

APPENDIX A: FINAL RULES

For the reasons discussed in the preamble, the Federal Communications Commission amends 47 CFR parts 2, 21, and 101 as follows:

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

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

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

2. Section 2.106, the Table of Frequency Allocations, is amended as follows:

a. Revise pages 47 and 49.

b. In the list of United States (US) Footnotes, remove footnote US256, revise footnote US311, and add footnote US378.

c. In the list of non-Federal Government (NG) Footnotes, revise footnote NGI 53 and add footnote NG176.

§ 2.106 Table of Frequency Allocations.

The revisions and additions read as follows:

* * * * *

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
1670-1675 METEOROLOGICAL AID FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE 5.380			1670-1675	1670-1675 FIXED MOBILE except aeronautic? mobile	Wireless Communications (27)
5.341			5.341 US211 US362	5.341 US211 US362	
1675-1690 METEOROLOGICAL AID FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	1675-1690 METEOROLOGICAL AID FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space)	1675-1690 METEOROLOGICAL AID FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	1675-1700 METEOROLOGICAL AID (radiosonde) METEOROLOGICAL-SATELLITE (space-to-Earth)		
1690-1700 METEOROLOGICAL AID METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed Mobile except aeronautical mobile	1690-1700 METEOROLOGICAL AID METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE-SATELLITE (Earth-to-space)	1690-1700 METEOROLOGICAL AID METEOROLOGICAL-SATELLITE (space-to-Earth)			
5.289 5.341 5.382	5.289 5.341 5.377 5.381	5.289 5.341 5.381	5.289 5.341 US211		
FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile MOBILE-SATELLITE (Earth-to-space)	FIXED METEOROLOGICAL-SATELLITE (space-to-Earth) MOBILE except aeronautical mobile	FIXED G118 METEOROLOGICAL-SATELLITE (space-to-Earth)	METEOROLOGICAL-SATELLITE (space-to-Earth) Fixed	
1710-1930 FIXED MOBILE 5.380 5.384A 5.388A			1710-1755	1710-1755 FIXED MOBILE	
			5.341 US311 US378	5.341 US311 US378 NG17E	

International Table			United States Table		CC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
2110-2120 FIXED MOBILE 5.388A SPACE RESEARCH (deep space) (Earth-to-space)			110-2120	2110-2155 FIXED NG23 MOBILE	Public Mobile (22) Fixed Microwave (101)
2120-2160 FIXED MOBILE 5.388A	2120-2160 FIXED MOBILE 5.388A Mobile-satellite (space-to-Earth)	2120-2160 FIXED MOBILE 5.388A	S252 120-2200	US252	
5.388	5.388	5.388		2155-2160 FIXED NG23	Domestic Public Fixed (21) Fixed Microwave (101)
2160-2170 FIXED MOBILE 5.388A	2160-2170 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth)	2160-2170 FIXED MOBILE 5.388A		2160-2165 FIXED NG23 NG153 MOBILE	Domestic Public Fixed (21) Public Mobile (22) Fixed Microwave (101)
5.388 5.392A	5.388 5.389C 5.389D 5.389E 5.390	5.388		2165-2200 MOBILE-SATELLITE (space-to-Earth)	Satellite Communications (25)
2170-2200 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) 5 351A				NG23 NG166	
5 388 5 369A 5 389F 5 392A					
2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION-SATELLITE (space-to-Earth) (space-to-space) FIXED MOBILE 5 391 SPACE RESEARCH (space-to-Earth) (space-to-space)			2200-2290 SPACE OPERATION (space-to-Earth) (space-to-space) EARTH EXPLORATION- SATELLITE (space-to- Earth) (space-to-space) FIXED (line-of-sight only)	2200-2290	

* * * * *

UNITED STATES (US) FOOTNOTES

* * * * *

Allen Telescope Array, Hat Creek, California	Rectangle between latitudes 40° 00' N and 42° 00' N and between longitudes 120° 15' W and 122° 15' W.		
NASA Goldstone Deep Space Communications Complex, Goldstone, California	80 kilometers (50 mile) radius centered on latitude 35° 18' N, longitude 116° 54' W.		
National Astronomy and Ionosphere Center, Arecibo, Puerto Rico	Rectangle between latitudes 17° 30' N and 19° 00' N and between longitudes 65° 10' W and 68° 00' W.		
National Radio Astronomy Observatory, Socorro, New Mexico	Rectangle between latitudes 32° 30' N and 35° 30' N and between longitudes 106° 00' W and 109° 00' W.		
National Radio Astronomy Observatory, Green Bank, West Virginia	Rectangle between latitudes 37° 30' N and 39° 15' N and between longitudes 78° 30' W and 80° 30' W.		
National Radio Astronomy Observatory, Very Long Baseline Array Stations	80 kilometer radius centered on:		
		Latitude (North)	Longitude (West)
	Brewster, WA	48° 08'	119° 41'
	Fort Davis, TX	30° 38'	103° 57'
	Hancock, NH	42° 56'	71° 59'
	Kitt Peak, AZ	31° 57'	111° 37'
	Los Alamos, NM	35° 47'	106° 15'
	Mauna Kea, HI	19° 48'	155° 27'
	North Liberty, IA	41° 46'	91° 34'
	Owens Valley, CA	37° 14'	118° 17'
	Pie Town, NM	34° 18'	108° 07'
Saint Croix, VI	17° 46'	64° 35'	
Owens Valley Radio Observatory, Big Pine, California	Two contiguous rectangles, one between latitudes 36° 00' N and 37° 00' N and between longitudes 117° 40' W and 118° 30' W and the second between latitudes 37° 00' N and 38° 00' N and between longitudes 118° 00' W and 118° 50' W.		

In the bands 1350-1400MHz and 4950-4990 MHz, every practicable effort will be made to avoid the assignment of frequencies to stations in the fixed and mobile services that could interfere with radio astronomy observations within the geographic areas given above. In addition, every practicable effort will be made to avoid assignment of frequencies in these bands to stations in the aeronautical mobile service which operate outside of those geographic areas, but which may cause harmful interference to the listed observatories. Should such assignments result in harmful interference to these observatories, the situation will be remedied to the extent practicable.

* * * * *

US378 In the band 1710-1755 MHz, Federal Government stations in the fixed and mobile services shall operate on a primary basis until reaccommodated in accordance with the Strom Thurmond National Defense Authorization Act for Fiscal Year 1999. Further, Federal Government stations may continue to operate in the band 1710-1755MHz as provided below:

(a) Federal fixed microwave and tactical radio relay stations may operate indefinitely on a primary basis at the sites listed below:

Location	Coordinates	Radius of Operation (km)
Cherry Point, NC..	34° 58' N 076° 56' W	80
Yuma, AZ.....	32° 32' N 113° 58' W	80

(b) Federal fixed microwave and tactical radio relay stations may operate on a secondary basis, and shall not cause harmful inference to, and must accept harmful interference from, primary non-Federal Government operations at the sites listed below:

Location	Coordinates	Radius of Operation (km)
China Lake, CA.....	35° 41' N 117° 41' W	80
Eglin AFB, FL..	30° 29' N 086° 31' W	80
Pacific Missile Test Range/Point Mugu, CA..	34° 07' N 119° 30' W	80
Nellis AFB, NV...	36° 14' N 115° 02' W	80
Hill AFB, UT.....	41° 07' N 111° 58' W	80
Patuxent River, MD.....	38° 17' N 076° 25' W	80
White Sands Missile Range, NM.....	33° 00' N 106° 30' W	80
Fort Irwin, CA.....	35° 16' N 116° 41' W	50
Fort Rucker, AL.....	31° 13' N 085° 49' W	50
Fort Bragg, NC.....	35° 09' N 079° 01' W	50
Fort Campbell, KY.....	36° 41' N 087° 28' W	50
Fort Lewis, WA.....	47° 05' N 122° 36' W	50
Fort Benning, GA..	32° 22' N 084° 56' W	50
Fort Stewart, GA.....	31° 52' N 081° 37' W	50

(c) In the sub-band 1710-1720 MHz, precision guided munitions shall operate on a primary basis until inventory is exhausted or until December 31, 2008, whichever is earlier.

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NON-FEDERAL GOVERNMENT (NG) FOOTNOTES

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NG153 The band 2160-2165 MHz is reserved for future emerging technologies on a co-primary basis with the fixed and mobile services. Allocations to specific services will be made in future proceedings. Authorizations in the band 2160-2162 MHz for stations in the Multipoint Distribution Service applied for after January 16, 1992 shall be on a secondary basis to emerging technologies.

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NG176 The allocations to the fixed and mobile services in the band 1710-1755 MHz shall come into effect on January 1,2004.

PART 21 — DOMESTIC PUBLIC FIXED RADIO SERVICES

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

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

4. Remove Section 21.50 and reserve the section number for future use.

§ 21.50 [Reserved].

PART 101—FIXED MICROWAVE SERVICES

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

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

4. Section 101.69 is amended by revising paragraph (d) to read as follows:

§ 101.69 Transition of the 1850-1990MHz, 2110-2150MHz, and 2160-2200 MHz bands from the fixed microwave services to personal communications services and emerging technoloieis.

* * * * *

(d) Relocation of FMS licensees in the 2110-2150 and 2160-2200MHz bands will be subject to mandatory negotiations only. Mandatory negotiation periods are defined as follows:

* * * * *

5. Section 101.73 is amended by revising paragraphs (d) and (d)(3) to read as follows:

§ 101.73 Mandatory negotiations.

* * * * *

(d) Provisions for Relocation of Fixed Microwave Licensees in the 2110-2150 and 2160-2200MHz bands. Mandatory negotiations will commence when the ET licensee informs the fixed microwave licensee in writing of its desire to negotiate. * * *

* * * * *

(3) *Operating Costs.* Operating costs are the cost to operate and maintain the FMS system. ET licensees would compensate FMS licensees for any increased recumng costs associated with the replacement facilities (e.g., additional rental payments, and increased utility fees) for five years after relocation. ET licensees could satisfy this obligation by making a lump-sum payment based on present value using current interest rates. * * *

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4. Section 101.75 is revised by amending paragraph (d) to read as follows:

§ 101.75 Involuntary relocation procedures.

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(d) Twelve-month *trial period*. If, within one year after the relocation to new facilities, the **FMS** licensee demonstrates that the new facilities are not comparable to the former facilities, the ET licensee must remedy the defects or pay to relocate the microwave licensee to one of the following: its former or equivalent 2 GHz channels, another comparable frequency band, a land-line system, or any other facility that satisfies the requirements specified in paragraph (b) of this section. This trial period commences on the date that the **FMS** licensee begins full operation of the replacement link. If the **FMS** licensee has retained its 2 GHz authorization during the trial period, it must return the license to the Commission at the end of the twelve months. FMS licensees relocated from the 21 10-2150 and 2160-2200 MHz bands may not be returned to their former 2 GHz channels. **All** other remedies specified in paragraph (d) are available to FMS licensees relocated from the 21 10-2150 MHz and 2160-2200 MHz bands, and may be invoked whenever the **FMS** licensee demonstrates that its replacement facility is not comparable, subject to no time limit.

* * * * *

5. Section 101.99 is revised by amending paragraph (a) to read as follows:

§ 101.99 Reimbursement and Relocation expenses in the 2110-2150 MHz and 2160-2200 MHz bands.

(a) Whenever an ET licensee (including Mobile-Satellite Service licensees) in the 21 10-2150 or 2160-2200 MHz bands relocates an incumbent paired microwave link with one path in the 21 10-2150 MHz band and the paired path in the 2160-2200 MHz band, the ET licensee is entitled to reimbursement of 50% of its relocation costs from any subsequently entering ET licensee which would have been required to relocate the same fixed microwave link.

APPENDIX B: LIST OF COMMENTING PARTIES[†]Commenters to the Notice *of Proposed Rule Making*Comments (due February 22, 2001):

Ad Hoc MDS Alliance	Eureka College
Alan Dixon	Halifax Community College
American Association of School Administrators	Henry County Board of Education
American Association of Community Colleges	Illinois Institute of Technology
American Federation of Teachers	IPWireless
American Petroleum Institute	ITFS Spectrum Development Alliance
Arizona Board of Regents for Arizona State University	Jet Propulsion Laboratory, California Institute of Technology
ArrayComm	Joint Comments of CTIA, TIA, and PCIA
Association of America's Public Television Stations	K-12 Community
AT&T Wireless Services	Lee County School District
Austin Community College	LinkAir Communications
Baypoint TV	Lucent Technologies
Black Hawk College	MMDS Mankato
Blooston	Motorola
Board of Regents of the University of Wisconsin System	National Academy of Science
Burlington County College	National ITFS Association
Canadian Wireless Telecommunications Association	National Telecommunications and Information Administration
Catawba Valley Community College	Network for Instructional TV
Catholic Television Network	Nokia
CDMA Development Group	Nortel Networks
CelPlan Technologies	Northern Arizona University Foundation
Central Dakota Telecommunications Consortium	Nucentrix Broadband Networks
Champion Industries	Oklahoma States Regents for Higher Education
Cingular Wireless	Orange Group
Cisco Systems	Personal Communications Industry Association
Clearwire Technologies	Petroleum Communications
Community Telecommunications Network	Public Utility Commission of Texas
Cook Inlet Region	Qualcomm
Council of the Great City Schools	Qwest Wireless
CTIA	Radio Advisory Board of Canada
DCT Los Angeles	Rebekah E. Adams
Digital Broadcast Corporation	Red Partnerships
Dutchess Community College	Richardson Independent School District
Education Community of the United States	The Rural Telecommunications Group
Education Service Center Region 9	San Diego County Office of Education
Ericsson	San Diego County Superintendent of Schools
	San Jose State University/William D. Nance
	Siemens
	SkyCable TV of Madison
	Sprint Corporation
	Software Defined Radio
	South Carolina Educational Television Commission

[†] A list of commenting parties to the CTIA Petition was included in the *Notice*. Notice, 16 FCC Rcd at 628-29, Appendix A.

Spectrumlink Networks
 Superintendent of Huntsville City Schools
 Tarrant County College
 Telephone and Data Systems
 Telecommunications Industry Association
 Treacy Lau
 University of Colorado
 University of North Carolina
 Verizon Wireless
 Virginia Communications
 Voicestream Wireless Corporation
 Wireless Communications Association
 International
 Wireless One of North Carolina
 WorldCom
 Yuba Community College District

Reply Comments (due March 9,2001):

Adams Telecom
 ArrayComm
 AT&T Wireless Services
 Baypoint TV
 Brown University
 Catholic Television Network
 Chilean Telecommunications Administration
 Cingular Wireless
 Cisco Systems
 Clearwire Technologies
 Council of the Great City Schools
 CTIA
 Education Community of the United States
 Illinois Institute of Technology
 Information Technology Industry Council
 ITFS Spectrum Development Alliance
 LinkAir Communications
 Microband Corporation of America
 Motorola
 National ITFS Association
 Network for Instructional TV
 Nortel Networks
 Nucentrix Broadband Networks
 Orange Group
 Qualcomm
 Red Partnerships
 Siemens
 Spectrumlink Networks
 Sprint Corporation
 Telephone and Data Systems
 The University of North Carolina
 Verizon Wireless
 Voicestream Wireless Corporation

Wireless Communications Association
 International
 Wireless One of North Carolina
 WorldCom

Commenters to the *Further Notice of
 Proposed Rule Making*

Comments (due October 9,2001):

21st Century Telesis/Robert Hart
 Ad Hoc MDS Alliance
 American Petroleum Institute
 APCO
 ArrayComm
 ARRL, The National Association for Amateur
 Radio
 AT&T Wireless Services
 Avaya
 Aviate! Communications
 Blackfoot Telephone Cooperative
 Blooston
 The Boeing Company
 Bryan P. King
 CTIA
 Celsat America
 Cingular Wireless
 Constantine Fantanas
 Constellation Communications Holdings
 Ericsson
 Globalstar
 iBee Communications
 Iridium Satellite
 Lockheed Martin Corporation
 Orange Group
 Midstate Communications
 Midvale Telephone Exchange
 Mobile Satellite Users Association
 Motorola
 MSTV and NAB
 NEC America
 New ICO Global Communications
 Nikolaus E. Leggett
 Nokia
 Nortel Networks
 Nucentrix Broadband Networks
 Panasonic
 Paul Toth-NA4AR
 Penasco Valley Telephone Cooperative
 PHS MoU Group
 The Progress & Freedom Foundation

Qualcomm
 Quantum Communications
 RNI Communications
 The Rural Telecommunications Group
 Satellite Industry Association
 Siemens
 Skycross
 Society of Broadcast Engineers
 Sprint Corporation
 TDD Coalition
 Telecom Consulting Associates
 Telecommunications Industry Association-
 Satellite communications Division
 Telecommunications Industry Association-
 Wireless Communications Division
 Telephone and Data Systems
 TMI Communications and Company, Limited
 Partnership
 UTAM
 UTStarcom
 Verizon Wireless
 Wireless Communications Association
 International
 Wireless information Networks Forum
 WorldCom

Reply Comments (due November 5, 2001):

2 GHz Broadcast Group
 Ad Hoc MDS Alliance
 ArrayComm
 ARRL, The National Association for Amateur
 Radio
 Avaya
 The Boeing Company
 Blackfoot Telephone Cooperative, Midstate
 Communications, Midvale Telephone
 Exchange, and Penasco Valley Telephone
 CDMA Development Group
 CTIA
 Celsat America
 Cingular Wireless
 Constellation Communications Holdings
 Cox Broadcasting and Cosmos Broadcasting
 Corporation
 DCT Los Angeles
 Globalstar
 Meredith Corporation
 Motorola
 MSTV and NAB
 National Telephone Cooperative Association
 New ICO Global Communications

Nucentrix Broadband Networks
 Orange Group
 Public Safety Wireless Network
 Siemens
 Society of Broadcast Engineers
 Space Enterprise Council
 Sprint Corporation
 TDD Coalition
 Telephone and Data Systems
 TMI Communications and Company, Limited
 Partnership
 UTAM and Wireless Information Networks
 Forum
 UTStarcom
 Voicestream Wireless Corporation
 Wireless Communications Association
 International
 WorldCom

Commenters to the 2002 *Viability* Assessment

Comments (due August 8, 2002):

Ad Hoc MDS Alliance
 Aerospace and Flight Test Radio Coordinating
 Council
 ArrayComm
 Bell South Corporation, Nucentrix Broadband
 Networks, Inc., Sprint Corporation,
 Worldcom, Inc., and Wireless
 Communications Association International,
 Inc. (collectively, the "MDS Commenters")
 Canadian Wireless Telecommunications
 Association
 CTIA
 Cingular Wireless
 DCT Los Angeles
 Ericsson
 ICO Global Communications (Holdings) Ltd.
 Maximum Service Television, Inc. and the
 National Association of Broadcasters
 (collectively, "Joint Broadcasters")
 Motorola
 Nokia
 Pinnacle West Capital Corporation
 Radio Advisory Board of Canada
 Siemens
 Sirius Satellite Radio Inc. and XM Radio Inc.
 (collectively, the "Satellite Radio
 Licensees")
 Telecommunications Industry Association
 Verizon Wireless

APPENDIX C: FINAL REGULATORY FLEXIBILITY ANALYSIS

As required by the Regulatory Flexibility Act (RFA)¹ an Initial Regulatory Flexibility Analysis (IRFA) was incorporated in the *Notice of Proposed Rulemaking and Order (Notice)*; as well as the *Memorandum Opinion and Order and Further Notice of Proposed Rule Making (Further Notice)*.² The Commission sought written public comments on the proposals in the *Notice* and *Further Notice*, including comment on each IRFA. This present Final Regulatory Flexibility Analysis (FRFA) conforms to the RFA.⁴

Need for, and Objectives of, the Second Report and Order

The goal of the *Second Report and Order (Second R&O)* is to promote the provision of advanced wireless services (AWS) to the public, which in turn supports our obligations under Section 706 of the 1996 Telecommunication Act⁵ and, more generally, serves the public interest by promoting rapid and efficient radio communication facilities.

The *Second R&O* discusses the need for spectrum allocations of sufficient size and with particular characteristics so as to allow for the provision of AWS, and evaluates spectrum that could be allocated to support these services. Specifically, the *Second R&O* allocates spectrum that is suitable for advanced services in the 1710-1755 MHz, 2110-2150 MHz, and 2150-2155 MHz bands.

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

There were no comments filed that specifically addressed the rules and policies proposed in the IRFA.

Description and Estimate of the Number of Small Entities to Which the 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 rules adopted herein.⁶ The RFA generally defines the term “small entity” as having the same meaning as the terms “small business,” “small organization,” and “small governmental jurisdiction.” In addition, the term “small business” has the same meaning as

¹ See 5 U.S.C. § 603. The RFA (codified at 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 Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems, ET Docket No. 00-258, *Notice of Proposed Rulemaking and Order*, 16 FCC Rcd 596 (2001)

³ Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems, ET Docket No. 00-258, ET Docket No. 95-18, and IB Docket No. 99-81, *Memorandum Opinion and Order and Further Notice of Proposed Rule Making*, 16 FCC Rcd 16043 (2001).

⁴ See 5 U.S.C. § 604.

⁵ Section 706 of the Communications Act of 1934, as amended, codified at 47 U.S.C. § 157.

⁶ 5 U.S.C. § 604(a)(3).

⁷ 5 U.S.C. § 601(6).

the term “small business concern” under the Small Business Act.⁸ A “small business concern” is one which: (1) is independently owned and operated; (2) is not dominant in its field of operation; and (3) satisfies any additional criteria established by the Small Business Administration (SBA).⁹

A small organization is generally “any not-for-profit enterprise which is independently owned and operated and is not dominant in its field.” Nationwide, as of 1992, there were approximately 275,801 small organizations.” “Small governmental jurisdiction” generally means “governments of cities, counties, towns, townships, villages, school districts, or special districts, with a population of less than 50,000.”¹² As of 1992, there were approximately 85,006 governmental entities in the United States.” This number includes 38,978 counties, cities, and towns; of these, 37,566, or 96%, have populations of fewer than 50,000.¹⁴ The Census Bureau estimates that this ratio is approximately accurate for all governmental entities. Thus, of the 85,006 governmental entities, we estimate that 81,600 (96%) are small entities.

Fixed Microwave Services. Microwave services include common carrier,” private-operational fixed,¹⁶ and broadcast auxiliary radio services.” At present, there are approximately 22,015 common carrier fixed licensees and 61,670 private 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 this FRFA, we will use the SBA’s definition applicable to wireless and other telecommunications companies – *i.e.*, an entity with no more than 1,500 persons.”

⁸ 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.”

⁹ 15 U.S.C. § 632.

¹⁰ 5 U.S.C. § 601(4)

¹¹ Department of Commerce, U.S. Bureau of the Census, 1992 Economic Census, Table 6 (special tabulation of data under contract to Office of Advocacy of the U.S. Small Business Administration).

¹² 5 U.S.C. § 601(5).

¹³ U.S. Dept. of Commerce, Bureau of the Census, “1992 Census of Governments.”

¹⁴ *Id.*

¹⁵ 47 CFR 101 *et seq.* (formerly, part 21 of the Commission’s Rules).

¹⁶ Persons eligible under parts 80 and 90 of the Commission’s rules can use Private Operational-Fixed Microwave services. See 47 CFR 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.

¹⁷ Auxiliary Microwave Service is governed by Part 74 of Title 47 of the Commission’s Rules. See 47 CFR 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.

¹⁸ 13 C.F.R. § 121.201, NAICS code 517212 (formerly 513322).

According to Census Bureau data for **1997**, there were **977** firms in this category, total, that operated for the entire year.” Of this total, **965** firms had employment of **999** or fewer employees, and an additional **12** firms had employment of 1,000 employees or more.²⁰ Thus, under this size standard, the great majority of firms can be considered small.

We note that the number of firms does not necessarily track the number of licensees. We estimate that all of the Fixed Microwave licensees (excluding broadcast auxiliary licensees) would qualify as small entities under the SBA definition. Of these licenses, approximately **8,210** are issued for frequencies in the *Emerging Technologies* bands affected by this proceeding. In addition, these bands contain approximately **70** licenses in the paging and radiotelephone service and the general aviation and air-ground radio telephone services. Thus, assuming that these entities also qualify as small businesses, as many as **8,280** small business licensees could be affected by the rules we adopt. We note that these entities have been subject to relocation under rules originally adopted ten years ago in the Commission’s *Emerging Technologies* proceeding. The *Second Report and Order* anticipates that these general relocation rules will continue to apply to FS microwave licensees and does not modify the class of licensees that are subject to these relocation provisions.

Multipoint Distribution Service (MDS). This service has historically provided primarily point-to-multipoint, one-way video services to subscribers, and Local Multipoint Distribution Service (LMDS).²¹ The Commission recently amended its rules to allow MDS licensees to provide a wide range of high-speed, two-way services to a variety of users.²² In connection with the **1996** MDS auction, the Commission defined small businesses as entities that had annual average gross revenues for the three preceding years not in excess of **\$40 million**.²³ The Commission established this small business definition in the context of this particular service and with the approval of the SBA.²⁴ The MDS auction resulted in **67** successful bidders obtaining licensing opportunities for **493** Basic Trading Areas (BTAs).²⁵ Of the **67** auction winners, **61** met the definition of a small business. At this time, we estimate that of the **61** small business MDS auction winners, **48** remain small business licensees. In addition to the **48** small businesses that hold BTA authorizations, there are approximately **392** incumbent MDS licensees that are

¹⁹ U.S. Census Bureau, **1997 Economic Census**, Subject Series: Information, “Employment Size of Firms Subject to Federal Income Tax: **1997**,” Table 5, NAICS code **5 17212** (issued Oct. **2000**).

²⁰ *Id.* The census data do not provide a more precise estimate of the number of firms that have employment of 1,500 or fewer employees; the largest category provided is “Firms with 1,000 employees or more.”

²¹ For purposes of this item, MDS includes single channel Multipoint Distribution Service (MDS) and the Multichannel Multipoint Distribution Service (MMDS). See **66 Fed. Reg. 36177**.

²² Amendment of Parts **21** and **74** to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions, MM Docket No. **97-217**, Report *and* Order, **13 FCC Rcd 19112 (1998)**, recon., **14 FCC Rcd 12764 (1999)**, *further* recon., **15 FCC Rcd 14566 (2000)**.

²³ **47 C.F.R. §§ 21.961 and 1.2110**.

²⁴ Amendment of Parts **21** and **74** of the Commission’s Rules with Regard to Filing Procedures in the Multipoint Distribution Service and in the Instructional Television Fixed Service and Implementation of Section **309(j)** of the Communications Act - Competitive Bidding, MM Docket No. **94-131**, Report and Order, **10 FCC Rcd 9589, 9670 (1995)**, **60 Fed. Reg. 36524 (July 17, 1995)**.

²⁵ Basic Trading Areas (BTAs) were designed by Rand McNally and are the geographic areas by which MDS was auctioned and authorized. See *id.* at **9608**.

considered small entities.²⁶ After adding the number of small business auction licensees to the number of incumbent licensees not already counted, we find that there are currently approximately 440 MDS licensees that are defined as small businesses under either the SBA or the Commission's rules. Because the Commission's action only affects MDS operations in the 2150-2155 MHz band, the actual number of MDS providers who will be affected by the *Second Report and Order* will only represent a small fraction of those 440 small business licensees.

Description of Projected Reporting, Recordkeeping, and Other Compliance Requirements

The *Second R&O* addresses the possible use of frequency bands below 3 GHz to support the introduction of new AWS, but does not propose service rules. Thus, the item contains no new reporting, recordkeeping, or other compliance requirements. Because the item does not establish procedures for the relocation of MDS incumbents from the 2150-2155 MHz band, there are no new compliance requirements for MDS at this time.

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

The *RFA* requires an agency to describe any significant alternatives that it has considered in developing its 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 and reporting requirements under the rule for such 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 such small entities."²⁷

Providing spectrum to support the introduction of new advanced mobile and fixed terrestrial wireless services is critical to the continuation of technological advancement. First and foremost, the Commission believes that our proposal to explore the possible use of several frequency bands that could offer a wide range of voice, data, and broadband services over a variety of mobile and fixed networks may provide substantial new opportunities for small entities.

However, we realize that some entities must be displaced to clear a sufficient quantity of contiguous spectrum to support new services. We endeavored to avoid this effect by identifying unencumbered spectrum, but spectrum in the suitable frequency range is heavily used already and a sufficient amount of unencumbered spectrum simply does not exist. We have therefore sought to minimize an adverse impact by proposing to reallocate frequency bands for those incumbents, including small entities, which might be accommodated in other spectrum and could be relocated more easily. The spectrum we allocate in the 1710-1755 MHz band is currently used for Federal Government services, and therefore there are no non-Federal Government incumbent small entities that will be displaced by the reallocation of this band. Similarly, as noted in paragraph 28, the 2110-2150 MHz band was previously identified as an Emerging Technology band, and relocation procedures already exist for incumbents in this band. These existing procedures (as modified in the *Second R&O*) should serve to ease the relocation

²⁶ 47 U.S.C. § 309(j). (Hundreds of stations were licensed to incumbent MDS licensees prior to implementation of Section 309(j) of the Communications Act of 1934, 47 U.S.C. § 309(j)). For these pre-auction licenses, the applicable standard is SBA's small business size standard for "other telecommunications" (annual receipts of \$12.5 million or less). See 13 C.F.R. § 121.201.

²⁷ 5 U.S.C. § 603(c)(1)-(c)(4)

of small entity incumbents in the 2110-2150MHz band, and make reallocation of this band preferable to the reallocation of other bands where we would have to establish new relocation rules.

Finally, the Commission has already received extensive comments in this proceeding on issues related to the possible reallocation of the 2150-2160 MHz (2.1 GHz) spectrum for advanced wireless purposes. Comments filed by the multipoint distribution/instructional television fixed services industry and several equipment manufacturers argue that the 2.1 GHz band is necessary for the continued roll-out of fixed wireless services across the country. Other commenters support the use of 2.1 GHz for advanced wireless services. Although many commenters ask that we reallocate a large contiguous spectrum block to include the entire 2150-2160 MHz band, we instead decide to reallocate 5 megahertz in the 2150-2160 MHz band as part of a 45 megahertz block of contiguous spectrum that can be used to provide advanced services. By doing so, we satisfy the need to designate a large block of contiguous spectrum that can be paired in order to allow for the deployment of advanced services (and thus, serve the goals of this proceeding). However, by allocating 5 megahertz of existing MDS spectrum, we retain greater flexibility to accommodate small entities that are MDS licensees than had we redesignated the entire 2.1 GHz MDS spectrum. For example, paragraph 39 notes that we retain the option to realign MDS spectrum to a 10 megahertz block in the 2155-2165 MHz band. Had we reallocated the entire 2.1 GHz MDS spectrum, as some commenters had suggested, this option would not have been available.

Report to Congress:

The Commission will send a copy of the Second Report and Order including this FRFA, in a report to be sent to Congress pursuant to the Congressional Review Act.²⁸ In addition, the Commission will send a copy of the Second Report and Order, including this FRFA, to the Chief Counsel for Advocacy of the SBA. A copy of the Second Report and Order and FRFA (or summaries thereof) will also be published in the Federal Register.²⁹

²⁸ See 5 U.S.C. § 801(a)(1)(A)

²⁹ See 5 U.S.C. § 604(b).

APPENDIX D: ANALYSIS OF INTERFERENCE IMPACT ON GOLDSTONE, CA
DEEP SPACE NETWORK FACILITY

Given the concern expressed by the commenters, staff from the Commission's Office of Engineering and Technology conducted an analysis of the possible impact of the Goldstone, California Deep Space Network ("DSN") Facility. This facility is operated by NASA and is an international network of antennas that supports interplanetary spacecraft missions and radio and radar astronomy observations for the exploration of the solar system and the universe. The DSN provides the two-way communications link that guides and controls these interplanetary missions, and brings back the images and new scientific information they collect. The Goldstone DSN facility has a 70-meter and a 34 meter steerable, high-gain, parabolic reflector antennas.¹ The DSN 70-meter antenna has a mainbeam gain of 62.7 dBi and can be connected to either a 20 kW or a 400 kW transmitter. The 400kW power level is generally used under emergency conditions, which are expected to be rare. The 34-meter antenna has a gain of 55 dBi. However, since the 70-meter dish is the worst case, our results consider primarily the 400 kW transmitter with the 70-meter antenna. Both of these dishes have minimum elevation angles of 10 degrees from horizontal?

We input these parameters, the antenna pattern of the 70-meter antenna, and the latitude and longitude of the antenna facility into a software package called RFCAD.³ RFCAD uses the Longley-Rice propagation model to produce propagation studies and displays the results over topographic maps for to show predicted signal strengths. We selected a confidence level of 99% for 99% of the locations and 99% of the levels to ensure the most accurate results possible. We also assumed that the antenna could be pointing in any direction in azimuth and above 10 degrees in elevation. We rotated the 70-meter antenna 360 degrees in azimuth to get a composite plot of the power levels in all azimuths.

The analysis showed that for the 70-meter DSN antenna using the 400 kW transmitter, power levels that could cause 3G handset receiver burn-out are limited to within about 15 kilometers of the DSN transmitter. This area is almost entirely within the bounds of Ft Irwin and the Naval Weapons Center. In the remaining directions where there is significant terrain blockage, power levels above -94 dBm⁴ in the main beam are limited to about 45 km away from the antenna.⁵ However, power levels in the mainbeam

¹ See Document 7B/14-E, *Characteristics of SRS stations operating in the 2110-2120 MHz band for use in the development of IMT-2000 frequency arrangement*, Submitted by the United States of America, 2 April, 2001.

² See ITU-R RR 21.10 and 21.15. Under these constraints, the DSN station is limited to a minimum elevation angle of 10 degrees and a power limit of 55 dBW/4kHz in the horizontal direction.

³ RFCAD is a software package produced by SiteSafe. See <http://www.rfcad.com> for more details,

⁴ This level is the 3G interference threshold for a desired signal 10 dB above the sensitivity for a 10⁻³ BER. See *FCC Final Report*, page A-26. However, we note that intrasystem noise would be considerably higher, thus negating any interference impact of a -94 dBm signal.

⁵ Most of this area is also within the Ft. Irwin Military Reservation or the U.S. Naval Weapons Center. Based upon computations using RFCAD software, power levels in Barstow, California, the closest city to Goldstone, are expected to be below -110 dBm. Power levels at the closest approach to 1-15 are also in the same range. The 20 kW transmitter generates power levels above -110 dBm within 32 km of the antenna in the mainbeam and 8 km in the sidelobes.

greater than -110 dBm⁶ can be expected up to approximately 150 km away from the antenna on the highest terrain in the southwest direction where there is little terrain blockage.⁷ These peaks are typically located away from populated areas and roads. The only large road found to the southwest of Goldstone is California Route 58. Based upon computations using **RFCAD** software, the maximum power that a vehicle traveling on this road is likely to see is -94 dBm. Since the highway is **66** kilometers away, the width of this -94 dBm “spot” on Highway 58 is **161** meters wide. A car traveling at **100** kilometers per hour (60 miles per hour) would transit this area in about **6** seconds. However, the road would only “see” these levels if the Goldstone antenna were pointing between 190 and 200 degrees from North.⁸ The 20 kW transmitter also generates power levels above **-110** dBm within 150 km of the antenna in the mainbeam in the southwesterly direction, but the maximum power levels are about 8 dB lower than with the 400 kW transmitter and affect a much smaller segment of Route 58. Outside of the southwesterly direction, power levels above -94 dBm are contained within a circle centered at the transmitter with a radius of approximately 35 km.

⁶ In a pristine interference-free environment, this is the interference level for a 3G mobile receiver for a 10% degradation in range. See *FCC Final Report*, page A-26. However, we note that intrasystem noise would be considerably higher, thus negating any interference impact of a -110 dBm signal.

⁷ The mountains surrounding Los Angeles block the transmitted energy from Goldstone from reaching the metropolitan Los Angeles area.

⁸ Maximum power levels outside of this 10-degree wide *arc* should not exceed -102 dBm. Approximately 24 kilometers of Route **58** could see these power levels, but only if the mainbeam of the DSN antenna was pointed in that direction.

STATEMENT OF CHAIRMAN MICHAEL K. POWELL

Re: *Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Systems* (adopted November 7, 2002).

Re: *Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands* (adopted November 7, 2002).

I previously identified new revenue sources and new services as among the key steps to recovery in the telecommunications sector. By our action today, we will make available spectrum resources that carriers and the consuming public demand – a major step in creating an environment hospitable to the introduction of new and innovative products and services. Access to new spectrum is not a cure for today's financially ailing wireless industry, but it is a key pre-condition to the long term health of the industry.

Today's decisions on the allocation and proposed service rules lay the groundwork for future innovation. We have allocated a significant slice of spectrum – two, contiguous **45 MHz** blocks capable of being paired. Moreover, we have proposed few limitations on its use. Our service rules **NPRM** proposes affording future licensees the maximum possible flexibility in deciding how to put this resource into service for the public benefit. Within this framework, service providers can be expected to move spectrum quickly to its highest and best use.

We have not acted alone in taking this significant step toward making advanced wireless services a reality. Throughout this proceeding, the Commission has coordinated closely with NTIA, particularly since the release of its **3G Viability Study** this summer. I am grateful for Assistant Secretary Victory's leadership and support, and look forward to working with NTIA in carrying this process forward.

STATEMENT OF COMMISSIONER MICHAEL J. COPPS

RE: In the Matter of Amendment of Part 2 of the Commission's Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Wireless Services, Including Third Generation Wireless Systems (Second Report and Order).

In the Matter of Service Rules for Advanced Wireless Services in the 1.7 GHz and 2.1 GHz Bands (NPRM).

I commend the Commission for moving forward with these critical proceedings. 3G has been a hot issue since I arrived at the Commission, and before, I'm certain. Like my colleagues, I am very excited about what the future holds for wireless technologies in these frequencies.

This Commission has, of course, a large and important role in promoting innovative and efficient uses of the American people's spectrum. It is our responsibility in allocating spectrum and setting service rules to place the highest value on what new uses of spectrum will mean to consumers. I mention this because I hope that no one will think the FCC can magically make the current woes of the wireless industry go away by merely allocating new spectrum. Life is not that simple! More importantly, we should always keep in mind that our job is to create a landscape where Americans can know that the spectrum that they have entrusted to us is used in their best interest, and that the endgame here goes beyond business interests to serve the public interest. If we do our job right here, I believe it will be a win-win for everyone.

I also hope that we will study the European experience with 3G very carefully. Various European countries moved ahead with 3G allocations before we did. Many of these countries allocated large amounts of spectrum to 3G. Despite that, 3G has been less than a success in Europe. What role did government allocations and service rules play? What other factors were at work? We need to know. Those who don't study history are condemned to repeat it.

But all that comes in the future. Today, the Commission has done the right thing, and has started the ball rolling on making spectrum available for exciting new technologies. I know that the negotiations over 3G spectrum were tough, and that the wireless industry was under some heavy pressures regarding things it may have wanted, and I hope those negotiations ended with the right result. We'll see.

What I can't wait to see is what all the amazing innovators in the communications industry come up with for these frequencies. From cellular to PCS to satellite to Wi-Fi, they have consistently brought us exciting new technologies that pushed the envelope. We will have done our job well if our actions today result in more such advances.

Thank you.

**CONSOLIDATED SEPARATE STATEMENT OF
COMMISSIONER KEVIN J. MARTIN**

Re: *Amendment of Part 2 of the Commission's Rules To Allocate Spectrum Below 3 GHz for Mobile and Fixed Services To Support the Introduction of New Advanced Wireless Services, including Third Generation Wireless Services*, Second Report and Order, ET Docket No. 00-258; *Service Rules for Advanced Wireless Services in the 1.7 and 2.1 GHz Bands*, Notice of Proposed Rulemaking, WT Docket No. 02-353

I am pleased to support these items, which allocate spectrum and seek comment on service rules for advanced wireless services in the 1.7 GHz and 2.1 GHz bands. These items provide two 45 MHz blocks of contiguous spectrum which, we propose, can be used for a range of advanced wireless services. While the wireless industry is already on the forefront in offering innovative new services, advances in technology are developing that will provide consumers exciting new applications such as truly high-speed Internet access on their mobile phones and the ability to use their mobile phones as cameras, sending digital pictures to other phones or computers at the touch of a button. A crucial ingredient to these services, however, is sufficient spectrum. These items provide some of that spectrum, making available a significant amount of spectrum that can be used for services such as expanded voice, data, and broadband applications provided over high-speed fixed and mobile networks – applications often called ‘third generation’ (“3G”) or, internationally, “International Mobile Telecommunications-2000” (“IMT-2000”). These items should thus lead to substantial consumer benefits, as new and better quality services develop in the 1.7 GHz and 2.1 GHz bands.

I commend all of the different parts of government for working together to make this happen. In particular, the National Telecommunications and Information Administration deserves praise for spearheading this effort. NTIA, working with the Department of Defense, the State Department, the Office of Management and Budget, and the FCC’s staff, developed a plan that serves as the blueprint for making this spectrum available. They accomplished a major step in ensuring that new and innovative wireless services will be available to American consumers.

These items also mark an important move toward a more predictable spectrum policy at the FCC. In the past, spectrum decisions have often been made ad hoc, leading to short bursts of spectrum being made available in response to specific exigencies. These items, in contrast, are part of a longer-range plan, in which we will make a significant amount of spectrum available over a period of several years. Spectrum users thus should have the certainty to develop business plans in advance of critical needs. They can be assured that when spectrum is needed it will be there.

These items are a step in the right direction, and I look forward to continuing our efforts to provide new and better services to consumers and certainty and predictability to the spectrum community.