabilities of backhaul radio infrastructure.[76]

32. Verizon and other commenters disagree with this viewpoint, arguing that the proposed interpretation is inconsistent with the underlying purpose of the rule and should not be adopted without "appropriate and enforceable limits or conditions that would ensure its spectral efficiency goals are met."[77] Specifically, Verizon expresses concern that basing compliance on an "average" data rate would allow licensees to deploy systems operating with spectrally inefficient, low data rate systems part of the time.[78] X-Dot, Inc. agrees with Verizon that the FWCC Request has the potential to cause spectrum inefficiency and limit spectrum availability for future users.[79]

33. The parties disagree on the procedural disposition of the petition. Verizon argues that the Bureau cannot offer relief under the guise of a rule interpretation and that a rulemaking would be necessary.[80] FWCC, on the other hand, argues that a rulemaking proceeding is unnecessary and expresses concern about the time a rulemaking would take.[81] FWCC also argues that their requested interpretation

[70] *Id.*

[71] *Id.* at 4.

[72] *Id.*

[73] Wireless Telecommunications Bureau Seeks Comment on Request of Alcatel-Lucent, *et al.* for Interpretation of 47 C.F.R. § 101.141(a)(3) to Permit the use of Adaptive Modulation Systems, Public Notice, WT Docket No. 09-106, 24 FCC Rcd 8549 (WTB 2009).

[74] *See* Comments of Fixed Wireless Communications Coalition, WT Docket No. 09-106 (filed Jul. 27, 2009) at 2; Comments of Clearwire Corporation, WT Docket No. 09-106 (filed Jul. 27, 2009) at 1-2.

[75] *See* Comments of AT&T, Inc., WT Docket No. 09-106 (filed Jul. 27, 2009) at 2; *See* Comments of United States Cellular Corporation, WT Docket No. 09-106 (filed Jul. 27, 2009) at 2.

[76] *See* Comments of DragonWave, Inc., WT Docket No. 09-106 (filed Jul. 27, 2009) at 1.

[77] Comments of Verizon and Verizon Wireless, WT Docket No. 09-106 (filed Jul. 27, 2009) at 3.

[78] *Id.* at 2.

[79] Reply Comments of X-Dot, Inc., WT Docket No. 09-106 (filed Aug. 11, 2009).

[80] *See* Reply Comments of Verizon Wireless, Verizon Communications, Inc., and subsidiaries, WT Docket No. 09-106 (filed Aug. 11, 2009) at 2-3 (Verizon Reply).

[81] *See* FWCC Reply Comments at 9-10.

of the Section 101.141(a)(3) is consistent within the present wording of the rule, and does not cause any possible disadvantage to other users of the spectrum.[82]

34. On May 14, 2010, FWCC followed up its original Request for Interpretation with a Request for Waiver of Section 101.141(a)(3) so that it can utilize adaptive modulation to average bit rates over time to combat fading.[83] FWCC acknowledges the Commission's indication in the National Broadband Plan that it intends to open a rulemaking with regards to adaptive modulation; however, FWCC argues that it urgently needs relief with respect to adaptive modulation and does not want to wait for a rulemaking cycle to be completed.[84]

2. Declaratory Ruling

35. We agree with Verizon that a rulemaking is necessary to implement the policy interpretation sought in the FWCC Request and we therefore deny the FWCC Request for declaratory ruling in this instance because the requested interpretation is inconsistent with the plain language of the current rule. The current rule specifies a "minimum" payload capacity, which commenters admit has been interpreted to mean that it must be complied with at all times when the system is in operation.[85] Such an interpretation is consistent with the use of the word "minimum." FWCC's proposed interpretation deviates from the commonly understood meaning of the rule. Furthermore, the fact that licensees had interpreted the rule as establishing a benchmark that must be complied with at all times is further evidence that it would not be appropriate to change the meaning of an established rule under the guise of a declaratory ruling. We also note that the comments raise various policy issues that are best addressed through the rulemaking process.

3. Rulemaking

36. We believe that it is in the public interest to commence a rulemaking proceeding to amend our rules to facilitate the use of adaptive modulation by allowing licensees to maintain communications in the face of adverse propagation characteristics. Adaptive modulation has the potential to reduce operational costs and facilitate the use of wireless backhaul in rural areas. While our current rules allow the use of adaptive modulation, they would require all modulation modes to comply with the minimum payload capacities contained in the rules at all times.[86] Allowing carriers to operate below the current efficiency standards for short periods when it is necessary to maintain an operational link, without a need for waiver, could enable carriers to save on costs and enhance reliability of microwave links. Accordingly, we seek comment in the context of this *NPRM* on revising Section 101.141 of the Commission's Rules to allow greater use of adaptive modulation by FS licensees.

37. It may be appropriate to allow licensees to operate for some period of time below the minimum efficiency standards. Adaptive modulation can allow communications to be maintained during adverse propagation conditions. Given the critical backhaul and public safety applications of FS stations, we find this benefit to be significant. By allowing this level of flexibility in our efficiency standards we hope to provide carriers with a way to lower their costs yet still use the spectrum efficiently.

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[82] *See* FWCC Request at 4; 47 C.F.R. § 101.141(a)(3).

[83] *See* Fixed Wireless Communications Coalition Request for Temporary Waiver of Section 101.141(a)(3) of the Commission's Rules (filed May 14, 2010) at 1-2 (FWCC Waiver Request).

[84] *See Id. at* 3-4.

[85] *See* FWCC Request at 2.

[86] *See* 47 C.F.R. § 101.141(a)(3).

38. We are concerned, however, that the proposal to allow compliance with the efficiency standards "on average" and "during normal operation" is too vague and open-ended. Commenters have noted that it is standard engineering practice to design microwave links to have 99.995 percent or higher link availability.[87] Under those circumstances, we believe the standard proposed in the FWCC Request would give licensees too much latitude to deploy inefficient systems that would be inconsistent with good engineering practices. To the extent the underlying concern behind this proposal is that the requirements of the rule are too strict and inhibit full use of the spectrum, we believe the better approach would be to review those standards and amend them, if appropriate.[88] Moreover, using an "on average" standard would make enforcement of the minimum payload capacity rule more difficult. We also tentatively conclude that the equipment restrictions proposed by Verizon would not be in the public interest because, as noted by HSX, such restrictions could increase equipment prices for carriers and consumers.

39. We tentatively conclude to adopt a more carefully tailored approach by amending Section 101.141 of the Commission's Rules to state that the minimum payload capacity requirements must be met at all times, except during anomalous signal fading, when lower capacities may be utilized in order to maintain communications. This approach will allow licensees to take advantage of the benefits of adaptive modulation without unduly undercutting the efficiency purpose that led to initial adoption of the minimum efficiency requirement. We seek comment on this proposal, as well as alternatives. We also seek comment on what might constitute anomalous signal fading. We also propose to adopt AT&T's suggestion to require licensees that wish to be able to temporarily use modulations below the minimum payload capacity in Section 101.141 of the Commission's Rules to state that fact in their prior coordination notices. We seek comment on whether, how, and to what extent this information should be logged and made part of the station records under Section 101.217[89] to facilitate enforcement. We also seek comment on related issues, including whether the rules should specify a minimum amount of time a link is operational or a minimum efficiency standard below which an FS station may not fall even when using adaptive modulation.

40. Finally, we deny FWCC's Waiver Request. We may grant a request for a waiver when: (i) the underlying purpose of the rules(s) would not be served or would be frustrated by application to the instant case, and a grant of the requested waiver would be in the public interest; or (ii) in view of the unique or unusual factual circumstances of the instant case, application of the rule(s) would be inequitable, unduly burdensome, or contrary to the public interest, or the applicant has no reasonable alternative.[90] FWCC has failed to make a showing under either prong of the waiver standard. Given the concerns we have regarding FWCC's proposal to use an "on average" standard, FWCC has not shown that it would be in the public interest to allow operation under such circumstances. Furthermore, FWCC's claims that there is an urgent need for relief are conclusory and lack any specificity. We therefore conclude that the better course is to proceed through our normal rulemaking process and determine the best means of allowing licensees to take advantage of adaptive modulation.

D. Auxiliary Stations

41. In this section, we seek comment on a proposal to allow substantially greater spatial reuse of microwave spectrum, thereby potentially reducing the cost of using FS spectrum for backhaul and other

[87] *See* Clearwire Comments at 2 (99.995% availability); Verizon Comments at 3 (99.999% or higher availability); HSX Comments at 2 (99.99-99.999% availability)

[88] *See* Section V B., *infra*.

[89] 47 C.F.R. § 101.217.

[90] 47 C.F.R. § 1.925(b)(3).

important purposes. Specifically, we propose to allow FS licensees to operate "auxiliary stations" in conjunction with existing microwave links, subject to conditions designed to enable the use of such stations to augment capacity while safeguarding existing users in the band.

1. Background

42. The Commission's current rules define a fixed station as "[a] station operating at a fixed location,"[91] and require a license for each station.[92] In the Part 101 Operational Fixed Services, the rules require evaluation of proposed point-to-point fixed microwave stations on a site-by-site, path-by-path basis, and do not provide exceptions based on the aggregation of multiple sites and paths. Each license application must include "all technical information required by the application form and any additional information necessary to fully describe the proposed facilities and to demonstrate compliance with all technical requirements of the rules governing the radio service involved . . . ."[93] This construct is different from services based on geographic area licensing, where a licensee, subject to certain exceptions, is allowed to place transmitters throughout its service area without individual Commission approval once it has obtained its geographic area license, subject to compliance with applicable service rules.[94]

43. On February 23, 2007, Wireless Strategies, Inc. (WSI) filed a petition asking the Commission to issue a declaratory ruling "confirming that a Fixed Service licensee is permitted to simultaneously coordinate multiple links whose transmitter elements collectively comply with the Commission's antenna standards and frequency coordination procedures."[95] WSI claimed that its proffered "interpretation" of the Commission's Rules would enhance spectrum efficiency by allowing a licensee to reuse the licensed spectrum in a given area. In support of its proposal, WSI maintains that the requested ruling would "directly support stated Commission goals: to maximize efficient use of spectrum; to minimize regulation where appropriate; and to facilitate innovative service and product offerings."[96] Comment on WSI's petition was sought by Public Notice,[97] and 27 parties filed comments, reply comments and *ex parte* statements.

44. As described by WSI in its petition, supporting comments and *ex parte* filings, WSI's proposal rests on the premise that once a microwave link is successfully coordinated and licensed, additional auxiliary links can be designed to re-use the same frequency near the coordinated/licensed transmitter without causing harmful interference to other microwave links.[98] WSI describes the additional

[91] 47 C.F.R. § 1.907.

[92] 47 C.F.R. § 1.903(a).

[93] 47 C.F.R. § 101.21. *See also* 47 C.F.R. § 1.923.

[94] *See*, *e.g.*, 47 C.F.R. § 27.1209(b).

[95] Request for Declaratory Ruling filed by Wireless Strategies, Inc., WT Docket No. 07-121 (filed Feb. 23, 2007) (WSI Petition) at 1. WSI describes itself as a "carrier's carrier" whose "mission is to engineer, provision, operate, lease and/or sell Concurrently Coordinated licensed microwave networks in every city and town across the United States." *See* http://www.wirelessstrategies.net (last visited May 25, 2010).

[96] WSI Petition at 8.

[97] Wireless Telecommunications Bureau Seeks Comment on Request for Declaratory Ruling by Wireless Strategies, Inc. Regarding Coordination of Microwave Links under Part 101 of the Commission's Rules, *Public Notice*, 22 FCC Rcd 11133 (2007). A list of commenters is attached as Appendix D.

[98] WSI Petition at 5-7.

links as "concurrently coordinated" because they are coordinated simultaneously with, and ancillary to, the main beam,"[99] and it describes the resulting networks as "Smart Antennas with Distributed Radiating Elements" or "DREs."[100] WSI maintains that these ancillary links should be allowed to operate "subject to conditions that (1) all radiating elements together conform to the applicable radiation pattern in Section 101.115 [of the Commission's rules], and (2) all links are successfully coordinated."[101]

45. In its original proposal, WSI proposed that that it would be unnecessary to separately coordinate auxiliary elements within the side lobes of the main station because "the antenna characteristics provided by the applicant to the coordinator, in addition to describing the main lobe, also incorporate the properties of the multiple distributed elements to be used for communication with other locations."[102] WSI referred to that concept as "concurrent coordination."[103] In response to arguments that coordination of the auxiliary elements is necessary, WSI modified its proposal. Specifically, WSI suggests that, once a "main link" is successfully coordinated and licensed, an auxiliary element would only be added (1) following regular frequency coordination and filing of an application for major modification of the license of the associated location whose frequency it would reuse, and (2) on a secondary basis to any future coordinated paths.[104]

46. The WSI Petition had several supporters and a number of opponents. Supporters assert that the proposal would allow the deployment of smart antenna systems supporting the deployment of additional services.[105] WSI claims that it would dramatically lower the cost of operating multiple paths and allow operators "to lower the size of antennas to one-foot or less, reuse the licensed frequencies multiple times, and dramatically lower the equipment cost per path."[106] After initially opposing the WSI Petition, Sprint subsequently stated that it believes, "WSI's proposal has the potential for permitting far more efficient use of the microwave spectrum, while also enabling licensees and users to implement microwave links on a less costly, better-scaled and more expedient basis."[107] Similarly, San Diego Gas & Electric Company and Southern California Gas Company believe that WSI's proposal holds promise for extending the reach and flexibility of its existing wireless backbone network, enabling

[99] *Id.* at 7.

[100] *See, e.g.*, WSI Reply Comments to the Fixed Wireless Communications Coalition's Letter of March 26, 2007, WT Docket No. 07-121 (filed Apr. 26, 2007) at 2.

[101] WSI Petition at 7-8. Note that while WSI uses the term DREs, we believe "auxiliary stations" is more accurate, and will hereinafter use this term.

[102] *Id.* at 7.

[103] *Id.*

[104] *See* Letter from Michael Mulcay, Chairman Wireless Strategies Inc., WT Docket No. 07-121 (filed Mar. 19, 2009) (WSI March 19 *Ex Parte*).

[105] See Comments of AirTegrity Wireless, Inc., WT Docket No. 07-121 (filed Jul. 19, 2007) at 2; Comments of Bridgeway Systems, Inc., WT Docket No. 07-121 (filed Jul. 19, 2007) at 2; Comments of Proximetry, Inc., WT Docket No. 07-121 (filed Jul. 19, 2007) at 2; Comments of Ferris, Baker Watts, Inc., WT Docket No. 07-121 (filed Jul. 19, 2007) at 1.

[106] *See* WSI March 19 *Ex Parte* at 1, 8.

[107] Letter from Richard B. Engelman, Director, Spectrum Resources, Sprint Nextel Corporation, WT Docket No. 07-121 (filed Mar. 12, 2009) at 2.

critical connectivity into local neighborhoods and associated metering/monitoring points on a point-to-multipoint basis.[108]

47. In contrast, opponents state that the WSI Petition is inconsistent with the Commission's frequency coordination and antenna standards rules.[109] On policy grounds, the opponents argue that (1) WSI's proposed point-to-multipoint mode of operation is incompatible with traditional point-to-point FS operations,[110] (2) WSI is improperly attempting to create protected geographic areas in Part 101 spectrum;[111] (3) the kinds of operation that WSI proposes will cause excessive interference to other users of the spectrum and would hurt the reliability and integrity of existing systems;[112] (4) WSI's proposal is not a legitimate implementation of the "smart antenna" concept;[113] and (5) allowing operation in the mode WSI contemplates would exacerbate the increasing congestion in FS bands and make spectrum unavailable for traditional point-to-point applications.[114]

2. Declaratory Ruling

48. Initially, we determine that the WSI Proposal is not consistent with our rules as currently drafted, and we therefore deny the request for declaratory ruling. In describing the operations it envisions, WSI considers only the performance of auxiliary stations collectively with the associated primary station. For example, it describes antennas[115] at auxiliary sites that do not meet the performance requirements of Section 101.115 of the Commission's Rules.[116] Nevertheless, WSI maintains that establishing auxiliary stations is consistent with the Commission's rules since, in its view, Sections 101.103[117] and 101.115 do not require specification of the physical characteristics of antennas or the

[108] Reply Comments of San Diego Gas & Electric Company and Southern California Gas Company, WT Docket No. 07-121 (filed Aug. 20, 2007) at 4.

[109] 47 C.F.R. § 101.103 and 47 C.F.R. § 101.115, respectively..

[110] Comments of Harris Stratex Networks, Inc., WT Docket No. 07-121 (filed Jul. 19, 2007) (HSX Comments) at 8; Comments of the National Spectrum Managers Association, WT Docket No. 07-121 (filed Jul. 19, 2007) (NSMA Comments) at 3, 7-8; Comments of the Society of Broadcast Engineers, Inc., WT Docket No. 07-121 (filed Jul. 19, 2007) at 3-4; Reply Comments of the American Petroleum Institute, WT Docket No. 07-121 (filed Aug. 20, 2007) (API Reply) at 6.

[111] NSMA Comments at 3; Opposition of Alcatel-Lucent to Request for Declaratory Ruling, WT Docket No. 07-121 (filed Jul. 19, 2007) (Alcatel-Lucent Opposition) at 6-8; Reply Comments United States Cellular Corporation, WT Docket No. 07-121 (filed Aug. 20, 2007) at 5-7.

[112] HSX Comments at 8; Comments of TerreStar Networks, Inc. and Mobile Satellite Ventures Subsidiary LLC, WT Docket No. 07-121 (filed Jul. 19, 2007) (TerreStar/MSV Comments) at 4; Comments of Comsearch, WT Docket No. 07-121 (filed Jul. 19, 2007) (Comsearch Comments) at 6-9; Reply Comments of the Fixed Wireless Communications Coalition, WT Docket No. 07-121 (filed Aug. 20, 2007) (FWCC Reply) at 3.

[113] Comsearch Comments at 4-6, HSX Comments at 7-8.

[114] Alltel-Lucent Opposition at 11-12; API Reply at 6-7.

[115] *See, e.g.*, WSI Mar. 19, 2009 *Ex parte,* at 4 (specifying "a small flat panel antenna (6in x 6in x 1in) having a gain of 18 dBi").

[116] 47 C.F.R. § 101.115.

[117] 47 C.F.R. § 101.103.

physical location of each element of a smart antenna.[118] Instead, WSI argues, "the rules specify antenna performance, but are flexible on how that performance can be achieved."[119]

49. WSI's proposal to consider the performance of a system on an aggregate basis is not consistent with the plain wording of our rules for two reasons. First, the rules require evaluation of proposed point-to-point fixed microwave stations on a site-by-site, path-by-path basis, and do not provide exceptions based on the aggregation of multiple sites and paths.[120] Second, WSI's proposal is inconsistent with the antenna standards rule, Section 101.115 of the Commission's Rules, because it proposes the use of antennas that do not meet those standards. The rules provide that all fixed stations must use antennas that meet the applicable performance standard.[121] In the WSI model, the various antennas in a cluster do not operate as one.[122] When any given antenna in a cluster is radiating, the other antennas in the cluster are not. Thus, there is no composite radiation mode that can meaningfully be analyzed apart from the performance of each station individually.[123] This situation is not changed simply because a licensee would coordinate the timing of each site's transmissions to prevent intra-cluster interference, or would design the auxiliary stations with the goal of causing no greater interference to others than the associated primary station. Each site must be considered a separate station, with the potential to cause interference to other stations, and consequently each site is individually subject to the rules governing fixed microwave stations.[124] The rules make no provision otherwise. We therefore deny WSI's Request for Declaratory Ruling because its proposal is not consistent with the rules as they currently exist.

3. Rulemaking

50. While we find that the concept proffered by WSI is not consistent with the current rules, we do find it worthy of further consideration. Because we cannot authorize this operation as a declaratory ruling, we seek comment in this *NPRM* on whether we should make changes, as necessary, to our Part 101 rules to afford licensees the opportunity to operate in this manner. WSI and other proponents argue that the proposed operations contemplated by WSI may have the potential to allow substantially greater reuse of microwave spectrum and thereby reduce the cost of using FS spectrum for backhaul and other important purposes. Under those circumstances, we find that it is in the public interest to initiate a rulemaking proceeding on our own motion to consider changes to our Part 101 rules to allow operation in the manner contemplated by WSI. A rulemaking proceeding will allow us to gather information on the

[118] Before clarifying that each auxiliary station would undergo coordination and licensing, WSI had argued that, "Certainly the main station antenna will be specified in compliance with the Rules. As there is no need to specify DRE locations, the omission of this information will not render [an] application incomplete." WSI Reply Comments at 14.

[119] WSI Petition at 9.

[120] *See* 47 C.F.R. § 101.21.

[121] *See* 47 C.F.R. § 101.115(b).

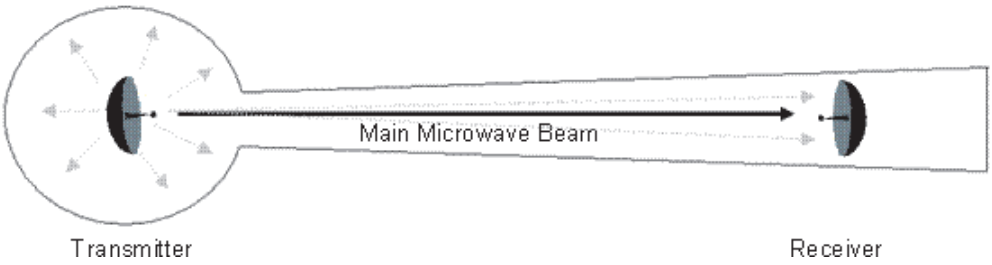
[122] For this reason, we refer to these additional points of communication as auxiliary stations rather than DRE's.

[123] This situation is thus completely different from considering the individual components making up an antenna, whether, for example, a phased-array smart antenna as that term is commonly understood or a conventional parabolic dish antenna.

[124] Section 301 of the Act requires the licensing of "any apparatus for the transmission of energy or communications or signals by radio. Section 308 assigns to the Commission responsibility for establishing the licensing process. 47 U.S.C. §§ 301, 308.

proposed types of operations, discuss specific rule changes, and consider further the arguments for and against the operations that WSI contemplates.

51. As WSI correctly states, FS stations do not direct all of their energy towards their respective reception antennas. A curved antenna focuses the radio beam in a certain direction, but the beam spreads gradually wider in a fan shape until it dissipates below the ambient noise threshold or encounters an obstacle. Regardless of how focused the antenna may be, the transmitter also spills a certain amount of energy in all directions, in a roughly circular shape. Overlaid on each other, the circle and the fan together produce a keyhole-shaped signal pattern. This characterization is oversimplified, of course, but it will suffice for purposes of the discussion below.



Picturing a keyhole-shaped signal pattern helps to visualize the preclusive effect that an FS station creates with respect to stations sharing the same spectrum, but doing so does not tell the whole story. An FS licensee is entitled to prevent another licensee's signal from traversing its signal pattern if, but only if, that trespass interferes with the original licensee's ability to receive its signal at its downlink station. Thus, for example, another licensee might transmit a signal at right angles to the original licensee's signal, crossing at its midpoint, without creating unacceptable interference. In such a case, our rules and the frequency coordination process would normally allow the second link to be deployed.

52. As is fleshed out in greater detail below, we seek comment on the potential benefits of permitting auxiliary stations under our Part 101 rules – the uses they may support, the efficiencies that may be achieved – as well as on the potential harms. Reserving judgment on the ultimate balancing of those benefits and harms, we observe that a series of changes to our Part 101 rules would be necessary in order to effectuate a Part 101 regime including auxiliary stations. Specifically, we seek comment on the following elements of such a regime:

- Each auxiliary station must operate on the same frequencies as the main licensed link.
- Auxiliary stations must not cause any incremental interference to other primary links, i.e., they must not cause any more interference to them than the main link would cause. This result can, possibly, be achieved by alternating transmissions between the primary station and the auxiliary stations on a time-division multiplexed basis or by any other method that achieves the required result.
- Auxiliary stations will be secondary in status and have no right to claim protection from interference from any primary stations, including stations in other services, such as BAS, CARS, and satellite stations, other than interference that violates the protection rights of the main link. Otherwise, auxiliary stations will have a right to claim protection only from later-deployed auxiliary stations.

- Auxiliary stations would have to be coordinated in advance with other licensees and applicants pursuant to the frequency coordination process specified in Section 101.103 of the Commission's Rules.

- After coordination, the licensee of the main link would file applications to make major modifications to the main link license to add auxiliary stations. In those bands where conditional authority is available, applicants could operate their auxiliary stations as soon as they complete the frequency coordination process and file their application with the Commission, subject to the usual conditions and exceptions to conditional authority.[125] Alternatively, we seek comment on whether, consistent with the procedures set out in Section 101.31 of our Rules for temporary fixed links, we could allow main link licensees to file blanket applications to operate temporary auxiliary stations at multiple locations within specified geographic areas surrounding the associated main links.

- Until we gain further experience with system operation under these new rules, we further propose to require that auxiliary stations be restricted from communicating directly with each other, i.e., that they be allowed to communicate directly only with the primary link's transmitter or receiver. We propose this restriction because it would reduce the chance of interference.

- Auxiliary stations would not be subject to the antenna standards or minimum path length requirements that apply to main links.[126] Eliminating the beamwidth requirement will enable licensees to use smaller, less expensive antennas that put less of a load on support structures and thereby reduce the cost of those structures. The main link, however, would still have to comply with those requirements.

- Main links would remain subject to existing loading and path length requirements, but auxiliary stations would be exempt from the loading and path length requirements.[127] Alternatively, in determining compliance with the loading requirements, licensees would be allowed to aggregate loading on the main link and auxiliary stations. We seek comment on both alternatives. Parties supporting the second alternative should explain how to avoid double counting traffic between a main link and an auxiliary link that also traverses the main link.

- Like primary stations, auxiliary stations would be required to obtain the necessary approvals for FAA tower clearance and to comply with environmental requirements covering non-ionizing radiation hazards, zoning, the National Environmental Act of 1969 and the National Historical Act of 1966, as applicable.[128]

We believe these proposed rule changes could facilitate the provision of advanced backhaul services in the FS bands while providing protection to existing users in the band. We seek comment on these proposals, as well as alternatives.

53. We note that FS and satellite users raised concerns about the proposal in the record on the WSI Petition, arguing that it is inconsistent with the frequency coordination[129] and antenna standards[130]

[125] *See* 47 C.F.R. § 101.31(b).

[126] *See* 47 C.F.R. §§ 101.115, 101.143.

[127] *See* 47 C.F.R. §§ 101.141(a)(3), 101.143.

[128] See 47 C.F.R. Part 1, Subpart I, and Part 17.

[129] 47 C.F.R. § 101.103.

rules. Our main concerns are avoiding interference to existing operations in the bands, maintaining the reliability and integrity of existing systems, and avoiding a situation where spectrum becomes unavailable to FS applicants and other users that share spectrum with FS. In order to compare the relative benefits and risks of allowing auxiliary stations, we request additional information from commenters.

54. Initially, we seek more specific information on the types of operations for which auxiliary stations could be used. Information that would be useful would include: (1) an estimate of how many systems parties contemplate operating with auxiliary stations, (2) information on whether such systems would typically be deployed in urban or rural areas, (3) the types of uses to which such systems would be put, (4) the contemplated distances between the auxiliary stations and the main link, and (5) the relative amount of traffic anticipated to be carried on the main link versus the auxiliary links.

55. We also seek comment on whether the contemplated operations could be accommodated in existing Part 101 services and bands that allow point-to-multipoint operation, such as the Local Multipoint Distribution Service, the 24 GHz Service, and the operations in the 38.6-40.0 GHz band. Those bands feature geographic area licensing that would appear to be well suited for the type of operations involving multiple stations, whether "auxiliary" or primary.

56. We note that the examples WSI provides propose use of the Lower 6 GHz Band (5925 MHz - 6425MHz).[131] Recently, we noted that that band has become highly congested and that there are areas where it is impossible to coordinate 30 megahertz bandwidth links.[132] While the Commission authorized 30 megahertz bandwidth links in the Upper 6 GHz Band in the *6/23 GHz R&O*, we anticipate that there will be considerable demand for those frequencies. We seek comment on whether there is sufficient capacity in those bands to accommodate many operations of the type contemplated by WSI, in addition to the existing uses in the band. We are particularly interested in the experiences of parties who have coordinated links in that band.

57. We seek comment on whether our proposal would strike the appropriate balance between auxiliary stations and other operations, particularly primary microwave links. We propose requiring frequency coordination and adding auxiliary sites to the license through our normal application process and seek comment on whether those requirements would be sufficient protection. Furthermore, given that auxiliary stations would be secondary to main links and could not be used to prevent coordination of main links, it appears unlikely that they could be used to establish pseudo-geographic service areas. We seek comment on concerns raised by some commenters that auxiliary links could give applicants an incentive to propose main links that would allegedly specify excessive power, and would allegedly be designed to maximize interference and the preclusive effect on other nearby operations.[133] We seek comment on the applicability of Section 101.103(d) (1) of the Commission's Rules, which requires applicants to avoid interference in excess of permissible levels to other users and requires applicants to make "every reasonable effort" to avoid blocking the growth of prior coordinated systems, to main links associated with auxiliary stations.[134]

(...continued from previous page)

[130] 47 C.F.R. § 101.115.

[131] *See*, *e.g.*, WSI March 19 *Ex Parte* at 3.

[132] *6/23 GHz R&O* at ¶¶ 4-5.

[133] *See* Alcatel-Lucent Opposition at 7; Comsearch Comments at 6-9.

[134] 47 C.F.R. § 101.103(d)(1).

58. Finally, we seek comment on whether we should establish restrictions on the locations of auxiliary stations. One option would be to confine auxiliary stations to an area within a defined field strength level of the main link. Another option would be to provide that an auxiliary station could not generate field strength that exceeds the primary station's field strength beyond the perimeter where the primary station generates the field strength discussed above. We emphasize that compliance with such restrictions would not absolve auxiliary stations from the further requirement that they not cause incremental interference to other primary links. We invite comment on the appropriate metrics to use for defining the relevant field strength perimeters, as well as alternative means of establishing limitations on the locations of auxiliary stations.

V. NOTICE OF INQUIRY

59. This Notice of Inquiry is intended to generate a record about other potential changes to Part 101 rules that could potentially reduce wireless backhaul costs and increase investment in broadband deployment. In the first part, we ask about the possibility of relaxing efficiency standards in rural areas, where links may be longer and the density of deployment lower than in urban areas. In the second part, we inquire as to whether changes in the Part 101 rules to permit smaller antennas could similarly reduce costs and stimulate investment. We invite commenters to offer specific proposals for rule changes on these issues, and encourage a full discussion of the advantages and disadvantages of rule changes.

A. Modification of Efficiency Standards in Rural Areas

60. Under our current rules, rural providers must maintain the same capacity requirements also maintained by carriers in more densely populated metropolitan areas. Lower traffic volume on the rural networks and greater distances between microwave links may make maintenance of these minimum capacity requirements financially prohibitive in some instances. Lowering the current efficiency standards in rural areas could reduce the costs associated with wireless backhaul. We therefore seek additional comment on whether relaxing the current efficiency standards in rural areas would benefit rural licensees without diminishing the availability of already increasingly scarce backhaul spectrum.

61. Section 101.141(a)(3) of the Commission's Rules establishes minimum payload capacities (in terms of megabits per second) and minimum traffic loading payload (as a percentage of payload capacity) for various channel sizes in certain Part 101 bands.[135] The underlying purpose of the rule is to promote efficient frequency use.[136] The requirements set forth in the rule apply equally to stations in urban areas and to stations in rural areas. The Wireless Telecommunications Bureau has historically granted waivers to licensees in rural and remote areas where operation of microwave facilities at the required efficiency standards would cause financial hardship to the extent that the underlying purpose of the rule would be frustrated.[137] For instance, a system utilizing a modulation of 64 QAM would require a signal-to-noise ratio over 13 dB higher than a system utilizing 4 QAM or 4 QPSK. This means that by allowing less capacity in the rural areas, a licensee could either use less power or be able to slightly

[135] 47 C.F.R. §101.141(a)(3).

[136] *See* Reorganization and Revision if Parts 1, 2, 21 and 94 of the Rules to Establish a New Part 101 Governing Terrestrial Microwave Fixed Radio Service, *Report and Order*, WT Docket No. 94-148, 11 FCC Rcd 13449, 13476 ¶ 77 (1996).

[137] *See*, *e.g.*, Kentucky Power Company d/b/a American Electric Power, *Order*, 17 FCC Rcd 453, 455 ¶ 6 (WTB PSPWD 2002) (operation in remote area, and transmitter purchased before efficiency standards were adopted); Wilderness Valley Telephone Company, *Order*, 15 FCC Rcd 11751, 11752 ¶ 6 (WTB PSPWD 2000) (operation in remote area, and no model of compliant transmitter would withstand the weather conditions at the proposed site); Alcatel Network Systems, Inc., *Order*, 11 FCC Rcd 22407 (WTB PSPWD 1996).

lengthen its path.[138] We ask whether this waiver policy should be reflected in our rules so that applicants could obtain facilities for backhaul in rural areas without the cost and delay inherent in seeking a waiver of our rules.

62. To the extent commenters support lowering the efficiency standards in rural areas, we seek specific proposals to modify the efficiency standards in Section 101.141(a)(3) of the Commission's Rules. Proponents of changes to the standards should explain how changes would provide more flexibility and facilitate deployment of backhaul and other facilities in rural areas. Commenters should also address the impact such changes would have on existing licensees, including licensees in other services that share spectrum with FS. We ask whether any changes would be consistent with the underlying purpose of Section 101.141(a)(3), which is to promote efficient utilization of the spectrum.[139]

63. In connection with this inquiry, we seek comment on the definition of "rural" that might be used to determine which geographic areas would be defined as rural under a revised rule relaxing efficiency standards in rural areas. In the Commission's *2004 Report and Order* addressing the ways to facilitate and enhance the provision of spectrum-based service in rural areas the Commission provided a baseline definition of "rural areas" as, "those counties (or equivalent) with a population density of 100 persons per square mile or less, based upon the most recently available Census data."[140] The Commission first used this definition as a proxy definition in its annual CMRS Competition Report for purposes of analyzing the average number of mobile telephony competitors in rural versus non-rural counties.[141] At the time that the Commission adopted this definition, it was determined that such a specific definition was necessary to establish continuity so that the Commission would have a basis for comparison of the effects of its "rural area" policies over time.[142] It was determined in that same proceeding that the definition would be treated as a presumption to be applied for current and future Commission wireless radio service rules, policies and analyses for which the term "rural area" has not been expressly defined.[143] In light of this established presumption, we seek comment on whether this definition is suitable to determine areas which should be considered rural for purposes of microwave efficiency standards in this band. We also seek comment on potential alternative definitions and any supporting reasons for why a specific definition should be utilized.

B. Review of Part 101 Antenna Standards

64. In this section, we solicit proposals for allowing FS licensees to use smaller antennas. The National Broadband Plan noted that it was important to ensure that the Commission's antenna standards

[138] *See* Source and Synthesizer Phase Noise Requirements for QAM Radio Applications by William Reuter, Senior Design Engineer, Synthesizer Group, CTI, Table 1, http://www.herley.com/pdfs/QAM_Article.pdf.

[139] *See* Reorganization and Revision of Parts 1, 2, 21, and 94 of the Rules to Establish a New Part 101 Governing Terrestrial Microwave Fixed Radio Services, *Report and Order*, WT Docket No. 94-148, 11 FCC Rcd 13449, 13476 ¶ 77 (1996); see also Wilderness Valley Telephone Company, *Order*, 15 FCC Rcd 11751, 11752 ¶ 5 (WTB PSPWD 2000).

[140] *See* In the Matter of Facilitating the Provision of Spectrum-Based Services to Rural Areas and Promoting Opportunities for Rural Telephone Companies To Provide Spectrum Based Services, *Report and Order*, WT Docket No. 02-381, *et al.*, 19 FCC Rcd 19078, 19087 ¶ 11 (2004) (*2004 Report and Order*).

[141] *See Id.*

[142] *See Id* at 19086-19087 ¶ 10.

[143] *See Id.* at 19088 ¶ 12.

are up to date "in order to maximize the cost-effectiveness of microwave services."[144] Smaller antennas may be cheaper, easier to install, and generate fewer objections than antennas specified by the current requirements. We ask whether smaller antennas can be accommodated in any FS band without causing interference to other users in the band.

65. Section 101.115(b) of the Commission's Rules[145] establishes directional antenna standards designed to maximize the use of microwave spectrum while avoiding interference between operators.[146] More specifically, the Commission's Rules set forth certain requirements, specifications, and conditions pursuant to which FS stations may use antennas that comply with either the more stringent performance standard in Category A (also known as Standard A) or the less stringent performance standard in Category B (also known as Standard B).[147] In general, the Commission's Rules require a Category B user to upgrade if the antenna causes interference problems that would be resolved by the use of a Category A antenna.[148] The rule on its face does not mandate a specific size of antenna. Rather, it specifies certain technical parameters – maximum beamwidth, minimum antenna gain, and minimum radiation suppression – that, depending on the state of technology at any point in time, directly affect the size of a compliant antenna.[149] The Commission adopts antenna specifications based on the technical sophistication of the communications equipment and the needs of the various users of the band at the time.[150] Indeed, the Commission adopted similar technical specifications that effectively limited the size of antennas used in other bands,[151] including those used by certain types of satellites.[152] Periodically, the

[144] National Broadband Plan, Section 5.5, Recommendation 5.10 at 94.

[145] 47 C.F.R. § 101.115(b).

[146] *Id*.

[147] *See* 47 C.F.R. § 101.115(b)-(d).

[148] *See* 47 C.F.R. § 101.115(c).

[149] We may herein refer to those antennas that comply with the Category A standard as either compliant antennas or Category A antennas and those antennas that do not comply with the Category A standard as non-compliant antennas or Category B antennas.

[150] *See* Amendment of Part 101 of the Commission's Rules to Modify Antenna Requirements for the 10.7 – 11.7 GHz Band, WT Docket No. 07-54, *Report and Order*, 22 FCC Rcd 17153, 17156 ¶ 3 (2007) (*11 GHz R&*O); Reorganization and Revision of Parts 1, 2, 21, and 94 of the Rules to Establish a New Part 101 Governing Terrestrial Microwave Fixed Radio Services, *Report and Order*, WT Docket No. 94-148, 11 FCC Rcd 13449 (1996). The Commission declined to consider significant changes to the proposed rule at that time because commenting parties did not sufficiently address the issue in the record. *See id.* at 13474-13475 ¶¶ 67-71; *see also* Reorganization and Revision of Parts 1, 2, 21, and 94 of the Rules to Establish a New Part 101 Governing Terrestrial Microwave Fixed Radio Services, *Notice of Proposed Rule Making,* WT Docket No. 94-148, 10 FCC Rcd 2508, 2515 ¶ 19 (1994) (*Part 101 NPRM*).

[151] *See, e.g., 11 GHz R&O*, 22 FCC Rcd at 17156 ¶ 3; Reorganization and Revision of Parts 1, 2, 21, and 94 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 94-148, 15 FCC Rcd 3129 (2000) (*Part 101 MO&O and NPRM*) (seeking comment on permitting smaller antennas in the 10 GHz band).

[152] *See, e.g.,* 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, ET Docket No. 98-206, *Second Memorandum Opinion and Order*, 18 FCC Rcd 10084 (2003).

Commission has since reconsidered some of those antenna specifications in light of the technological evolution of communications equipment.[153]

66. Smaller antennas can have several advantages for carriers and consumers. In the *11 GHz R&O*, the Commission noted that smaller antennas:

> cost less to manufacture and distribute, are less expensive to install because they weigh less and need less structural support, and cost less to maintain because they are less subject to wind load and other destructive forces. In addition, proponents of the rule change contend that the modest weight of small antennas makes them practical for installation at sites incapable of supporting large dishes, including many rooftops, electrical transmission towers, water towers, monopoles and other radio towers. Proponents also state that 0.61 meter antennas raise fewer aesthetic objections, thereby permitting easier compliance with local zoning and homeowner association rules and generating fewer objections.[154]

On the other hand, smaller antennas have increased potential to cause interference because smaller antennas "result in more radiofrequency energy being transmitted in directions away from the actual point-to-point link."[155] We have noted that tower siting costs and scarcity of desirable antenna position may constitute significant entry barriers to new providers.[156]

67. In light of the sharp increase in demand for FS facilities for backhaul and other purposes, we believe it is appropriate to inquire whether we should review our antenna standards in any particular band. Our goal in this inquiry would be to identify opportunities to facilitate increased deployment of FS facilities without subjecting other licensees to increased interference. Parties that believe that a review of antenna standards is appropriate should: (1) identify specific FS bands where they believe the antenna standards should be reviewed, (2) offer specific proposals for new standards, (3) describe the technological or other changes that they believe support new antenna standards, (4) describe how the new antenna standards would facilitate deployment in that band, (5) discuss the impact such new antenna standards would have on other licensees in the band, including both FS licensees and other services that share the band, (6) discuss whether the proposed standards should apply to only rural areas or all geographical areas. Other parties are encouraged to provide their evaluation of proposed changes.

C. Increasing Flexibility Generally

68. We also seek comment on whether we should examine any additional modifications to the Part 101 rules, or other policies or regulations, to promote flexible, efficient and cost-effective provisions

[153] *See, e.g. 11 GHz R&O* (adopting rules allowing smaller antennas in the 11 GHz band); Amendment of Part 101 of the Commission's Rules to Streamline Processing of Microwave Applications in the Wireless Telecommunications Services, WT Docket 00-19, *Report and Order*, 17 FCC Rcd 15040 (2002) (*2002 Part 101 R&O*) (adopting smaller antennas for 10 GHz and 23 GHz bands); Procedures to Govern the Use of Satellite Earth Stations on Board Vessels in the 5925-6425 MHz / 3700-4200 MHz Band and 14.0-14.5 GHz / 11.7-12.2 GHz Bands, IB Docket No. 02-10, *Report and Order*, 20 FCC Rcd 674 (2005) (*ESV R&O*).

[154] *11 GHz R&O*, 22 FCC Rcd at 17160-17161 ¶ 11.

[155] *Id.* at 17159 ¶ 9.

[156] *See 14th CMRS Competition Report* at 158-159 ¶¶ 287-292.

of wireless backhaul service.[157] For example, are there any additional measures that could be taken to promote additional sharing with satellite, broadcast and other services? We also seek comment on any additional safeguards that may be needed to adequately protect the interests of existing licensees. Additionally, we seek comment on whether there are any changes we could make to our frequency coordination or application processes that could make it easier for applicants to access backhaul spectrum. We also ask commenters to identify any of our current rules or processes that could act as an unintended barrier to obtaining backhaul spectrum.[158]

VI. PROCEDURAL MATTERS

A. *Ex Parte* Rules – Permit-But-Disclose

69. This is a permit-but-disclose notice and comment rulemaking proceeding. *Ex parte* presentations are permitted, except during the Sunshine Agenda period, provided they are disclosed pursuant to the Commission's rules.[159]

B. Comment Period and Procedures

70. Pursuant to sections 1.415 and 1.419 of the Commission's rules, 47 C.F.R §§ 1.415, 1.419, interested parties may file comments and reply comments on or before the dates indicated on the first page of this document. Comments may be filed using: (1) the Commission's Electronic Comment Filing System (ECFS), (2) the Federal Government's eRulemaking Portal, or (3) by filing paper copies. See Electronic Filing of Documents in Rulemaking Proceedings, 63 FR 24121 (1998).

71. *Electronic Filers*: Comments may be filed electronically using the Internet by accessing the ECFS: http://www.fcc.gov/cgb/ecfs/ or the Federal eRulemaking Portal: http://www.regulations.gov. Filers should follow the instructions provided on the website for submitting comments. All comments shall be filed in WT Docket NO. 10-153. In completing the transmittal screen, filers should include their full name, U.S. Postal Service mailing address, and the applicable docket or rulemaking number. Parties may also submit an electronic comment by Internet e-mail. To get filing instructions, filers should send an e-mail to ecfs@fcc.gov, and include the following words in the body of the message, "get form." A sample form and directions will be sent in response.

72. *Paper Filers*: Parties who choose to file by paper must file an original and four copies of each filing. If more than one docket or rulemaking number appears in the caption of this proceeding,

[157] We note that there are several pending petitions for rulemaking that may raise issues related to this inquiry. *See, e.g.*, *Petition for Rulemaking of the Fixed Wireless Communications Coalition In the Matter of Amendment of Parts 2 and 101 of the Commission's Rules to Provide for Federal and Non-Federal Sharing in the 7125-8500 MHz Band,* RM-11605 (filed Mar. 16, 2010) and *Petition for Rulemaking In the Matter of Fixed Wireless Communications Coalition, Petition to Amend Part 101 of the Commission's Rules to Authorize 60 and 80 MHz Channels in Certain Bands for Broadband Communications*, RM-11602 (filed May 14, 2010). These petitions will be addressed separately. In addition, a petition for reconsideration has been filed asking the Commission to allow limited use of the television white spaces for fixed, licensed wireless backhaul. See Petition for Reconsideration, FiberTower Corporation, the Rural Telecommunications Group, Inc., COMPTEL, and Sprint Nextel Corporation, ET Docket Nos. 04-186 and 02-380 (filed Mar. 19, 2009).

[158] In addition to permanent networks, we note that temporary microwave networks are sometimes needed to support special events. While our rules allow for temporary authorizations (see 47 C.F.R. Sec. 101.31(a)), our inquiry concerning barriers to obtaining spectrum includes barriers to obtaining temporary authorizations.

[159] *See generally* 47 C.F.R. §§ 1.1202, 1.1203, 1.1206.

filers must submit two additional copies for each additional docket or rulemaking number. Filings can be sent by hand or messenger delivery, by commercial overnight courier, or by first-class or overnight U.S. Postal Service mail (although we continue to experience delays in receiving U.S. Postal Service mail). All filings must be addressed to the Commission's Secretary, Office of the Secretary, Federal Communications Commission. The Commission's contractor will receive hand-delivered or messenger-delivered paper filings for the Commission's Secretary at 236 Massachusetts Avenue, NE, Suite 110, Washington, DC 20002. The filing hours at this location are 8:00 a.m. to 7:00 p.m. All hand deliveries must be held together with rubber bands or fasteners. Any envelopes must be disposed of before entering the building. Commercial overnight mail (other than U.S. Postal Service Express Mail and Priority Mail) must be sent to 9300 East Hampton Drive, Capitol Heights, MD 20743. U.S. Postal Service first-class, Express, and Priority mail must be addressed to 445 12th Street, SW, Washington DC 20554.

73. *People with Disabilities*: To request materials in accessible formats for people with disabilities (Braille), large print, electronic files, audio format), send an e-mail to fcc504@fcc.gov or call the Consumer & Governmental Affairs Bureau at 202-418-0530 (voice), 202-418-0432 (tty).

74. The public may view the documents filed in this proceeding during regular business hours in the FCC Reference Information Center, Federal Communications Commission, 445 12th Street, S.W., Room CY-A257, Washington, D. C. 20554, and on the Commission's Internet Home Page: <http://www.fcc.gov>. Copies of comments and reply comments are also available through the Commission's duplicating contractor: Best Copy and Printing, Inc., 445 12th Street, SW, Room CY-B402, Washington, DC, 20554, 1-800-378-3160.

C. Initial Regulatory Flexibility Analysis

75. As required by the Regulatory Flexibility Act of 1980 (RFA),[160] the Commission has prepared an Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on small entities of the policies and rules proposed in the *NPRM* portion of this document. The analysis is found in Appendix B. We request written public comment on the analysis. Comments must be filed by the same dates as listed in the first page of this document, and must have a separate and distinct heading designating them as responses to the IRFA. The Commission**'**s Consumer and Governmental Affairs Bureau, Reference Information Center, will send a copy of this *NPRM*, including the IRFA, to the Chief Counsel for Advocacy of the Small Business Administration.

D. Initial Paperwork Reduction Analysis

76. This document does not contain proposed information collection(s) subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. In addition, therefore, it does not contain any new or modified "information collection burden for small business concerns with fewer than 25 employees," pursuant to the Small Business Paperwork Relief Act of 2002.[161]

E. Further Information

77. For further information concerning this rulemaking proceeding, contact Lynn Ratnavale., Wireless Telecommunications Bureau, at (202) 418-1514; or Charles Oliver, Wireless Telecommunications Bureau, at (202) 418-1325, Federal Communications Commission, 445 12th Street,

[160] 5 U.S.C. § 603.

[161] Public Law 107- 198; *see* 44 U.S.C. § 3506(c)(4).

S.W., Washington, D.C. 20554; or via the Internet to Lynn.Ratnavale@fcc.gov or Charles.Oliver@fcc.gov.

VII. ORDERING CLAUSES

78. Accordingly, IT IS ORDERED, pursuant to Sections 1, 2, 4(i), 7, 10, 201, 214, 301, 302, 303, 307, 308, 309, 310, 319, 324, 332 and 333 of the Communications Act of 1934, 47 U.S.C. §§ 151, 152, 154(i), 157, 160, 201, 214, 301, 302, 303, 307, 308, 309, 310, 319, 324, 332, 333, that this Notice of Proposed Rulemaking and Notice of Inquiry is hereby ADOPTED.

79. IT IS FURTHER ORDERED that NOTICE IS HEREBY GIVEN of the proposed regulatory changes described in this Notice, and that comment is sought on these proposals.

80. IT IS FURTHER ORDERED, pursuant to Section 4(i) of the Communications Act of 1934, 47 U.S.C. § 154(i), and Section 1.2 of the Commission's Rules, 47 C.F.R. § 1.2, that the Request for Interpretation of Section 101.141 (a)(3) of the Commission's Rules to Permit the Use of Adaptive Modulation Systems filed by Alcatel-Lucent, Dragonwave, Inc. Ericsson, Inc., Exalt Communications, the Fixed Wireless Communications Coalition, Harris Stratex Networks and Motorola, Inc. on May 8, 2009 IS DENIED.

81. IT IS FURTHER ORDERED, pursuant to Section 4(i) of the Communications Act of 1934, 47 U.S.C. § 154(i), and Section 1.2 of the Commission's Rules, 47 C.F.R. § 1.2, that the Request for Declaratory Ruling filed by Wireless Strategies, Inc. on February 23, 2007 IS DENIED.

82. IT IS FURTHER ORDERED, pursuant to pursuant to Section 4(i) of the Communications Act of 1934, 47 U.S.C. § 154(i), and Sections 1.3 and 1.925 of the Commission's Rules, that the Request for Waiver of Section 101.141(a)(3) filed by the Fixed Wireless Communications Coalition on May 14, 2010 IS DENIED.

83. IT IS FURTHER ORDERED that WT Docket Nos. 07-121 and 09-106 ARE TERMINATED.

84. IT IS FURTHER ORDERED that the Commission's Consumer and Governmental Affairs Bureau, Reference Information Center, SHALL SEND a copy of this Notice, including the Initial Regulatory Flexibility Analysis, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Marlene H. Dortch
Secretary

APPENDIX A

Proposed Rules

For the reasons discussed in the preamble, the Federal Communications Commission hereby proposes to amend 47 CFR parts 1, 74, and 101 as follows:

PART 1 – PRACTICE AND PROCEDURE

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

AUTHORITY: 15 U.S.C. 79 et seq.; 47 U.S.C. 151, 154(i), 154(j), 155, 157, 225, 303(r), and 309.

2. Amend § 1.929 by revising paragraphs (d)(1)(ix) and (d)(1)(x) and adding (d)(1)(xi) to read as follows:

§ 1.929 Classification of filings as major or minor.

* * * * *

(d) * * *

(1) * * *

(ix) Any change in transmit antenna azimuth greater than 1 degree, except as specified in paragraph (d)(3) of this section;

(x) Any change which together with all minor modifications or amendments since the last major modification or amendment produces a cumulative effect exceeding any of the above major criteria; or

(xi) Any addition of or change to auxiliary stations pursuant to § 101.58 of this chapter.

* * * * *

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

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

AUTHORITY: 47 U.S.C. 154, 303, 307, 336(f), 336(h) and 554.

4. Amend § 74.602 by revising paragraph (a) introductory text and by adding paragraphs (j) and (k) to read as follows:

§ 74.602 Frequency assignment

(a) The following frequencies are available for assignment to television pickup, television STL, television relay and television translator relay stations. The band segments 17,700-18,580 and 19,260-19,700 MHz are available for broadcast auxiliary stations as described in paragraph (g) of this section. The band segment 6425-6525 MHz is available for broadcast auxiliary stations as described in paragraph (i) of this section. The band segment 6875-7125 MHz is available for broadcast auxiliary stations as described in this paragraph and in paragraph (j) of this section. The band segment 12700 – 13200 MHz is available for broadcast auxiliary stations as described in this paragraph and in paragraph (k) of this section. Broadcast network-entities may also use the 1990-2110, 6425-6525 and 6875-7125 MHz bands for mobile television pickup only.

*****

(j) *6875 to 7125 MHz*. These frequencies are available for assignment to television STL, television relay stations and television translator relay stations as described in paragraphs (a) and (j)of this section.. This band is co-equally shared with stations licensed pursuant to Parts 78 and 101 of the Commission's Rules. The following channel plans apply:

(1) 400 kHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6875.2	7000.2
6875.6	7000.6
6876.0	7001.0
6876.4	7001.4
6876.8	7001.8
6877.2	7002.2
6877.6	7002.6
6878.0	7003.0
6878.4	7003.4
6878.8	7003.8
6879.2	7004.2
6879.6	7004.6
6880.0	7005.0
6880.4	7005.4
6880.8	7005.8
6881.2	7006.2
6881.6	7006.6
6882.0	7007.0
6882.4	7007.4
6882.8	7007.8
6883.2	7008.2
6883.6	7008.6
6884.0	7009.0
6884.4	7009.4
6884.8	7009.8
6885.2	7010.2
6885.6	7010.6
6886.0	7011.0

6886.4	7011.4
6886.8	7011.8
6887.2	7012.2
6887.6	7012.6
6888.0	7013.0
6888.4	7013.4
6888.8	7013.8
6889.2	7014.2
6889.6	7014.6
6890.0	7015.0
6890.4	7015.4
6890.8	7015.8
6891.2	7016.2
6891.6	7016.6
6892.0	7017.0
6892.4	7017.4
6892.8	7017.8
6893.2	7018.2
6893.6	7018.6
6894.0	7019.0
6894.4	7019.4
6894.8	7019.8
6895.2	7020.2
6895.6	7020.6
6896.0	7021.0
6896.4	7021.4
6896.8	7021.8
6897.2	7022.2
6897.6	7022.6
6898.0	7023.0
6898.4	7023.4
6898.8	7023.8
6899.2	7024.2
6899.6	7024.6
6900.0	7025.0
6900.4	7025.4
6900.8	7025.8
6901.2	7026.2
6901.6	7026.6
6902.0	7027.0
6902.4	7027.4
6902.8	7027.8
6903.2	7028.2
6903.6	7028.6
6904.0	7029.0
6904.4	7029.4
6904.8	7029.8
6905.2	7030.2
6905.6	7030.6
6906.0	7031.0

6906.4	7031.4
6906.8	7031.8
6907.2	7032.2
6907.6	7032.6
6908.0	7033.0
6908.4	7033.4
6908.8	7033.8
6909.2	7034.2
6909.6	7034.6
6910.0	7035.0
6910.4	7035.4
6910.8	7035.8
6911.2	7036.2
6911.6	7036.6
6912.0	7037.0
6912.4	7037.4
6912.8	7037.8
6913.2	7038.2
6913.6	7038.6
6914.0	7039.0
6914.4	7039.4
6914.8	7039.8
6915.2	7040.2
6915.6	7040.6
6916.0	7041.0
6916.4	7041.4
6916.8	7041.8
6917.2	7042.2
6917.6	7042.6
6918.0	7043.0
6918.4	7043.4
6918.8	7043.8
6919.2	7044.2
6919.6	7044.6
6920.0	7045.0
6920.4	7045.4
6920.8	7045.8
6921.2	7046.2
6921.6	7046.6
6922.0	7047.0
6922.4	7047.4
6922.8	7047.8
6923.2	7048.2
6923.6	7048.6
6924.0	7049.0
6924.4	7049.4
6924.8	7049.8
6925.2	7050.2
6925.6	7050.6
6926.0	7051.0

6926.4	7051.4
6926.8	7051.8
6927.2	7052.2
6927.6	7052.6
6928.0	7053.0
6928.4	7053.4
6928.8	7053.8
6929.2	7054.2
6929.6	7054.6
6930.0	7055.0
6930.4	7055.4
6930.8	7055.8
6931.2	7056.2
6931.6	7056.6
6932.0	7057.0
6932.4	7057.4
6932.8	7057.8
6933.2	7058.2
6933.6	7058.6
6934.0	7059.0
6934.4	7059.4
6934.8	7059.8
6935.2	7060.2
6935.6	7060.6
6936.0	7061.0
6936.4	7061.4
6936.8	7061.8
6937.2	7062.2
6937.6	7062.6
6938.0	7063.0
6938.4	7063.4
6938.8	7063.8
6939.2	7064.2
6939.6	7064.6
6940.0	7065.0
6940.4	7065.4
6940.8	7065.8
6941.2	7066.2
6941.6	7066.6
6942.0	7067.0
6942.4	7067.4
6942.8	7067.8
6943.2	7068.2
6943.6	7068.6
6944.0	7069.0
6944.4	7069.4
6944.8	7069.8
6945.2	7070.2
6945.6	7070.6
6946.0	7071.0

6946.4	7071.4
6946.8	7071.8
6947.2	7072.2
6947.6	7072.6
6948.0	7073.0
6948.4	7073.4
6948.8	7073.8
6949.2	7074.2
6949.6	7074.6
6950.0	7075.0
6950.4	7075.4
6950.8	7075.8
6951.2	7076.2
6951.6	7076.6
6952.0	7077.0
6952.4	7077.4
6952.8	7077.8
6953.2	7078.2
6953.6	7078.6
6954.0	7079.0
6954.4	7079.4
6954.8	7079.8
6955.2	7080.2
6955.6	7080.6
6956.0	7081.0
6956.4	7081.4
6956.8	7081.8
6957.2	7082.2
6957.6	7082.6
6958.0	7083.0
6958.4	7083.4
6958.8	7083.8
6959.2	7084.2
6959.6	7084.6
6960.0	7085.0
6960.4	7085.4
6960.8	7085.8
6961.2	7086.2
6961.6	7086.6
6962.0	7087.0
6962.4	7087.4
6962.8	7087.8
6963.2	7088.2
6963.6	7088.6
6964.0	7089.0
6964.4	7089.4
6964.8	7089.8
6965.2	7090.2
6965.6	7090.6
6966.0	7091.0

6966.4	7091.4
6966.8	7091.8
6967.2	7092.2
6967.6	7092.6
6968.0	7093.0
6968.4	7093.4
6968.8	7093.8
6969.2	7094.2
6969.6	7094.6
6970.0	7095.0
6970.4	7095.4
6970.8	7095.8
6971.2	7096.2
6971.6	7096.6
6972.0	7097.0
6972.4	7097.4
6972.8	7097.8
6973.2	7098.2
6973.6	7098.6
6974.0	7099.0
6974.4	7099.4
6974.8	7099.8
6975.2	7100.2
6975.6	7100.6
6976.0	7101.0
6976.4	7101.4
6976.8	7101.8
6977.2	7102.2
6977.6	7102.6
6978.0	7103.0
6978.4	7103.4
6978.8	7103.8
6979.2	7104.2
6979.6	7104.6
6980.0	7105.0
6980.4	7105.4
6980.8	7105.8
6981.2	7106.2
6981.6	7106.6
6982.0	7107.0
6982.4	7107.4
6982.8	7107.8
6983.2	7108.2
6983.6	7108.6
6984.0	7109.0
6984.4	7109.4
6984.8	7109.8
6985.2	7110.2
6985.6	7110.6
6986.0	7111.0

6986.4	7111.4
6986.8	7111.8
6987.2	7112.2
6987.6	7112.6
6988.0	7113.0
6988.4	7113.4
6988.8	7113.8
6989.2	7114.2
6989.6	7114.6
6990.0	7115.0
6990.4	7115.4
6990.8	7115.8
6991.2	7116.2
6991.6	7116.6
6992.0	7117.0
6992.4	7117.4
6992.8	7117.8
6993.2	7118.2
6993.6	7118.6
6994.0	7119.0
6994.4	7119.4
6994.8	7119.8
6995.2	7120.2
6995.6	7120.6
6996.0	7121.0
6996.4	7121.4
6996.8	7121.8
6997.2	7122.2
6997.6	7122.6
6998.0	7123.0
6998.4	7123.4
6998.8	7123.8
6999.2	7124.2
6999.6	7124.6

(2) 800 kHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6875.4	7000.4
6876.2	7001.2
6877.0	7002.0
6877.8	7002.8
6878.6	7003.6
6879.4	7004.4
6880.2	7005.2
6881.0	7006.0
6881.8	7006.8
6882.6	7007.6

6883.4	7008.4
6884.2	7009.2
6885.0	7010.0
6885.8	7010.8
6886.6	7011.6
6887.4	7012.4
6888.2	7013.2
6889.0	7014.0
6889.8	7014.8
6890.6	7015.6
6891.4	7016.4
6892.2	7017.2
6893.0	7018.0
6893.8	7018.8
6894.6	7019.6
6895.4	7020.4
6896.2	7021.2
6897.0	7022.0
6897.8	7022.8
6898.6	7023.6
6899.4	7024.4
6900.2	7025.2
6901.0	7026.0
6901.8	7026.8
6902.6	7027.6
6903.4	7028.4
6904.2	7029.2
6905.0	7030.0
6905.8	7030.8
6906.6	7031.6
6907.4	7032.4
6908.2	7033.2
6909.0	7034.0
6909.8	7034.8
6910.6	7035.6
6911.4	7036.4
6912.2	7037.2
6913.0	7038.0
6913.8	7038.8
6914.6	7039.6
6915.4	7040.4
6916.2	7041.2
6917.0	7042.0
6917.8	7042.8
6918.6	7043.6
6919.4	7044.4
6920.2	7045.2
6921.0	7046.0
6921.8	7046.8
6922.6	7047.6

6923.4	7048.4
6924.2	7049.2
6925.0	7050.0
6925.8	7050.8
6926.6	7051.6
6927.4	7052.4
6928.2	7053.2
6929.0	7054.0
6929.8	7054.8
6930.6	7055.6
6931.4	7056.4
6932.2	7057.2
6933.0	7058.0
6933.8	7058.8
6934.6	7059.6
6935.4	7060.4
6936.2	7061.2
6937.0	7062.0
6937.8	7062.8
6938.6	7063.6
6939.4	7064.4
6940.2	7065.2
6941.0	7066.0
6941.8	7066.8
6942.6	7067.6
6943.4	7068.4
6944.2	7069.2
6945.0	7070.0
6945.8	7070.8
6946.6	7071.6
6947.4	7072.4
6948.2	7073.2
6949.0	7074.0
6949.8	7074.8
6950.6	7075.6
6951.4	7076.4
6952.2	7077.2
6953.0	7078.0
6953.8	7078.8
6954.6	7079.6
6955.4	7080.4
6956.2	7081.2
6957.0	7082.0
6957.8	7082.8
6958.6	7083.6
6959.4	7084.4
6960.2	7085.2
6961.0	7086.0
6961.8	7086.8
6962.6	7087.6

6963.4	7088.4
6964.2	7089.2
6965.0	7090.0
6965.8	7090.8
6966.6	7091.6
6967.4	7092.4
6968.2	7093.2
6969.0	7094.0
6969.8	7094.8
6970.6	7095.6
6971.4	7096.4
6972.2	7097.2
6973.0	7098.0
6973.8	7098.8
6974.6	7099.6
6975.4	7100.4
6976.2	7101.2
6977.0	7102.0
6977.8	7102.8
6978.6	7103.6
6979.4	7104.4
6980.2	7105.2
6981.0	7106.0
6981.8	7106.8
6982.6	7107.6
6983.4	7108.4
6984.2	7109.2
6985.0	7110.0
6985.8	7110.8
6986.6	7111.6
6987.4	7112.4
6988.2	7113.2
6989.0	7114.0
6989.8	7114.8
6990.6	7115.6
6991.4	7116.4
6992.2	7117.2
6993.0	7118.0
6993.8	7118.8
6994.6	7119.6
6995.4	7120.4
6996.2	7121.2
6997.0	7122.0
6997.8	7122.8
6998.6	7123.6
6999.4	7124.4

(3) 1.25 MHz bandwidth channels:

TRANSMIT	RECEIVE

(receive) (MHz)	(transmit) (MHz)
6875.625	7000.625
6876.875	7001.875
6878.125	7003.125
6879.375	7004.375
6880.625	7005.625
6881.875	7006.875
6883.125	7008.125
6884.375	7009.375
6885.625	7010.625
6886.875	7011.875
6888.125	7013.125
6889.375	7014.375
6890.625	7015.625
6891.875	7016.875
6893.125	7018.125
6894.375	7019.375
6895.625	7020.625
6896.875	7021.875
6898.125	7023.125
6899.375	7024.375
6900.625	7025.625
6901.875	7026.875
6903.125	7028.125
6904.375	7029.375
6905.625	7030.625
6906.875	7031.875
6908.125	7033.125
6909.375	7034.375
6910.625	7035.625
6911.875	7036.875
6913.125	7038.125
6914.375	7039.375
6915.625	7040.625
6916.875	7041.875
6918.125	7043.125
6919.375	7044.375
6920.625	7045.625
6921.875	7046.875
6923.125	7048.125
6924.375	7049.375
6925.625	7050.625
6926.875	7051.875
6928.125	7053.125
6929.375	7054.375
6930.625	7055.625
6931.875	7056.875
6933.125	7058.125
6934.375	7059.375

6935.625	7060.625
6936.875	7061.875
6938.125	7063.125
6939.375	7064.375
6940.625	7065.625
6941.875	7066.875
6943.125	7069.125
6944.375	7069.375
6945.625	7070.625
6946.875	7071.875
6948.125	7073.125
6949.375	7074.375
6950.625	7075.625
6951.875	7076.875
6953.125	7078.125
6954.375	7079.375
6955.625	7080.625
6956.875	7081.875
6958.125	7083.125
6959.375	7084.375
6960.625	7085.625
6961.875	7086.875
6963.125	7088.125
6964.375	7089.375
6965.625	7090.625
6966.875	7091.875
6968.125	7093.125
6969.375	7094.375
6970.625	7095.625
6971.875	7096.875
6973.125	7098.125
6974.375	7099.375
6975.625	7100.625
6976.875	7101.875
6978.125	7103.125
6979.375	7104.375
6980.625	7105.625
6981.875	7106.875
6983.125	7108.125
6984.375	7109.375
6985.625	7110.625
6986.875	7111.875
6988.125	7113.125
6989.375	7114.375
6990.625	7115.625
6991.875	7116.875
6993.125	7118.125
6994.375	7119.375
6995.625	7120.625
6996.875	7121.875

6998.125	7123.125
6999.375	7124.375

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(4) 2.5 MHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6876.25	7001.25
6878.75	7003.75
6881.25	7006.25
6883.75	7008.75
6886.25	7011.25
6888.75	7013.75
6891.25	7016.25
6893.75	7018.75
6896.25	7021.25
6898.75	7023.75
6901.25	7026.25
6903.75	7028.75
6906.25	7031.25
6908.75	7033.75
6911.25	7036.25
6913.75	7038.75
6916.25	7041.25
6918.75	7043.75
6921.25	7046.25
6923.75	7048.75
6926.25	7051.25
6928.75	7053.75
6931.25	7056.25
6933.75	7058.75
6936.25	7061.25
6938.75	7063.75
6941.25	7066.25
6943.75	7068.75
6946.25	7071.25
6948.75	7073.75
6951.25	7076.25
6953.75	7078.75
6956.25	7081.25
6958.75	7083.75
6961.25	7086.25
6963.75	7088.75
6966.25	7091.25
6968.75	7093.75
6971.25	7096.25
6973.75	7098.75
6976.25	7101.25

6978.75	7103.75
6981.25	7106.25
6983.75	7108.75
6986.25	7111.25
6988.75	7113.75
6991.25	7116.25
6993.75	7118.75
6996.25	7121.25
6998.75	7123.75

(5) 3.75 MHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6876.875	7001.875
6880.625	7005.625
6884.375	7009.375
6888.125	7013.125
6891.875	7016.875
6895.625	7020.625
6899.375	7024.375
6903.125	7028.125
6906.875	7031.875
6910.625	7035.625
6914.375	7039.375
6918.125	7043.125
6921.875	7046.875
6925.625	7050.625
6929.375	7054.375
6933.125	7058.125
6936.875	7061.875
6940.625	7065.625
6944.375	7069.375
6948.125	7073.125
6951.875	7076.875
6955.625	7080.625
6959.375	7084.375
6963.125	7088.125
6966.875	7091.875
6970.625	7095.625
6974.375	7099.375
6978.125	7103.125
6981.875	7106.875
6985.625	7110.625
6989.375	7114.375
6993.125	7118.125
6996.875	7121.875

(6) 5 MHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6877.5	7002.5
6882.5	7007.5
6887.5	7012.5
6892.5	7017.5
6897.5	7022.5
6902.5	7027.5
6907.5	7032.5
6912.5	7037.5
6917.5	7042.5
6922.5	7047.5
6927.5	7052.5
6932.5	7057.5
6937.5	7062.5
6942.5	7067.5
6947.5	7072.5
6952.5	7077.5
6957.5	7082.5
6962.5	7087.5
6967.5	7092.5
6972.5	7097.5
6977.5	7102.5
6982.5	7107.5
6987.5	7112.5
6992.5	7117.5
6997.5	7122.5

(7) 10 MHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6880	7005
6890	7015
6900	7025
6910	7035
6920	7045
6930	7055
6940	7065
6950	7075
6960	7085
6970	7095

6980	7105
6990	7115

(8) 30 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
6890	7015
6920	7045
6950	7075
6980	7105

(k) *12700 to 13200 MHz*. 30 MHz authorized bandwidth.

(1) 1.25 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12700.625	12950.625
12701.875	12951.875
12703.125	12953.125
12704.375	12954.375
12705.625	12955.625
12706.875	12956.875
12708.125	12958.125
12709.375	12959.375
12710.625	12960.625
12711.875	12961.875
12713.125	12963.125
12714.375	12964.375
12715.625	12965.625
12716.875	12966.875
12718.125	12968.125
12719.375	12969.375
12720.625	12970.625
12721.875	12971.875
12723.125	12973.125
12724.375	12974.375
12725.625	12975.625
12726.875	12976.875
12728.125	12978.125
12729.375	12979.375
12730.625	12980.625
12731.875	12981.875
12733.125	12983.125
12734.375	12984.375

12735.625	12985.625
12736.875	12986.875
12738.125	12988.125
12739.375	12989.375
12740.625	12990.625
12741.875	12991.875
12743.125	12993.125
12744.375	12994.375
12745.625	12995.625
12746.875	12996.875
12748.125	12998.125
12749.375	12999.375
12750.625	13000.625
12751.875	13001.875
12753.125	13003.125
12754.375	13004.375
12755.625	13005.625
12756.875	13006.875
12758.125	13008.125
12759.375	13009.375
12760.625	13010.625
12761.875	13011.875
12763.125	13013.125
12764.375	13014.375
12765.625	13015.625
12766.875	13016.875
12768.125	13018.125
12769.375	13019.375
12770.625	13020.625
12771.875	13021.875
12773.125	13023.125
12774.375	13024.375
12775.625	13025.625
12776.875	13026.875
12778.125	13028.125
12779.375	13029.375
12780.625	13030.625
12781.875	13031.875
12783.125	13033.125
12784.375	13034.375
12785.625	13035.625
12786.875	13036.875
12788.125	13038.125
12789.375	13039.375
12790.625	13040.625
12791.875	13041.875
12793.125	13043.125
12794.375	13044.375
12795.625	13045.625
12796.875	13046.875

12798.125	13048.125
12799.375	13049.375
12800.625	13050.625
12801.875	13051.875
12803.125	13053.125
12804.375	13054.375
12805.625	13055.625
12806.875	13056.875
12808.125	13058.125
12809.375	13059.375
12810.625	13060.625
12811.875	13061.875
12813.125	13063.125
12814.375	13064.375
12815.625	13065.625
12816.875	13066.875
12818.125	13068.125
12819.375	13069.375
12820.625	13070.625
12821.875	13071.875
12823.125	13073.125
12824.375	13074.375
12825.625	13075.625
12826.875	13076.875
12828.125	13078.125
12829.375	13079.375
12830.625	13080.625
12831.875	13081.875
12833.125	13083.125
12834.375	13084.375
12835.625	13085.625
12836.875	13086.875
12838.125	13088.125
12839.375	13089.375
12840.625	13090.625
12841.875	13091.875
12843.125	13093.125
12844.375	13094.375
12845.625	13095.625
12846.875	13096.875
12848.125	13098.125
12849.375	13099.375
12850.625	13100.625
12851.875	13101.875
12853.125	13103.125
12854.375	13104.375
12855.625	13105.625
12856.875	13106.875
12858.125	13108.125
12859.375	13109.375

12860.625	13110.625
12861.875	13111.875
12863.125	13113.125
12864.375	13114.375
12865.625	13115.625
12866.875	13116.875
12868.125	13118.125
12869.375	13119.375
12870.625	13120.625
12871.875	13121.875
12873.125	13123.125
12874.375	13124.375
12875.625	13125.625
12876.875	13126.875
12878.125	13128.125
12879.375	13129.375
12880.625	13130.625
12881.875	13131.875
12883.125	13133.125
12884.375	13134.375
12885.625	13135.625
12886.875	13136.875
12888.125	13138.125
12889.375	13139.375
12890.625	13140.625
12891.875	13141.875
12893.125	13143.125
12894.375	13144.375
12895.625	13145.625
12896.875	13146.875
12898.125	13148.125
12899.375	13149.375
12900.625	13150.625
12901.875	13151.875
12903.125	13153.125
12904.375	13154.375
12905.625	13155.625
12906.875	13156.875
12908.125	13158.125
12909.375	13159.375
12910.625	13160.625
12911.875	13161.875
12913.125	13163.125
12914.375	13164.375
12915.625	13165.625
12916.875	13166.875
12918.125	13168.125
12919.375	13169.375
12920.625	13170.625
12921.875	13171.875

12923.125	13173.125
12924.375	13174.375
12925.625	13175.625
12926.875	13176.875
12928.125	13178.125
12929.375	13179.375
12930.625	13180.625
12931.875	13181.875
12933.125	13183.125
12934.375	13184.375
12935.625	13185.625
12936.875	13186.875
12938.125	13188.125
12939.375	13189.375
12940.625	13190.625
12941.875	13191.875
12943.125	13193.125
12944.375	13194.375
12945.625	13195.625
12946.875	13196.875
12948.125	13198.125
12949.375	13199.375

(2) 2.5 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12701.25	12951.25
12703.75	12953.75
12706.25	12956.25
12708.75	12958.75
12711.25	12961.25
12713.75	12963.75
12716.25	12966.25
12718.75	12968.75
12721.25	12971.25
12723.75	12973.75
12726.25	12976.25
12728.75	12978.75
12731.25	12981.25
12733.75	12983.75
12736.25	12986.25
12738.75	12988.75
12741.25	12991.25
12743.75	12993.75
12746.25	12996.25
12748.75	12998.75

12751.25	13001.25
12753.75	13003.75
12756.25	13006.25
12758.75	13008.75
12761.25	13011.25
12763.75	13013.75
12766.25	13016.25
12768.75	13018.75
12771.25	13021.25
12773.75	13023.75
12776.25	13026.25
12778.75	13028.75
12781.25	13031.25
12783.75	13033.75
12786.25	13036.25
12788.75	13038.75
12791.25	13041.25
12793.75	13043.75
12796.25	13046.25
12798.75	13048.75
12801.25	13051.25
12803.75	13053.75
12806.25	13056.25
12808.75	13058.75
12811.25	13061.25
12813.75	13063.75
12816.25	13066.25
12818.75	13068.75
12821.25	13071.25
12823.75	13073.75
12826.25	13076.25
12828.75	13078.75
12831.25	13081.25
12833.75	13083.75
12836.25	13086.25
12838.75	13088.75
12841.25	13091.25
12843.75	13093.75
12846.25	13096.25
12848.75	13098.75
12851.25	13101.25
12853.75	13103.75
12856.25	13106.25
12858.75	13108.75
12861.25	13111.25
12863.75	13113.75
12866.25	13116.25
12868.75	13118.75
12871.25	13121.25
12873.75	13123.75

12876.25	13126.25
12878.75	13128.75
12881.25	13131.25
12883.75	13133.75
12886.25	13136.25
12888.75	13138.75
12891.25	13141.25
12893.75	13143.75
12896.25	13146.25
12898.75	13148.75
12901.25	13151.25
12903.75	13153.75
12906.25	13156.25
12908.75	13158.75
12911.25	13161.25
12913.75	13163.75
12916.25	13166.25
12918.75	13168.75
12921.25	13171.25
12923.75	13173.75
12926.25	13176.25
12928.75	13178.75
12931.25	13181.25
12933.75	13183.75
12936.25	13186.25
12938.75	13188.75
12941.25	13191.25
12943.75	13193.75
12946.25	13196.25
12948.75	13198.75

(3) 3.75 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12701.875	12951.875
12705.625	12955.625
12709.375	12959.375
12713.125	12963.125
12716.875	12966.875
12720.625	12970.625
12724.375	12974.375
12728.125	12978.125
12731.875	12981.875
12735.625	12985.625
12739.375	12989.375
12743.125	12993.125

12746.875	12996.875
12750.625	13000.625
12754.375	13004.375
12758.125	13008.125
12761.875	13011.875
12765.625	13015.625
12769.375	13019.375
12773.125	13023.125
12776.875	13026.875
12780.625	13030.625
12784.375	13034.375
12788.125	13038.125
12791.875	13041.875
12795.625	13045.625
12799.375	13049.375
12803.125	13053.125
12806.875	13056.875
12810.625	13060.625
12814.375	13064.375
12818.125	13068.125
12821.875	13071.875
12825.625	13075.625
12829.375	13079.375
12833.125	13083.125
12836.875	13086.875
12840.625	13090.625
12844.375	13094.375
12848.125	13098.125
12851.875	13101.875
12855.625	13105.625
12859.375	13109.375
12863.125	13113.125
12866.875	13116.875
12870.625	13120.625
12874.375	13124.375
12878.125	13128.125
12881.875	13131.875
12885.625	13135.625
12889.375	13139.375
12893.125	13143.125
12896.875	13146.875
12900.625	13150.625
12904.375	13154.375
12908.125	13158.125
12911.875	13161.875
12915.625	13165.625
12919.375	13169.375
12923.125	13173.125
12926.875	13176.875
12930.625	13180.625

12934.375	13184.375
12938.125	13188.125
12941.875	13191.875
12945.625	13195.625

(4) 5 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12702.5	12952.5
12707.5	12957.5
12712.5	12962.5
12717.5	12967.5
12722.5	12972.5
12727.5	12977.5
12732.5	12982.5
12737.5	12987.5
12742.5	12992.5
12747.5	12997.5
12752.5	13002.5
12757.5	13007.5
12762.5	13012.5
12767.5	13017.5
12772.5	13022.5
12777.5	13027.5
12782.5	13032.5
12787.5	13037.5
12792.5	13042.5
12797.5	13047.5
12802.5	13052.5
12807.5	13057.5
12812.5	13062.5
12817.5	13067.5
12822.5	13072.5
12827.5	13077.5
12832.5	13082.5
12837.5	13087.5
12842.5	13092.5
12847.5	13097.5
12852.5	13102.5
12857.5	13107.5
12862.5	13112.5
12867.5	13117.5
12872.5	13122.5
12877.5	13127.5
12882.5	13132.5
12887.5	13137.5

12892.5	13142.5
12897.5	13147.5
12902.5	13152.5
12907.5	13157.5
12912.5	13162.5
12917.5	13167.5
12922.5	13172.5
12927.5	13177.5
12932.5	13182.5
12937.5	13187.5
12942.5	13192.5
12947.5	13197.5

(5) 10 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12705	12955
12715	12965
12725	12975
12735	12985
12745	12995
12755	13005
12765	13015
12775	13025
12785	13035
12795	13045
12805	13055
12815	13065
12825	13075
12835	13085
12845	13095
12855	13105
12865	13115
12875	13125
12885	13135
12895	13145
12905	13155
12915	13165
12925	13175
12935	13185
12945	13195

(6) 30 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12715	12965
12745	12995
12775	13025
12805	13055
12835	13085
12865	13115
12895	13145
12925	13175

PART 101 – FIXED MICROWAVE SERVICES

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

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

6. Amend § 101.31by revising paragraph (b)(1) introductory text to read as follows:

§ 101.31 Temporary and conditional authorizations.

* * * * *

(b) *Conditional authorization.* (1) An applicant for a new point-to-point microwave radio station(s) or a modification of an existing station(s) in the 952.95-956.15, 956.55-959.75, 3,700-4,200; 5,925-6,425; 6,525-6,875; 6,875-7,125; 10,550-10,680; 10,700-11,700; 11,700-12,200; 12,700-13,200; 13,200-13,250; 17,700-19,700; and 21,800-22,000 MHz, and 23,000-23,200 MHz bands (see § 101.147(s) for specific service usage) may operate the proposed station(s) during the pendency of its applications(s) upon the filing of a properly completed formal application(s) that complies with subpart B of part 101 if the applicant certifies that the following conditions are satisfied:

* * * * *

7. Add new § 101.58 to read as follows:

§ 101.58 Auxiliary Stations.

(a) Stations in the Private Operational Fixed Point-to-Point Microwave Service licensed under Subpart H of this chapter and the Common Carrier Fixed Point-to-Point Microwave Service licensed under Subpart I of this chapter may add auxiliary stations to their authorizations in accordance with this section.

(b) Each auxiliary station must operate on the same frequencies as the main licensed link. Auxiliary stations may communicate directly only with the primary link's receiver.

(c) Auxiliary stations may not cause any increase in interference to other licensed services, i.e., less than the interference that would be predicted to exist from its own main link. A licensee or prior applicant with auxiliary stations may object to a prior coordination notice based on interference only if such interference would be predicted to exist to the other service based solely on the operation of the main link.

(d) Auxiliary stations shall not be required to comply with the provisions of §§ 101.115, 101.141 and 101.143.

(e) Licensees seeking to add auxiliary stations shall prior coordinate such stations pursuant to the frequency coordination procedures of § 101.103.

(f) For each auxiliary station, an application shall be filed on Form 601 to modify the license to add the auxiliary station. Such application shall contain the information required in § 101.21. Auxiliary stations shall be eligible for conditional authorization pursuant to § 101.31(b) if they comply with the requirements of that section.

8. Amend § 101.101 by adding the entry "6875-7125" to the table to read as follows:

§ 101.101 Frequency availability.

FREQUENCY BAND (MHz)	RADIO SERVICE				
	COMMON CARRIER (Part 101)	PRIVATE RADIO (Part 101)	BROADCAST AUXILIARY (Part 74)	OTHER (Parts 15, 21, 22, 24, 25, 74, 78, & 100)	NOTES
* *	*	*	*		* *
6875-7125	CC	OFS	TV BAS	CARS	
* *	*	*	*		* *

* * * * *

9. Amend § 101.103 by revising paragraph (d)(2)(ii) to read as follows:

§ 101.103 Frequency coordination procedures.

* * * * *

(d) * * *

(2) * * *

(ii) Notification must include relevant technical details of the proposal. At minimum, this should include, as applicable, the following:

Applicant's name and address.

Transmitting station name.

Transmitting station coordinates.

Frequencies and polarizations to be added, changed or deleted.

Transmitting equipment type, its stability, actual output power, emission designator, and type of modulation(s) (loading). Notification shall indicate if modulations not compliant with the standards contained in § 101.141(a)(3) of the Commission's rules will be used.

Transmitting antenna type(s), model, gain and, if required, a radiation pattern provided or certified by the manufacturer.

Transmitting antenna center line height(s) above ground level and ground elevation above mean sea level.

Receiving station name.

Receiving station coordinates.

Receiving antenna type(s), model, gain, and, if required, a radiation pattern provided or certified by the manufacturer.

Receiving antenna center line height(s) above ground level and ground elevation above mean sea level.

Path azimuth and distance.

Estimated transmitter transmission line loss expressed in dB.

Estimated receiver transmission line loss expressed in dB.

For a system utilizing ATPC, maximum transmit power, coordinated transmit power, and nominal transmit power.

Note: The position location of antenna sites shall be determined to an accuracy of no less than ±1 second in the horizontal dimensions (latitude and longitude) and ±1 meter in the vertical dimension (ground elevation) with respect to the National Spatial Reference System.

* * * * *

10. Amend § 101.107(a), in the table add the entry "6,875 to 7,125[1]" to read as follows:

§ 101.107 Frequency tolerance.

(a) * * *

Frequency (MHz)	**FREQUENCY TOLERANCE (PERCENT)**
***	****
6,875 to 7,125[1]	0.005
***	****

*****

11. Amend § 101.109(c), in the table add the entry "6,875 to 7,125" to read as follows:

§ 101.109 Bandwidth.

* * * * *

(c) * * *

Frequency Band (MHz)	Maximum Authorized Bandwidth
***	****

Frequency Band (MHz)	Maximum Authorized Bandwidth
***	****
6,875 to 7,125	30 MHz[1]
***	****

* * * * *

12. Amend § 101.113(a), in the table add the entry "6,875-7,125" to read as follows:

§ 101.113 Transmitter power limitations.

(a) * * *

Frequency Band (MHz)	Maximum allowable EIRP[1, 2]	
	Fixed[1,2] (dBW)	Mobile (dBW)
* * *	* *	* * *
6,875-7,125	+55	
* * *	* *	* * *

* * * * *

13. Amend § 101.115(b), in the table add the entry "6,875-7,125" to read as follows:

§ 101.115 Directional antennas.

* * * * *

(b) * * *

Antenna Standards										
Frequency (MHz)	Category	Maximum beamwidth to 3 dB points[1] (included angle in degrees)	Minimum antenna gain (dBi)	Minimum radiation suppression to angle in degrees from centerline of main beam in decibels						
				5°	10°	15°	20°	30°	100°	140°

				to 10°	to 15°	to 20°	to 30°	to 100°	to 140°	to 180°
* * *									* * * *	
6,875 to 7,125	A	2.2	38	25	29	33	36	42	55	55
	B	2.2	38	21	25	29	32	35	39	45
* * *									* * * *	

* * * * *

14. Amend § 101.141 by revising paragraph (a)(3) the introductory text to read as follows:

§ 101.141 Microwave Modulation.

(a) * * *

(3) The following capacity and loading requirements must be met for equipment applied for, authorized, and placed in service after June 1, 1997 in 3700-4200 MHz (4 GHz), 5925-6425, 6525-6875 MHz, and 6875-7125 MHz (6 GHz), 10,550-10,680 MHz (10 GHz), and 10,700-11700 MHz (11 GHz) bands, except during anomalous signal fading. During anomalous signal fading, licensees may adjust to a modulation specified in their authorization if such modulation is necessary to allow licensees to maintain communications, even if the modulation will not comply with the capacity and loading requirements specified in this paragraph.

* * * * *

15. Amend § 101.147 by adding the entry "6,875-7,125 MHz (10)" to the table in paragraph (a), redesignating paragraph (l) as paragraph (k), adding a new paragraph (l), and revising paragraphs (p) and (q) to read as follows:

§ 101.147 Frequency assignments.

* * * * *

(a) * * *

* * * * *

6,875-7,125 MHz (10)

* * * * *

(l) *6875 to 7125 MHz*. 30 MHz authorized bandwidth.

(1) 400 kHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6875.2	7000.2

6875.6	7000.6
6876.0	7001.0
6876.4	7001.4
6876.8	7001.8
6877.2	7002.2
6877.6	7002.6
6878.0	7003.0
6878.4	7003.4
6878.8	7003.8
6879.2	7004.2
6879.6	7004.6
6880.0	7005.0
6880.4	7005.4
6880.8	7005.8
6881.2	7006.2
6881.6	7006.6
6882.0	7007.0
6882.4	7007.4
6882.8	7007.8
6883.2	7008.2
6883.6	7008.6
6884.0	7009.0
6884.4	7009.4
6884.8	7009.8
6885.2	7010.2
6885.6	7010.6
6886.0	7011.0
6886.4	7011.4
6886.8	7011.8
6887.2	7012.2
6887.6	7012.6
6888.0	7013.0
6888.4	7013.4
6888.8	7013.8
6889.2	7014.2
6889.6	7014.6
6890.0	7015.0
6890.4	7015.4
6890.8	7015.8
6891.2	7016.2
6891.6	7016.6
6892.0	7017.0
6892.4	7017.4
6892.8	7017.8
6893.2	7018.2
6893.6	7018.6
6894.0	7019.0
6894.4	7019.4
6894.8	7019.8
6895.2	7020.2

6895.6	7020.6
6896.0	7021.0
6896.4	7021.4
6896.8	7021.8
6897.2	7022.2
6897.6	7022.6
6898.0	7023.0
6898.4	7023.4
6898.8	7023.8
6899.2	7024.2
6899.6	7024.6
6900.0	7025.0
6900.4	7025.4
6900.8	7025.8
6901.2	7026.2
6901.6	7026.6
6902.0	7027.0
6902.4	7027.4
6902.8	7027.8
6903.2	7028.2
6903.6	7028.6
6904.0	7029.0
6904.4	7029.4
6904.8	7029.8
6905.2	7030.2
6905.6	7030.6
6906.0	7031.0
6906.4	7031.4
6906.8	7031.8
6907.2	7032.2
6907.6	7032.6
6908.0	7033.0
6908.4	7033.4
6908.8	7033.8
6909.2	7034.2
6909.6	7034.6
6910.0	7035.0
6910.4	7035.4
6910.8	7035.8
6911.2	7036.2
6911.6	7036.6
6912.0	7037.0
6912.4	7037.4
6912.8	7037.8
6913.2	7038.2
6913.6	7038.6
6914.0	7039.0
6914.4	7039.4
6914.8	7039.8
6915.2	7040.2

6915.6	7040.6
6916.0	7041.0
6916.4	7041.4
6916.8	7041.8
6917.2	7042.2
6917.6	7042.6
6918.0	7043.0
6918.4	7043.4
6918.8	7043.8
6919.2	7044.2
6919.6	7044.6
6920.0	7045.0
6920.4	7045.4
6920.8	7045.8
6921.2	7046.2
6921.6	7046.6
6922.0	7047.0
6922.4	7047.4
6922.8	7047.8
6923.2	7048.2
6923.6	7048.6
6924.0	7049.0
6924.4	7049.4
6924.8	7049.8
6925.2	7050.2
6925.6	7050.6
6926.0	7051.0
6926.4	7051.4
6926.8	7051.8
6927.2	7052.2
6927.6	7052.6
6928.0	7053.0
6928.4	7053.4
6928.8	7053.8
6929.2	7054.2
6929.6	7054.6
6930.0	7055.0
6930.4	7055.4
6930.8	7055.8
6931.2	7056.2
6931.6	7056.6
6932.0	7057.0
6932.4	7057.4
6932.8	7057.8
6933.2	7058.2
6933.6	7058.6
6934.0	7059.0
6934.4	7059.4
6934.8	7059.8
6935.2	7060.2

6935.6	7060.6
6936.0	7061.0
6936.4	7061.4
6936.8	7061.8
6937.2	7062.2
6937.6	7062.6
6938.0	7063.0
6938.4	7063.4
6938.8	7063.8
6939.2	7064.2
6939.6	7064.6
6940.0	7065.0
6940.4	7065.4
6940.8	7065.8
6941.2	7066.2
6941.6	7066.6
6942.0	7067.0
6942.4	7067.4
6942.8	7067.8
6943.2	7068.2
6943.6	7068.6
6944.0	7069.0
6944.4	7069.4
6944.8	7069.8
6945.2	7070.2
6945.6	7070.6
6946.0	7071.0
6946.4	7071.4
6946.8	7071.8
6947.2	7072.2
6947.6	7072.6
6948.0	7073.0
6948.4	7073.4
6948.8	7073.8
6949.2	7074.2
6949.6	7074.6
6950.0	7075.0
6950.4	7075.4
6950.8	7075.8
6951.2	7076.2
6951.6	7076.6
6952.0	7077.0
6952.4	7077.4
6952.8	7077.8
6953.2	7078.2
6953.6	7078.6
6954.0	7079.0
6954.4	7079.4
6954.8	7079.8
6955.2	7080.2

6955.6	7080.6
6956.0	7081.0
6956.4	7081.4
6956.8	7081.8
6957.2	7082.2
6957.6	7082.6
6958.0	7083.0
6958.4	7083.4
6958.8	7083.8
6959.2	7084.2
6959.6	7084.6
6960.0	7085.0
6960.4	7085.4
6960.8	7085.8
6961.2	7086.2
6961.6	7086.6
6962.0	7087.0
6962.4	7087.4
6962.8	7087.8
6963.2	7088.2
6963.6	7088.6
6964.0	7089.0
6964.4	7089.4
6964.8	7089.8
6965.2	7090.2
6965.6	7090.6
6966.0	7091.0
6966.4	7091.4
6966.8	7091.8
6967.2	7092.2
6967.6	7092.6
6968.0	7093.0
6968.4	7093.4
6968.8	7093.8
6969.2	7094.2
6969.6	7094.6
6970.0	7095.0
6970.4	7095.4
6970.8	7095.8
6971.2	7096.2
6971.6	7096.6
6972.0	7097.0
6972.4	7097.4
6972.8	7097.8
6973.2	7098.2
6973.6	7098.6
6974.0	7099.0
6974.4	7099.4
6974.8	7099.8
6975.2	7100.2

6975.6	7100.6
6976.0	7101.0
6976.4	7101.4
6976.8	7101.8
6977.2	7102.2
6977.6	7102.6
6978.0	7103.0
6978.4	7103.4
6978.8	7103.8
6979.2	7104.2
6979.6	7104.6
6980.0	7105.0
6980.4	7105.4
6980.8	7105.8
6981.2	7106.2
6981.6	7106.6
6982.0	7107.0
6982.4	7107.4
6982.8	7107.8
6983.2	7108.2
6983.6	7108.6
6984.0	7109.0
6984.4	7109.4
6984.8	7109.8
6985.2	7110.2
6985.6	7110.6
6986.0	7111.0
6986.4	7111.4
6986.8	7111.8
6987.2	7112.2
6987.6	7112.6
6988.0	7113.0
6988.4	7113.4
6988.8	7113.8
6989.2	7114.2
6989.6	7114.6
6990.0	7115.0
6990.4	7115.4
6990.8	7115.8
6991.2	7116.2
6991.6	7116.6
6992.0	7117.0
6992.4	7117.4
6992.8	7117.8
6993.2	7118.2
6993.6	7118.6
6994.0	7119.0
6994.4	7119.4
6994.8	7119.8
6995.2	7120.2

6995.6	7120.6
6996.0	7121.0
6996.4	7121.4
6996.8	7121.8
6997.2	7122.2
6997.6	7122.6
6998.0	7123.0
6998.4	7123.4
6998.8	7123.8
6999.2	7124.2
6999.6	7124.6

(2) 800 kHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6875.4	7000.4
6876.2	7001.2
6877.0	7002.0
6877.8	7002.8
6878.6	7003.6
6879.4	7004.4
6880.2	7005.2
6881.0	7006.0
6881.8	7006.8
6882.6	7007.6
6883.4	7008.4
6884.2	7009.2
6885.0	7010.0
6885.8	7010.8
6886.6	7011.6
6887.4	7012.4
6888.2	7013.2
6889.0	7014.0
6889.8	7014.8
6890.6	7015.6
6891.4	7016.4
6892.2	7017.2
6893.0	7018.0
6893.8	7018.8
6894.6	7019.6
6895.4	7020.4
6896.2	7021.2
6897.0	7022.0
6897.8	7022.8
6898.6	7023.6
6899.4	7024.4
6900.2	7025.2
6901.0	7026.0

6901.8	7026.8
6902.6	7027.6
6903.4	7028.4
6904.2	7029.2
6905.0	7030.0
6905.8	7030.8
6906.6	7031.6
6907.4	7032.4
6908.2	7033.2
6909.0	7034.0
6909.8	7034.8
6910.6	7035.6
6911.4	7036.4
6912.2	7037.2
6913.0	7038.0
6913.8	7038.8
6914.6	7039.6
6915.4	7040.4
6916.2	7041.2
6917.0	7042.0
6917.8	7042.8
6918.6	7043.6
6919.4	7044.4
6920.2	7045.2
6921.0	7046.0
6921.8	7046.8
6922.6	7047.6
6923.4	7048.4
6924.2	7049.2
6925.0	7050.0
6925.8	7050.8
6926.6	7051.6
6927.4	7052.4
6928.2	7053.2
6929.0	7054.0
6929.8	7054.8
6930.6	7055.6
6931.4	7056.4
6932.2	7057.2
6933.0	7058.0
6933.8	7058.8
6934.6	7059.6
6935.4	7060.4
6936.2	7061.2
6937.0	7062.0
6937.8	7062.8
6938.6	7063.6
6939.4	7064.4
6940.2	7065.2
6941.0	7066.0

6941.8	7066.8
6942.6	7067.6
6943.4	7068.4
6944.2	7069.2
6945.0	7070.0
6945.8	7070.8
6946.6	7071.6
6947.4	7072.4
6948.2	7073.2
6949.0	7074.0
6949.8	7074.8
6950.6	7075.6
6951.4	7076.4
6952.2	7077.2
6953.0	7078.0
6953.8	7078.8
6954.6	7079.6
6955.4	7080.4
6956.2	7081.2
6957.0	7082.0
6957.8	7082.8
6958.6	7083.6
6959.4	7084.4
6960.2	7085.2
6961.0	7086.0
6961.8	7086.8
6962.6	7087.6
6963.4	7088.4
6964.2	7089.2
6965.0	7090.0
6965.8	7090.8
6966.6	7091.6
6967.4	7092.4
6968.2	7093.2
6969.0	7094.0
6969.8	7094.8
6970.6	7095.6
6971.4	7096.4
6972.2	7097.2
6973.0	7098.0
6973.8	7098.8
6974.6	7099.6
6975.4	7100.4
6976.2	7101.2
6977.0	7102.0
6977.8	7102.8
6978.6	7103.6
6979.4	7104.4
6980.2	7105.2
6981.0	7106.0

6981.8	7106.8
6982.6	7107.6
6983.4	7108.4
6984.2	7109.2
6985.0	7110.0
6985.8	7110.8
6986.6	7111.6
6987.4	7112.4
6988.2	7113.2
6989.0	7114.0
6989.8	7114.8
6990.6	7115.6
6991.4	7116.4
6992.2	7117.2
6993.0	7118.0
6993.8	7118.8
6994.6	7119.6
6995.4	7120.4
6996.2	7121.2
6997.0	7122.0
6997.8	7122.8
6998.6	7123.6
6999.4	7124.4

(3) 1.25 MHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6875.625	7000.625
6876.875	7001.875
6878.125	7003.125
6879.375	7004.375
6880.625	7005.625
6881.875	7006.875
6883.125	7008.125
6884.375	7009.375
6885.625	7010.625
6886.875	7011.875
6888.125	7013.125
6889.375	7014.375
6890.625	7015.625
6891.875	7016.875
6893.125	7018.125
6894.375	7019.375
6895.625	7020.625
6896.875	7021.875
6898.125	7023.125
6899.375	7024.375
6900.625	7025.625

6901.875	7026.875
6903.125	7028.125
6904.375	7029.375
6905.625	7030.625
6906.875	7031.875
6908.125	7033.125
6909.375	7034.375
6910.625	7035.625
6911.875	7036.875
6913.125	7038.125
6914.375	7039.375
6915.625	7040.625
6916.875	7041.875
6918.125	7043.125
6919.375	7044.375
6920.625	7045.625
6921.875	7046.875
6923.125	7048.125
6924.375	7049.375
6925.625	7050.625
6926.875	7051.875
6928.125	7053.125
6929.375	7054.375
6930.625	7055.625
6931.875	7056.875
6933.125	7058.125
6934.375	7059.375
6935.625	7060.625
6936.875	7061.875
6938.125	7063.125
6939.375	7064.375
6940.625	7065.625
6941.875	7066.875
6943.125	7069.125
6944.375	7069.375
6945.625	7070.625
6946.875	7071.875
6948.125	7073.125
6949.375	7074.375
6950.625	7075.625
6951.875	7076.875
6953.125	7078.125
6954.375	7079.375
6955.625	7080.625
6956.875	7081.875
6958.125	7083.125
6959.375	7084.375
6960.625	7085.625
6961.875	7086.875
6963.125	7088.125

6964.375	7089.375
6965.625	7090.625
6966.875	7091.875
6968.125	7093.125
6969.375	7094.375
6970.625	7095.625
6971.875	7096.875
6973.125	7098.125
6974.375	7099.375
6975.625	7100.625
6976.875	7101.875
6978.125	7103.125
6979.375	7104.375
6980.625	7105.625
6981.875	7106.875
6983.125	7108.125
6984.375	7109.375
6985.625	7110.625
6986.875	7111.875
6988.125	7113.125
6989.375	7114.375
6990.625	7115.625
6991.875	7116.875
6993.125	7118.125
6994.375	7119.375
6995.625	7120.625
6996.875	7121.875
6998.125	7123.125
6999.375	7124.375

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(4) 2.5 MHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6876.25	7001.25
6878.75	7003.75
6881.25	7006.25
6883.75	7008.75
6886.25	7011.25
6888.75	7013.75
6891.25	7016.25
6893.75	7018.75
6896.25	7021.25
6898.75	7023.75
6901.25	7026.25
6903.75	7028.75
6906.25	7031.25

6908.75	7033.75
6911.25	7036.25
6913.75	7038.75
6916.25	7041.25
6918.75	7043.75
6921.25	7046.25
6923.75	7048.75
6926.25	7051.25
6928.75	7053.75
6931.25	7056.25
6933.75	7058.75
6936.25	7061.25
6938.75	7063.75
6941.25	7066.25
6943.75	7068.75
6946.25	7071.25
6948.75	7073.75
6951.25	7076.25
6953.75	7078.75
6956.25	7081.25
6958.75	7083.75
6961.25	7086.25
6963.75	7088.75
6966.25	7091.25
6968.75	7093.75
6971.25	7096.25
6973.75	7098.75
6976.25	7101.25
6978.75	7103.75
6981.25	7106.25
6983.75	7108.75
6986.25	7111.25
6988.75	7113.75
6991.25	7116.25
6993.75	7118.75
6996.25	7121.25
6998.75	7123.75

(5) 3.75 MHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6876.875	7001.875
6880.625	7005.625
6884.375	7009.375
6888.125	7013.125
6891.875	7016.875
6895.625	7020.625

6899.375	7024.375
6903.125	7028.125
6906.875	7031.875
6910.625	7035.625
6914.375	7039.375
6918.125	7043.125
6921.875	7046.875
6925.625	7050.625
6929.375	7054.375
6933.125	7058.125
6936.875	7061.875
6940.625	7065.625
6944.375	7069.375
6948.125	7073.125
6951.875	7076.875
6955.625	7080.625
6959.375	7084.375
6963.125	7088.125
6966.875	7091.875
6970.625	7095.625
6974.375	7099.375
6978.125	7103.125
6981.875	7106.875
6985.625	7110.625
6989.375	7114.375
6993.125	7118.125
6996.875	7121.875

(6) 5 MHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6877.5	7002.5
6882.5	7007.5
6887.5	7012.5
6892.5	7017.5
6897.5	7022.5
6902.5	7027.5
6907.5	7032.5
6912.5	7037.5
6917.5	7042.5
6922.5	7047.5
6927.5	7052.5
6932.5	7057.5
6937.5	7062.5
6942.5	7067.5
6947.5	7072.5
6952.5	7077.5
6957.5	7082.5

6962.5	7087.5
6967.5	7092.5
6972.5	7097.5
6977.5	7102.5
6982.5	7107.5
6987.5	7112.5
6992.5	7117.5
6997.5	7122.5

(7) 10 MHz bandwidth channels:

TRANSMIT (receive) (MHz)	RECEIVE (transmit) (MHz)
6880	7005
6890	7015
6900	7025
6910	7035
6920	7045
6930	7055
6940	7065
6950	7075
6960	7085
6970	7095
6980	7105
6990	7115

(8) 30 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
6890	7015
6920	7045
6950	7075
6980	7105

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(p) *12,000-12,700 MHz.* (1) The Commission has allocated the 12.2-12.7 GHz band for use by the Direct Broadcast Satellite Service (DBS), the Multichannel Video Distribution and Data Service (MVDDS), and the Non-Geostationary Satellite Orbit Fixed Satellite Service (NGSO FSS). MVDDS shall be licensed on a non-harmful interference co-primary basis to existing DBS operations and on a co-primary basis with NGSO FSS stations in this band. MVDDS use can be on a common carrier and/or non-common carrier basis and can use channels of any desired bandwidth up to the maximum of 500 MHz

provided the EIRP does not exceed 14 dBm per 24 megahertz. Private operational fixed point-to-point microwave stations authorized after September 9, 1983, are licensed on a non-harmful interference basis to DBS and are required to make any and all adjustments necessary to prevent harmful interference to operating domestic DBS receivers. Incumbent public safety licensees shall be afforded protection from MVDDS and NGSO FSS licensees, however all other private operational fixed licensees shall be secondary to DBS, MVDDS and NGSO FSS licensees. As of May 23, 2002, the Commission no longer accepts applications for new licenses for point-to-point private operational fixed stations in this band, however, incumbent licensees and previously filed applicants may file applications for minor modifications and amendments (as defined in § 1.929 of this chapter) thereto, renewals, transfer of control, or assignment of license. Notwithstanding any other provisions, no private operational fixed point-to-point microwave stations are permitted to cause harmful interference to broadcasting-satellite stations of other countries operating in accordance with the Region 2 plan for the Broadcasting-Satellite Service established at the 1983 WARC.

(2) *Special provisions for incumbent low power, limited coverage systems in the band segments 12.2-12.7 GHz.*

(i) As of May 23, 2002, the Commission no longer accepts applications for new stations in this service and incumbent stations may remain in service provided they do not cause harmful interference to any other primary services licensed in this band as described in paragraph (p) of this section. However, incumbent licensees and previously filed applicants may file applications for minor modifications and amendments (as defined in § 1.929 of this chapter) thereto, renewals, transfer of control, or assignment of license.

(ii) Prior to December 8, 2000, notwithstanding any contrary provisions in this part, the frequency pairs 12.220/12.460 GHz, 12.260/12.500 GHz, 12.300/12.540 GHz and 12.340/12.580 GHz, were authorized for low power, limited coverage systems subject to the following provisions:

(A) Maximum equivalent isotropically radiated power (EIRP) shall be 55 dBm;

(B) The rated transmitter output power shall not exceed 0.5 watts;

(C) Frequency tolerance shall be maintained to within 0.01 percent of the assigned frequency;

(D) Maximum beamwidth shall not exceed 4°. However, the sidelobe suppression criteria contained in § 101.115 shall not apply, except that a minimum front-to-back ratio of 38 dB shall apply;

(E) Upon showing of need, a maximum bandwidth of 12 MHz may be authorized per frequency assigned;

(F) Radio systems authorized under the provisions of this section shall have no more than three hops in tandem, except upon showing of need, but in any event the maximum tandem length shall not exceed 40 km (25 miles);

(G) Interfering signals at the receiver antenna terminals of stations authorized under this section shall not exceed -90 dBm and -70 dBm respectively, for co-channel and adjacent channel interfering signals, and

(H) Stations authorized under the provisions of this section shall provide the protection from interference specified in § 101.105 to stations operating in accordance with the provisions of this part.

(q) *12700 to 13200 MHz*. 30 MHz maximum authorized bandwidth.

(1) 1.25 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12700.625	12950.625
12701.875	12951.875
12703.125	12953.125
12704.375	12954.375
12705.625	12955.625
12706.875	12956.875
12708.125	12958.125
12709.375	12959.375
12710.625	12960.625
12711.875	12961.875
12713.125	12963.125
12714.375	12964.375
12715.625	12965.625
12716.875	12966.875
12718.125	12968.125
12719.375	12969.375
12720.625	12970.625
12721.875	12971.875
12723.125	12973.125
12724.375	12974.375
12725.625	12975.625
12726.875	12976.875
12728.125	12978.125
12729.375	12979.375
12730.625	12980.625
12731.875	12981.875
12733.125	12983.125
12734.375	12984.375
12735.625	12985.625
12736.875	12986.875
12738.125	12988.125
12739.375	12989.375
12740.625	12990.625
12741.875	12991.875
12743.125	12993.125
12744.375	12994.375
12745.625	12995.625

12746.875	12996.875
12748.125	12998.125
12749.375	12999.375
12750.625	13000.625
12751.875	13001.875
12753.125	13003.125
12754.375	13004.375
12755.625	13005.625
12756.875	13006.875
12758.125	13008.125
12759.375	13009.375
12760.625	13010.625
12761.875	13011.875
12763.125	13013.125
12764.375	13014.375
12765.625	13015.625
12766.875	13016.875
12768.125	13018.125
12769.375	13019.375
12770.625	13020.625
12771.875	13021.875
12773.125	13023.125
12774.375	13024.375
12775.625	13025.625
12776.875	13026.875
12778.125	13028.125
12779.375	13029.375
12780.625	13030.625
12781.875	13031.875
12783.125	13033.125
12784.375	13034.375
12785.625	13035.625
12786.875	13036.875
12788.125	13038.125
12789.375	13039.375
12790.625	13040.625
12791.875	13041.875
12793.125	13043.125
12794.375	13044.375
12795.625	13045.625
12796.875	13046.875
12798.125	13048.125
12799.375	13049.375
12800.625	13050.625
12801.875	13051.875
12803.125	13053.125
12804.375	13054.375
12805.625	13055.625
12806.875	13056.875
12808.125	13058.125

12809.375	13059.375
12810.625	13060.625
12811.875	13061.875
12813.125	13063.125
12814.375	13064.375
12815.625	13065.625
12816.875	13066.875
12818.125	13068.125
12819.375	13069.375
12820.625	13070.625
12821.875	13071.875
12823.125	13073.125
12824.375	13074.375
12825.625	13075.625
12826.875	13076.875
12828.125	13078.125
12829.375	13079.375
12830.625	13080.625
12831.875	13081.875
12833.125	13083.125
12834.375	13084.375
12835.625	13085.625
12836.875	13086.875
12838.125	13088.125
12839.375	13089.375
12840.625	13090.625
12841.875	13091.875
12843.125	13093.125
12844.375	13094.375
12845.625	13095.625
12846.875	13096.875
12848.125	13098.125
12849.375	13099.375
12850.625	13100.625
12851.875	13101.875
12853.125	13103.125
12854.375	13104.375
12855.625	13105.625
12856.875	13106.875
12858.125	13108.125
12859.375	13109.375
12860.625	13110.625
12861.875	13111.875
12863.125	13113.125
12864.375	13114.375
12865.625	13115.625
12866.875	13116.875
12868.125	13118.125
12869.375	13119.375
12870.625	13120.625

12871.875	13121.875
12873.125	13123.125
12874.375	13124.375
12875.625	13125.625
12876.875	13126.875
12878.125	13128.125
12879.375	13129.375
12880.625	13130.625
12881.875	13131.875
12883.125	13133.125
12884.375	13134.375
12885.625	13135.625
12886.875	13136.875
12888.125	13138.125
12889.375	13139.375
12890.625	13140.625
12891.875	13141.875
12893.125	13143.125
12894.375	13144.375
12895.625	13145.625
12896.875	13146.875
12898.125	13148.125
12899.375	13149.375
12900.625	13150.625
12901.875	13151.875
12903.125	13153.125
12904.375	13154.375
12905.625	13155.625
12906.875	13156.875
12908.125	13158.125
12909.375	13159.375
12910.625	13160.625
12911.875	13161.875
12913.125	13163.125
12914.375	13164.375
12915.625	13165.625
12916.875	13166.875
12918.125	13168.125
12919.375	13169.375
12920.625	13170.625
12921.875	13171.875
12923.125	13173.125
12924.375	13174.375
12925.625	13175.625
12926.875	13176.875
12928.125	13178.125
12929.375	13179.375
12930.625	13180.625
12931.875	13181.875
12933.125	13183.125

12934.375	13184.375
12935.625	13185.625
12936.875	13186.875
12938.125	13188.125
12939.375	13189.375
12940.625	13190.625
12941.875	13191.875
12943.125	13193.125
12944.375	13194.375
12945.625	13195.625
12946.875	13196.875
12948.125	13198.125
12949.375	13199.375

(2) 2.5 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12701.25	12951.25
12703.75	12953.75
12706.25	12956.25
12708.75	12958.75
12711.25	12961.25
12713.75	12963.75
12716.25	12966.25
12718.75	12968.75
12721.25	12971.25
12723.75	12973.75
12726.25	12976.25
12728.75	12978.75
12731.25	12981.25
12733.75	12983.75
12736.25	12986.25
12738.75	12988.75
12741.25	12991.25
12743.75	12993.75
12746.25	12996.25
12748.75	12998.75
12751.25	13001.25
12753.75	13003.75
12756.25	13006.25
12758.75	13008.75
12761.25	13011.25
12763.75	13013.75
12766.25	13016.25
12768.75	13018.75
12771.25	13021.25

12773.75	13023.75
12776.25	13026.25
12778.75	13028.75
12781.25	13031.25
12783.75	13033.75
12786.25	13036.25
12788.75	13038.75
12791.25	13041.25
12793.75	13043.75
12796.25	13046.25
12798.75	13048.75
12801.25	13051.25
12803.75	13053.75
12806.25	13056.25
12808.75	13058.75
12811.25	13061.25
12813.75	13063.75
12816.25	13066.25
12818.75	13068.75
12821.25	13071.25
12823.75	13073.75
12826.25	13076.25
12828.75	13078.75
12831.25	13081.25
12833.75	13083.75
12836.25	13086.25
12838.75	13088.75
12841.25	13091.25
12843.75	13093.75
12846.25	13096.25
12848.75	13098.75
12851.25	13101.25
12853.75	13103.75
12856.25	13106.25
12858.75	13108.75
12861.25	13111.25
12863.75	13113.75
12866.25	13116.25
12868.75	13118.75
12871.25	13121.25
12873.75	13123.75
12876.25	13126.25
12878.75	13128.75
12881.25	13131.25
12883.75	13133.75
12886.25	13136.25
12888.75	13138.75
12891.25	13141.25
12893.75	13143.75
12896.25	13146.25

12898.75	13148.75
12901.25	13151.25
12903.75	13153.75
12906.25	13156.25
12908.75	13158.75
12911.25	13161.25
12913.75	13163.75
12916.25	13166.25
12918.75	13168.75
12921.25	13171.25
12923.75	13173.75
12926.25	13176.25
12928.75	13178.75
12931.25	13181.25
12933.75	13183.75
12936.25	13186.25
12938.75	13188.75
12941.25	13191.25
12943.75	13193.75
12946.25	13196.25
12948.75	13198.75

(3) 3.75 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12701.875	12951.875
12705.625	12955.625
12709.375	12959.375
12713.125	12963.125
12716.875	12966.875
12720.625	12970.625
12724.375	12974.375
12728.125	12978.125
12731.875	12981.875
12735.625	12985.625
12739.375	12989.375
12743.125	12993.125
12746.875	12996.875
12750.625	13000.625
12754.375	13004.375
12758.125	13008.125
12761.875	13011.875
12765.625	13015.625
12769.375	13019.375
12773.125	13023.125
12776.875	13026.875

12780.625	13030.625
12784.375	13034.375
12788.125	13038.125
12791.875	13041.875
12795.625	13045.625
12799.375	13049.375
12803.125	13053.125
12806.875	13056.875
12810.625	13060.625
12814.375	13064.375
12818.125	13068.125
12821.875	13071.875
12825.625	13075.625
12829.375	13079.375
12833.125	13083.125
12836.875	13086.875
12840.625	13090.625
12844.375	13094.375
12848.125	13098.125
12851.875	13101.875
12855.625	13105.625
12859.375	13109.375
12863.125	13113.125
12866.875	13116.875
12870.625	13120.625
12874.375	13124.375
12878.125	13128.125
12881.875	13131.875
12885.625	13135.625
12889.375	13139.375
12893.125	13143.125
12896.875	13146.875
12900.625	13150.625
12904.375	13154.375
12908.125	13158.125
12911.875	13161.875
12915.625	13165.625
12919.375	13169.375
12923.125	13173.125
12926.875	13176.875
12930.625	13180.625
12934.375	13184.375
12938.125	13188.125
12941.875	13191.875
12945.625	13195.625

(4) 5 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12702.5	12952.5
12707.5	12957.5
12712.5	12962.5
12717.5	12967.5
12722.5	12972.5
12727.5	12977.5
12732.5	12982.5
12737.5	12987.5
12742.5	12992.5
12747.5	12997.5
12752.5	13002.5
12757.5	13007.5
12762.5	13012.5
12767.5	13017.5
12772.5	13022.5
12777.5	13027.5
12782.5	13032.5
12787.5	13037.5
12792.5	13042.5
12797.5	13047.5
12802.5	13052.5
12807.5	13057.5
12812.5	13062.5
12817.5	13067.5
12822.5	13072.5
12827.5	13077.5
12832.5	13082.5
12837.5	13087.5
12842.5	13092.5
12847.5	13097.5
12852.5	13102.5
12857.5	13107.5
12862.5	13112.5
12867.5	13117.5
12872.5	13122.5
12877.5	13127.5
12882.5	13132.5
12887.5	13137.5
12892.5	13142.5
12897.5	13147.5
12902.5	13152.5
12907.5	13157.5
12912.5	13162.5
12917.5	13167.5
12922.5	13172.5
12927.5	13177.5

12932.5	13182.5
12937.5	13187.5
12942.5	13192.5
12947.5	13197.5

(5) 10 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12705	12955
12715	12965
12725	12975
12735	12985
12745	12995
12755	13005
12765	13015
12775	13025
12785	13035
12795	13045
12805	13055
12815	13065
12825	13075
12835	13085
12845	13095
12855	13105
12865	13115
12875	13125
12885	13135
12895	13145
12905	13155
12915	13165
12925	13175
12935	13185
12945	13195

(6) 30 MHz Bandwidth Channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12715	12965
12745	12995
12775	13025
12805	13055
12835	13085
12865	13115

12895	13145
12925	13175

* * * * *

APPENDIX B

Initial Regulatory Flexibility Analysis

As required by the Regulatory Flexibility Act of 1980, as amended (RFA),[1] the Commission has prepared this present Initial Regulatory Flexibility Analysis (IRFA) of the possible significant economic impact on a substantial number of small entities by the policies and rules proposed in this *Notice of Proposed Rulemaking (NPRM)*. Written public comments are requested on this IRFA. Comments must be identified as responses to the IRFA and must be filed by the deadlines specified in the *NPRM* for comments. The Commission will send a copy of this *NPRM*, including this IRFA, to the Chief Counsel for Advocacy of the Small Business Administration (SBA).[2] In addition, the *NPRM* and IRFA (or summaries thereof) will be published in the Federal Register.[3]

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

In this *NPRM*, we propose four changes to our rules involving microwave stations. First, we propose allowing fixed service stations to operate in the 6875-7125 MHz and 12700-13200 MHz bands. Second, we propose to eliminate the prohibition on broadcasters using Part 101 stations as the final radiofrequency (RF) link in the chain of distribution of the program material to broadcast stations. Third, we propose to amend our minimum payload capacity rule to facilitate the use of adaptive modulation to allow licensees to maintain communications by briefly reducing the rate at which they send data. Fourth, we propose to allow Part 101 licensees to add auxiliary stations in order to allow substantially greater reuse of microwave spectrum and substantially reduce the cost of using FS spectrum for backhaul and other important purposes.

With respect to the first proposal, we anticipate that demand for fixed service spectrum will increase substantially as it is increasingly used for wireless backhaul and other important purposes. The 6875-7125 MHz and 12700-13200 MHz bands are currently assigned to television pickup, television studio-transmitter links, television relay stations, television translator relay stations, and mobile only CARS. Based upon our experience in other bands, we believe assigning this band to the fixed service would be compatible with these other services using the frequency coordination procedures in Section 101.103 of the Commission's Rules. Assigning this spectrum to the fixed service would help provide additional spectrum that could be used for wireless backhaul and other critical applications.

Second, Section 101.603(a)(7) of the Commission's Rules, commonly known as the "final link" rule, prohibits broadcasters from using Part 101 stations as the final radiofrequency (RF) link in the chain of distribution of the program material to broadcast stations. The rules ensures that private operational fixed stations are used for private, internal purposes and prevents broadcasters from causing congestion when Part 74 Broadcast Auxiliary Service (BAS) frequencies are available. In light of recent technological and regulatory developments, we believe the "final link" rule may no longer serve its intended purpose and may in fact inhibit the full use of Part 101 spectrum. As broadcasters and other microwave users move to digital-based systems, we question whether it makes sense to maintain regulatory restrictions based on the type of content that the digital data represents. Based on the record developed in waiver requests granted by the Wireless Telecommunications Bureau, it appears that there

[1] *See* 5 U.S.C. § 603. The RFA, *see* 5 U.S.C. § 601-612, has been amended by the Small Business Regulatory Enforcement Fairness Act of 1996, (SBREFA) Pub. L. No. 104-121, Title II, 110 Stat. 857 (1996).

[2] *See* 5 U.S.C. § 603(a).

[3] *See* 5 U.S.C. § 603(a).

are an increasing number of markets where Broadcast Auxiliary Service (BAS) spectrum is scarce. Furthermore, the rule may impose additional costs by requiring broadcasters to build two different systems: one system to carry program material to the transmitter site, and a separate system to handle other data. In light of the extensive sharing between BAS and FS of the same bands, we believe it is appropriate to provide broadcasters with additional flexibility to use the FS bands. We therefore propose to eliminate this rule.

Our third proposal is to amend out Part 101 technical rules to facilitate the use of adaptive modulation. Section 101.141(a)(3) of the Commission's Rules establishes minimum payload capacities (in terms of megabits per second) for various channel sizes in certain Part 101 bands. The underlying purpose of the rule is to promote efficient frequency use. Although the Commission has never quantified the time period over which licensees must comply with those standards, the industry has generally construed the payload requirements as applying whenever the link is in service. Fixed service links, especially long links, are subject to atmospheric fading: a temporary drop in received power caused by changes in propagation conditions. Fading leads to an increase in bit errors, and sometimes to a complete loss of communications. One way to combat fading is by briefly reducing the data rate, which requires a temporary change in the type of modulation, a process called "adaptive modulation." The use of adaptive modulation may reduce the minimum payload capacity below the value specified in the rule for a short time, although this still represents an increase over the otherwise zero level during the fade. Adaptive modulation has public interest benefits of allowing communications to be maintained during adverse propagation conditions. Given the critical backhaul and public safety applications of fixed service stations, we find this benefit to be significant. By allowing this level of flexibility in our efficiency standards we hope to provide carriers with a way to lower their costs yet still use the spectrum efficiently. We therefore propose to amend our rules to state that the minimum payload capacity requirements must be complied with at all times, except during anomalous propagation conditions, when lower capacities may be utilized in order to maintain communications. That approach would allow licensees to take advantage of the benefits of adaptive modulation while ensuring efficient use of the spectrum.

Finally, we seek comment on allowing substantially greater reuse of microwave spectrum and substantially reduce the cost of using fixed spectrum for backhaul and other important purposes by allowing licensees to place auxiliary antennas that the licensee of each primary FS link be allowed to deploy as many auxiliary stations as it wishes under the following conditions:

- Each auxiliary station must operate on the same frequencies as the main licensed link.
- Auxiliary stations must not cause any incremental interference to other primary links, i.e., they must not cause any more interference to them than the main link would cause. This result can, possibly, be achieved by alternating transmissions between the primary station and the auxiliary stations on a time-division multiplexed basis or by any other method that achieves the required result.
- Auxiliary stations will be secondary in status and have no right to claim protection from interference from any primary stations, including stations in other services, such as BAS, CARS, and satellite stations, other than interference that violates the protection rights of the main link. Otherwise, auxiliary stations will have a right to claim protection only from later-deployed auxiliary stations.
- Auxiliary stations would have to be coordinated in advance with other licensees and applicants pursuant to the frequency coordination process specified in Section 101.103 of the Commission's Rules.

- After coordination, the licensee of the main link would file applications to make major modifications to the main link license to add auxiliary stations. In those bands where conditional authority is available, applicants could operate their auxiliary stations as soon as they complete the frequency coordination process and file their application with the Commission, subject to the usual conditions and exceptions to conditional authority.[4] Alternatively, we seek comment on whether, consistent with the procedures set out in Section 101.31 of our Rules for temporary fixed links, we could allow main link licensees to file blanket applications to operate temporary auxiliary stations at multiple locations within specified geographic areas surrounding the associated main links.

- Until we gain further experience with system operation under these new rules, we further propose to require that auxiliary stations be restricted from communicating directly with each other, i.e., that they be allowed to communicate directly only with the primary link's transmitter or receiver. We propose this restriction because it would reduce the chance of interference.

- Auxiliary stations would not be subject to the antenna standards or minimum path length requirements that apply to main links.[5] Eliminating the beamwidth requirement will enable licensees to use smaller, less expensive antennas that put less of a load on support structures and thereby reduce the cost of those structures. The main link, however, would still have to comply with those requirements.

- Main links would remain subject to existing loading and path length requirements, but auxiliary stations would be exempt from the loading and path length requirements.[6] Alternatively, in determining compliance with the loading requirements, licensees would be allowed to aggregate loading on the main link and auxiliary stations. We seek comment on both alternatives. Parties supporting the second alternative should explain how to avoid double counting traffic between a main link and an auxiliary link that also traverses the main link.

- Like primary stations, auxiliary stations would be required to obtain the necessary approvals for FAA tower clearance and to comply with environmental requirements covering non-ionizing radiation hazards, zoning, the National Environmental Act of 1969 and the National Historical Act of 1966, as applicable.[7]

B. Legal Basis

The proposed action is authorized pursuant to sections 1, 2, 4(i), 7, 10, 201, 214, 301, 302, 303, 307, 308, 309, 310, 319, 324, 332 and 333 of the Communications Act of 1934, as amended, 47 U.S.C. §§ 151, 152, 154(i), 157, 160, 201, 214, 301, 302, 303, 307, 308, 309, 310, 319, 324, 332, and 333.

[4] *See* 47 C.F.R. § 101.31(b).

[5] *See* 47 C.F.R. §§ 101.115, 101.143.

[6] *See* 47 C.F.R. §§ 101.141(a)(3), 101.143.

[7] See 47 C.F.R. Part 1, Subpart I, and Part 17.

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

The RFA directs agencies to provide a description of, and, where feasible, an estimate of the number of small entities that may be affected by the proposed rules and policies, if adopted.[8] The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."[9] In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.[10] A "small business concern" is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the SBA.[11]

Our proposed action, if implemented, may, over time, affect small entities that are not easily categorized at present. We therefore describe here, at the outset, three comprehensive, statutory small entity size standards.[12] First, nationwide, there are a total of approximately 27.2 million small businesses, according to the SBA.[13] In addition, a "small organization" is generally "any not-for-profit enterprise which is independently owned and operated and is not dominant in its field."[14] Nationwide, as of 2002, there were approximately 1.6 million small organizations.[15] Finally, the term "small governmental jurisdiction" is defined generally as "governments of cities, towns, townships, villages, school districts, or special districts, with a population of less than fifty thousand."[16] Census Bureau data for 2002 indicate that there were 87,525 local governmental jurisdictions in the United States.[17] We estimate that, of this total, 84,377 entities were "small governmental jurisdictions."[18] Thus, we estimate that most governmental jurisdictions are small.

Wireless Telecommunications Carriers (except satellite). Microwave services include common carrier,[19] private-operational fixed,[20] and broadcast auxiliary radio services.[21] At present, there are

[8] 5 U.S.C. § 603(b)(3).

[9] 5 U.S.C. § 601(6).

[10] 5 U.S.C. § 601(3) (incorporating by reference the definition of "small-business concern" in the Small Business Act, 15 U.S.C. § 632). Pursuant to 5 U.S.C. § 601(3), the statutory definition of a small business applies "unless an agency, after consultation with the Office of Advocacy of the Small Business Administration and after opportunity for public comment, establishes one or more definitions of such term which are appropriate to the activities of the agency and publishes such definition(s) in the Federal Register."

[11] 15 U.S.C. § 632.

[12] *See* 5 U.S.C. §§ 601(3)–(6).

[13] *See* SBA, Office of Advocacy, "Frequently Asked Questions," http://web.sba.gov/faqs (last visited Oct. 21, 2009).

[14] 5 U.S.C. § 601(4).

[15] INDEPENDENT SECTOR, THE NEW NONPROFIT ALMANAC & DESK REFERENCE (2002).

[16] 5 U.S.C. § 601(5).

[17] U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES: 2006, Section 8, page 272, tbl. 415.

[18] We assume that the villages, school districts, and special districts are small, and total 48,558. *See* U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES: 2006, section 8, page 273, tbl. 417. For 2002, Census Bureau data indicate that the total number of county, municipal, and township governments nationwide was 38,967, of which 35,819 were small. *Id.*

[19] 47 C.F.R. Part 101 *et seq*. (formerly, part 21 of the Commission's Rules) for common carrier fixed microwave services (except MDS).

approximately 31,428 common carrier fixed licensees and 79,732 private and public safety operational-fixed licensees and broadcast auxiliary radio licensees in the microwave services. The Commission has not yet defined a small business with respect to microwave services. For purposes of the IRFA, we will use the SBA definition that applies to Wireless Telecommunications Carriers (except satellite) – *i.e.*, an entity with no more than 1,500 persons.[22] Since 2007, the Census Bureau has placed wireless firms within this new, broad, economic census category.[23] Prior to that time, such firms were within the now-superseded categories of "Paging" and "Cellular and Other Wireless Telecommunications."[24] Under the present and prior category definitions, the SBA has deemed a wireless business to be small if it has 1,500 or fewer employees.[25] For the category of Wireless Telecommunications Carriers (except Satellite), preliminary data for 2007, *i.e.*, data based on the superseded SBA classification, show that there were 11,927 firms operating that year.[26] While the Census Bureau has not released data on such establishments broken down by number of employees, we note that the Census Bureau lists total employment for all firms in that sector at 281,262.[27] Since all firms with fewer than 1,500 employees are considered small, given the total employment in the sector, we estimate that the vast majority of wireless firms are small. We estimate that virtually all of the Fixed Microwave licensees (excluding broadcast auxiliary licensees) would qualify as small entities under the SBA definition.

Radio Broadcasting. A radio broadcasting station is an establishment primarily engaged in broadcasting aural programs by radio to the public.[28] Included in this industry are commercial, religious, educational, and other radio stations.[29] Radio broadcasting stations which primarily are engaged in radio

(...continued from previous page)

[20] Persons eligible under Parts 80 and 90 of the Commission's rules can use Private-Operational Fixed Microwave services. *See* 47 C.F.R. Parts 80 and 90. Stations in this service are called operational-fixed to distinguish them from common carrier and public fixed stations. Only the licensee may use the operational-fixed station, and only for communications related to the licensee's commercial, industrial, or safety operations.

[21] Auxiliary Microwave Service is governed by Part 74 of Title 47 of the Commission's Rules. *See* 47 C.F.R. Part 74 *et seq*. Available to licensees of broadcast stations and to broadcast and cable network entities, broadcast auxiliary microwave stations are used for relaying broadcast television signals from the studio to the transmitter, or between two points such as a main studio and an auxiliary studio. The service also includes mobile TV pickups, which relay signals from a remote location back to the studio.

[22] 13 C.F.R. § 121.201, NAICS code 517210.

[23] U.S. Census Bureau, 2007 NAICS Definitions, "517210 Wireless Telecommunications Categories (Except Satellite)"; http://www.census.gov/naics/2007/def/ND517210.HTM#N517210.

[24] U.S. Census Bureau, 2002 NAICS Definitions, "517211 Paging"; http://www.census.gov/epcd/naics02/def/NDEF517.HTM.; U.S. Census Bureau, 2002 NAICS Definitions, "517212 Cellular and Other Wireless Telecommunications"; http://www.census.gov/epcd/naics02/def/NDEF517.HTM.

[25] 13 C.F.R. § 121.201, NAICS code 517210 (2007 NAICS). The now-superseded, pre-2007 C.F.R. citations were 13 C.F.R. § 121.201, NAICS codes 517211 and 517212 (referring to the 2002 NAICS).

[26] U.S. Census Bureau, 2007 Economic Census, Sector 51, EC0751I1 Information: Industry Series: Preliminary Summary Statistics for the United States: 2007, NAICS code 517210 (issued Oct. 20, 2009); http://factfinder.census.gov/servlet/IBQTable?-fds_name=EC0700A1&-_clearIBQ=Y&-ds_name=EC0751I1&-NAICS2007=51721.

[27] *Id.*

[28] U.S. Census Bureau, 2007 NAICS Definitions, "515112 Radio Stations"; http://www.census.gov/naics/2007/def/ND515112.HTM#N515112.

[29] *Id.*

broadcasting and which produce radio program materials are similarly included.[30] However, radio stations that are separate establishments and are primarily engaged in producing radio program material are classified under another NAICS number.[31] The SBA has established a small business size standard for this category, which is: firms having $7 million or less in annual receipts.[32] According to BIA Advisory Services, L.L.C., MEDIA Access Pro Database on March 17, 2009, 10,884 (95%) of 11,404 commercial radio stations have revenue of $6 million or less. Therefore, the majority of such entities are small entities. We note, however, that many radio stations are affiliated with much larger corporations having much higher revenue. Our estimate, therefore, likely overstates the number of small entities that might be affected by any ultimate changes to the rules and forms.

Television Broadcasting. The SBA defines a television broadcasting station as a small business if such station has no more than $14.0 million in annual receipts.[33] Business concerns included in this industry are those "primarily engaged in broadcasting images together with sound."[34] The Commission has estimated the number of licensed commercial television stations to be 1,392.[35] According to Commission staff review of the BIA/Kelsey, MAPro Television Database ("BIA") as of April 7, 2010, about 1,015 of an estimated 1,380 commercial television stations[36] (or about 74 percent) have revenues of $14 million or less and, thus, qualify as small entities under the SBA definition. The Commission has estimated the number of licensed noncommercial educational (NCE) television stations to be 390.[37] We note, however, that, in assessing whether a business concern qualifies as small under the above definition, business (control) affiliations[38] must be included. Our estimate, therefore, likely overstates the number of small entities that might be affected by our action, because the revenue figure on which it is based does not include or aggregate revenues from affiliated companies. The Commission does not compile and otherwise does not have access to information on the revenue of NCE stations that would permit it to determine how many such stations would qualify as small entities.

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[30] *Id.*

[31] U.S. Census Bureau, 2007 NAICS Definitions, "515111 Radio Networks"; http://www.census.gov/naics/2007/def/ND515111.HTM#N515111.

[32] 13 C.F.R. § 121.201, NAICS code 515112.

[33] *See* 13 C.F.R. § 121.201, NAICS Code 515120 (2007).

[34] *Id*. This category description continues, "These establishments operate television broadcasting studios and facilities for the programming and transmission of programs to the public. These establishments also produce or transmit visual programming to affiliated broadcast television stations, which in turn broadcast the programs to the public on a predetermined schedule. Programming may originate in their own studios, from an affiliated network, or from external sources." Separate census categories pertain to businesses primarily engaged in producing programming. *See* Motion Picture and Video Production, NAICS code 512110; Motion Picture and Video Distribution, NAICS Code 512120; Teleproduction and Other Post-Production Services, NAICS Code 512191; and Other Motion Picture and Video Industries, NAICS Code 512199.

[35] *See* News Release, "Broadcast Station Totals as of December 31, 2009," 2010 WL 676084 (F.C.C.) (dated Feb. 26, 2010) ("*Broadcast Station Totals*"); also available at http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-296538A1.pdf.

[36] We recognize that this total differs slightly from that contained in *Broadcast Station Totals*, *supra*, note 33; however, we are using BIA's estimate for purposes of this revenue comparison.

[37] *See Broadcast Station Totals*, *supra*, note 33.

[38] "[Business concerns] are affiliates of each other when one concern controls or has the power to control the other or a third party or parties controls or has to power to control both." 13 C.F.R. § 121.103(a)(1).

In addition, an element of the definition of "small business" is that the entity not be dominant in its field of operation. We are unable at this time to define or quantify the criteria that would establish whether a specific television station is dominant in its field of operation. Accordingly, the estimate of small businesses to which rules may apply do not exclude any television station from the definition of a small business on this basis and are therefore over-inclusive to that extent. Also, as noted, an additional element of the definition of "small business" is that the entity must be independently owned and operated. We note that it is difficult at times to assess these criteria in the context of media entities and our estimates of small businesses to which they apply may be over-inclusive to this extent.

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

This *Notice of Proposed Rulemaking* imposes no new reporting or recordkeeping requirements.

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

As noted above, this *NPRM* proposes rules to (1) allow fixed service stations to operate in the 6875-7125 MHz band, (2) eliminate the prohibition on broadcasters using Part 101 stations as the final radiofrequency (RF) link in the chain of distribution of the program material to broadcast stations, (3) amend our minimum payload capacity rule to facilitate the use of adaptive modulation to allow licensees to maintain communications by briefly reducing the rate at which they send data, and (4) allow Part 101 licensees to add auxiliary stations. These actions would provide additional options to all licensees, including small entity licensees. Such action will serve the public interest by making additional spectrum available for fixed service users, providing additional flexibility for broadcasters to use microwave spectrum, allowing communications to be maintained during adverse propagation conditions, facilitating the efficient use of the 6 GHz and 23 GHz bands. The rules could therefore open up economic opportunities to a variety of spectrum users, including small businesses.

Generally, the alternative approach would be to maintain the existing rules. If the rules were not changed, the 6875-7125 MHz and 12700-13200 MHz bands would remain unavailable for fixed service use. Given the increasing demand for Part 101 spectrum for backhaul and other uses, not making that spectrum available may make it increasingly difficult to meet demand for microwave facilities. If the prohibition on broadcasters using Part 101 stations as the final radiofrequency (RF) link in the chain of distribution of the program material to broadcast stations is not eliminated, broadcasters will be limited to using Broadcast Auxiliary Service spectrum for that purpose, and may have to build two separate microwave systems using different frequencies, such an alternative would be inadequate to meet the demands of licensees and therefore less than ideal. If no BAS spectrum is available, broadcasters will have to pay to prepare a request for waiver to access Part 101 spectrum and await action on that waiver request before they can begin operation. Such expense and delay may be particularly harmful to small businesses.

With respect to our proposal to amend our minimum capacity payload rule to facilitate adaptive modulation, if our rules are not amended to facilitate the use of adaptive modulation, licensees will be unable to fully use technology to maintain critical communications during signal fades. Under the proposal made in the *NPRM*, the minimum payload capacity requirements must be met at all times, except during anomalous propagation conditions, when lower capacities may be utilized in order to maintain communications.

An alternative to the adaptive modulation proposal made in the *NPRM* would be to allow compliance with the efficiency standards "on average" and "during normal operation." We believe that

standard would give licensees too much latitude to deploy inefficient systems that would be inconsistent with good engineering practices.

Finally, while herein we propose to authorize the use of auxiliary stations, we are open to alternatives such as authorizing auxiliary stations in a more limited fashion or not at all, however, if we do not authorize auxiliary stations in some fashion, we may prevent licensees from fully utilizing their spectrum for backhaul and other purposes.

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

None.

APPENDIX C

List of Commenters on Fixed Wireless Communications Coalition, *et al.* Request For Declaratory Ruling (WT Docket No. 09-106)

Comments
AT&T Inc.
Clearwire Corporation
DragonWave, Inc.
Fixed Wireless Communications Coalition
Harris Stratex Networks, Inc.
United States Cellular Corporation
Verizon and Verizon Wireless

Reply Comments
Fixed Wireless Communications Coalition
Harris Stratex Networks, Inc.
Motorola, Inc.
X-Dot, Inc.

Ex Parte Filings
Fixed Wireless Communications Coalition

APPENDIX D

List of Commenters on Wireless Strategies, Inc. Petition for Declaratory Ruling (WT Docket No. 07-121)

Comments
AirTegrity Wireless, Inc.
Alcatel-Lucent
Bridgeway Systems, Inc.
Comsearch
Ferris, Baker Watts, Inc.
Fixed Wireless Communications Coalition
Harris Stratex Networks, Inc.
Mobile Satellite Ventures Subsidiary LLC and TerreStar Networks, Inc.
National Spectrum Managers Association
David B. Popkin
Proximetry, Inc.
Society of Broadcast Engineers, Inc.
Summit Tower, LLC
TerreStar Networks, Inc. and Mobile Satellite Ventures Subsidiary LLC
Verizon

Reply Comments
AirTegrity Wireless, Inc.
American Petroleum Institute
Bridgeway Systems, Inc.
Fixed Wireless Communications Coalition
National Cable & Telecommunications Association
San Diego Gas & Electric Company and Southern California Gas Company
Satellite Industry Association and Global VSAT Forum
Sprint Nextel Corporation
United States Cellular Company
Verizon
Wireless Strategies, Inc.

Ex Parte Filings
Doctors Telehealth Networks, Inc.
Engineers for the Integrity of Broadcast Auxiliary Services Spectrum
Exalt Communications Inc.
FiberTower Corporation
Fixed Wireless Communications Coalition
Mt. Vernon.net, Inc.
National Spectrum Managers Association
San Diego Gas & Electric Company and Southern California Gas Company
Satellite Industry Association and Global VSAT Forum
Sprint Nextel Corporation
Wireless Strategies, Inc.

STATEMENT OF
CHAIRMAN JULIUS GENACHOWSKI

Re: *Amendment of Part 101 of the Commission's Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees*; *Request for Interpretation of Section 101.141(a)(3) of the Commission's Rules Filed by Alcatel-Lucent, Inc., et al.*; *Petition for Declaratory Ruling Filed by Wireless Strategies, Inc.*; *Request for Temporary Waiver of Section 101.141(a)(3) of the Commission's Rules Filed by Fixed Wireless Communications Coalition*; WT Docket Nos. 10-153; 09-106; 07-121

Today we implement another important recommendation of the National Broadband Plan. Some of the most important recommendations of the National Broadband Plan fall under the heading of spectrum. Unleashing spectrum for mobile broadband is critical for investment, innovation and U.S. global competitiveness. So I'm very pleased that the Plan's recommendations in this area have received broad support—including bipartisan legislation and the President's recent Executive Memorandum on Spectrum.

Today, we launch an effort to ensure that sufficient microwave spectrum is available to meet the current and future demands for wireless backhaul. This item brings together three key themes of the National Broadband Plan: unleashing spectrum; removing outdated regulatory barriers; and seizing the opportunities of broadband for rural America.

Microwave communications has become, in a growing number of situations, a viable option for backhaul of mobile broadband traffic. As broadband providers accelerate deployment of next-generation networks, they will require backhaul that can carry what will be an exponential growth in mobile data traffic. If that capacity is unduly restrained, it will hamper our ability to take full advantage of emerging communications technologies and undermine our ability to lead the world in mobile.

Today's item takes a fresh look at our rules governing the use of certain microwave bands. Specifically, we propose increasing the flexibility, capacity, and cost-effectiveness of prime microwave bands, while protecting incumbent licensees in these bands. The increased flexibility proposed in the item will also make more frequencies available for fixed broadcast studio links.

Flexible rules can greatly increase our efficient use of microwave spectrum. With spectrum sharing, we have the opportunity to make 750 MHz of microwave spectrum newly available for broadband backhaul or other advanced point-to-point uses. Removing outdated regulatory barriers to keep pace with the rapid changes in technology will help reduce some of the costs of 4G deployment and increase investment in new 4G services that enhance economic growth and U.S. competitiveness.

These changes in our microwave rules can have a particularly positive impact on rural America. Microwave backhaul may be the only practical solution available to reach 4G cell sites in very remote rural areas.

This item recommends concrete steps to facilitate deployment of mobile services on which all Americans – regardless of geography – increasingly depend to communicate for work, with family, and for personal safety.

Thank you to the staff for taking a close look at the ways in which we can increase spectrum flexibility and improve spectrum efficiency.

STATEMENT OF
COMMISSIONER MICHAEL J. COPPS

Re: *Amendment of Part 101 of the Commission's Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees*; *Request for Interpretation of Section 101.141(a)(3) of the Commission's Rules Filed by Alcatel-Lucent, Inc., et al.*; *Petition for Declaratory Ruling Filed by Wireless Strategies, Inc.*; *Request for Temporary Waiver of Section 101.141(a)(3) of the Commission's Rules Filed by Fixed Wireless Communications Coalition*; WT Docket Nos. 10-153; 09-106; 07-121

Today's action is yet another important step in implementing the National Broadband Plan. We are looking at ways to expand flexibility in spectrum use by removing barriers to the provision of wireless backhaul in certain bands. Backhaul is the life blood of a healthy and inventive wireless broadband market, providing the necessary bandwidth to get data between a cell tower and the network. As I noted in a statement at the Commission's last Open Meeting, spectrum is a finite resource. We can't make any more of it, so we need to find ways to optimize our supply by expanding flexibility of use for licensees and by improving efficiency through new and innovative technologies. With this Notice of Proposed Rulemaking and Notice of Inquiry, we take an encouraging step in that direction.

We have compiled and seriously considered a vast number of suggestions and proposals on wireless backhaul in crafting this item. I am hopeful that it will spark a robust dialogue on the best approaches to expand essential capacity and competitive choice in backhaul, which is currently a significant part of wireless networks' operating expense.

I am especially appreciative that this item gives particular focus to the economic and geographic impediments working to isolate large parts of ***rural*** America from the full potential of broadband. Many rural areas have few, if any, real options for fiber backhaul, and increasingly rely on wireless backhaul to deliver the capacity needed for broadband. Admittedly, some of the difficulties facing these areas may be the result—at least in part—of out-dated regulatory policies that limit flexibility and competitive choice. But in calling for a national broadband strategy, Congress directed us to ensure that ***every*** American has access to broadband capability—no matter who they are, where they live, or the particular circumstances of their individual lives. Through responsible reform efforts and inventive solutions like those proposed in this item, we can overcome these obstacles and ensure the broadband rights of all Americans.

I would like to Ruth Milkman and her entire team who worked to bring us such a thorough item for consideration. I look forward to working expeditiously with the Chairman and my colleagues as we continue working to maximize the public interest benefits of our precious spectrum resource.

STATEMENT OF
COMMISSIONER ROBERT M. McDOWELL

Re: *Amendment of Part 101 of the Commission's Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees*; *Request for Interpretation of Section 101.141(a)(3) of the Commission's Rules Filed by Alcatel-Lucent, Inc., et al.*; *Petition for Declaratory Ruling Filed by Wireless Strategies, Inc.*; *Request for Temporary Waiver of Section 101.141(a)(3) of the Commission's Rules Filed by Fixed Wireless Communications Coalition*; WT Docket Nos. 10-153; 09-106; 07-121

I am delighted to vote to approve today's notice of proposed rulemaking and notice of inquiry seeking guidance on removing regulatory barriers to the use of spectrum for backhaul and other point-to-point and point-to-multipoint communications. By enabling the development of more flexible and cost-effective microwave services, the Commission will be poised to assist with increasing deployment of fourth-generation (4G) mobile broadband networks.

Last month's report from the Pew Internet & American Life Project reveals that American consumers are taking advantage of a much wider range of mobile services – taking pictures, web browsing, and playing music, to name a few. Of course this is even before the launch of 4G technologies. As the use of mobile data increases, providers will need to increase their backhaul capacity, including microwave backhaul, to accommodate that traffic. Increasing the availability of, and lowering barriers to entry for, microwave will serve as an additional choice for backhaul services.

This is an issue that I've been speaking about for some time now, most notably in November 2008 as part of the Commission's work on the TV white spaces proceeding, particularly in rural areas. I will continue to stay engaged on this issue, and look forward to learning more. In the meantime, I hope my colleagues agree that moving forward expeditiously in this proceeding, as well as in the white spaces proceeding, would be a win-win.

STATEMENT OF
COMMISSIONER MIGNON L. CLYBURN

Re: *Amendment of Part 101 of the Commission's Rules to Facilitate the Use of Microwave for Wireless Backhaul and Other Uses and to Provide Additional Flexibility to Broadcast Auxiliary Service and Operational Fixed Microwave Licensees*; *Request for Interpretation of Section 101.141(a)(3) of the Commission's Rules Filed by Alcatel-Lucent, Inc., et al.*; *Petition for Declaratory Ruling Filed by Wireless Strategies, Inc.*; *Request for Temporary Waiver of Section 101.141(a)(3) of the Commission's Rules Filed by Fixed Wireless Communications Coalition*; WT Docket Nos. 10-153; 09-106; 07-121

I am pleased to support this item because the changes it proposes may reduce the costs that companies face to provide wireless services, including broadband, and could lead to more wireless opportunities for consumers, particularly rural consumers.

In May of this year, the Commission released its *Fourteenth Annual Report and Analysis* on the mobile wireless market. That report made three interrelated findings that, in my opinion, are important about the state of wireless services in rural areas. First, more than ten million people live in rural areas with two or fewer wireless service providers. Second, the need for backhaul transport imposes significant costs on wireless service providers. Third, rural service providers are increasing their use**,** of microwave communications to reduce the costs of backhaul transport. Those findings suggest that we should look for ways to lower the costs of providing wireless services, including backhaul transport, in order to promote those services in rural areas.

One way to reduce the costs for backhaul transport for wireless providers is to create a regulatory environment that allows for more flexible use of microwave communications. Giving service providers more options on how they can use microwave communications, enhances their ability to find the most cost effective backhaul transport solutions for their respective business models. This item identifies a number of areas in which the Commission's rules could encourage more flexible use of microwave communications of up to 750 megahertz of spectrum, while proposing to protect incumbent operations, and increase the flexibility of operations.

I applaud Chairman Genachowski's leadership in setting ambitious goals in this proceeding, and I thank the Wireless Telecommunications Bureau staff for its efforts in crafting a Notice to elicit further information from the public, on how we should balance these important public interest benefits.