

APPENDIX A

Final Rules

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

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

1. 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.

§ 74.602 by revising paragraph (a) introductory text 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 bands 6875-7125 MHz and 12700 – 13200 MHz are co-equally shared with stations licensed pursuant to Parts 78 and 101 of the Commission's Rules. Broadcast network-entities may also use the 1990-2110, 6425-6525 and 6875-7125 MHz bands for mobile television pickup only.

* * * * *

2. Add § 74.605 to read as follows:

§ 74.605 Registration of stationary TV pickup receive sites

Licenses of TV pickup stations in the 6875-7125 MHz and 12700-13200 MHz bands shall register their stationary receive sites using the Commission's Universal Licensing System.

* * * * *

PART 101 – FIXED MICROWAVE SERVICES

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

3. Amend § 101.31 by 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; 12,700-13,150; 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:

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

5. 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 lower than the values listed in the table to § 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.

* * * * *

6. Amend § 101.107(a), in the table add the entry “6,875 to 7,125¹” to read as follows:

§ 101.107 Frequency tolerance.

(a) * * *

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

7. Amend § 101.109(c), in the table add the entries “6,875 to 7,125” and “12,700-13,150” 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	25 MHz ¹
12,700 to 13,150	50 MHz
***	****

8. 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	
***	**	***

9. 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 B	2.2 2.2	38 38	25 21	29 25	33 29	36 32	42 35	55 39	55 45
***				*****						

11. Amend § 101.141 by revising paragraph (a)(3) the introductory text and the table 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 (6 GHz), 6875-7125 MHz (7 GHz), 10,550-10,680 MHz (10 GHz), 10,700-11700 MHz (11 GHz), and 12,700-13,150 MHz (13 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. Links that use equipment capable of adjusting modulation must be designed using generally accepted multipath fading and rain fading models to meet the specified capacity and loading requirements at least 99.95% of the time, in the aggregate of both directions in a two-way link.

Nominal channel bandwidth (MHz)	Minimum Payload capacity (Mbits/s) ¹	Minimum traffic payload (as percent of payload capacity)	Typical utilization ²
***	****	****	****
25.0	89.4	³ 50	2 DS-3/STS-1
***	****	****	****

10. Amend § 101.147 by adding the entry “6,875-7,125 MHz” to the table in paragraph (a), amending the entry “12,700-13,200 MHz” in the table in paragraph (a), adding footnote (34) to paragraph (a), redesignating paragraph (l) as paragraph (k), adding a new paragraph (l), redesignating paragraphs (p) and (q) as paragraphs (q) and (r), respectively, and adding a new paragraph (p) to read as follows:

§ 101.147 Frequency assignments.

(a) ***

6,875-7,125 MHz (10), (34)

12,700-13,200 (22), (34)

(34) In the bands 6,875-7,125 MHz and 12,700-13,150 MHz, links shall not intersect with the service areas of television pickup stations.

(1) 6875 to 7125 MHz. 25 MHz authorized bandwidth.

(1) 5 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
6877.5	7027.5
6882.5	7032.5
6887.5	7037.5
6892.5	7042.5
6897.5	7047.5
6902.5	7052.5
6907.5	7057.5
6912.5	7062.5
6917.5	7067.5
6922.5	7072.5
6927.5	7077.5
6932.5	7082.5
6937.5	7087.5
6942.5	7092.5
6947.5	7097.5
6952.5	7102.5
6957.5	7107.5
6962.5	7112.5
6967.5	7117.5
6972.5	7122.5

(2) 8.33 MHz bandwidth channels:

Transmit (receive)	Receive (transmit)
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(MHz)	(MHz)
6879.165	7029.165
6887.495	7037.495
6895.825	7045.825
6904.155	7054.155
6912.485	7062.485
6920.815	7070.815
6929.145	7079.145
6937.475	7087.475
6945.805	7095.805
6954.135	7104.135
6962.465	7112.465
6970.795	7120.795

(3) 12.5 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
6881.25	7031.25
6893.75	7043.75
6906.25	7056.25
6918.75	7068.75
6931.25	7081.25
6943.75	7093.75
6956.25	7106.25
6968.75	7118.75

(4) 25 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
6887.5	7037.5
6912.5	7062.5
6937.5	7087.5
6962.5	7112.5

* * * * *

(p) 12700 to 13150 MHz. 50 MHz authorized bandwidth.

(1) 5 MHz channels:

Transmit	Receive

(receive) (MHz)	(transmit) (MHz)
12702.5	12927.5
12707.5	12932.5
12712.5	12937.5
12717.5	12942.5
12722.5	12947.5
12727.5	12952.5
12732.5	12957.5
12737.5	12962.5
12742.5	12967.5
12747.5	12972.5
12752.5	12977.5
12757.5	12982.5
12762.5	12987.5
12767.5	12992.5
12772.5	12997.5
12777.5	13002.5
12782.5	13007.5
12787.5	13012.5
12792.5	13017.5
12797.5	13022.5
12802.5	13027.5
12807.5	13032.5
12812.5	13037.5
12817.5	13042.5
12822.5	13047.5
12827.5	13052.5
12832.5	13057.5
12837.5	13062.5
12842.5	13067.5
12847.5	13072.5
12852.5	13077.5
12857.5	13082.5
12862.5	13087.5
12867.5	13092.5
12872.5	13097.5
12877.5	13102.5
12882.5	13107.5
12887.5	13112.5
12892.5	13117.5
12897.5	13122.5
12902.5	13127.5
12907.5	13132.5
12912.5	13137.5
12917.5	13142.5
12922.5	13147.5

(2) 8.33 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12704.165	12929.165
12712.495	12937.495
12720.825	12945.825
12729.155	12954.155
12737.485	12962.485
12745.815	12970.815
12754.145	12979.145
12762.475	12987.475
12770.805	12995.805
12779.135	13004.135
12787.465	13012.465
12795.795	13020.795
12804.125	13029.125
12812.455	13037.455
12820.785	13045.785
12829.115	13054.115
12837.445	13062.445
12845.775	13070.775
12854.105	13079.105
12862.435	13087.435
12870.765	13095.765
12879.095	13104.095
12887.425	13112.425
12895.755	13120.755
12904.085	13129.085
12912.415	13137.415

(3) 12.5 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12706.25	12931.25
12718.75	12943.75
12731.25	12956.25
12743.75	12968.75
12756.25	12981.25
12768.75	12993.75
12781.25	13006.25
12793.75	13018.75
12806.25	13031.25

12818.75	13043.75
12831.25	13056.25
12843.75	13068.75
12856.25	13081.25
12868.75	13093.75
12881.25	13106.25
12893.75	13118.75
12906.25	13131.25
12918.75	13143.75

(4) 25 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12712.5	12937.5
12737.5	12962.5
12762.5	12987.5
12787.5	13012.5
12812.5	13037.5
12837.5	13062.5
12862.5	13087.5
12887.5	13112.5
12912.5	13137.5

(5) 50 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
12725	12925
12775	12975
12825	13025
12875	13075

* * * * *

11. Amend § 101.603 by revising paragraph (a)(7) to read as follows:

§ 101.603 Permissible Communications.

(a) * * *

(7) Licensees may transmit program material from one location to another;

* * * * *

APPENDIX B

Final Regulatory Flexibility Analysis

1. As required by the Regulatory Flexibility Act of 1980, as amended (RFA),¹ we incorporated an 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 the *Notice of Proposed Rulemaking (NPRM)*. No comments were filed addressing the IRFA. Because we amend the rules in this *Report and Order*, we have included this Final Regulatory Flexibility Analysis (FRFA). This present FRFA conforms to the RFA.²

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

2. In this *Report and Order*, we adopt three changes to our rules involving microwave stations. First, we allow fixed service (FS) stations to operate in the 6875-7125 MHz and 12700-13150 MHz bands. Second, we eliminate the prohibition on broadcasters using Part 101 stations as the final radiofrequency (RF) link in the chain of distribution of program material to broadcast stations. Third, we 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.

3. With respect to the first action, 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 12700-13150 MHz bands are currently assigned to television pickup, television studio-transmitter links, television relay stations, television translator relay stations, and mobile-only CARS. Assigning this spectrum to the fixed service will provide additional spectrum that will be used for wireless backhaul and other critical applications, while protecting other existing services in these bands.

4. 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 program material to broadcast stations. The rule 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 the increasing use of digital technologies, we conclude that 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 conclude it does not make sense to distinguish between program material and other types of content transmitted using digital technologies. 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 eliminate this rule.

5. Third, we amend our Part 101 technical rules to facilitate the use of adaptive modulation, which is a process that reduces the data rate of a microwave link in order to maintain

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. § 604.

communications. 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 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. This rule change will allow licensees to take advantage of the benefits of adaptive modulation while ensuring efficient use of the spectrum.

B. Legal Basis

6. The action is authorized pursuant to sections 1, 2, 4(i), 7, 201, 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, 201, 301, 302, 303, 307, 308, 309, 310, 319, 324, 332, and 333, and Section 706 of the Telecommunications Act of 1996, as amended, 47 U.S.C. § 1302.

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

7. 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.³ The RFA generally defines the term "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction."⁴ In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act.⁵ 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.⁶

8. *Small Businesses, Small Organizations, and Small Governmental Jurisdictions.* Our action 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.⁷ First, nationwide,

³ 5 U.S.C. § 603(b)(3).

⁴ 5 U.S.C. § 601(6).

⁵ 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."

⁶ 15 U.S.C. § 632.

⁷ See 5 U.S.C. §§ 601(3)-(6).

there are a total of approximately 27.5 million small businesses, according to the SBA.⁸ 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.”⁹ Nationwide, as of 2007, there were approximately 1,621,315 small organizations.¹⁰ 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.”¹¹ Census Bureau data for 2011 indicate that there were 89,476 local governmental jurisdictions in the United States.¹² We estimate that, of this total, as many as 88,506 entities may qualify as “small governmental jurisdictions.”¹³ Thus, we estimate that most governmental jurisdictions are small.

9. *Wireless Telecommunications Carriers (except satellite)*. The appropriate size standard under SBA rules is for the category Wired Telecommunications Carriers. Under that size standard, such a business is small if it has 1,500 or fewer employees.¹⁴ Census Bureau data for 2007, which now supersede data from the 2002 Census, show that there were 3,188 firms in this category that operated for the entire year. Of this total, 3,144 had employment of 999 or fewer, and 44 firms had employment of 1,000 employees or more. Thus under this category and the associated small business size standard, the Commission estimates that the majority of wireless telecommunications carriers (except satellite) are small entities that may be affected by our proposed action.¹⁵

10. *Fixed Microwave Services*. Microwave services include common carrier,¹⁶ private-operational fixed,¹⁷ and broadcast auxiliary radio services.¹⁸ At present, there are approximately 31,549

⁸ See SBA, Office of Advocacy, “Frequently Asked Questions,” web.sba.gov/faqs (last visited May 6, 2011; figures are from 2009).

⁹ 5 U.S.C. § 601(4).

¹⁰ INDEPENDENT SECTOR, THE NEW NONPROFIT ALMANAC & DESK REFERENCE (2010).

¹¹ 5 U.S.C. § 601(5).

¹² U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES: 2011, Table 427 (2007)

¹³ The 2007 U.S. Census data for small governmental organizations are not presented based on the size of the population in each such organization. There were 89,476 small governmental organizations in 2007. If we assume that county, municipal, township, and school district organizations are more likely than larger governmental organizations to have populations of 50,000 or less, the total of these organizations is 52,125. If we make the same assumption about special districts and also assume that special districts are different from county, municipal, township, and school districts, in 2007 there were 37,381 special districts. Therefore, of the 89,476 small governmental organizations documented in 2007, as many as 89,506 may be considered small under the applicable standard. This data may overestimate the number of such organizations that has a population of 50,000 or less. U.S. CENSUS BUREAU, STATISTICAL ABSTRACT OF THE UNITED STATES 2011, Tables 427, 426 (Data cited therein are from 2007).

¹⁴ 13 C.F.R. § 121.201, NAICS code 517110.

¹⁵ See http://factfinder.census.gov/servlet/IBQTable?_bm=y&-fds_name=EC0700A1&-geo_id=&-skip=600&-ds_name=EC0751SSSZ5&-lang=en

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

¹⁷ 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.

common carrier fixed licensees and 89,633 private and public safety operational-fixed licensees and broadcast auxiliary radio licensees in the microwave services. Microwave services include common carrier,¹⁹ private-operational fixed,²⁰ and broadcast auxiliary radio services.²¹ They also include the Local Multipoint Distribution Service (LMDS),²² the Digital Electronic Message Service (DEMS),²³ and the 24 GHz Service,²⁴ where licensees can choose between common carrier and non-common carrier status.²⁵ The Commission has not yet defined a small business with respect to microwave services. For purposes of the IRFA, the Commission will use the SBA's definition applicable to Wireless Telecommunications Carriers (except satellite)—i.e., an entity with no more than 1,500 persons is considered small.²⁶ For the category of Wireless Telecommunications Carriers (except Satellite), Census data for 2007, which supersede data contained in the 2002 Census, show that there were 1,383 firms that operated that year.²⁷ Of those 1,383, 1,368 had fewer than 100 employees, and 15 firms had more than 100 employees. Thus under this category and the associated small business size standard, the majority of firms can be considered small. The Commission notes that the number of firms does not necessarily track the number of licensees. The Commission estimates that virtually all of the Fixed Microwave licensees (excluding broadcast auxiliary licensees) would qualify as small entities under the SBA definition.

11. *Radio Broadcasting.* The subject rules and policies potentially will apply to all AM and FM radio broadcasting licensees and potential licensees. 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
(Continued from previous page)

¹⁸ Auxiliary Microwave Service is governed by Part 74 and Part 78 of Title 47 of the Commission's Rules.

Available to licensees of broadcast stations, cable operators, and to broadcast and cable network entities. 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 TV pickup and CARS pickup, which relay signals from a remote location back to the studio.

¹⁹ See 47 C.F.R. Part 101, Subparts C and I.

²⁰ See 47 C.F.R. Part 101, Subparts C and H.

²¹ Auxiliary Microwave Service is governed by Part 74 of Title 47 of the Commission's Rules. See 47 C.F.R. Part 74. 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 See 47 C.F.R. Part 101, Subpart L.

²³ See 47 C.F.R. Part 101, Subpart G.

²⁴ See *id.*

²⁵ See 47 C.F.R. §§ 101.533, 101.1017.

²⁶ 13 C.F.R. § 121.201, NAICS code 517210.

²⁷ U.S. Census Bureau, 2007 Economic Census, Sector 51, 2007 NAICS code 517210 (rel. Oct. 20, 2009), http://factfinder.census.gov/servlet/IBQTable?_bm=y&-geo_id=&-fds_name=EC0700A1&-_skip=700&-ds_name=EC0751SSSZ5&-_lang=en.

²⁸ U.S. Census Bureau, 2007 NAICS Definitions, 515111 Radio Stations;

<http://www.census.gov/naics/2007/def/ND515111HTM#N51512>

²⁹ *Id.*

primarily are engaged in radio 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/Kelsey, MEDIA Access Pro Database on January 13, 2011, 10,820 (97%) of 11,127 commercial radio stations have revenue of \$7 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.

12. *Television stations.* 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 1,390.³⁵ According to Commission staff review of the BIA Kelsey Inc. Media Access Pro Television Database (BIA) as of January 31, 2011, 1,006 (or about 78 percent) of an estimated 1,298 commercial television stations³⁶ in the United States 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 391.³⁷ We note, however, that, in assessing whether a business concern qualifies as small under the above definition, business (control) affiliations³⁸ 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.

³⁰ *Id.*

³¹ *Id.*

³² 13 C.F.R. § 121.201, NAICS code 515112 (updated for inflation in 2008).

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, 2010,” 2011 WL 484756 (F.C.C.) (dated Feb. 11, 2011) (“*Broadcast Station Totals*”); also available at http://www.fcc.gov/Daily_Releases/Daily_Business/2011/db0211/DOC-304594A1.pdf.

³⁶ We recognize that this total differs slightly from that contained in *Broadcast Station Totals*, *supra*, note 15; however, we are using BIA’s estimate for purposes of this revenue comparison.

³⁷ See *Broadcast Station Totals*, *supra*.

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).

13. 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

14. This *Report and Order* contains new information collection requirements subject to the Paperwork Reduction Act of 1995 (PRA), Public Law 104-13. It will be submitted to the Office of Management and Budget (OMB) for review under Section 3507(d) of the PRA. OMB, the general public, and other Federal agencies are invited to comment on the new or modified information collection requirements contained in this proceeding. In addition, we note that pursuant to the Small Business Paperwork Relief Act of 2002, Public Law 107-198, see 44 U.S.C. 3506(c)(4), we seek specific comment on how the Commission might further reduce the information collection burden for small business concerns with fewer than 25 employees.

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

15. The RFA requires an agency to describe any significant alternatives that it has considered in reaching its proposed approach, which may include the following four alternatives (among others): (1) the establishment of differing compliance or reporting requirements or timetables that take into account the resources available to small entities; (2) the clarification, consolidation, or simplification of compliance or reporting requirements under the rule for small entities; (3) the use of performance, rather than design, standards; and (4) an exemption from coverage of the rule, or any part thereof, for small entities.³⁹

16. As noted above, this *Report and Order* (1) allows fixed service stations to operate in the 6875-7125 and 12700-13150 MHz bands, (2) eliminates 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) and amends 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. These actions would provide additional options to all licensees, including small entity licensees. Such actions will serve the public interest by making additional spectrum available for fixed service users, providing additional flexibility for broadcasters to use microwave spectrum, and allowing communications to be maintained during adverse propagation conditions. The rules could therefore open up beneficial economic opportunities to a variety of spectrum users, including small businesses.

17. Generally, the alternative approach would be to maintain the existing rules. If the rules were not changed, the 6875-7125 MHz and 12700-13150 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 would make it increasingly difficult to meet the demand for microwave facilities. If the prohibition on broadcasters using Part 101 stations as the final radiofrequency (RF) link in the chain

³⁹ 5 U.S.C. § 603(c).

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 is 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.

18. 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. 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.

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

19. None.

G. Report to Congress

20. The Commission will send a copy of the *Report and Order*, including the FRFA, in a report to Congress pursuant to the Congressional Review Act.⁴⁰ In addition, the Commission will send a copy the *Report and Order*, including FRFA, to the Chief Counsel for Advocacy of the Small Business Administration. A copy of this *Report and Order* and FRFA (or summaries thereof) will be published in the Federal Register.⁴¹

⁴⁰ See 5 U.S.C. § 801(a)(1)(A). The Congressional Review Act is contained in Title II, § 251, of the CWAAA, see Pub. L. No. 104-121, Title II, § 251, 110 Stat. 868.

⁴¹ See 5 U.S.C. § 604(b).

APPENDIX C

Proposed Rules

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

PART 101 – FIXED MICROWAVE SERVICES

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

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

2. Amend § 101.3 by adding the following::

§ 101.3 Definitions.

Payload Capacity. The bit rate available for transmission of data over a radiocommunication system, excluding overhead data generated by the system.

3. Amend § 101.109(c), in the table revise the entries “5,925 to 6,425” and “10,700 to 11,700” to read as follows: :

§ 101.109 Bandwidth.

(c) ***

Frequency Band (MHz)	Maximum Authorized Bandwidth
***	****
5,925 to 6,425	60 MHz ¹
***	****
10,700 to 11,700	80 MHz ¹
***	****

4. Amend § 101.115 by revising the introductory text to paragraph (b) and the table in paragraph (b)(2) to read as follows:

§ 101.115 Directional Antennas.

(b) Fixed stations (other than temporary fixed stations and DEMS nodal stations) operating at 932.5 MHz or higher must employ transmitting and receiving antennas (excluding second receiving antennas for operations such as space diversity) meeting the appropriate performance Standard A indicated below, except that in areas not subject to frequency congestion, antennas meeting performance Standard B may be used, subject to the requirements set forth in paragraph (d) of this section. For frequencies with a Standard B1 and a Standard B2, Standard B1 shall apply to stations authorized prior to [insert effective date of rule], and Standard B2 shall apply to stations authorized after [insert effective date of rule]. Licensees shall comply with the antenna standards table shown in this paragraph in the following manner:

(2) ***

Frequency	Category	Maximum beam-width to 3 dB pts	Minimum antenna Gain (dBi)	Minimum radiation suppression to angle in degrees						
				From centerline of main beam in decibels						
				5° to 10°	10° to 15°	15° to 20°	20° to 30°	30° to 100°	100° to 140°	140° to 180°

5,925 to 6,425 ⁵	A	2.2	38	25	29	33	36	42	55	55
	B1	2.2	38	21	25	29	32	35	39	45
	B2	4.1	32	15	20	23	28	29	60	60

6,525 to 6,875 ⁵	A	2.2	38	25	29	33	36	42	55	55
	B1	2.2	38	21	25	29	32	35	39	45
	B2	4.1	32	15	20	23	28	29	60	60
6,875 to 7,075	A	2.2	38	25	29	33	36	42	55	55
	B1	2.2	38	21	25	29	32	35	39	45

	B2	4.1	32	15	20	23	28	29	60	60

17,700 to 18,820	A	2.2	38	25	29	33	36	42	55	55
	B1	2.2	38	20	24	28	32	35	36	36
	B2	3.3	33.5	18	22	29	31	35	57	59
18,920 to 19,700 ¹⁰	A	2.2	38	25	29	33	36	42	55	55
	B1	2.2	38	20	24	28	32	35	36	36
	B2	3.3	33.5	18	22	29	31	35	57	59
21,200 to 23,600 ^{7, 11}	A	3.3	33.5	18	26	26	33	33	55	55
	B1	3.3	33.5	17	24	24	29	29	40	50
	B2	4.5	30.5	14	19	22	24	29	52	52

5. Amend § 101.141(a)(3) to read as follows:

§ 101.141 Microwave Modulation.

(a) ***

(3) When use of an antenna meeting performance Standard A (see § 101.115) is required, 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, unless a showing is made in the application that (i) the capacity and loading requirements prevent the deployment of the requested link for economic or technical reasons; (ii) the applicant does not have any reasonable alternative; and (iii) not applying the capacity and loading requirements would result in tangible and specific public interest benefits. During anomalous signal fading, licensees subject to the capacity and loading requirements 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. Links that must comply with the capacity and loading requirements that use equipment capable of adjusting modulation must be designed using generally accepted multipath fading and rain fading models to meet the specified capacity and loading requirements at least 99.95% of the time, in the aggregate of both directions in a two-way link.

* * * * *

6. Amend § 101.145 by revising the introductory text in section (b) and section (c) to read as follows:

§ 101.145 Interference to geo-stationary-satellites.

* * * * *

(b) *2655 to 2690 MHz and 5925 to 7075 MHz.* No directional transmitting antenna utilized by a fixed station operating in these bands with EIRP greater than 35 dBW may be aimed within 2 degrees of the geostationary-satellite orbit, taking into account atmospheric refraction. However, exception may be made in unusual circumstances upon a showing that there is no reasonable alternative to the transmission path proposed. If there is no evidence that such exception would cause possible harmful interference to an authorized satellite system, said transmission path may be authorized on waiver basis where the maximum value of the equivalent isotropically radiated power (EIRP) does not exceed:

* * * * *

(c) *12.7 to 13.25 GHz.* No directional transmitting antenna utilized by a fixed station operating in this band with EIRP greater than 45 dBW may be aimed within 1.5 degrees of the geostationary-satellite orbit, taking into account atmospheric refraction.

* * * * *

7. Amend § 101.147 by revising the introductory text to sections (i) and (o) and adding new sections (i)(9) and (o)(8) to read as follows:

§ 101.147 Frequency assignments.

* * * * *

(i) *5,925 to 6,425 MHz.* 60 MHz authorized bandwidth.

* * * * *

(9) 60 MHz bandwidth channels:

Transmit (receive) (MHz)	Receive (transmit) (MHz)
5964.97	6217.01
6024.27	6276.31
6083.57	6335.61
6142.87	6394.91

* * * * *

(o) 10,700 to 11,700 MHz. 80 MHz authorized bandwidth.

Transmit (receive) (MHz)	Receive (transmit) (MHz)
10745	11235
10825	11315
10905	11395
10985	11475
11065	11555
11145	11635

* * * * *

APPENDIX D

Initial Regulatory Flexibility Analysis

1. 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

2. In this *Further Notice of Proposed Rulemaking*, we propose five additional changes to our rules involving microwave stations. These changes are described in further detail below. First, we propose to allow the use of smaller antennas in the 5925-6875 MHz band (6 GHz band), 17700-18300 and 19300-19700 MHz bands (18 GHz band), and 21200-23600 MHz band (23 GHz band) fixed service (FS) bands. Second, we propose to exempt microwave stations in non-congested areas from our capacity and loading requirements in order to facilitate the provision of service to rural areas. Third, we propose to widen the permissible maximum channel size in the 5925-6425 GHz Band (Lower 6 GHz Band) (to allow 60 megahertz channels) and in the 10700-11700 MHz band (11 GHz Band) (to allow 80 megahertz channels) to allow faster data rates. Fourth, we propose to revise the criteria under which microwave stations that are pointing in the direction of geostationary satellites must seek a waiver prior to operating to expedite service. Finally, we propose to add a definition of “payload capacity” to our rules, and seek comment on updating our capacity and loading requirements to reflect the increasing use of interfaces such as Internet Protocol.

3. With respect to the first proposal, Section 101.115(b) of the Commission’s Rules establishes directional antenna standards designed to maximize the use of microwave spectrum while avoiding interference between operators. 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. Smaller antennas have several advantages. They 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, 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. Smaller antennas raise fewer aesthetic objections, thereby permitting easier compliance with local zoning and homeowner association rules and generating fewer objections. On the other hand, smaller antennas have increased potential to cause interference because smaller antennas

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).

result in more radiofrequency energy being transmitted in directions away from the actual point-to-point link. We seek comment on whether we can allow smaller antennas in the 6, 18 and 23 GHz bands without producing harmful interference.

4. Second, pursuant to Section 101.141(a)(3) of the Commission's Rules, Fixed Service operators must comply with minimum payload capacities (in terms of megabits per second) and minimum traffic loading payload (as a percentage of payload capacity) to promote efficient frequency use for various channel sizes in certain Part 101 bands. Under the current rules, the requirements apply equally to stations in urban areas and to stations in rural areas. We seek comment on whether exempting stations in less congested areas from complying with the minimum payload capacity rule could allow licensees to establish longer links, resulting in cost savings and facilitating the use of wireless broadband and other critical services.

5. Third, we propose to allow the use of wider channels in the Lower 6 GHz Band and 11 GHz Band. Specifically, we seek comment on allowing 60 megahertz channels in the Lower 6 GHz Band and 80 megahertz channels in the 11 GHz Band. The proposal has the potential to allow backhaul operators to handle more capacity and offer faster data rates.

6. Fourth, we seek comment on amending Section 101.145 of the Commission's Rules to limit the circumstances under which fixed service transmitters must obtain a waiver in order to point near the geostationary arc. Specifically, we propose to require a waiver only if the EIRP is greater than 35 dBW for the 5925-7075 MHz band and is greater than 45 dBW in the 12700-13250 MHz band. Limiting the circumstances where a waiver is necessary will be beneficial. Once the frequency coordination process is completed, the Commission's rules provide many applicants with conditional authority to begin service immediately, without waiting for final approval from the Commission, and with the stipulation that they must take their stations down if the Commission later rejects their applications. Conditional authority is not available, however, to applicants that must request waivers of existing rules. Accordingly, limiting the circumstances under which a waiver is needed will allow more applicants to rapidly commence service. Furthermore, we tentatively conclude that such a change would be consistent with international regulations and can be made without any increased risk of interference to satellite services.

7. Finally, we propose to add a definition of "payload capacity" to our rules, and seek comment on updating our capacity and loading standards to take into account the increasing use of interfaces such as Internet Protocol. Currently, Section 101.141(a)(3) of the Commission's Rules lists a "minimum payload capacity" for various nominal channel bandwidths. The same rule also defines "typical utilization" of the required payload capacity for each channel bandwidth as multiples of the number of voice circuits a channel can accommodate. These definitions are becoming outdated as systems support interfaces such as Internet Protocol. Accordingly, we propose to update our rules to add a definition of payload capacity. We also seek comment on revising our efficiency requirements to define those requirements in terms of bits-per-second-per-Hertz ("bps/Hz") across all bands. Such changes could make our rules clearer and would be consistent with modern digital technologies.

B. Legal Basis

8. The proposed action is authorized pursuant to sections 1, 2, 4(i), 7, 201, 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, 201, 301, 302, 303, 307, 308, 309, 310, 319, 324, 332, and 333 and Section 706 of the Telecommunications Act of 1996, as amended, 47 U.S.C. § 1302.