

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

In the Matter of	)	
	)	
Amendment of Part 2 of the Commission's Rules to	)	ET Docket No. 00-258
Allocate Spectrum Below 3 GHz for Mobile and	)	
Fixed Services to Support the Introduction of New	)	
Advanced Wireless Services, including Third	)	
Generation Wireless Systems	)	
	)	
Amendment of the U.S. Table of Frequency	)	
Allocations to Designate the 2500-2520/2670-2690	)	RM-9911
MHz Frequency Bands for the Mobile-Satellite	)	
Service	)	

**FIRST REPORT AND ORDER AND MEMORANDUM OPINION AND ORDER**

**Adopted:** September 6, 2001

**Released:** September 24, 2001

**By the Commission:** Commissioners Tristani and Copps concurring in part, dissenting in part, and issuing a joint statement;\* Commissioner Abernathy issuing a statement.

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\* We note that this item was adopted prior to Commissioner Tristani's leaving the Commission.

## I. INTRODUCTION

1. In this *First Report and Order* (“*First R&O*”), we conclude the part of this spectrum allocation proceeding concerning the 2500-2690 MHz band, which is currently used by Instructional Television Fixed Service (“ITFS”) and Multichannel Multipoint Distribution Services (“MMDS”) networks to provide educational and commercial fixed wireless services, including broadband services. We recognize that consideration of this band for advanced wireless services has created uncertainty about the future of the new broadband fixed services being developed under the current allocation and service rules. Because we believe it is important to remove this uncertainty, we are now separately addressing and resolving the allocation issues involving this band raised in the *New Advanced Wireless Services NPRM*.<sup>1</sup>

2. Specifically, we are adding a mobile allocation to the 2500-2690 MHz band to provide additional near-term and long-term flexibility for use of this spectrum, thereby making this band potentially available for advanced mobile and fixed terrestrial wireless services, including third generation (“3G”) and future generations of wireless systems. However, because the 2500-2690 MHz band is extensively used by incumbent ITFS and MMDS licensees, and in order to preserve the viability of the incumbent services, we are not relocating the existing licensees or otherwise modifying their licenses. Building upon our prior decisions to expand the potential uses of this band,<sup>2</sup> adding a mobile allocation to the band will provide additional near-term and long-term flexibility without forcibly displacing incumbent operators. Relying generally on market forces rather than making regulatory judgments about the best use of the band, a more flexible allocation would, for example, allow certain portable data applications to be provided under existing service rules (*i.e.*, not cause harmful interference to incumbent one-way and two-way fixed services) and could provide flexibility for introducing other advanced fixed and mobile applications in the future.

3. Further, in this *Memorandum Opinion and Order* (“*MO&O*”), we deny a petition for reconsideration filed by the Satellite Industry Association (“SIA”) of the *Order* in this proceeding. SIA had requested that we reconsider our decision not to allocate the 2500-2520 MHz and 2670-2690 MHz bands for Mobile Satellite Service (“MSS”) use for 3G services, but we affirm our prior determination that reallocation of the 2.5 GHz band to the MSS is unwarranted because sharing between terrestrial and satellite systems would present substantial technical challenges in that band and MSS already has access to a significant amount of spectrum below 3 GHz to meet its needs in the foreseeable future.

4. By these actions, we promote the continued introduction of fixed wireless broadband services; provide for the introduction of new advanced wireless services to the public, consistent with our obligations under section 706 of the 1996 Telecommunications Act;<sup>3</sup> and promote increased competition among

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<sup>1</sup> See *Notice of Proposed Rule Making and Order* (“*New Advanced Wireless Services NPRM*”), ET Docket No. 00-258, 16 FCC Rcd 596 (2001).

<sup>2</sup> See ¶ 8, *infra*.

<sup>3</sup> See Pub.L. 104-104, Title VII, § 706, Feb. 8, 1996, 110 Stat. 153, reproduced in the notes under 47 U.S.C. § 157 (“Section 706”). Section 706(c)(1) defines “advanced telecommunications capability . . . without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data graphics, and video telecommunications using any technology.” See *generally Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket 98-146, Second Report (“*Section 706 Second Report*”), 15 FCC Rcd 20913 (2000).

(continued....)

terrestrial services.

## II. BACKGROUND

5. The Commission initiated this proceeding to explore spectrum options in response to the increased growth of wireless mobile services and requests for additional spectrum to support the introduction of advanced wireless services (*i.e.*, new data and broadband services such as Internet access, electronic mail, and short messaging service). The *New Advanced Wireless Services NPRM* noted that the International Telecommunication Union (“ITU”) has fostered the development of advanced wireless services (known as “IMT-2000” or 3G) through the development of technical standards and the identification of spectrum for such services. Specifically, the 1992 World Administrative Radio Conference and the 2000 World Radiocommunication Conference (“WRC-2000”) identified a number of frequency bands below 3 GHz that could be used for 3G systems. WRC-2000 adopted resolutions that stated that as much as 160 MHz of additional spectrum may be needed to support IMT-2000 deployment in those areas where the traffic is highest by 2010, and that each administration could decide which, if any, of the identified bands to use for IMT-2000.<sup>4</sup>

6. In the *New Advanced Wireless Services NPRM*, the Commission sought comment on the types of advanced services that will likely be provided in the future and the technical characteristics of those services; the amount of additional spectrum that should be made available for advanced mobile and fixed services; and the frequency bands in which these services should be located.<sup>5</sup> The *New Advanced Wireless Services NPRM* explored the possibility of introducing advanced wireless services in frequency bands currently used for cellular, broadband Personal Communications Service (“PCS”), and Specialized Mobile Radio services; in certain frequency bands already allocated for Fixed and Mobile services that could be used to deploy new advanced wireless services; and in five other frequency bands: 1710-1755 MHz, 1755-1850 MHz, 2110-2150 MHz, 2160-2165 MHz, and 2500-2690 MHz.<sup>6</sup> Pursuant to its independent spectrum management responsibilities, the Commission undertook a study of the 2500-2690 MHz band.<sup>7</sup> An Interim Report regarding this band was issued in November 2000,<sup>8</sup> and a Final Report was issued in March 2001.<sup>9</sup> On August 9, 2001, the Commission adopted a *Memorandum Opinion and Order and Further Notice of Proposed Rule Making* (“*Further NPRM*”) in this proceeding and in two companion proceedings that explores the possibility of introducing advanced wireless services in bands not identified in

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<sup>4</sup> *New Advanced Wireless Services NPRM* at ¶ 4.

<sup>5</sup> *Id.* at ¶¶ 14-19, 25.

<sup>6</sup> *Id.* at ¶¶ 1, 30-65.

<sup>7</sup> *Id.* at ¶¶ 5-7.

<sup>8</sup> See FCC Staff Report issued by the Office of Engineering and Technology, Mass Media Bureau, Wireless Telecommunications Bureau, and International Bureau: “Spectrum Study of the 2500-2690 MHz Band: The Potential for Accommodating Third Generation Mobile Systems,” *Interim Report*, ET Docket No. 00-232, 15 FCC Rcd 22310 (2000).

<sup>9</sup> See FCC Staff Report issued by the Office of Engineering and Technology, Mass Media Bureau, Wireless Telecommunications Bureau, and International Bureau: “Spectrum Study of the 2500-2690 MHz Band: The Potential for Accommodating Third Generation Mobile Systems,” *Final Report*, ET Docket No. 00-258, released March 30, 2001.

the *NPRM*, including bands currently designated for MSS, Unlicensed PCS, Amateur Radio Service, and MDS.<sup>10</sup> Specifically, we sought comment in the *Further NPRM* on reallocating some spectrum in the 1910-1930 MHz, 1990-2025 MHz, 2150-2160 MHz, 2165-2200 MHz, and 2390-2400 MHz bands for advanced wireless services.<sup>11</sup>

7. The *New Advanced Wireless Services NPRM* noted that the 2500-2690 MHz band is allocated in Region 2 on a primary basis to the Fixed, Fixed Satellite, Mobile except aeronautical mobile, and Broadcasting-Satellite Services. In the United States, this band is allocated to the Fixed service and, as noted above, is used by ITFS and MMDS licensees. There are currently thirty-one 6 MHz channels and one 4 MHz channel, or 190 MHz of spectrum, assigned to ITFS/MMDS in this band. About 2,500 MMDS licensees transmit programming from one or more fixed stations, which is received by multiple receivers at various locations. ITFS has approximately 1,275 entities holding over 2,175 licenses with over 70,000 registered receive sites. ITFS stations are licensed on a site-specific basis, as were all MMDS stations originally. However, in 1996 the Commission awarded area-wide MMDS licenses through a competitive bidding process. The licensees in these areas are authorized to construct facilities to provide service over any usable MMDS channels within a Basic Trading Area. Fixed “downstream” and hub stations are licensed in these areas on a site-specific basis. ITFS channels occupy the 2500–2596 MHz portion of the band and MMDS channels occupy the 2596-2660 MHz portion. The remaining ITFS and MMDS channels are interleaved in the upper portion of the band above 2660 MHz.<sup>12</sup> MMDS licensees often lease capacity from ITFS operators, which in turn allow ITFS licensees to fund their educational missions.<sup>13</sup>

8. Historically, the 2500-2690 MHz band has been predominantly used for one-way analog video transmission. Increasingly, ITFS/MMDS operators are using the band for two-way digital broadband services. Our July 1996 *Digital Declaratory Ruling* first permitted digital use of the band.<sup>14</sup> In October 1996, we allowed high-speed digital data applications, including Internet access.<sup>15</sup> In 1998, we approved the use of two-way transmissions, effectively enabling the provision of voice, video, and data services.<sup>16</sup> Several major companies currently plan to use ITFS/MMDS spectrum to roll out high-speed Internet

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<sup>10</sup> See *Memorandum Opinion and Order and Further Notice of Proposed Rule Making*, ET Docket No. 00-258, ET Docket No. 95-18, and IB Docket No. 99-81, FCC 01-224, released August 20, 2001.

<sup>11</sup> *Id.* at ¶ 2.

<sup>12</sup> Our rules allow MMDS and ITFS licensees to swap channels, subject to our approval. 47 C.F.R. §§ 21.901(e) and 74.902(f). In addition, under certain circumstances, MMDS entities can apply for licenses for up to eight ITFS channels per community, with ITFS entities having a subsequent right of access to those channels. 47 C.F.R. §§ 74.990 and 74.992.

<sup>13</sup> *New Advanced Wireless Services NPRM* at ¶¶ 58-59.

<sup>14</sup> See *Request for Declaratory Ruling on the Use of Digital Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations, Declaratory Ruling and Order*, 11 FCC Rcd 18839 (1996).

<sup>15</sup> See *The Mass Media Bureau Implements Policy for Provision of Internet Service on MMDS and Leased ITFS Frequencies, Public Notice*, 11 FCC Rcd 22419 (1996).

<sup>16</sup> See *Two-Way Order*, 13 FCC Rcd 19112 (1998), *recon.*, 14 FCC Rcd 12764 (1999), *further recon.*, 15 Rcd 14566 (2000).

access in about 200 markets.<sup>17</sup> In the initial filing window and subsequent rolling one-day filing window for two-way service, MMDS and ITFS licensees have filed approximately 2,900 applications. As of August 2001, about 2,400 applications have been processed.

9. In the *New Advanced Wireless Services NPRM*, we invited comment on allocating the 2500-2690 MHz band for Mobile and Fixed services on a co-primary basis. We also invited comment on the public interest costs and benefits of adding a mobile allocation to the band without any mandatory relocation of incumbent licensees. Consistent with our secondary markets initiative,<sup>18</sup> we invited comment as to whether there are any steps that we should take to facilitate a secondary market in the band to allow it to evolve to its highest valued use, whether that be fixed broadband, mobile, or some other type of use. We also inquired as to whether current ITFS/MMDS licensees could reorganize their systems to continue providing current services and also offer new mobile services on a competitive basis with other wireless system providers, such as cellular or PCS. We further invited comment on the possibility of segmenting the 2500-2690 MHz band to allow for entry by new entities in a portion of the band, and inquired as to whether such segmentation would affect two lower Multipoint Distribution Service (“MDS”) channels at 2150-2162 MHz<sup>19</sup> that are used to provide MMDS. We requested that commenters identify the frequency bands that could accommodate ITFS/MMDS incumbents if they had to be relocated from the 2500-2690 MHz band and specify what relocation procedures should be used.<sup>20</sup>

10. The FCC *Final Report* regarding the 2500-2690 MHz band – prepared by our staff – states that the band is in a state of rapid evolution by incumbent ITFS and MMDS licensees. The FCC staff’s *Final Report* notes that the MMDS industry has invested several billion dollars to develop broadband fixed wireless data systems in the band, including high-speed Internet access, and that these systems offer a significant opportunity for further competition with cable and digital subscriber line services in the provision of broadband services in urban and rural areas. The FCC staff’s *Final Report* also notes that the 2500-2690 MHz band is used to provide video services for education and training in schools, health care centers, and a wide variety of other institutions, as well as for the provision of a commercial video distribution service known as wireless cable. Additionally, the FCC staff’s *Final Report* notes that incumbent ITFS and MMDS use of the 2500–2690 MHz band varies from one geographic area to another, and that this lack of uniformity presents serious challenges to developing band sharing or segmentation options that could be used across the country without severely disrupting ITFS/MMDS use. For example, the FCC staff’s *Final Report* notes that, if currently contemplated 3G systems were to share the same channels with incumbent ITFS/MMDS systems in any given geographic area, large co-channel separation distances would be needed between the systems. Without such separation distances, 3G and ITFS/MMDS systems would cause extensive interference to each other.<sup>21</sup> The FCC staff’s *Final Report* did note that

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<sup>17</sup> WCA Comments at 23-25.

<sup>18</sup> See *Policy Statement*, 15 FCC Rcd 24178 (2000); and *Notice of Proposed Rule Making*, WT Docket No. 00-230, 15 FCC Rcd 24203 (2000).

<sup>19</sup> The first MDS channel encompasses the 2150-2156 MHz band and the second MDS channel encompasses the 2156-2162 MHz band in the top 50 markets. Outside of the top 50 markets, the second MDS channel encompasses the 2156-2160 MHz band.

<sup>20</sup> *New Advanced Wireless Services NPRM* at ¶¶ 63-65.

<sup>21</sup> FCC staff’s *Final Report* at ii.

there are some geographic areas where incumbent services are not operational and these areas may offer some promise of sharing with 3G systems.

11. With regard to the possibility of segmenting the 2500–2690 MHz band to enable advanced mobile systems to access a portion of the band, the FCC staff's *Final Report* concludes that segmentation would raise significant technical and economic difficulties for incumbents, especially if ITFS/MMDS operations were to be relocated within the band. Segmentation could affect the economics of current and planned ITFS/MMDS systems and lessen their ability to provide service to rural areas or smaller markets. The FCC staff's *Final Report* also states that there is no readily identifiable alternate frequency band that could accommodate a substantial relocation of incumbent operations from the 2500-2690 MHz band. Moreover, relocation of ITFS/MMDS operations to a band above 3 GHz would affect deployment of these systems because of changes in signal propagation in higher bands. The FCC staff's *Final Report* examined several potential relocation bands for ITFS/MMDS and concludes that each band is severely capacity constrained,<sup>22</sup> that existing licensees in those bands would have to be relocated to accommodate ITFS/MMDS incumbents, and the costs of moving those licensees would range from approximately \$10.2-\$30.4 billion.<sup>23</sup> The FCC staff's *Final Report* concludes that implementation of either the segmentation or relocation options would significantly affect deployment of fixed wireless broadband services and impose considerable costs on ITFS/MMDS systems. For example, the *Final Report* notes that the relocation/segmentation costs to ITFS/MMDS operators over a ten-year period could be up to \$19 billion.<sup>24</sup>

12. *Petition for Reconsideration of SIA.* In the *Order* adopted simultaneously with the *New Advanced Wireless Services NPRM*, we decided that sharing between terrestrial and satellite systems in the 2500-2520 MHz worldwide MSS downlink (space-to-Earth) band and in the 2670-2690 MHz worldwide MSS uplink (Earth-to-space) band, as requested by SIA in a petition for rule making,<sup>25</sup> was not feasible. Specifically, we found that MSS use of those bands in the United States would present substantial technical challenges and that MSS already has access to a significant amount of spectrum below 3 GHz to meet its needs in the foreseeable future. We also found that SIA did not otherwise present sufficient reasons to justify institution of a rulemaking proceeding. Accordingly, we denied SIA's petition for rule making.<sup>26</sup> In February 2001, SIA submitted a petition for reconsideration of the *Order*.<sup>27</sup> In its petition for reconsideration, SIA contends that our bases for refusing to allocate the 2500-2520 MHz and 2670-2690 MHz bands to MSS do not withstand scrutiny.<sup>28</sup> SIA maintains that there is no evidence that spectrum sharing between fixed services and MSS will result in interference and that existing MSS spectrum allocations are insufficient.<sup>29</sup> SIA cites Telecommunications Industry Association ("TIA") joint working

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<sup>22</sup> *Id.* at 59-80.

<sup>23</sup> *Id.* at iii.

<sup>24</sup> *Id.* at ii-iii.

<sup>25</sup> See SIA Petition for Rule Making, RM-9911, filed April 28, 2000.

<sup>26</sup> *New Advanced Wireless Services NPRM* at ¶ 73.

<sup>27</sup> See SIA Petition for Reconsideration, ET Docket No. 00-258, filed February 22, 2001.

<sup>28</sup> *Id.* at 2.

<sup>29</sup> *Id.* at 6-8.

group TR14.11/TR34.2 as finding in its Telecommunications System Bulletin (“TSB”) 86 that sharing between fixed services and MSS is feasible. SIA also argues that the geographic separation of MSS and ITFS/MMDS users should significantly alleviate any potential interference between the services.<sup>30</sup> Finally, SIA argues that interference from MSS spacecraft was addressed by the ITU over the 1994-1996 period and power flux density limits were developed to protect fixed services operating in the 2500-2520 MHz and 2670-2690 MHz bands. SIA contends that these limits have been incorporated into the ITU’s Radio Regulations, and ITFS/MMDS interests have presented no technical evidence to support their claim that those limits are insufficient to protect ITFS/MMDS licensees from MSS interference.<sup>31</sup> Therefore, SIA contends that we must reconsider our decision to dismiss its petition for reconsideration and request comment on the merits of allocating the 2500-2520 MHz and 2670-2690 MHz bands to MSS on a shared basis with fixed services.<sup>32</sup>

### III. DISCUSSION

#### A. First Report and Order

##### 1. Comments Regarding 2500-2690 MHz Band

13. The majority of parties filing comments in response to the *New Advanced Wireless Services NPRM* oppose relocating or displacing incumbents in the 2500-2690 MHz band in order to allow new providers of advanced mobile services.<sup>33</sup> Dozens of educational organizations and institutions contend that they provide important services in the band and that any reduction of ITFS/MMDS spectrum could jeopardize those services. For example, the ITFS Spectrum Development Alliance (“ISDA”) states that non-profit educational institutions have held ITFS licensees for years and provide distance learning to schools, community centers, and adult learning centers in remote and isolated areas.<sup>34</sup> ISDA contends that service rules for the 2500-2690 MHz band are not conducive to sharing arrangements between fixed and mobile users.<sup>35</sup> The Education Community of the United States (“ECUS”) argues that relocation of ITFS/MMDS incumbents will destroy leasing arrangements that ITFS providers have with MMDS providers, thereby removing financial resources for ITFS systems that provide additional funds for school distance learning programs. ECUS also argues that relocation would impact the ability of ITFS systems to provide broadband services to rural, inner-city, and Indian reservation areas not reached by digital subscriber line and cable modem services, and that segmentation could increase equipment costs and cause service disruptions and cutbacks.<sup>36</sup> The American Federation of Teachers (“AFT”) states that any loss of 2500-2690 MHz spectrum could halt plans for delivery of advanced services to schools.<sup>37</sup> Tarrant County

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<sup>30</sup> *Id.* at 6.

<sup>31</sup> *Id.* at 6-7.

<sup>32</sup> *Id.* at 9.

<sup>33</sup> Comments were due by February 22, 2001 and reply comments were due by March 9, 2001.

<sup>34</sup> ISDA Comments at 2.

<sup>35</sup> *Id.* at 3-4.

<sup>36</sup> ECUS Comments at 8-9.

<sup>37</sup> AFT Comments at 2.

College (“Tarrant”) states that preservation of the ITFS/MMDS allocations is necessary, both for the continuation of existing educational services and for the rollout of new services.<sup>38</sup> Trident Technical College (“Trident”) states that it has invested \$1.5 million in building an ITFS system, and that the system is uplinked to the South Carolina Educational Television Digital Satellite Network, which transmits to sites throughout the state. Trident states that reallocation of the 2500-2690 MHz band would mean that its community would lose educational programming and that it would lose its excess channel leasing arrangements with MMDS entities, thereby losing revenues.<sup>39</sup> The University of North Carolina (“UNC”) states that the entire 2500-2690 MHz band is required to ensure successful and orderly implementation of high-speed wireless broadband services at acceptable throughput rates. UNC contends that there is an ever increasing demand for high-speed digital wireless broadband services in North Carolina, and that a reallocation of just a portion of the band would be disastrous for large-scale statewide systems.<sup>40</sup>

14. MMDS service providers and organizations also oppose relocating incumbents in the 2500-2690 MHz band for advanced mobile services. Sprint Corporation (“Sprint”) states that ITFS/MMDS licensees may be the only providers of broadband services to rural and underserved markets.<sup>41</sup> Sprint further states that its broadband fixed service system has been highly successful, with more than 2000 customers per week currently being added to the system.<sup>42</sup> Sprint contends that forcing relocation of ITFS/MMDS operations would mean that the Commission was abandoning its long-term commitment to enhancing education.<sup>43</sup> Sprint also contends that an abundance of available spectrum exists elsewhere for advanced mobile services and that global harmonization in the 2500-2690 MHz band is impossible, given existing conflicting uses of the band.<sup>44</sup> WorldCom, Inc. (“WorldCom”) states that reallocating MMDS spectrum would amount to taking away spectrum rights obtained at a Commission auction and establish a dangerous precedent.<sup>45</sup> WorldCom contends that its broadband fixed network requires all available ITFS/MMDS channels in the 2500-2690 MHz band.<sup>46</sup> The Wireless Communications Association International, Inc. (“WCA”) states that fixed broadband technologies in the 2500-2690 MHz band are the types of advanced services that the Commission is seeking to promote, and that any forced migration of some or all ITFS/MMDS licensees would cripple deployment of fixed networks designed to serve unserved and underserved residential, commercial, and educational users.<sup>47</sup> WCA contends that the interdependent relationship between MMDS operators and the ITFS educational community has led to the creation of shared networks capable of delivering broadband services to educational institutions and reaching into the

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<sup>38</sup> Tarrant Comments at 2.

<sup>39</sup> Trident Comments at 1.

<sup>40</sup> UNC Comments at 5.

<sup>41</sup> Sprint Comments at 13.

<sup>42</sup> *Id.* at 2. Sprint indicates that it is providing service to more than 25,000 residential and small business customers in 13 markets. Sprint Reply comments at 4.

<sup>43</sup> *Id.* at 15.

<sup>44</sup> *Id.* at 32-33.

<sup>45</sup> WorldCom Comments at 10.

<sup>46</sup> *Id.* at 16.

<sup>47</sup> WCA Comments at i.

residential and small business markets.<sup>48</sup> WCA also contends that relocation of ITFS/MMDS incumbents would be more difficult than prior relocations of fixed wireless incumbents because of the integrated and consumer-oriented nature of the ITFS/MMDS services.<sup>49</sup>

15. Other entities also oppose reallocating the 2500-2690 MHz band for advanced mobile services. Clearwire Technologies (“Clearwire”) states that leaving the band as is will foster development of advanced technology in a fixed wireless setting where the RF environment is stable.<sup>50</sup> Cisco Systems, Inc. (“Cisco”) also favors continued use of this band to provide fixed wireless broadband access. It contends that reallocation of ITFS/MMDS to a band above 3 GHz would dramatically increase the deployment costs of ITFS/MMDS systems and would result in a time-to-market delay, creating a corresponding loss of market, profitability, and delay in service availability.<sup>51</sup> Cisco also contends that segmentation of the 2500-2690 MHz band would require significant reengineering, would waste spectrum, and be very expensive.<sup>52</sup> Specifically, Cisco provides a case study that claims that a service provider would need to triple base station deployment if segmentation were to take place, and that capital and operational expenses to deploy broadband fixed wireless in the top 100 Metropolitan Statistical Areas would increase by \$5.19 billion over the first five years.<sup>53</sup> Digital Broadcast Corporation (“DBC”) states that the Commission has fostered, through its initiatives, educator/commercial operator relationships that are financially viable and beneficial to the public, and that reallocating the 2500-2690 MHz band would render those initiatives null and void.<sup>54</sup> DBC further states that reallocation would destroy the educator/commercial collaborations that provide for additional funds for schools.<sup>55</sup> Nortel Networks Inc. (“Nortel”) argues that “[w]hile it is important to make additional spectrum available for 3G services, that spectrum should not be allocated at the expense of the incumbents in the MMDS/ITFS bands, who are presently providing competitive broadband services.”<sup>56</sup> Motorola, Inc. (“Motorola”) states that no country has yet implemented any commercial mobile services in the 2500-2690 MHz band, and that the band does not offer the same near term potential for spectrum harmonization as the 1710-1850 MHz band.<sup>57</sup>

16. IPWireless, Inc. (“IPW”) states that it has developed an advanced broadband wireless technology that can be used by ITFS licensees to bring the next generation of broadband interactive

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<sup>48</sup> *Id.* at ii.

<sup>49</sup> *Id.* at 50.

<sup>50</sup> Clearwire Comments at 12.

<sup>51</sup> Cisco Comments at 2-3.

<sup>52</sup> *Id.* at 9-10.

<sup>53</sup> *Id.* at 12.

<sup>54</sup> DBC Comments at 2-3.

<sup>55</sup> *Id.* at 5.

<sup>56</sup> Nortel Reply Comments at 2.

<sup>57</sup> Motorola Comments at 12.

education to American students.<sup>58</sup> IPW contends that its technology provides high-speed Internet access, is simple to install and is affordable, and complies with international standards for IMT-2000.<sup>59</sup> IPW also contends that its customers will generally be able to utilize IPW modems inside buildings because its technology permits operation for non-line-of-sight conditions, and that its customers with laptop computers will be able to obtain service throughout IPW's service area, including in homes, offices, restaurants, airports, and classrooms.<sup>60</sup> IPW further contends that, as a result of the Commission's recent decisions authorizing two-way use of the 2500-2690 MHz band, IPW can bring its technology to market in the United States in 2001 without the regulatory delays inherent in spectrum reallocation and auction proceedings.<sup>61</sup> IPW states that it is confident that it can deploy its technology without displacing or interfering with incumbent ITFS/MMDS licensees, and that many of these licensees would then be likely to deploy IPW's technology in their next generation services.<sup>62</sup> IPW further states that there is no need to make the 2500-2690 MHz band available for advanced cellular/PCS services because there is sufficient spectrum available in other bands to satisfy the demand for those services.<sup>63</sup> IPW therefore recommends that we decide expeditiously that the 2500-2690 MHz band will be preserved exclusively for ITFS/MMDS licensees.<sup>64</sup>

17. Some parties favor using the 2500-2690 MHz band for advanced mobile services. Ericsson, Inc. ("Ericsson") recommends that we combine a new mobile allocation in that band with a segmentation plan, which would offer spectrum to both incumbent users and new licensees. Ericsson proposes that all current spectrum users should be transitioned through a "relocation/ reimbursement" process.<sup>65</sup> Verizon Wireless ("Verizon") recommends that we allocate substantial amounts of additional spectrum for 3G, harmonized to the maximum extent possible with global 3G allocations, and that this new U.S. allocation include the 2500-2690 MHz band.<sup>66</sup> Verizon contends that a portion of that band should be allocated exclusively to 3G services because only a fraction of the band is currently being used to provide instructional programming.<sup>67</sup> Specifically, Verizon recommends that at least 60 MHz be reallocated for 3G services to allow at least two 3G licensees to operate in the 2500-2690 MHz band.<sup>68</sup> Verizon argues that

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<sup>58</sup> IPW Comments at ii. IPW has begun initial deployment of this technology under a developmental authorization in Greensboro, North Carolina. In addition, a subsidiary of IPW is a licensee of MMDS spectrum in Las Vegas, Nevada.

<sup>59</sup> *Id.* at 1.

<sup>60</sup> *Id.* at 3.

<sup>61</sup> *Id.* at 4.

<sup>62</sup> *Id.* at 8.

<sup>63</sup> *Id.* at 9.

<sup>64</sup> *Id.* at 14.

<sup>65</sup> Ericsson Comments at 16.

<sup>66</sup> Verizon Comments at 9.

<sup>67</sup> *Id.* at 23.

<sup>68</sup> *Id.* at 25.

ITFS licensees would likely have sufficient spectrum to operate in the remainder of the band, especially if digital technology is employed.<sup>69</sup> Alternatively, Verizon argues that ITFS licensees could be relocated to spectrum above 3 GHz.<sup>70</sup> Verizon also argues that displaced MMDS operators could be accommodated in remaining MMDS spectrum if operators reduce cell sizes. Alternatively, Verizon argues that MMDS operators could compete in spectrum auctions against 3G proponents.<sup>71</sup> Cingular Wireless (“Cingular”) states that the bulk of 3G spectrum should come from either the 1710-1850 MHz band or the 2500-2690 MHz band. Cingular contends that failure to use either of these bands would be inconsistent with the U.S. position at WRC-2000 and would harm the credibility of the United States.<sup>72</sup> Cingular argues that, if clearing of the 1710-1850 MHz bands proves impractical, 120 MHz of spectrum at 2500-2690 MHz could be cleared by relocating ITFS licensees to another band and requiring MMDS licensees to operate in their originally-allocated 70 MHz of spectrum using efficient technology. Cingular maintains that relocation and segmentation of the 2500-2690 MHz band would be easier to accomplish than clearing the 1710-1850 MHz band. Cingular acknowledges, however, that the Commission must first study the feasibility of separating the ITFS and MMDS services.<sup>73</sup> AT&T Wireless Services, Inc. (“AT&T”) states that to the extent reallocation of the 1755-1850 MHz band cannot be accomplished, we should reallocate some or all of the spectrum in the 2500-2690 MHz band.<sup>74</sup> AT&T argues that this band is well-suited for 3G services both because it contains a large amount of contiguous spectrum that could be paired internally and because it would enhance global roaming.<sup>75</sup>

18. Several parties commented on adding a mobile allocation to the 2500-2690 MHz band without relocating incumbent ITFS/MMDS licensees. AT&T urges that a mobile allocation for use only by incumbents not be added to the band. AT&T contends that such an allocation would provide incumbent licensees with an unwarranted windfall and would deprive potential competitors of the opportunity to bid on licenses that will be needed to provide 3G services.<sup>76</sup> WorldCom contends that adding a mobile allocation to the band would create uncertainty in the marketplace and delay the provision of fixed broadband services by diverting resources. WorldCom further contends that adding a mobile allocation to the band would significantly complicate frequency coordination.<sup>77</sup> Similarly, WCA states that providing incumbent licensees with the flexibility to offer mobile 3G services would necessitate interference protection rules that would preclude significant 3G use.<sup>78</sup> However, the Ad Hoc MDS Alliance (“Ad Hoc”) supports flexible use of the 2500-2690 MHz band. Ad Hoc recommends that we add mobile and portable

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<sup>69</sup> *Id.* at 25-26.

<sup>70</sup> *Id.* at 26.

<sup>71</sup> *Id.* at 27.

<sup>72</sup> Cingular Comments at i.

<sup>73</sup> *Id.* at ii.

<sup>74</sup> AT&T Comments at 9.

<sup>75</sup> *Id.* at 12-13.

<sup>76</sup> *Id.* at 13.

<sup>77</sup> WorldCom Comments at 24-25.

<sup>78</sup> WCA Comments at iii.

services to the authorized use of all ITFS/MMDS channels to permit use of these channels by new and innovative communications services, while not jeopardizing the ability of incumbent licensees to provide existing and improved fixed services to the public.<sup>79</sup> Ad Hoc contends that, in contrast to refarming the band, its proposed service additions would not strand the investment already made in fixed wireless broadband services in the band.<sup>80</sup> Ad Hoc further contends that its recommended approach would serve the public faster and more efficiently than refarming the band because its approach would permit existing licensees and lessees to evolve services under existing business relationships.<sup>81</sup> Ad Hoc concludes that its approach would ensure maximum flexibility in bringing advanced 3G-type service to the public.<sup>82</sup> In an August 2001 letter to Chairman Powell, the Catholic Television Network (“CTN”) and the National ITFS Association (“NIA”) state that they would not object to flexible use of the 2500-2690 MHz band, provided that: (1) all fixed use of the band is protected from interference, and (2) any new use of the band is subject to a formal rulemaking process to determine if such use is feasible and, if so, what new rules are needed to accommodate any new use.<sup>83</sup>

## 2. Decision

19. As commenters note, the 2500-2690 MHz band has been used for a number of years to provide one-way analog fixed services and is now being increasingly used to provide two-way digital, including broadband, fixed services. Nationwide deployment of two-way, digital ITFS/MMDS systems will provide Americans with another option for high-speed broadband access, furthering competition with other service providers such as digital subscriber line (“DSL”), cable modem, or satellite-based services provided by incumbent telephone companies, cable operators, or satellite operators.<sup>84</sup> As suggested by Ad Hoc and as discussed below, we will add a mobile allocation to this band in order to provide additional flexibility for use of this spectrum and promote more efficient use, thereby serving the public interest. However, we also conclude that we will not relocate, displace, or otherwise modify incumbent ITFS/MMDS operations. We will rely instead on a market-based approach to introduce additional flexibility in this band. We note that such additional flexibility will not necessarily result in any change in service offerings in the 2500-2690 MHz band because fixed uses could prove to be more highly-valued by the market than mobile uses.

20. We find that adding a mobile allocation to the 2500-2690 MHz band will further promote the public interest by providing an additional option to service providers in that band. As we stated in our November 1999 *Policy Statement* on principles for reallocation of spectrum: “Flexible allocations may result in more efficient spectrum markets.”<sup>85</sup> We recognize that with flexible allocations, spectrum

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<sup>79</sup> Ad Hoc Comments at 7.

<sup>80</sup> *Id.* at 8.

<sup>81</sup> *Id.* at 9.

<sup>82</sup> *Id.* at 10.

<sup>83</sup> See CTN/NIA letter of August 29, 2001 at 1. This letter has been placed into the record of this proceeding.

<sup>84</sup> In rural or underserved markets in the country, and for many educational users, ITFS/MMDS may be the sole provider of broadband service.

<sup>85</sup> See Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, FCC 99-354, *Policy Statement*, 14 FCC Rcd 19868, 19870 (1999) at ¶ 9.

efficiencies can be accomplished in a number of ways. For example, licensees can negotiate among themselves arrangements for avoiding interference rather than relying on mandatory technical rules to control interference; relaxed service rules would allow licensees greater freedom in determining the specific services to be offered; and rules for similar services can be harmonized to provide regulatory neutrality to help establish a level playing field across technologies and foster more effective competition.<sup>86</sup> We have already provided such flexibility in many services, including PCS,<sup>87</sup> WCS,<sup>88</sup> and new services operating on television channels 60-69;<sup>89</sup> and have proposed flexibility in other services, including new services operating on television channels 52-59.<sup>90</sup> In permitting new services to operate on television channels 60-69, we added Fixed and Mobile services to the Broadcasting allocation in the 746-806 MHz band.<sup>91</sup> In our related proceeding that developed service rules for the 746-764 MHz and 776-794 MHz bands, we stated that our goal was “enabling the broadest possible use of this spectrum, consistent with sound spectrum management . . . .”<sup>92</sup> We adopted service rules primarily oriented toward fulfilling the need for a variety of fixed and mobile wireless services in those bands, but did not structure the rules to establish a particular service configuration. Rather, the service rules would allow licensees to make determinations respecting the services provided and the technologies to be used, including new broadcast-type services so long as they complied with the technical rules adopted for the bands.<sup>93</sup> In proposing to permit new services to operate on television channels 52-59, we also proposed a co-primary Fixed, Mobile, and Broadcasting allocation to “enable service providers to select the technology they wish to use to provide new broadband services in order to make the best use of this spectrum.”<sup>94</sup> Thus, we have provided flexible spectrum use for many services and are proposing to provide flexible spectrum use for other services.<sup>95</sup>

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<sup>86</sup> *Id.*

<sup>87</sup> In Amendment of the Commission's Rules to Permit Flexible Service Offerings in the Commercial Mobile Radio Services, WT Docket No. 96-6, the Commission expanded permitted offerings of fixed wireless service by Commercial Mobile Radio Service providers. See *First Report and Order and Further Notice of Proposed Rule Making*, 11 FCC Rcd 8965 (1996). With respect to PCS, the Commission deleted “footnotes US330 and US331, which prohibited narrowband and broadband PCS licensees from providing fixed service, except for ancillary fixed services used in support of mobile PCS.” *Id.* at ¶ 33.

<sup>88</sup> In general, the WCS permits licensees to “provide any services for which its frequency bands are allocated.” See 47 C.F.R. § 27.2.

<sup>89</sup> See *Reallocation of Television Channels 60-69, the 746-806 MHz Band*, ET Docket No. 97-157, *Report and Order*, 12 FCC Rcd 22953 (1998), *recon.*, 13 FCC Rcd 21578 (1998); *Service Rules for the 746-764 and 776-794 MHz Bands, and Revisions to Part 27 of the Commission's Rules*, WT Docket No. 99-168, *First Report and Order*, 15 FCC Rcd 476 (2000).

<sup>90</sup> See *Notice of Proposed Rule Making*, GN Docket No. 01-74, 16 FCC Rcd 7278 (2001).

<sup>91</sup> See *Report and Order*, ET Docket No. 97-157, *supra* n.89, at ¶ 1.

<sup>92</sup> See *First Report and Order*, WT Docket No. 99-168, *supra* n.89, at ¶ 1.

<sup>93</sup> *Id.* at ¶ 15.

<sup>94</sup> See *Notice of Proposed Rule Making*, GN Docket No. 01-74, *supra* n.90, at ¶ 1.

<sup>95</sup> For example, we stated in our November 2000 *Policy Statement* on secondary markets for radio spectrum: “Licensees/users should have flexibility in determining the services to be provided and the technology used for operation consistent with the other policies and rules governing the service.” *Policy Statement, supra* (continued....)

21. Specifically with regard to ITFS/MMDS, we already have provided licensees with additional operational flexibility. First, in 1995 we expanded the protected service area contour for site-based MMDS licensees from a 15 mile radius to a 35 mile radius.<sup>96</sup> Second, in 1996 we implemented rules for the use of digital modulation schemes, thereby allowing ITFS/MMDS licensees to provide multiple channels of video programming and high-speed data applications such as Internet access.<sup>97</sup> Third, in 1998 we authorized the use of two-way transmissions on ITFS/MMDS frequencies, effectively enabling the provision of voice, video and data services and granted a 35-mile protected service area to every ITFS licensee.<sup>98</sup> With the advent of two-way technology, ITFS/MMDS has become a vehicle for offering high-speed Internet access and broadband service to educational, residential and small office/home office customers. Finally, we note that, although many MMDS licenses were granted subject to area-wide (Basic Trading Areas or “BTAs”) auctions in 1996, the secondary market for both MMDS licenses and ITFS spectrum on a leased basis has been very vibrant. Since 1998 WorldCom and Sprint have invested over \$2 billion dollars in the acquisition, by purchase or lease, of MMDS and ITFS channel rights covering 60 million households.<sup>99</sup>

22. The Communications Act of 1934, as amended, specifically authorizes the Commission to allocate spectrum to provide flexibility of use, if –

- (1) such use is consistent with international agreements to which the United States is a party; and
- (2) the Commission finds, after notice and an opportunity for public comment, that –
  - (A) such an allocation would be in the public interest;
  - (B) such use would not deter investment in communications services and systems, or technology development; and
  - (C) such use would not result in harmful interference among users.<sup>100</sup>

23. With regard to the 2500-2690 MHz band, we find that the above conditions are met and that adding a mobile allocation to the band is in the public interest. First, as noted above and in the *Advanced Wireless Services NPRM*, the 2500-2690 MHz band is allocated in Region 2 on a primary basis to the Fixed, Fixed Satellite, Mobile except aeronautical mobile, and Broadcasting-Satellite Services.<sup>101</sup> WRC- (Continued from previous page) \_\_\_\_\_

n.18, at ¶ 20. In a companion *Notice of Proposed Rule Making* on secondary markets for radio spectrum, we opened a proceeding to examine a number of actions we might take to remove unnecessary regulatory barriers to the development of more robust secondary markets in radio spectrum usage rights. *Notice of Proposed Rule Making, supra* n.18, at ¶ 1.

<sup>96</sup> *In the Matter of Amendment of Parts 21, 43, 74, 78, and 94 of the Commission’s Rules Governing Use of the Frequencies in the 2.1 and 2.5 GHz Bands Affecting Private Operational Fixed Microwave Service, Multipoint Distribution Service, Instructional Television Fixed Service & Cable Television Relay Service*, 10 FCC Rcd 7074 (1995).

<sup>97</sup> See *Declaratory Ruling and Order, supra* n.14; and *Public Notice, supra* n.15.

<sup>98</sup> See *Two-Way Order, supra* n.16, 13 FCC Rcd at 19173.

<sup>99</sup> For a more complete description of the evolution of the flexible use of the 2500-2690 MHz band, see FCC staff’s *Interim Report, supra* n.8. For a discussion on secondary markets in spectrum, see *Policy Statement and Notice of Proposed Rule Making, supra* n.18.

<sup>100</sup> 47 U.S.C. § 303(y).

<sup>101</sup> 47 C.F.R. § 2.106.

2000 identified the 2500-2690 MHz band for possible terrestrial IMT-2000 use.<sup>102</sup> While it is unclear whether other countries will use this band for advanced mobile systems, the band is potentially available in many countries,<sup>103</sup> and it is possible that advanced wireless use will evolve there on a regional or worldwide basis. Therefore, adding a mobile allocation to the 2500-2690 MHz band in the United States is consistent with international agreements to which the United States is a party and will permit the possibility of long-term harmonized use of the band.

24. Second, we find that adding a mobile allocation to the band would not deter investment in current fixed wireless operations, and would not result in harmful interference if appropriate protective measures are taken. As discussed above, the public interest is served because a flexible allocation allows licensees to make efficient use of spectrum, especially if licensees are given greater freedom in determining the specific services to be offered. We also conclude that investment in communications services and systems and technology development would not be deterred by a flexible allocation in this band. While some ITFS/MMDS incumbents indicate that investment in the band, particularly for fixed broadband deployment, could be deterred and interference to incumbents could be caused if we were to add a mobile allocation to the band, we believe that a flexible allocation will actually encourage investment in and the development of new and innovative technology and services. For example, investment in ITFS/MMDS increased as the result of the Commission's decision to allow for two-way digital services in this band, thereby allowing for the deployment of fixed broadband services. A flexible allocation that permits mobile service will spur new technology developments and investment.

25. Third, we note that there is support for potentially using this spectrum for mobile services.<sup>104</sup> Further, IPW has developed and is testing technology for portable data services that it claims can operate under existing ITFS/MMDS service rules (*i.e.*, not cause harmful interference to incumbent one-way and two-way fixed services) without disrupting the provision of fixed services in the 2500-2690 MHz band.<sup>105</sup> The addition of a mobile allocation will facilitate the introduction of these types of services and will provide flexibility for introducing other mobile applications in the future, thereby encouraging technology development and investment. We emphasize that this addition merely increases options for incumbents to employ spectrum in its highest-valued use, consistent with prior Commission policy, and does not change existing ITFS/MMDS service or technical rules.

26. Finally, we conclude that the introduction of additional mobile uses in the 2500-2690 MHz band can be accomplished without causing harmful interference to incumbent ITFS/MMDS operators. As we discuss below, we emphasize that existing technical rules, including interference rules, will be maintained until a rulemaking proceeding has been completed that will address any changes to those rules that may be necessary. More importantly, we emphasize that until that occurs, any mobile use introduced

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<sup>102</sup> See *Provisional Final Acts of the World Radiocommunication Conference (Istanbul, WRC-2000)*. At WRC-2000, the United States proposed that the 698-960 MHz, 1710-1885 MHz, and 2500-2690 MHz bands be identified for the terrestrial component of IMT-2000 and other advanced communication applications. During preparations for WRC-2000, the United States committed to studying the feasibility of using all or parts of these bands for IMT-2000.

<sup>103</sup> *New Advanced Wireless Services NPRM* at ¶ 69.

<sup>104</sup> See ¶ 17, *supra*.

<sup>105</sup> We note that IPW recently conducted a demonstration of its advanced broadband wireless technology, which IPW contends permits "portable broadband" use in various bands, including 2500-2690 MHz. See IPW Ex Parte Communication, ET Docket No. 00-258, July 13, 2001, at 7, 20.

in this band would be subject to existing technical rules or interference agreements between incumbent users and new mobile users.<sup>106</sup> We note that changes in geographic or service applications by incumbent ITFS/MMDS operators may permit other types of mobile uses to be introduced in this band, licensees may partition their service areas, and parties may develop non-interference agreements. Under those circumstances, additional technical service rules would have to be established to protect incumbent operations.

27. We disagree with AT&T that our action here will necessarily result in a “windfall” to incumbent ITFS/MMDS licensees. Permitting mobile use of the 2500-2690 MHz band simply allows incumbent licensees an additional option, but it is entirely possible that fixed use of the band will continue to predominate. Additionally, we note that certain types of mobile applications could be deployed in the near-term under existing service rules; thus, as noted above, our action is consistent with the type of flexibility already afforded other types of licensees, such as cellular and broadband PCS. Finally, it is reasonable for us to conclude that, on balance, although incumbents may enjoy some benefits by adding a mobile allocation to the band, permitting mobile use of the band by new service providers would pose a very high risk of disrupting important incumbent fixed operations that our decision does not pose. Accordingly, we find it in the public interest to permit ITFS/MMDS licensees the flexibility to offer mobile services, and we are adding a “Mobile except aeronautical mobile” allocation for the United States to the 2500-2690 MHz band.

28. While we find that adding a mobile allocation in the 2500-2690 MHz band would be in the public interest, we find that relocating incumbent ITFS/MMDS operations would jeopardize the provision of important fixed wireless broadband services. The FCC staff’s *Final Report* studied whether the band could be shared with or reallocated, in whole or in part, for new advanced mobile service providers. The FCC staff’s *Final Report* concludes that in many cases lack of uniform geographic use in the band precludes co-frequency sharing between ITFS/MMDS and advanced mobile service providers. The FCC staff’s *Final Report* recognized that although voluntary partitioning between incumbent users and new advanced mobile service operators offered some promise of sharing as an interim measure in some geographic areas, sufficient spectrum does not appear to be available in populated areas to support viable advanced mobile services operations.<sup>107</sup> That conclusion is unchallenged by any party to this proceeding. The FCC staff’s *Final Report* also studied permitting mobile use by new service providers by reallocating all or a portion of the 2500-2690 MHz band from fixed to mobile services.<sup>108</sup> However, even the 60 MHz reallocation proposed by Verizon would cause severe disruptions to ITFS/MMDS incumbents if they were forced to vacate a segment of the band. Cisco’s study indicates that such a reduction in authorized spectrum capacity would cause a major escalation of costs, and those increased costs would likely result in ITFS/MMDS service cutbacks or, at a minimum, a failure to expand broadband fixed services to all areas of the country.<sup>109</sup> Further, the option of relocating ITFS/MMDS incumbents to another band would likely

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<sup>106</sup> The current technical rules require licensees to “make exceptional efforts to avoid harmful interference to other users and to avoid blocking potential adjacent channel use in the same city and *cochannel use in nearby cities.*” 47 C.F.R. § 21.902(a); *see also id.* §§ 21.902(b)-(h) (MDS interference protection rules), § 74.903 (ITFS interference protection rules). We have faith that incumbents will continue to abide by these and future interference protection rules and, if they do not, they will be subject to swift enforcement action.

<sup>107</sup> FCC staff’s *Final Report* at ii.

<sup>108</sup> FCC staff’s *Final Report* at ii-iii.

<sup>109</sup> Cisco Comments at 12.

impose even greater overall costs because existing licensees in all candidate relocation bands examined by the FCC staff's *Final Report* would also need to be relocated to accommodate displaced ITFS/MMDS incumbents.<sup>110</sup> Based on this record, we find that relocating ITFS/MMDS incumbents would not be cost-effective or desirable.

29. Our assessment is shared by the majority of parties to this proceeding. Some parties contend that there will likely be insufficient spectrum for advanced mobile services if a portion of the 2500-2690 MHz band is not reallocated for exclusive mobile use. However, as noted in paragraph 6, *supra*, in our recent *Further NPRM* we solicited comment on allocating additional bands for advanced mobile services. Further, as discussed above, we are adding a mobile allocation to the 2500-2690 MHz band to permit flexibility for incumbent licensees. We will be addressing the issue of how much additional spectrum from other bands is required for advanced mobile services in a forthcoming decision in this proceeding. Moreover, we have encouraged the provision of both advanced mobile and fixed services and note that the services currently being provided and planned in the 2500-2690 MHz band – while fixed in nature – have significant value.<sup>111</sup> Accordingly, we find that displacing ITFS/MMDS incumbents to permit advanced mobile use of the 2500-2690 MHz band by new service providers would be detrimental to the public interest.

30. We recognize that, under current technology and service rules, fixed and mobile (other than portable) sharing of the 2500-2690 MHz band does not appear feasible, but we anticipate advances in technology that may permit such sharing. We further recognize that we will have to explore in a separate future proceeding the service rules that will apply to permit mobile operations in the band. As previously discussed, the FCC staff's *Final Report* cites the possibility of interference to incumbent ITFS/MMDS operations from new advanced mobile service providers, and we would want to provide service and technical rules that would allow both incumbent ITFS/MMDS and mobile operations to co-exist in the band. As noted above, in developing service rules for the 746-764 MHz and 776-794 MHz bands, we struck a balance in developing rules that would facilitate licensees' flexibility to provide either fixed or mobile services as well as certain broadcast-type services on a non-interference basis. We would want to strike the same balance for the 2500-2690 MHz band so that mobile use of the band will not impair fixed use of the band. We emphasize that if fixed and mobile sharing of the band continues to be infeasible in the long run, our service rules would ensure the protection of fixed operations.

## **B. Memorandum Opinion and Order**

### **1. Comments Regarding SIA's Petition for Reconsideration**

31. A number of parties oppose SIA's petition for reconsideration on four major grounds: 1) SIA does not satisfy our procedural criteria for petitions for reconsideration; 2) SIA does not explain how sharing between the MSS and fixed services could occur; 3) the ITU material cited by SIA is not relevant;

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<sup>110</sup> FCC staff's *Final Report* at iii.

<sup>111</sup> See *Section 706 Second Report, supra* n.3. We also note that broadband fixed services can be provided at very high data rates. Sprint states that its Internet "downstream" (to computer terminals) data rates range from 512 thousand bits per second ("kbps") to 1.5 million bits per second ("mbps") with burst rates up to 5 mbps, and that its "upstream" (from computer terminals) data rates are up to 256 kbps. Sprint contends that these data rates are faster than data rates proposed for 3G services. Sprint Comments at 8.

and 4) the MSS does not require additional spectrum.<sup>112</sup> CTN states that SIA raises no new facts or arguments in support of its petition, but merely recites arguments that it has previously raised.<sup>113</sup> CTN contends that SIA erroneously believes that any sharing problems between its proposed MSS operations and existing and planned ITFS/MMDS deployment in the same bands can be overcome by geographical separation. CTN asserts that ITFS currently is deployed on a nationwide basis and that both the Commission and the ITFS/MMDS industry stress the potential for deployment of those broadband services in rural markets.<sup>114</sup> Sprint states that spectrum sharing between fixed services and MSS will result in interference. Sprint argues that the TSB 86 bulletin cited by SIA does not focus on the 2500-2690 MHz band, but rather on the 2165-2200 MHz band, and that subsequent studies have established that 3G satellite services will cause interference with ITFS/MMDS.<sup>115</sup> Sprint also argues that there is no reason to believe that MSS will remain a rural service and that ITFS/MMDS is very well suited to both urban and rural areas.<sup>116</sup> Finally, Sprint argues that sufficient spectrum has already been allocated for MSS and that worldwide use of the 2500-2690 MHz band for mobile services is virtually non-existent; therefore, allocation of that band for either terrestrial or satellite 3G will not promote regional or global roaming.<sup>117</sup> WCA generally concurs with Sprint, and states that while SIA contends that ITFS/MMDS and MSS may share the 2500-2520 MHz and 2670-2690 MHz bands, SIA does not specify how this would be accomplished.<sup>118</sup> IPW argues that SIA's reconsideration petition does not comply with our rules because SIA does not show that the facts or circumstances it relies upon have changed since its last opportunity to present them to us nor does SIA show how grant of its petition would be in the public interest. IPW notes that TSB 86 was undertaken in 1999 and that SIA cites unspecified ITU recommendations that SIA states were undertaken during 1994-1996. IPW maintains that all of this information was available to SIA at the time it filed its April 2000 petition for rulemaking, and yet SIA failed to cite the information in that petition.<sup>119</sup> The Network for Instructional TV, Inc. ("NITV") states that MSS sharing of the 2500-2520 MHz and 2670-2690 MHz bands would interfere with NITV's use of those bands and denigrate and potentially terminate NITV's agreements with commercial fixed wireless operators in every community in which it holds an ITFS license.<sup>120</sup> NITV also states that SIA is misguided in claiming that TIA's working group study demonstrates the feasibility of MSS sharing with ITFS/MMDS systems. NITV contends that TIA's study was concerned with fixed point-to-point systems, rather than point-to-multipoint systems, such

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<sup>112</sup> Oppositions to SIA's reconsideration petition were due by March 22, 2001. In addition to the parties cited below, NIA; Wireless One of North Carolina, L.L.C.; and WorldCom, Inc. filed oppositions.

<sup>113</sup> CTN Opposition at 2.

<sup>114</sup> *Id.* at 3.

<sup>115</sup> Sprint Opposition at 5.

<sup>116</sup> *Id.* at 6.

<sup>117</sup> *Id.* at 6-9.

<sup>118</sup> WCA Opposition at i.

<sup>119</sup> IPW Opposition at 3-4.

<sup>120</sup> NITV Opposition at 6.

as ITFS/MMDS. Finally, NITV contends that SIA has not submitted any studies demonstrating that MSS has insufficient spectrum.<sup>121</sup>

32. Globalstar, L.P. (“Globalstar”) filed a reply to the various oppositions.<sup>122</sup> Globalstar states that opponents have failed to demonstrate that sharing between MSS and fixed services is not feasible in the 2500-2520 MHz and 2670-2690 MHz bands.<sup>123</sup> Globalstar contends that, contrary to opponents, the frequency sharing techniques discussed in TSB 86 are applicable to those bands.<sup>124</sup> Globalstar states that TSB 86 addresses generic frequency sharing problems that might exist between MSS and fixed services when sharing an MSS downlink and notes that the starting point for the development of the criteria and interference assessment methodology given in TSB 86 was Recommendation ITU-R M.1142-1, which addressed the entire 1-3 GHz band.<sup>125</sup> Globalstar maintains that the considerations and techniques presented in TSB 86 are readily applicable to similar frequency sharing situations in other bands below 3 GHz, including 2500-2520 MHz and 2670-2690 MHz.<sup>126</sup> Globalstar also maintains that the 2500-2520 MHz band is allocated as an MSS downlink and that, if MSS systems keep their emissions below power flux density limits specified by the ITU, sharing between MSS and fixed systems is possible in that band.<sup>127</sup>

## 2. Decision

33. At the outset, we agree with commenters that SIA’s petition for reconsideration relies on facts that have not been presented to the Commission previously. Section 1.429(b) of our rules states:

A petition for reconsideration which relies on facts which have not previously been presented to the Commission will be granted only under the following circumstances:

- (1) The facts relied on relate to events which have occurred or circumstances which have changed since the last opportunity to present them to the Commission;
- (2) The facts relied on were unknown to petitioner until after his last opportunity to present them to the Commission, and he could not through the exercise of ordinary diligence have learned of the facts in question prior to such opportunity; or
- (3) The Commission determines that consideration of the facts relied on is required in the public interest.<sup>128</sup>

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<sup>121</sup> *Id.* at 4.

<sup>122</sup> See “Reply of Globalstar, L.P. to Oppositions to the Petition for Reconsideration of the Satellite Industry Association,” April 2, 2001.

<sup>123</sup> *Id.* at 1-2.

<sup>124</sup> *Id.* at 3.

<sup>125</sup> *Id.* at 3-4.

<sup>126</sup> *Id.* at 4.

<sup>127</sup> *Id.* at 5.

<sup>128</sup> 47 C.F.R. § 1.429(b).

34. SIA submitted its petition for rulemaking in April 2000, significantly after the October 1999 TSB 86 document was published and even more significantly after the 1994-1996 ITU work that SIA cites in its petition for reconsideration. Thus, SIA properly should have cited the TSB 86 document and the ITU work in its petition for rulemaking. Even in its petition for reconsideration, SIA does not explain the relevance of this material to its petition. TSB 86 is titled “Criteria and Methodology to Assess Interference Between Systems in the Fixed Service and the Mobile-Satellite Service in the Band 2165-2200 MHz” and thus was prepared for analyzing interference in another frequency band for space-to-Earth satellite links.<sup>129</sup> Further, the working group that prepared TSB 86 “was formed under the auspices of TIA following a number of informal discussions among representatives of the mobile satellite and terrestrial fixed microwave point-to-point service industry sectors.”<sup>130</sup> Thus, contrary to SIA and Globalstar, TSB 86 does not appear relevant either to the 2500-2690 MHz band or to the ITFS/MMDS point-to-multipoint licensees that use that band. Additionally, neither SIA nor Globalstar explains how power flux density limits that they contend the ITU developed for that band would permit sharing of the 2500-2520 MHz and 2670-2690 MHz band segments by the MSS and ITFS/MMDS. Globalstar cites Recommendation ITU-R M.1142-1; however, the Recommendation “applies only for sharing in the space-Earth direction. No specific criteria have been developed for sharing in the Earth-to-space direction.”<sup>131</sup>

35. We also agree with opponents of SIA’s petition for reconsideration that ITFS/MMDS licensees are deploying services in rural, as well as urban, areas; thus, in a best case scenario, the areas in which geographical sharing with MSS could occur would be quite limited. Moreover, given the fact that we are herein permitting mobile, as well as fixed, use of the 2500-2690 MHz band by ITFS/MMDS licensees, the possibility of such sharing is further sharply diminished. Therefore, we find that authorizing MSS use of the 2500-2520 MHz and 2670-2690 MHz band segments would result in little, if any, actual MSS use of those segments while greatly complicating their use for ITFS/MMDS.

36. Finally, we affirm our finding in the *Order* that MSS has sufficient spectrum without those band segments,<sup>132</sup> and note that our International Bureau recently authorized eight new MSS systems in the 1990-2025 MHz and 2165-2200 MHz bands.<sup>133</sup> While we recognize that our *Further NPRM* solicits comment on reallocating portions of those bands for advanced mobile terrestrial services and that a companion *Notice of Proposed Rule Making* solicits comment on bringing flexibility to the delivery of communications by MSS providers,<sup>134</sup> final decisions on these proposals will take into account the needs of the MSS. We note that the ITU has adopted a resolution inviting studies of the sharing and coordination

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<sup>129</sup> See letter of November 11, 1999 from Gerald S. Rosenblatt, Director Technical and Regulatory Affairs, TIA to Magalie Salas, FCC Secretary, ET Docket No. 95-18, at 3.

<sup>130</sup> *Id.* at 1.

<sup>131</sup> See Recommendation ITU-R M.1142-1, “Sharing in the 1-3 GHz Frequency Range Between Non-Geostationary Space Stations Operating in the Mobile-Satellite Service and Stations in the Fixed Service,” at n.1. ITU-R M.1142-1 and TSB 86 have been placed into the ET Docket No. 00-258 file.

<sup>132</sup> *New Advanced Wireless Services NPRM* at ¶ 73.

<sup>133</sup> See “FCC International Bureau Authorizes New Mobile Satellite Service Systems in the 2 GHz Band, July 17, 2001. This news release is available on-line at: [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/DOC-214588A1.doc](http://hraunfoss.fcc.gov/edocs_public/attachmatch/DOC-214588A1.doc)

<sup>134</sup> See *Notice of Proposed Rule Making*, IB Docket No. 01-85 and ET Docket No. 95-18, FCC 01-225, released August 17, 2001.

issues in several bands, including the 2500-2520 MHz and 2670-2690 MHz bands, "related to use of the mobile-satellite service allocations for the satellite component of IMT-2000 and the use of this spectrum by the other allocated services . . . ." <sup>135</sup> Our action here is without prejudice to renewal of SIA's request, in the event ITU studies develop new methods for sharing or coordination that would result in enhanced service to the public, without creating significant complications for provision of existing service. Accordingly, we deny SIA's petition for reconsideration.

#### IV. PROCEDURAL INFORMATION

37. *Final Regulatory Flexibility Certification.* The Regulatory Flexibility Act of 1980, as amended ("RFA") <sup>136</sup> requires that a regulatory flexibility analysis be prepared for rulemaking proceedings, unless the agency certifies that "the rule will not have a significant economic impact on a substantial number of small entities." <sup>137</sup> The RFA generally defines "small entity" as having the same meaning as the terms "small business," "small organization," and "small governmental jurisdiction." <sup>138</sup> In addition, the term "small business" has the same meaning as the term "small business concern" under the Small Business Act. <sup>139</sup> 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). <sup>140</sup>

38. In this *First Report and Order*, the Commission adds a mobile allocation to the 2500-2690 MHz band and thus provides ITFS/MMDS incumbent users of that band additional flexibility to offer mobile, as well as current fixed, services. This change may provide new opportunities for ITFS/MMDS incumbents, but will not adversely affect any incumbents because mobile use of the band will be at their discretion. As noted in paragraph 26, *supra*, "the introduction of additional mobile uses in the 2500-2690 MHz band can be accomplished without causing harmful interference to incumbent ITFS/MMDS operators because . . . the incumbent licensees will have the flexibility to determine the specific services to be offered." Therefore, we certify that the requirements of this *First Report and Order* will not have a significant economic impact on a substantial number of small entities. The Commission will send a copy of the *First Report and Order*, including a copy of this final certification, in a report to Congress pursuant to the Congressional Review Act, *see* 5 U.S.C. § 801(a)(1)(A). In addition, the *First Report and Order* and this certification will be sent to the Chief Counsel for Advocacy of the Small Business Administration, and will be published in the Federal Register. *See* 5 U.S.C. § 605(b).

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<sup>135</sup> *See* ITU Resolution 225 (WRC-2000).

<sup>136</sup> The RFA, *see* § 5 U.S.C. S 601 *et. seq.*, has been amended by the Contract With America Advancement Act of 1996, Pub. L. No. 104-121, 110 Stat. 847 (1996) (CWAAA). Title II of the CWAAA is the Small Business Regulatory Enforcement Fairness Act of 1996 (SBREFA).

<sup>137</sup> 5 U.S.C. § 605(b).

<sup>138</sup> 5 U.S.C. § 601(6)

<sup>139</sup> 5 U.S.C. § 601(3) (incorporating by reference the definition of "small business concern" in Small Business Act, 15 U.S.C. S § 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."

<sup>140</sup> Small Business Act, § 15 U.S.C. S 632.

**V. ORDERING CLAUSES**

39. Accordingly, **IT IS ORDERED** that pursuant to the authority contained in Sections 1, 4(i), 7(a), 301, 303(c), 303(f), 303(g), 303(r), 308, and 309(j) of the Communications Act of 1934, as amended, 47 U.S.C. Sections 151, 154(i), 157(a), 301, 303(c), 303(f), 303(g), 303(r), 308, and 309(j), this *First Report and Order and Memorandum Opinion and Order* and the rules specified in the Appendix **ARE ADOPTED**.

40. **IT IS FURTHER ORDERED** that the rules specified in the Appendix **WILL BECOME EFFECTIVE** 30 days after publication in the Federal Register.

41. **IT IS FURTHER ORDERED** that the petition for reconsideration filed by the Satellite Industry Association **IS DENIED**.

42. **IT IS FURTHER ORDERED** that the Commission's Consumer Information Bureau, Reference Information Center, **SHALL SEND** a copy of this *First Report and Order*, including the Final Regulatory Flexibility Certification, to the Chief Counsel for Advocacy of the Small Business Administration.

FEDERAL COMMUNICATIONS COMMISSION

Magalie Roman Salas  
Secretary

**APPENDIX: FINAL RULES**

Part 2 of title 47 of the Code of Federal Regulations is amended as follows:

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

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

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

2. Section 2.106, the Table of Frequency Allocations, is amended by revising pages 52 and 53.

The revisions read as follows:

**§ 2.106 Table of Frequency Allocations.**

\* \* \* \* \*

<p>2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) S5.351A Radiolocation</p> <p>S5.150 S5.371 S5.397 S5.398 S5.399 S5.400 S5.402</p>	<p>2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) S5.351A RADIOLOCATION RADIODETERMINATION- SATELLITE (space-to- Earth) S5.398</p> <p>S5.150 S5.402</p>	<p>2483.5-2500 FIXED MOBILE MOBILE-SATELLITE (space-to-Earth) S5.351A RADIOLOCATION Radiodetermination-satellite (space-to-Earth) S5.398</p> <p>S5.150 S5.400 S5.402</p>	<p>2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 RADIODETERMINATION- SATELLITE (space-to- Earth) S5.398</p> <p>S5.150 S5.402 US41</p>	<p>2483.5-2500 MOBILE-SATELLITE (space-to-Earth) US319 RADIODETERMINATION- SATELLITE (space-to- Earth) S5.398</p> <p>S5.150 S5.402 US41 NG147</p>	<p>ISM Equipment (18) Satellite Communications (25) Private Land Mobile (90) Fixed Microwave (101)</p>
<p>2500-2520 FIXED S5.409 S5.410 S5.411 MOBILE except aeronautical Mobile S5.384A MOBILE-SATELLITE (space-to-Earth) S5.403 S5.351A</p> <p>S5.405 S5.407 S5.412 S5.414</p>	<p>2500-2520 FIXED S5.409 S5.411 FIXED-SATELLITE (space-to-Earth) S5.415 MOBILE except aeronautical mobile S5.384A MOBILE-SATELLITE (space-to-Earth) S5.403 S5.351A</p> <p>S5.404 S5.407 S5.414 S5.415A</p>	<p>2500-2655</p>	<p>2500-2655 FIXED S5.409 S5.411 US205 FIXED-SATELLITE (space-to-Earth) NG102 MOBILE except aeronautical Mobile BROADCASTING- SATELLITE NG101</p>	<p>Domestic Public Fixed (21) Auxiliary Broadcasting (74)</p>	
<p>2520-2655 FIXED S5.409 S5.410 S5.411 MOBILE except aeronautical Mobile S5.384A BROADCASTING- SATELLITE S5.413 S5.416</p> <p>S5.339 S5.403 S5.405 S5.412 S5.418</p>	<p>2520-2655 FIXED S5.409 S5.411 FIXED-SATELLITE (space-to-Earth) S5.415 MOBILE except aeronautical mobile S5.384A BROADCASTING- SATELLITE S5.413 S5.416</p> <p>S5.339 S5.403</p>	<p>2520-2535 FIXED S5.409 S5.411 FIXED-SATELLITE (space-to-Earth) S5.415 MOBILE except aeronautical Mobile S5.384A BROADCASTING- SATELLITE S5.413 S5.416</p> <p>S5.403 S5.415A</p> <p>2535-2655 FIXED S5.409 S5.411 MOBILE except aeronautical Mobile S5.384A BROADCASTING- SATELLITE S5.413 S5.416</p> <p>S5.339 S5.418</p>	<p>S5.339 US205 US269</p>	<p>S5.339 US269</p>	

International Table			United States Table		FCC Rule Part(s)
Region 1	Region 2	Region 3	Federal Government	Non-Federal Government	
2655-2670 FIXED S5.409 S5.410 S5.411 MOBILE except aeronautical mobile S5.384A BROADCASTING SATELLITE S5.413 S5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2655-2670 FIXED S5.409 S5.411 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) S5.415 MOBILE except aeronautical mobile S5.384A BROADCASTING-SATELLITE S5.413 S5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2655-2670 FIXED S5.409 S5.411 FIXED-SATELLITE (Earth-to-space) S5.415 MOBILE except aeronautical mobile S5.384A BROADCASTING-SATELLITE S5.413 S5.416 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2655-2690 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2655-2690 FIXED US205 FIXED-SATELLITE (Earth-to-space) NG102 MOBILE except aeronautical Mobile BROADCASTING-SATELLITE NG101 Earth exploration-satellite (passive) Radio astronomy Space research (passive)	Domestic Public Fixed (21) Auxiliary Broadcasting (74)
S5.149 S5.412 S5.420	S5.149 S5.420	S5.149 S5.420			
2670-2690 FIXED S5.409 S5.410 S5.411 MOBILE except aeronautical mobile S5.384A MOBILE-SATELLITE (Earth-to-space) S5.351A Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2670-2690 FIXED S5.409 S5.411 FIXED-SATELLITE (Earth-to-space) (space-to-Earth) S5.415 MOBILE except aeronautical mobile S5.384A MOBILE-SATELLITE (Earth-to-space) S5.351A Earth exploration-satellite (passive) Radio astronomy Space research (passive)	2670-2690 FIXED S5.409 S5.411 FIXED-SATELLITE (Earth-to-space) S5.415 MOBILE except aeronautical mobile S5.384A MOBILE-SATELLITE (Earth-to-space) S5.351A Earth exploration-satellite (passive) Radio astronomy Space research (passive)			
S5.149 S5.419 S5.420	S5.149 S5.419 S5.420	S5.149 S5.419 S5.420	US205 US269	US269 NG47	
2690-2700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY SPACE RESEARCH (passive)			2690-2700 EARTH EXPLORATION-SATELLITE (passive) RADIO ASTRONOMY US74 SPACE RESEARCH (passive)		
S5.340 S5.421 S5.422			US246		
2700-2900 AERONAUTICAL RADIONAVIGATION S5.337 Radiolocation			2700-2900 AERONAUTICAL RADIO-NAVIGATION S5.337 METEOROLOGICAL AIDS Radiolocation G2	2700-2900	
S5.423 S5.424			S5.423 US18 G15	S5.423 US18	

**JOINT STATEMENT OF  
COMMISSIONERS GLORIA TRISTANI AND MICHAEL J. COPPS  
Concurring in Part, Dissenting in Part**

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, First Report and Order, ET Docket No. 00-258*

It is high time to remove the cloud of uncertainty from the 2500-2690 MHz (2.5 GHz) band, and we wholeheartedly support the decision not to relocate current licensees or otherwise alter their licenses. The ITFS/MMDS community deserves no less after nearly a year under review. We cannot, however, support the majority's decision to add a mobile allocation to this band at this time. Today's decision does not satisfy the findings required by statute that any flexible allocation serve the public interest and not pose harm to existing uses. It is a rush to judgment not supported by evidence in the record. We thus concur in part and dissent in part.

Section 303(y) of the Communications Act requires the Commission, as part of its allocation process, to make several affirmative findings before permitting flexible use in any band. The Commission must find *inter alia* that: such an allocation would be in the public interest; such use would not result in harmful interference among users; and such use would not deter investment in services or systems.<sup>141</sup> The record here does not support such findings, but the majority nonetheless adopts a flexible allocation based on the view that markets will always determine the most highly valued use of spectrum. Section 303(y) demands a more rigorous analysis prior to adopting a flexible allocation.

Had Congress desired an across-the-board policy in favor of flexible allocations and purely market-driven service decisions, it would have adopted one. Instead, Congress delegated to the Commission the responsibility to examine the public interest, interference concerns, and the impact on investment to determine whether flexibility would be appropriate in particular instances. After reviewing the comments filed in this proceeding and the Commission staff's own *Final Report*, we conclude that the record as it presently exists does not support a flexible allocation in the 2.5 GHz band.

*The Public Interest*

The Commission set aside spectrum for ITFS almost forty years ago to give educators a powerful tool to help their students. The paramount public interest in the ITFS spectrum should be to support users' educational programming mission. Although the *Notice of Proposed Rulemaking* specifically asked whether the addition of a mobile allocation would further the ITFS mission, the record offers no support for such a finding.

The record does, however, make clear that the education community makes excellent use of the band. The 1,275 current ITFS licensees serve millions of students on thousands of channels at more than 70,000 locations. The licensees form a broad spectrum of educators and educational entities, including state governments, state universities, public colleges, secondary schools, elementary schools, parochial and private schools, public television stations, and hospitals. These educators use the ITFS spectrum for a variety of innovative and successful applications, including telecourses at all educational levels, traditional educational programming, professional and worker training, and back office administrative communications for schools.

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<sup>141</sup> 47 U.S.C. § 303(y)(2). Section 303(y)(1) also requires the Commission to find that such use is consistent with international agreements.

We take this opportunity to recognize the important contributions that ITFS makes in our educational system and to note that the costs of undermining the services delivered by its licensees would be high. Success stories regarding the delivery of point-to-multi-point educational video and audio programming, interactive telecourses, and other ITFS-related applications are legion. In order to illustrate the public interest value of this service we believe that it is important to highlight examples of the efforts of a few licensees in three broad areas where ITFS improves our country's educational performance.

- *Rural access.* The South Carolina Educational Television Commission includes 64 stations. It serves nearly 800 public schools and more than 400,000 students. Given that a majority of South Carolina's students live in rural areas, ITFS allows the state to tailor its educational technology plan so rural students have access to 1,500 hours of new educational programming each year, as well as live, interactive remote instruction. These powerful services might otherwise be beyond the reach of rural schools.
- *Inner city access.* The Catholic Television Network uses its ITFS licenses to serve more than 600,000 students and 400,000 households. Recipients of these services include schools, colleges, parishes, community centers, hospitals, nursing homes, and residences across the country. From the Los Angeles Archdiocese to the New York Archdiocese, these ITFS licensees are providing critical educational services to a large number of low-income communities where services delivered via CTN's ITFS facilities bring educational resources that are otherwise unavailable.
- *Worker training.* Stanford University operates five ITFS channels. Using these channels, the university offers 250 graduate-level courses each year to thousands of workers at hundreds of companies in Northern California. In an era when "knowledge-based workers" are the most valuable resource to our national economy, the ITFS is giving Stanford and educational institutions around the country the ability to improve worker skills and improve productivity through remote education.

In the last several years we have made significant changes in the service rules governing 2.5 GHz band, including allowing digital operations and two-way services. In each instance, we were careful to ensure that the changes advanced the ITFS mission.<sup>142</sup> As noted above, we requested comment on whether adding a mobile allocation for this band would advance the educational mission and, if so, how such operations could be used in the educational context.<sup>143</sup> In response, no educational users expressed support for adding a mobile allocation.<sup>144</sup> Absent evidence that mobility will assist educational users, we risk the unintentional

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<sup>142</sup> See, e.g., *Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions*, Report and Order, 13 FCC Rcd 19112, 19115 at ¶ 6 (1998), *recon.*, 14 FCC Rcd 12764, *further recon.* FCC 00-244 (rel. July 21, 2000) (amending the Commission's rules realizes the goal of "provid[ing] benefits to the educational community through the use of two-way services").

<sup>143</sup> *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*, Notice of Proposed Rulemaking, ET Docket No. 00-258, FCC 00-455 at ¶ 64 (rel. Jan. 5, 2001).

<sup>144</sup> See, Comments of National ITFS Association at 32 ("NIA does not believe that it is in the interests of ITFS licensees, educators, students, adult learners, the general public seeking broadband access, or even the United States economy, to facilitate any attempt to substitute mobile services for fixed wireless broadband and educational video services that are now being deployed in the 2500-2690 MHz band."). See also, Letter of (continued....)

consequence of undermining the mission of the ITFS.

The majority asserts that the public interest is satisfied by providing licensees with choice. They cite the Commission's 1999 *Spectrum Management Policy Statement*, which finds that "Flexible allocations *may* result in more efficient spectrum markets."<sup>145</sup> While flexible allocations are appropriate in many instances, the *Policy Statement* clearly did not state that flexible allocations are warranted in all circumstances. We believe that the public interest in this band is served by ensuring that our policies further the ITFS educational mission. The record simply does not support the majority's finding.

The majority also points to the value of fixed wireless broadband services in rural areas as a reason for protecting incumbents in the 2.5 GHz band. We strongly agree. Congress demonstrated an unmistakable interest in the availability of advanced services, such as wireless broadband services, in rural areas in Section 706 of the Telecommunications Act of 1996. The MMDS licensees have demonstrated that their technologies hold great promise to deliver broadband services to rural areas where wireline broadband might be unavailable. The availability of broadband services in these communities would contribute to achieving the Communications Act's goal of equal access to communications services in all areas of the country.

We therefore think that it is important to understand how the addition of a mobile allocation would effect the roll-out of wireless broadband services in rural areas. If we are relying on the value of MMDS licensees providing rural broadband as a reason for not relocating current licensees, we must be sure that by adding a mobile allocation we are not undermining rural broadband. The decision here could have a damaging effect on broadband deployment.

#### *Interference Concerns*

The Commission has previously concluded that section 303(y) reflects "Congressional concern that proposals for flexible use of spectrum have the potential, if not thoroughly considered, to create interference between services and discourage investment and technical innovation."<sup>146</sup> To address these concerns, the Commission has determined that section 303(y) requires "a positive determination that such issues have been considered, and that these potential problems will not be realized, *before it approves such flexible use of spectrum allocations – i.e., allocation or service rules . . .*"<sup>147</sup> Although the majority finds that under current technology, fixed and mobile (other than portable) sharing of the 2500-2690 MHz band does not appear feasible, the majority nonetheless concludes that a flexible allocation satisfies the requirements of section 303(y). We disagree.

During the past year, the Commission's staff has conducted an exhaustive examination of the 2.5 GHz band. The staff's *Final Report* reviewed the technical characteristics of the band, the incumbent licensing scheme, the current and evolving uses of the spectrum, and the potential for using the band for advanced

(Continued from previous page) \_\_\_\_\_

Catholic Television Network and National ITFS Association to the Honorable Michael Powell on August 29, 2001 at 1 ("We have not asked, and are not now asking, for a flexible use designation.").

<sup>145</sup> *Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium*, Policy Statement, 14 FCC Rcd 19868, 19870 at ¶ 9 (emphasis added).

<sup>146</sup> *Upper 700 MHz First R&O*, *supra* n.106 at ¶ 10.

<sup>147</sup> *Id.* (emphasis added).

wireless mobile systems.<sup>148</sup> The *Final Report* identified the significant hurdles raised by introducing mobile services into this band. In particular, the report concluded:

- Current licensing scheme. Incumbent ITFS and MDS use of the 2500-2690 MHz band varies from one geographic area to another. This lack of uniformity presents serious challenges to developing band sharing or segmentation options that could be used across the country without severely disrupting ITFS and MDS use.<sup>149</sup>
- Sharing. If currently contemplated 3G systems were to share the same spectrum or channels in any given geographic area, large co-channel separation distances would be needed between 3G systems and incumbent ITFS and MDS systems to avoid harmful interference. For example, a 3G base station (either high-powered or low-powered) would have to be beyond the radio horizon or 100 miles to avoid causing interference to a co-channel ITFS/MDS receiver. Very low-powered 3G mobile stations would have to maintain distances between 62 and 100 miles to avoid causing harmful interference to co-channel ITFS/MDS receivers.<sup>150</sup>
- Segmentation. Segmenting the 2500-2690 MHz band to enable third generation mobile wireless systems access to a portion of this spectrum would raise significant technical and economic difficulties for incumbents, especially if all ITFS/MDS operations were to be relocated within the band. Any segmentation plan would sharply reduce the spectrum available for two-way ITFS/MDS systems, which would result in reduced data speeds or smaller coverage areas.<sup>151</sup>

The comments in this proceeding, moreover, reveal significant opposition to a flexible allocation. Many ITFS and MDS parties conclude that the addition of a mobile allocation simply makes no sense.<sup>152</sup> Even mobile wireless providers committed to finding 3G spectrum conclude that the 2.5 GHz band is not a viable solution to their needs.<sup>153</sup>

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<sup>148</sup> FCC Staff Report Issued by the Office of Engineering and Technology, Mass Media Bureau, Wireless Telecommunications Bureau, and International Bureau, "Spectrum Study of the 2500-2690 MHz Band: The Potential for Accommodating Third Generation Mobile Systems," Final Report, ET Docket No. 00-258 (rel. Mar. 30, 2001) (*Final Report*).

<sup>149</sup> *Id.* at ii.

<sup>150</sup> *Id.* at ii, 30-31.

<sup>151</sup> *Id.* at ii, 53

<sup>152</sup> See, Comments of WorldCom at 25 ("A flexible allocation approach, moreover, would significantly complicate frequency coordination in the MMDS/ITFS frequency bands. As it stands now, coordination among two-way licensees and incumbent MMDS/ITFS providers is a daunting and complicated task. Adding a mobile allocation to the band would only further complicate matters by creating new and more difficult interference scenarios."). See also, Comments of National ITFS Association at 31-32 ("NIA does not support adding a mobile allocation to the 2500-2690 MHz band, even if there is no mandatory reallocation. NIA believes that the FCC correctly suggested, in the *Interim Report*, that mobile services cannot share this spectrum with the ubiquitous fixed service operations in the band.").

<sup>153</sup> See, Letter of the Cellular Telecommunications & Internet Association to Magalie Roman Salas on Aug. 28, 2001 at 2 ("Adding a mobile allocation in this band raises significant interference and service quality concerns.").

The majority's explanation of its basis for concluding that a mobile allocation would not result in harmful interference among users does not satisfy us. They assert that parties can introduce mobile services into this band without causing harmful interference to ITFS/MMDS operations because incumbent licensees will determine the specific services to be offered. Harmful interference, of course, is of critical concern to neighboring licensees, and the fact that an incumbent rather than a new entrant would choose to introduce mobile services does little to assuage an adjacent licensee's concerns.

The decision also observes that any mobile use that does not comport with existing technical rules or interference agreements cannot occur in this band until after the Commission conducts a service rules proceeding. Any new rules, they assert, would ensure that incumbent ITFS/MMDS and mobile operations could co-exist in this band and protect incumbent uses. While the majority has decided to defer consideration of interference issues to a service rules proceeding, section 303(y) requires the Commission to address these concerns "before it approves such flexible use of spectrum allocations",<sup>154</sup>

#### *Impact on Investment*

Finally, several incumbent licensees assert that a mobile designation will negatively impact investment in fixed broadband technologies and systems in the 2.5 GHz band. Without a solid basis to conclude that both fixed and mobile services can thrive in this band, we are wary of the unintended consequences that could result. We sincerely hope this is not the case. Given the interference hurdles identified above, we believe it is premature to conclude that a mobile allocation will spur investment in new technologies for this band.

We note that the majority expresses no desire to initiate a mobile service rules proceeding at this time. We believe a more prudent course would have been to not grant a mobile allocation at this time and indicate that, as technological and marketplace developments occur, it may be appropriate to review the 2.5 GHz allocation at a later date.

In conclusion, we strongly support the decision not to relocate current licensees or otherwise alter their licenses. ITFS provides critical services across the country, and MMDS has the potential to contribute significantly to the roll-out of broadband in rural areas. However, adding a mobile allocation for the 2500 MHz band is premature, unwise, and contrary to the statute.

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<sup>154</sup> *Upper 700 MHz First R&O*, 15 FCC Rcd at 481 ¶ 10.

**SEPARATE STATEMENT OF  
COMMISSIONER KATHLEEN ABERNATHY**

**In 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, First Report and Order, ET Docket No. 00-258**

Today the Commission affirms and expands the bundle of rights of MMDS/ITFS licensees to continue to operate in the 2500-2690 MHz band. Although I would have preferred a decision sooner, our Order resolves the lingering uncertainty for these licensees and allows the parties to move forward with their operations. As for the flexibility afforded by today's Order, I trust the MMDS/ITFS licensees will exercise or decline to utilize these rights responsibly and as they see fit. I do not believe that government is better positioned than these licensees to assess what is in their interest or how best to deliver their services. Nonetheless, the FCC will remain vigilant to ensure that the bundle of spectrum usage rights, including interference protections, afforded to our licenses in these bands will remain intact for all licensees.

Since the World Radio Conference (WRC) in Istanbul designated the 2500-2690 MHz band as a possible location for advanced wireless services<sup>155</sup>, the MMDS/ITFS community has faced the difficult uncertainty of possible relocation at a critical time in their development. The evolution of this service – from an analog one-way point-to-point microwave system for video distribution to a dynamic two-way wireless digital broadband pipe – has been long and difficult. Then last year, on the cusp of the first significant MMDS broadband deployments, the WRC's cloud of relocation uncertainty settled over the MMDS bands. While some licensees were adding broadband wireless customers at a rate of 2000 a week, the FCC looked at plans to take substantial chunks of spectrum away from MMDS.<sup>156</sup> For ITFS, the difficulties were no less acute. These bands had been used for decades to provide needed distance learning services to schools, hospitals, and universities around the nation. ITFS licensees had navigated the potentially difficult shoals of a relationship with their MMDS brethren to form a symbiotic and productive partnership in these bands. The specter of forced relocation slowed interest and investment. The Commission's Office of Engineering and Technology issued an Interim and then Final Report that found relocation would be extremely difficult and result in costs estimated at \$10-30 billion. In the end, these facts led me to the inevitable conclusion that these licensees should not be subject to forced relocation. I regret that it took us almost six months after the Final OET staff report to come to this conclusion – but I believe it is the right one.

Today's Order also concludes that adding a mobile allocation to this band is consistent with Section 303(y) of the Communications Act. That provision grants the Commission authority to allocate spectrum to provide for flexible use if:

- (1) such use is consistent with international agreements to which the United States is a party;  
and
- (2) the Commission finds, after notice and an opportunity for public comment, that –
  - (A) such an allocation would be in the public interest;

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<sup>155</sup> See Provisional Final Acts of the World Radiocommunication Conference (Istanbul, WRC-2000).

<sup>156</sup> See Sprint Reply Comments at 4.

- (B) such use would not deter investment in communications services and systems, or technology development; and
- (C) such use would not result in harmful interference among users.

**Consistent with International Agreements:** A mobile allocation is consistent with international agreements to which the United States is a party. The 2500-2690 MHz band is allocated in Region 2 (which includes the U.S.) on a primary basis to the Fixed, Fixed Satellite, Mobile except aeronautical mobile, and Broadcasting-Satellite Services.<sup>157</sup>

**Serves the Public Interest:** Adding a mobile allocation to this band continues an evolutionary trend in the 2500-2690 band. This evolution has been most dramatic in the commercial portion of the band. Originally conceived as a wireless competitor to multi-channel video service providers, the Commission eventually granted the MMDS licensees, along with their ITFS partners, flexibility to provide two-way digital services, including broadband. The additional flexibility granted here continues this trend, is consistent with the Commission's Spectrum Policy Statement, and recognizes that a flexible approach to spectrum allocation affords licensees the ability to keep pace with new technologies and respond to changing market conditions.<sup>158</sup>

I wish to emphasize that this prong of the statutory test is the "public interest" – not solely the "incumbents' interests." Although I believe our decision in this case is consistent with both, there is an inherent danger in equating the two concepts – as the dissenters appear to do. Indeed if we were to have followed such an approach five years ago, we still might only have one-way analog video services in these bands today. Our interests must be broader than those of any one set of licensees; our interests must encompass the totality of the "public" interest.

There is no question that the ITFS and MMDS licensees in these bands currently provide extremely valuable services to the public. At the recent WCA conference in Boston, I visited with the dozens of service providers, manufacturers, and licensees in these bands.<sup>159</sup> The ITFS licensees told me about the schools and hospitals that relied on ITFS-based services in order to complete their missions. These licensees also spoke eloquently about the support they received through the leasing arrangements with their MMDS colleagues. The MMDS industry updated me on their rollout plans and the success they were having in the marketplace. I expressed my strong support for clearing any regulatory hurdles or uncertainty that could inhibit the creation of the all-important third broadband pipe to the home. Particularly because MMDS may well provide such services in areas where cable and DSL service are not yet fully deployed. I would not support any decision that would undermine these services.

My colleagues in the minority seem to suggest that our decision here would damage these incumbent operations and that somehow the majority does not appreciate the contributions of these licensees. This is not the case. Nothing in today's Order will inhibit the ability of incumbents to continue to offer their services for as long as they wish. Instead it simply provides another option that these licensees may utilize to achieve their goals – whether those goals be in the classroom, the operating room,

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<sup>157</sup> 47 C.F.R. § 2.106; see also Provisional Final Acts of the World Radiocommunication Conference (Istanbul, WRC-2000) (designating 2500-2690 for possible IMT-2000 use).

<sup>158</sup> See Principles for Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the New Millennium, FCC 99-354, *Policy Statement*, 14 FCC Rcd 19868 (1999).

<sup>159</sup> Cmr. Kathleen Abernathy, Remarks at the 14th Annual Wireless Communications Ass'n Convention (June 25, 2001) (transcript available at <http://www.fcc.gov/Speeches/Abernathy/2001/kqa101.html>).

or the boardroom.<sup>160</sup> It may well be that ten years from now there will not be a single mobile use in these bands – but I will still regard flexibility as the right policy.

Fundamentally I believe in these licensees and their ability to exercise sound judgment. I believe in their ability to make choices about their spectrum usage. I believe they can best decide whether to deploy a mobile service – or to continue with their current applications. I believe in their record of working together to achieve their common goals. I believe they will continue to serve the public interest through whatever range of services they chose to offer. I do not agree that government is best positioned to decide how these licensees use their spectrum – or that government should deny these licensees (and thus their end users) a mobile service choice.

There has been some concern raised about the nature of the record support for a mobile allocation in this band. There is no disputing that the weight of the record provided by the incumbents opposes a flexible allocation. This is hardly surprising given the political posture of this proceeding. The primary focus of this proceeding has always been a possible relocation plan for these licensees – that is, MMDS/ITFS would be forced to give up all or part of their existing spectrum to make way for new mobile service providers to be determined at auction. In short, MMDS/ITFS licensees were fighting for their spectrum lives. With the stakes so high, it is no surprise that MMDS/ITFS focused their sights on maintaining the status quo rather than expanding their rights.<sup>161</sup> It's a bit like a politician asking for a pay raise while immersed in a difficult re-election campaign. First, the pay raise request does not help her case on re-election. Second, it is simply not a great time to ask for a pay increase, regardless of the merits of such a claim. I believe our decision here cuts through to the merits of the claim for mobile flexibility – even if perhaps the timing may have hindered active advocacy of such an approach by most parties.

I also believe that advocacy of flexibility may have been seen as inconsistent with permitting incumbents to maintain their existing allocations. In other words, the accusation goes, why should incumbents be permitted to provide a mobile service while a new entrant cannot. I do not believe there is any inconsistency in these approaches. By our decision today, we indicate that the existing ITFS/MMDS uses in these bands are too valuable to disrupt through the government-mandated relocation that would be required in order for new entrants to begin offering mobile services. Alternatively, if incumbents can continue to provide those services or chose to modify their offerings to allow for mobility, those policy outcomes do not disrupt via government fiat the important operations in these bands. In the end, our goal is only to provide licensees the opportunity to enhance their value through mobile use, if the licensees wish to initiate such a service.

***Would Not Deter Investment In Communications Services And Systems, Or Technology Development:*** Nothing in today's order should hinder technological development for ITFS and MMDS uses. In fact, today's decision may well provide the impetus for new and innovative services in these bands by removing the cloud of uncertainty from this band and harmonizing the allocation with the rest of the Region 2. Regionally harmonized allocations lend themselves to the type of scale and scope which leads to research and product development. Moreover, in light of our conclusions about the need to protect incumbent users, our decision may well spur development of integrated service offerings that allow mobile and fixed services to share more readily.

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<sup>160</sup> For example, there is no reason to think that an ITFS/MMDS lease arrangement will not be just as – if not more – lucrative with a mobile use than with a fixed application.

<sup>161</sup> This is particularly true at a time when these licensees are just incorporating the additional flexibility afforded by our two-way and digital policies.

One might argue that the item's flexibility analysis on this prong would always result in flexibility. In other words, when would flexibility deter investment? It is a difficult question, given my general comfort with spectrum flexibility and the marketplace. However, there may indeed be situations where flexibility could inhibit investment and innovation. For example, the Commission recently set aside significant amounts of spectrum for wireless medical telemetry.<sup>162</sup> Adding flexibility to that band could very well chill investment in medical telemetry services without any corresponding up-tick in investment for the flexible service offerings.

***Would Not Result In Harmful Interference Among Users:*** Today's decision does not alter in any way the existing interference protection afforded to licensees in these bands – which, coupled with private “interference contracts,” have proven effective in protecting all users from harmful interference. Therefore, future mobile uses in this band can only happen if the use will “not result in harmful interference among users.”

Interference protection lies at the core of the Commission's responsibilities. Regardless of the extensive nature of the spectrum usage rights that we distribute, we will always be called upon to prevent licensees from externalizing costs (through interference) onto their neighbors. Today's Order contemplates a further rulemaking to assess whether modifications of our interference rules in these bands are appropriate in light of the additional mobile allocation. I look forward to a full record in that proceeding. My colleagues in dissent suggest that we are required under our Upper 700 MHz First Report and Order to assess the impact of interference “before [the FCC] approves such flexible use.”<sup>163</sup> The minority misconstrues that Order. Prior to that Order, the Commission had already reallocated the 700 MHz band for use on a flexible basis by the fixed, mobile and broadcasting services.<sup>164</sup> The quoted Order addressed the service rules necessary to control interference under the flexible allocation. Similarly, the majority now finds that the 2.5 GHz band can be allocated for mobile service on a flexible basis and any potential interference issues can be addressed in a future service rule proceeding. Moreover in this band – unlike the new service to be provided in the cleared spectrum at 700 MHz – there are existing interference protections that allow for continued operations. For now, these interference rules and the obligation of any new services to operate on a non-interference basis ensure that the addition of the new capability will not result in harmful interference among users. That is what every licensee has the right to expect.

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MMDS/ITFS licensees and the public are now well positioned to enjoy the fruits of a decade of technological advances and the Commission's regulatory labor. We have removed technical restrictions, increased commercial flexibility, made more spectrum available, and encouraged technological innovation. Again, today we take another substantial step towards providing licensees with one more choice on how to further develop and deploy services that meet their and the public's needs. The history of this band over the last thirty years has been one of great promise, false starts, rebirth, and success. As the

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<sup>162</sup> See Amendment of Parts 2 and 95 of the Commission's Rules to Establish a Wireless Medical Telemetry Service; Report and Order, ET Docket 99-255 (rel. Feb. 23, 2001).

<sup>163</sup> See Cmrs. Tristani and Copps' Joint Statement concurring in part and dissenting in part with 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, First Report and Order, ET Docket No. 00-258 (rel. Sept. 10, 2001).

<sup>164</sup> See *Reallocation Report and Order* 12 FCC Rcd 22953 (1998) and *Reallocation Reconsideration* 13 FCC Rcd 21578 (1998).

communications world moves from static analog one-way services to a dynamic digital two-way mobile environment, the ITFS and MMDS licensees in this band will now have the tools for another cycle of innovation, investment and creative new services to better meet the needs of their users. I look forward to the public's opportunity to fully enjoy the benefits of these licensees' entrepreneurship, dedication to community, and innovation in the marketplace.