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Before the  
**FEDERAL COMMUNICATIONS COMMISSION**  
Washington, D.C. 20554

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In the Matter of )  
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)  
Amendment of Section 2.106 of the )  
Commission's Rules to Allocate )  
Spectrum at 2 GHz for Use by the )  
Mobile-Satellite Service )  
)

ET Docket No. 95-18

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**JOINT COMMENTS OF THE MSS COALITION**

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## SUMMARY

The time is ripe for the FCC to adopt the 2 GHz MSS allocation proposed in this proceeding (1990-2025 and 2165-2200 MHz). Immediately following this allocation, the Commission should open a short window to allow the filing of MSS satellite systems. These actions are needed to ensure the service and operational rules are developed in a timely manner and that the benefits of 2 GHz MSS services are introduced to the public as rapidly as possible.

The MSS allocation, of course, raises the question of how to accommodate the existing licensees in the MSS downlink and uplink spectrum bands. The proposed MSS downlink spectrum (2165-2200 MHz) is currently used by fixed service microwave ("FS") operators and the MSS uplink spectrum (1990-2025 MHz) constitutes broadcast auxiliary service ("BAS") Channels 1 and 2. The *Notice* assumes that the existing licensees in the affected bands will have to relocate to other frequency bands at the MSS licensees' expense, namely FS licensees to frequencies above 2 GHz and Channel 1 and 2 BAS systems to the 2110-2145 MHz band.

However, the Joint Commentors submit that relocation and reimbursement rules of the sort adopted by the FCC for the personal communications services ("PCS") bands are not necessary in the MSS bands. Unlike the situation between PCS and incumbent FS licensees at 1850-1990 MHz, sharing is feasible for an extended period between FS licensees and MSS systems. Longstanding Commission policy has favored sharing as the quickest and most economical way to introduce new uses in existing allocations, as well as the most spectrally efficient. In the *Emerging Technologies* proceedings that laid the ground work for the current MSS spectrum allocation proposal, the Commission made clear that it contemplated

sharing between incumbent licensees and new systems in the emerging technologies bands where possible, and that relocation would be employed only when necessary.

*The MSS Downlink (2165-2200 MHz).* When the Commission issued its *Notice*, it did not consider the possibility that MSS and FS licensees could share the MSS downlink. Indeed, the reason that the world, at WARC-92, decided to implement international MSS as late as the year 2005 was the premature conclusion -- in the absence of detailed studies -- by the conferees that MSS and FS sharing would not be feasible. As a result, the *Notice*, apparently following suit, as well as seeking to extend the framework implemented in the PCS bands, simply assumed that FS licensees would have to be relocated at MSS licensees' expense and that relocation rules should be adopted simultaneously with the allocation order.

By WRC-95, the views toward coordination between MSS and FS licensees had matured. The conferees, confident that MSS and FS operations could share for a substantial period before MSS traffic levels are at a maximum (thus permitting FS operations gradually to transfer out of the MSS downlink band by the year 2005), made resolutions and recommendations to develop MSS/FS sharing methodologies. Since the Conference, much has been accomplished to refine the methodologies for coordination and further demonstrate the feasibility of sharing. Specifically, several ITU-R working groups have been deeply engaged in the development of sharing/coordination methodologies since WRC-95, and these efforts have reached advanced stages. In addition, MSS and FS industry representatives have met informally in this country concerning the prospects for sharing and appear to concur with the wisdom of additional discussions to explore these matters. In the Joint Commentors' view, sharing can work.

***The MSS Uplink (1990-2025 MHz).*** Although the Joint Commentors strongly believe that the MSS downlink can be shared with the FS incumbents for an extended period, the *Notice* contemplates that FS licensees may have to move for another reason. Specifically, the *Notice* raises the issue that BAS Channels 1 and 2 licensees in the MSS uplink (1990-2025 MHz) may be relocated to the FS band at 2110-2145 MHz. As FS licensees use paired channels, with one channel in the 2110-2150 MHz band and the other channel in the 2160-2200 MHz band, if the BAS licensees move to the 2110-2145 MHz band, then FS licensees in the MSS downlink band will have to move regardless of whether they can share the downlink spectrum.

While the Joint Commentors do not believe BAS and MSS operations can reliably share the same spectrum, *i.e.*, the MSS uplink, they are confident there are several practical engineering alternatives to relocating the occupants of BAS Channels 1 and 2 (which cover the MSS uplink) to the 2110-2145 MHz FS band. For example, the prospects for using rechannelization and/or digital techniques to allow all BAS licensees to utilize the spectrum currently used by BAS Channels 3-7 (2025-2110 MHz) without a degradation of service are very promising. Requiring such measures would be appropriate given the large amounts of spectrum available in several bands for BAS operations (almost 370 MHz) and the very inefficient use of the spectrum made by BAS analog equipment. If BAS were to rechannelize or digitalize or migrate to a new home outside the 2 GHz band, then FS licensees could remain in 2110-2145 MHz and share the 2165-2200 MHz band with MSS for a reasonable period of time.

***International Considerations.*** The application of relocation and reimbursement rules to the MSS spectrum allocations would be unsound as a matter of public policy because of the

international nature of 2 GHz MSS. The provision of international MSS will require a significant degree of international regulatory coordination. To date the United States has taken a leadership role in the efforts to make international MSS a reality and to bring the benefits of MSS to the public as rapidly as possible. The FCC should endeavor to ensure that the U.S. maintains this position by seeing that the U.S. regulatory framework is in accord with the approaches taken by other countries. Without imposing unnecessary cost burdens on MSS, the FCC should seek to harmonize its approach with international trends. The application in the MSS bands of relocation and reimbursement rules like those employed in the PCS bands, as proposed in the *Notice*, would be diametrically opposed to international developments.

\* \* \* \* \*

Accordingly, the Joint Commentors firmly believe, based upon the significant advancements toward development of FS/MSS sharing methodologies, the prospects for BAS engineering alternatives for Channels 1 and 2 licensees, and the desirability of fostering cooperation within the international community, that relocation and reimbursement rules for the MSS downlink are not necessary. Therefore, simultaneously with making the MSS spectrum allocation and accepting applications for MSS systems, the FCC should decline to adopt rules concerning relocation of incumbent licensees affected by the allocation to MSS. Rather, the FCC should adopt the phased transition plan in the COMSAT *Supplemental Comments*. Simultaneously, the FCC should impose an immediate freeze on the acceptance and processing of FS and BAS license and modification applications for use of the MSS spectrum, except for a narrowly construed class of minor modifications. By taking these steps, the Commission will give MSS the best opportunity to develop and ensure the incumbent operators in 1990-2025 and 2165-2200 MHz are not unfairly burdened.

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**JOINT COMMENTS OF THE MSS COALITION**

Celsat America, Inc. ("Celsat"), COMSAT Corporation ("COMSAT"), Hughes Space and Communications International ("Hughes"), ICO Global Communications ("ICO"),<sup>1</sup> and Personal Communications Satellite Corporation ("PCSAT")<sup>2</sup> (collectively, the "Joint Commentors"), by their attorneys, hereby submit these Joint Comments in response to the Commission's April 17, 1996, Public Notice.<sup>3</sup> The FCC, in that Public Notice, requested comments on the March 14, 1996 Supplemental Comments of COMSAT Corporation ("Supplemental Comments"), which advocated a phased transition plan to 2 GHz Mobile Satellite Service ("MSS"), and on the responses to the Supplemental Comments filed by Motorola, Inc., UTC, and the American Petroleum Institute ("API").<sup>4</sup>

The Joint Commentors represent a diverse cross-section of participants in the MSS industry. They include potential operators of MSS systems, wholesalers and retailers of MSS

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<sup>1</sup>ICO joins in these comments and supports the positions presented herein, but also notes that some MSS systems filed at the ITU with coverage and service areas over the United States will be independently subject to the applicable international ITU coordination procedures.

<sup>2</sup>PCSAT is a wholly owned subsidiary of American Mobile Satellite Corporation.

<sup>3</sup>See DA 96-677.

<sup>4</sup>On April 11, 1996, COMSAT replied to the responses of Motorola and UTC. The Joint Commentors incorporate COMSAT's reply thereto herein by reference.

services in the U.S. and abroad, investors in MSS systems and MSS equipment manufacturers.<sup>5</sup> These Joint Comments present a unanimous view on the important sharing issues discussed in the Supplemental Comments and the necessary steps to bring MSS to the American public expeditiously.

## I. INTRODUCTION

After the release of the Notice of Proposed Rulemaking in the above-captioned proceeding,<sup>6</sup> the United States delegation at WRC-95 successfully obtained more than 70 MHz of spectrum at 2 GHz in the U.S. (and Canada) -- *i.e.*, 1990-2025 and 2160-2220 MHz -- to permit the introduction of MSS in the United States beginning on January 1, 2000. The WRC-95 conferees also agreed to accelerate, by five years, the availability of 60 MHz in the rest of the world (1980-2010 and 2170-2200 MHz) from January 1, 2005 to January 1, 2000. These efforts were made in the recognition that accelerated and globally coordinated introduction of international MSS systems in the 2 GHz band would bring a myriad of public benefits more quickly and that sharing between MSS systems and fixed microwave service ("FS") licensees for an extended period of time would be practical.

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<sup>5</sup>COMSAT participates in these Comments -- even though COMSAT prompted the Commission's Public Notice -- because a failure to do so could have detracted from the unanimous consensus on these issues among the many companies that are planning to commence operating MSS systems in the year 2000. In addition, these Joint Comments also reply to portions of the opposition of the American Petroleum Institute to the Supplemental Comments, a filing to which COMSAT had not, to date, responded.

<sup>6</sup>*Amendment to Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for use by the Mobile Satellite Service*, Notice of Proposed Rulemaking, 10 FCC Rcd 5230 (1995) ("*2 GHz Notice*").

The record developed in this proceeding, beginning with the FCC's assessment in the *2 GHz Notice*,<sup>7</sup> confirms both the public interest in the development of MSS and the ability of MSS to share the 2 GHz bands with incumbents during an extended transitional period. Accordingly, the Joint Commentors believe the time is now ripe for the Commission to take action to facilitate the development of MSS in the U.S.

Specifically, as discussed more fully below, the Commission should reject its proposal to apply its emerging technology relocation rules to MSS. Application of those rules to MSS is not only unnecessary, but would significantly hinder the development of the service.

In addition, the Commission should:

- implement the results of the 1995 World Radiocommunication Conference ("WRC-95") by allocating 1990-2025 MHz and 2165-2200 MHz to MSS;
- adopt the phased transition plan set forth in the *Supplemental Comments*;
- encourage FS incumbents to participate in technical discussions to refine MSS/FS coordination methodologies;
- freeze the licensing and modification (except for minor modifications) of FS systems in the 2165-2200 MHz bands and the Broadcast Auxiliary Service ("BAS") systems in the 1990-2025 MHz; and
- establish a filing window for 2 GHz MSS systems.

By taking these steps, the Commission will provide MSS with the best opportunity to develop, while at the same time ensuring that incumbent users of the MSS bands are not unfairly burdened.

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<sup>7</sup>*2 GHz Notice*, 10 FCC Rcd at 5233.

## **II. THE COMMISSION NEED NOT AND SHOULD NOT APPLY THE EMERGING TECHNOLOGIES RELOCATION RULES TO 2 GHZ MSS OPERATIONS**

The Commission has proposed to apply the relocation rules developed in the *Emerging Technologies* proceeding to MSS.<sup>8</sup> That proposal should be rejected for two reasons. First, the relocation rules were designed to compensate incumbents for incurring additional expenses associated with having to replace their equipment (due to relocating) before they normally would do so when sharing was not feasible. Incumbents in the MSS bands will not incur these additional expenses. As we explain below, MSS and FS operations in the MSS downlink band will be able to share until such time as the incumbents would normally replace their equipment. Moreover, incumbent BAS operators in the MSS uplink need not be moved to 2110-2145 GHz, as the Commission has proposed. Engineering solutions are available that would allow those BAS operators to utilize spectrum more efficiently and thus also avoid harmful interference with MSS operators until such time as the BAS operators would normally replace their equipment.

Second, in light of the inherent international nature of MSS, forcing MSS operators to bear the unnecessary expenses associated with relocation could seriously hinder the development of this service. In recognition of this fact, regulatory bodies in other countries have taken steps to provide for MSS and FS sharing until such time as the existing FS licensees can gradually transition out of the current FS allocations to be used by MSS.

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<sup>8</sup>See *Redevelopment of Spectrum to Encourage Incorporation in the Use of New Telecommunications Technologies*, First Report and Order and Third Notice of Proposed Rulemaking, 7 FCC Rcd 6886 (1992) ("First ET Order"), *recon.* Third Report and Order and Memorandum Opinion and Order, 8 FCC Rcd 6589 (1993) ("Third ET Order"), *recon.*, Memorandum Opinion and Order, 9 FCC Rcd 1993 (1994) ("ET Reconsideration Order").

Accordingly, at the same time that the Commission adopts the 1990-2025 and 2165-2200 MHz bands allocation for MSS, it should reject the proposal that relocation and reimbursement rules are necessary for these bands.<sup>9</sup>

**A. Relocation Rules Are Not Required for MSS  
Use of 2165-2200 MHz**

**B.  
The *Emerging Technologies Proceeding Concluded*  
That New Licensees and Incumbents Should  
Share Where Feasible**

The FCC historically has supported sharing solutions as a means of expediting the introduction of new services. In implementing its statutory directives, the FCC has long recognized coordination as a "critical element in the efficient use of the spectrum."<sup>10</sup> Acknowledging that radio spectrum is a scarce national resource, the FCC has "come to promote spectrum saving technologies and spectrum sharing, to make the most of the spectrum available."<sup>11</sup> Thus, for example, the FCC has noted, that in considering a request

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<sup>9</sup>Should the Commission conclude that further study of the issue of the applicability of the relocation rules to MSS is warranted, it nevertheless can and should immediately take certain steps discussed herein in order to avoid unnecessarily delaying the development of MSS at 2 GHz. Specifically, the Commission should (1) issue an order modifying the U.S. Table of Frequency Allocations by allocating 1990-2025 and 2165-2200 MHz to MSS; (2) adopt the phased transition plan in the *Supplemental Comments*; (3) impose a freeze on all new BAS and FS license applications in the MSS-allocated bands; (4) take steps, as necessary, to encourage and facilitate technical discussions between MSS interests and incumbent licenses regarding the accommodation of the MSS allocation; and (5) open a brief filing window for 2 GHz MSS applications.

<sup>10</sup>*Frequency Coordination in Private Land Mobile Radio*, 4 F.C.C. Rcd 6325, 6325 (1989). See also 47 U.S.C. § 157(a) (the Communications Act of 1934, as amended, establishes a national policy "to encourage the provision of new technologies and services to the public"); 47 U.S.C. § 303(g) (the Commission is charged with "[s]tudy[ing] new uses for radio" and "generally encourag[ing] the larger and more effective use of radio in the public interest.").

<sup>11</sup>Statement of Thomas P. Stanley, Chief Engineer, before the Senate Subcommittee on Communications at 3 (Aug. 2, 1990).

for a pioneer's preference, the Commission could reward an applicant for "proposals that promise to enable the sharing, or co-use, of allocated spectrum."<sup>12</sup>

Indeed, so central is the exploration of spectrum sharing to the FCC's frequency management responsibilities that the Congress, in giving the Commission the authority to auction spectrum, made clear that the FCC was not thereby relieved "of the obligation in the public interest to continue to use engineering solutions, negotiation, . . . and other means in order to avoid mutual exclusivity in application and licensing proceedings."<sup>13</sup> As the Commission has recognized, the encouragement of spectrum sharing, where feasible, even in an age of competitive bidding, remains the "obligation" of the FCC. A recent example of FCC action in this regard was the successful development of a band sharing plan by the big-LEO MSS applicants in 33 MHz of spectrum in late 1994.<sup>14</sup>

The FCC's orders in the *Emerging Technologies* proceeding established two spectrum allocations for new, "emerging technologies" addressed in the pending *Notice*, namely the 2110-2150 MHz and 2160-2200 MHz bands. In those orders, the Commission acknowledged that it would evaluate the steps needed to accommodate incumbent licensees occupying that spectrum in the context of the specific new services proposed for these bands. Given the Commission's longstanding policy of promoting spectrum sharing and engineering solutions, where feasible, the FCC's *Emerging Technologies* decisions clearly state a preference for accommodating incumbents through sharing:

. . . we are allocating the 1850-1990, 2110-2150, and 2160-2200 MHz bands for the development and implementation of emerging technologies *on a shared basis with the*

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<sup>12</sup>*Establishment of a Pioneer's Preference*, 6 F.C.C. Rcd 3488, 3492 (1991).

<sup>13</sup>47 U.S.C. § 309(j)(6)(E).

<sup>14</sup>*See Low-Earth Orbiting Satellite Systems*, Report and Order, 9 FCC Rcd 5936 (1994).

*fixed service*. The use of these allocations will be developed in ongoing and future proceedings that will address particular emerging technology services. When specific services are allocated in these bands *we will adopt specific interference standards to allow for the sharing of this spectrum*. These standards will protect operations of incumbent licensees from harmful interference caused by operations of emerging technology licensees.<sup>15</sup>

Because the agency was not making allocations to specific services in the *Emerging Technologies* orders, it acknowledged that "the feasibility of spectrum sharing between new services and fixed microwave services has not been fully determined and will depend upon the technical design of individual new systems and services." In other words, once the FCC determined the specific service that would occupy each emerging technologies allocation, the feasibility of spectrum sharing with incumbent licensees would have to be examined anew. Despite the need to resolve these issues in particular circumstances, the FCC was

. . . hopeful, however, that spectrum sharing techniques for some services, . . . may prove workable. The success of those techniques could allow co-primary operation of some emerging technologies with existing fixed microwave services on a non-interference basis *without the need for any relocation agreements*. . . . As other future services that use emerging technologies develop, sharing by those will be addressed in subsequent rule making proceedings.<sup>16</sup>

In its subsequent orders in the *Emerging Technologies* proceeding, the FCC confirmed its strong preference for sharing emerging technologies spectrum with incumbents where it proves feasible.<sup>17</sup>

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<sup>15</sup>*First ET Order*, 7 FCC Rcd at 6890 (emphases added). See also 47 C.F.R. § 2.106 NG 153 (2160-2200 MHz allocated to emerging technologies on a "co-primary" basis with fixed and mobile services). See also *First ET Order*, 7 FCC Rcd at 6891 (the FCC encourages "spectrum sharing between emerging technologies services and incumbent 2 GHz fixed microwave users whenever technically feasible")

<sup>16</sup>*Id.* at 6891 (emphasis added).

<sup>17</sup>In the *Third ET Order*, the Commission began by noting that it intended to "provide for the fair and equitable sharing of 2 GHz spectrum by new services and the existing fixed microwave services that currently use these frequencies." Accordingly, the Commission

(continued...)

In short, the *Emerging Technologies* orders make it incumbent upon the Commission to evaluate carefully the prospects for sharing when entities planning to use one of the emerging technologies allocations make strong demonstrations that sharing will be feasible.<sup>18</sup> Where sharing can be practicably achieved, rules requiring negotiations with incumbents regarding relocation and reimbursement are unnecessary.<sup>19</sup>

### **C.MSS and FS Can Avoid Harmful Interference During an Extended Transitional Period**

Sharing between FS and MSS licensees for an extended period is practical. As an initial matter, it should be recognized that the WRC-95 Final Acts regarding 2 GHz MSS are predicated upon sharing between MSS and FS over an extended period of time. Indeed, it was the demonstration made at WRC-95 that sharing was possible for an extended period that led the WRC to advance the date of Entry into Force for 2 GHz MSS from 2005 -- adopted by WARC-92 -- to 2000.<sup>20</sup> The co-primary allocation of MSS and FS at 2 GHz, and the

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<sup>17</sup>(...continued)

contemplated that relocation of incumbents would be called for only "where necessary." *Id. Accord id.* at 6596 (¶ 16). Similarly, in the *ET Reconsideration Order*, the FCC noted that it had "adopted a regulatory framework that will allow this spectrum [*i.e.*, the emerging technologies bands] to be shared by new services and the existing fixed microwave services that currently use these frequencies." *ET Reconsideration Order*, 9 FCC Rcd at 1943. Again, the Commission called for relocation only "[i]n those instances where both of these services cannot share this spectrum . . . ." *Id.*

<sup>18</sup> To adopt relocation and reimbursement rules in the face of strong evidence that sharing is feasible, not the least of which is that the ITU is proceeding and planning 2 GHz MSS on that understanding, would appear to contravene the Commission's own orders and policies and thus run afoul of the Administrative Procedures Act.

<sup>19</sup> As discussed below, public policy considerations related to the international nature of some 2 GHz MSS systems offer an independent basis for deciding not to adopt relocation rules. *See* Section II.C., *infra*.

<sup>20</sup>Final Acts of the World Radiocommunication Conference (WRC-95) Part I, Geneva, 1995, ("WRC-95 Final Acts"). Footnote S5.389 D, at 136. The 1992 World Administrative  
(continued...)

adoption of a coordination procedure such as that contemplated by Resolution 46, is predicated on a reasonable degree of sharing.<sup>21</sup>

At WRC-95, the 1995 Radiocommunication Assembly adopted several Resolutions and Recommendations which tasked ITU-R Study Groups to develop and propose methodologies for MSS/FS coordination.<sup>22</sup> Resolution 716 (COM 5-10) requested the ITU-R to develop expeditiously the necessary tools and procedures for conducting detailed coordination of MSS systems at 2 GHz with the fixed service.<sup>23</sup> As a complement to Resolution 716, Recommendation 717 calls on the ITU-R to study the remaining issues relating to frequency sharing between MSS and FS more generally in the 1-3 GHz range.<sup>24</sup>

Following WRC-95, ITU-R Working Parties 8D and 9D took up the issue of MSS/FS sharing and began developing a number of tools to support shared uses of the 2 GHz spectrum. At its March 1996 meetings in Geneva, WP 8D proposed detailed methodologies

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<sup>20</sup>(...continued)

Radio Conference (WARC-92) had allocated 1980-2010 and 2170-2200 MHz to become fully available to MSS globally beginning in 2005. In the United States, an additional 20 MHz was available for MSS (1970-1980 and 2160-2170 MHz). All 80 MHz of the WARC-92 MSS allocation for the U.S. was to be available commencing January 1, 1996. See Final Acts of the World Administrative Radio Conference for Dealing with Frequency Allocations in Certain Parts of the Spectrum (WARC-92), Malaga-Torremolinos, 1992; 47 C.F.R. § 2.106, FN 746C (1995). In the United States, 20 MHz of this spectrum is set aside for personal communications services ("PCS"), namely 1970-1990 MHz. It would be extremely ironic if the premise for this advancement in 2 GHz availability, namely sharing, were ignored by the FCC and the advancement itself was seen as the predicate for the need to relocate incumbent licensees immediately at the expense of MSS licensees.

<sup>21</sup>WARC-95 Final Acts, Res. 46 (as modified by WRC-95) ("Resolution 46").

<sup>22</sup>Rec. ITU-R IS.1141; Rec. ITU-R IS.1142; and Rec. ITU-R IS.1143.

<sup>23</sup>WRC-95 Final Acts (Part II), Res COM 5-10.

<sup>24</sup>*Id.* Rec. 717. In addition, Resolution 46 was modified by WRC-95 to develop a methodology for the standard computation program to be used in determining the need for coordination of MSS systems in the space-to-earth direction with the FS.

to enable development of computer programs for coordination, to facilitate bilateral coordination in the MSS downlink band between MSS and the various terrestrial line-of-sight FS systems (e.g., analog, digital, FM-TV).<sup>25</sup> WP 9D, the terrestrial FS study group, is currently reviewing these methodologies, and is itself developing the FS parameters to be used in the bilateral coordination procedure.<sup>26</sup> For example, WP 9D is considering the standard reference bandwidth for interference calculations, studying the aggregate interference to MSS of point-to-multipoint FS, considering the effect on FS receivers from combined CDMA/FDMA and TDMA/FDMA systems, and examining an entire series of technical and operational matters to phase in sharing between MSS and FS. To accelerate the process of developing sharing methodologies, a joint WP 8D/9D *Rapporteurs Group* chaired by the U.S. was created at the March 1996 meeting to reach a consensus on the methodologies and their implementation.<sup>27</sup>

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<sup>25</sup> See ITU Document 8D/TEMP/23-E, March 18, 1996: "Methodology to Evaluate the Impact of Interference From TDMA/FDMA non-GSO MSS Satellites Operating in the 2 GHz Range on the Performance of Analogue and Digital Line-of-Sight Fixed Service Receivers"; ITU Document 8D/TEMP/24-E, March 18, 1996: "Methodology to Evaluate the Impact of Interference From TDMA/FDMA non-GSO MSS Satellites Operating in the 2 GHz Range on Baseband Performance in FDM-FM Analogue Line-of-Sight Fixed Service Receivers"; ITU Document 8D/TEMP/25-E, March 18, 1996 "Methodology to Evaluate the Impact of Interference From TDMA/FDMA Non-GSO MSS Satellites Operating in the 2 GHz Range on Video Baseband Performance in TV-FM Analogue Line-of-Sight Fixed Service Receivers."

<sup>26</sup> See ITU Document 8D/TEMP/51-E, 19 March 1996: "Liaison Statement to Working Party 9D" (WP 8D sharing its proposed standard computation program for determining the need for coordination of MSS Earth-to-space transmissions with FS systems and seeking WP 9D's comments).

<sup>27</sup>API, in its response to the *Supplemental Comments*, mischaracterizes the objectives of the U.S. Study Group 9D. Its goal is *not* to prepare the groundwork for the U.S. official position at WRC-97. API Response at 6. To the contrary, the ITU-R Working Parties 8D and 9D have agreed together, pursuant to an international agreement (Doc. ITU-R 9D/TEMP/2 (Rev. 1), to conduct joint studies to develop methodologies for MSS/FS sharing  
(continued...)

In this country, the MSS interests have had meetings with representatives of the FS services to discuss the international developments. Indeed, only three weeks ago, representatives of the MSS and FS industry met at COMSAT's invitation to discuss the need for a U.S. process to resolve MSS/FS's sharing issues. At that meeting, the MSS representatives demonstrated a commercially available software designed to assess the levels of interference from MSS systems into very specific types of FS receivers.<sup>28</sup> The FS industry now appears ready to continue discussions with the MSS industry to reach consensus on technical parameters needed to refine the application of the program (*e.g.*, performance objectives, interference criteria, fading models, and system characteristics).

The Joint Commentors are pleased with the level of discussions at this time, fully expect the dialogue to develop, and anticipate timely agreement upon sharing methodologies. The Joint Commentors support the coordination procedure proposals in the *Supplemental Comments*,<sup>29</sup> and anticipate further discussions with the FS industry on these suggestions. Nonetheless, it would be useful for the FCC to facilitate the process of assembling data on the performance characteristics of FS equipment installed in the 2165-2200 MHz band to help

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<sup>27</sup>(...continued)

below 3 GHz, as directed by Resolution 716 and Recommendation 717. Naturally, the ITU-R can be expected to discuss this matter at WRC-97 and assess the progress of the Working Parties. The point is that the international commitment to the sharing solution is far stronger than API suggests, and much work will be completed at the international level by this fall.

<sup>28</sup>See letter of Nancy J. Thompson, General Attorney, COMSAT, to William F. Caton, Acting Secretary, FCC (dated April 30, 1996). Contrary to the assertions of the API, the MSS industry is giving the FS industry the opportunity to review computer simulations, interference models, and sharing methodologies, as this meeting demonstrates. See Response of API at 3-4.

<sup>29</sup>See, *e.g.*, *Supplemental Comments*, Charts B and C (describing the specific steps to be followed to coordinate MSS downlinks into existing FS receive stations).

the parties negotiate mutually agreeable coordination procedures and realistic standards for permissible levels of interference. If the parties are unable to agree on such procedures and standards themselves, the Commission needs to stand ready to implement the necessary procedures and standards.<sup>30</sup>

Because MSS and FS incumbents are expected to be able to share spectrum for several years, FS incumbents can continue to operate at their current spectrum position until such time as they would have reasonably expected to amortize equipment costs and voluntarily have chosen to replace their equipment regardless of the allocation of their current spectrum to MSS.<sup>31</sup> At that point, the Commission can reasonably require incumbents to move to other spectrum concurrent with the replacement of their equipment at their own expense. This process would impose little or no burden on incumbents since the timetable for relocation under such a phased transition plan would coincide with the anticipated timetable for renewal or replacement of incumbents' existing assets. Incumbent FS would thus be left no worse off than if their spectrum had never been allocated to MSS.<sup>32</sup>

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<sup>30</sup>While the MSS industry is confident that MSS/FS sharing is feasible, there may very well be isolated instances where the coordination methodologies that are developed cannot prevent impermissible interference to incumbent, co-primary FS systems. The MSS licensees will agree, in those limited circumstances, to negotiate with the FS licensee(s) involved to help ensure continued operability. *See Supplemental Comments* at 21, n.35.

<sup>31</sup>As the Commission recently observed, APCO contends that 2 GHz analog systems (which represent the majority of 2 GHz FS equipment) is becoming infeasible and most incumbents have long-term plans to replace their equipment with digital equipment. *See Amendment to the Commission's Rules Regarding a Plan for Sharing the Costs of Microwave Relocation*, First Report and Order and Further Notice of Proposed Rule Making, FCC No. 96-196, WT Docket No. 95-157, ¶ 67 (released April 30, 1996) ("*Microwave Relocation Order*").

<sup>32</sup>In addition to promoting economic efficiency, refraining from imposing relocation rules on MSS would produce other public interest benefits. Allowing MSS and FS to share free of relocation and reimbursement rules would promote administrative efficiency by clearing the 2  
(continued...)

The Commission's *Microwave Relocation Order* supports the notion that incumbent licensees who avoid involuntary relocation for an extended period of time should bear the burden of later relocation.<sup>33</sup> The *Microwave Relocation Order* establishes a 10-year period for 2 GHz incumbents to retain their primary status with respect to incoming PCS systems. During this period, of course, incumbents operating under secondary status, as required by the Commission beginning in 1992, must avoid interfering with emerging technologies licensees. At the sunset of the 10-year period, an incumbent assumes secondary status once a PCS license requires use of the spectrum. The rationale for this rule is to "encourage incumbents to relocate to another band when they replace existing equipment."<sup>34</sup> The burden of relocation costs in these situations, the Commission explained, are properly borne by incumbents because of the fact that during the next ten years "much of the microwave equipment operating today at 2 GHz is likely to be either fully amortized or in need of replacement."<sup>35</sup>

In sum, the ability of MSS to share with FS for several years coupled with the fact that existing FS equipment is expected to require replacement during that period make the Commission's relocation reimbursement rules especially inappropriate in this context. The rules' elaborate negotiation procedures, for example, make no sense in a situation where MSS will not cause harmful interference to primary incumbent FS licensees and hence, will

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<sup>32</sup>(...continued)

GHz MSS bands with minimal FCC oversight or intervention. Additionally, refraining from imposing relocation rules here would advance the development of MSS without imposing the prohibitive costs that would be associated with relocating incumbents.

<sup>33</sup>*Microwave Relocation Order, supra*, ¶¶ 60-68.

<sup>34</sup>*Microwave Relocation First R&O* at ¶ 67.

<sup>35</sup>*Id.* (citing Comments of BellSouth).

not be negotiating relocation agreements.<sup>36</sup> In fact, imposition of the relocation rules on MSS would seriously threaten the prospects for sharing in the band since primary FS incumbents would be encouraged to demand reimbursed relocation rather than cooperate in efforts to share spectrum. By applying the relocation reimbursement rules to MSS, the Commission would undermine its own policies encouraging sharing and avoiding relocation except where necessary because of unavoidable harmful interference, and would render the joint industry discussion on sharing largely a futile exercise.

Accordingly, the PCS relocation and reimbursement rules should not apply to MSS in the downlink (2165-2200 MHz). Rather, the Commission should foster efforts between MSS and FS to develop additional sharing options during a transitional phase. Because MSS-FS sharing is now recognized as feasible in the near term, the Commission should implement simple and limited measures, as suggested below, in Section III, to facilitate an orderly and efficient migration from the MSS band.

#### **D. BAS Migration from the MSS Uplink Does Not Trigger the Need for Relocation Rules**

Although MSS and FS sharing is possible in the downlink spectrum, the *Notice* suggested that the FS licensees may nonetheless have to move because of the BAS licensees vacating the MSS uplink (1990-2025 MHz). Specifically, the *Notice* proposed putting these BAS licensees in the 2110-2145 MHz band, which is used by FS operations in conjunction with the 2165-2200 MHz band on a paired basis. As explained below, while co-primary sharing is not technically feasible between MSS and BAS operators, imposition of relocation and reimbursement rules, as a result of BAS migration from Channels 1 and 2, is unnecessary

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<sup>36</sup>Furthermore, MSS licensees will not be obligated to protect any FS licensee currently authorized to operate on a secondary basis pursuant to the licensing policies adopted in the emerging technologies bands since 1992. See 47 C.F.R. § 2.105(c)(3).

because of the availability of the engineering solutions discussed below.<sup>37</sup> Moreover, the adoption of such rules would remove any incentive for incumbent BAS to make their operations more efficient. Incumbent BAS would likely hold out and demand reimbursement for relocation rather than work with MSS to develop mechanisms for compatible and spectrally efficient use of the 2 GHz spectrum.

Rather than apply PCS-type relocation and reimbursement rules to the BAS bands, the Commission should require the broadcasters to actively pursue alternatives for accommodating BAS in spectrum other than the 2110-2145 MHz. The *Supplemental Comments* discuss a variety of mechanisms for gradually introducing MSS into the current BAS Channels 1 and 2. These include rechannelization of the remaining BAS band (2025-2110 MHz), which the Society of Broadcast Engineers has indicated could be done.<sup>38</sup> adding additional BAS receive sites in given markets to accommodate split channel operation

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<sup>37</sup>Because the BAS bands were explicitly excluded from the emerging technology docket, the Commission's *Emerging Technologies* rules do not apply directly to BAS operations occupying the 2 GHz band. See *Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies*, Notice of Proposed Rule Making, ("ET NPRM"), 7 FCC Rcd 1542, 1544 (1992), *First ET Order*, 7 FCC Rcd at 6888. In the *ET NPRM* and *First ET Order*, the Commission concluded that the BAS bands should be excluded from the emerging technology allocation given the heavy use of the spectrum by ENG users and the possibility of even greater BAS spectrum demand given the expected implementation of advanced television services. *Id.*

<sup>38</sup>Rechannelization would involve the returning of the center frequencies and corresponding bandwidth of the seven BAS/ENG channels. Based on a study performed by COMSAT Laboratories, and submitted as part of COMSAT's original filing in this proceeding, it seems likely that a rechannelization of BAS operations to 15 MHz, would only produce about a 1.5-2.5 dB degradation to the nominal 56.5 TV signal-to-noise ratio. (This level of quality offers sufficient performance for "contribution quality links." COMSAT Comments, ET Docket No. 95-18, (filed May 5, 1995) at Appendix III ("Comsat Comments"); COMSAT Reply, ET Docket No. 95-18 (filed June 21, 1995) at 12 and Tables 1 and 2.) The Society of Broadcast Engineers ("SBE") has indicated that a similar rechannelization of the BAS band to 15 MHz per channel is, indeed, one possible, viable alternative to relocation into the 2110-2145 MHz band. Comments of SBE, ET Docket No. 95-18 (filed May 5, 1995) at 8.

in BAS channels 3 to 7 during peak periods, digitalization of BAS operations,<sup>39</sup> and the movement of licensees in BAS Channels 1 and 2 to a different band. The Commission should encourage the broadcasters to select one or more of these, or possibly other plans. In particular, the Commission should require new BAS licensees to employ bandwidth-efficient digital technology.

Requiring BAS licensees to clear the MSS uplink by adopting one of the engineering solutions discussed above would be consistent with federal spectrum policy promoting increased spectrum efficiency and the conversion of existing analog equipment to digital standards.<sup>40</sup> In a digital age, spectrum policy should be guided by consideration of whether incumbent and future licensees are taking full advantage of the benefits of digitalization. The BAS after clearing the MSS uplink will still have available 370 MHz in the 2 GHz and 7 GHz bands.<sup>41</sup> All these operations are running on conventional analog equipment, a

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<sup>39</sup>Already state-of-the-art digital TV transmission equipment is being used routinely by broadcast networks and satellite operators to transmit an extremely high-quality, television picture in a much smaller bandwidth than the 17-18 MHz BAS utilizes at 2 GHz. For example, broadcast networks use INTELSAT for TV transmission; via satellite news gathering SNG feeds at bit rates of 6-8 Mbits. *These systems typically utilize 4 to 6 MHz per TV signal for transmission.* For certain sports and entertainment programs rates as high as 15 Mbits are used, requiring a 10.5 MHz RF bandwidth. Interaction Satellite Operations Group/Signatories Subcommittee on Digital Compression, "Report on Digital SNG," dated Sept. 28, 1993. In view of the current trends in technology, the 12 MHz digital rechannalization COMSAT originally proposed for the 2 GHz BAS band (13 MHz for Channel 1) is adequate for any type of TV transmission and such a rechannalization would permit seven BAS channels in a spectrum space of only 85 MHz, freeing up 35 MHz for MSS uplinks in the band 1990-2025 MHz.

<sup>40</sup>For example, in draft legislation under consideration in Congress, Senator Pressler has advocated comprehensive spectrum reform to increase the efficient use of radio spectrum, including a proposal to encourage broadcasters to convert to digital technology. *See* 142 Cong. Rec. S 4928 (May 9, 1996).

<sup>41</sup>85 MHz will remain for BAS at 2 GHz (2025-2110 MHz) after the MSS uplink spectrum is allocated, 250 MHz is available at 7 GHz (6875-7125 MHz), and 33.5 MHz of spectrum can be used on a secondary basis by BAS licensees at 2450-2483.5 MHz.

highly inefficient use of this vast spectral resource. Moreover, Joint Commentors believe that the prospects for using these alternative techniques to allow BAS licensees to occupy the spectrum currently used by BAS Channels 3-7 without a degradation of service is very promising. Accordingly, the FCC should require the broadcasters to utilize one or more of these alternatives to develop a scheme that provides MSS with access to its allocated uplink spectrum with minimal disruption to incumbent BAS users.

**E. The Commission Must Consider the International Nature of MSS**

MSS systems are by their nature international enterprises, unlike other emerging technologies such as PCS which are domestic. MSS operators will provide service internationally,<sup>42</sup> bringing the benefits of seamless wireless communications to countries around the world. This new service requires an unprecedented degree of cooperation between regulators to coordinate harmonious approaches to MSS so that its development is not artificially impeded.

In this respect, the Joint Commenters commend the United States' efforts to encourage the rapid development globally of MSS. At WRC-95 the United States assumed the leadership role in securing an agreement on a uniform date of entry for MSS in all regions.<sup>43</sup> Those efforts conformed previously incongruous dates of entry around the world, thereby accelerating the introduction of global MSS by five years to the year 2000.

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<sup>42</sup>While 2 GHz is not exclusively an international service -- not all of the Joint Commenters plans to file application to provide MSS worldwide -- the allocations of 2 GHz MSS spectrum in Regions 1, 2, and 3 contemplate the operation of at least some international MSS systems.

<sup>43</sup>See note 20, *supra*, regarding multiple dates of entry after WARC-92.

Following on the accomplishments of the United States delegation at WRC-95, the Commission's actions in this proceeding can help ensure the realization of this innovative worldwide service by 2000. The Joint Commenters urge the Commission to recognize the efforts of other countries to adopt a framework for licensing MSS and to attempt to ensure that U.S. MSS policies are in accord.

In fact, regulatory efforts under way in a number of other countries support the Joint Commenters' position that viable alternatives to immediate relocation and reimbursement exist. Internationally, national regulators have begun to formulate and implement 2 GHz MSS spectrum policies based on the recognition, as reinforced by WRC-95, that sharing between FS and MSS during a transition period is possible. To the best knowledge of the Joint Commenters, no country, other than the United States, has proposed an MSS policy involving reimbursement for relocation of 2 GHz incumbents. Various countries have already adopted measures to limit the number of potential FS licensees that could be potentially interfered with by MSS and vice versa following a transitional sharing period.

For example, Canada has imposed a moratorium on new FS licenses in the 1990-2010 and 2110-2200 MHz bands in anticipation of the implementation of MSS.<sup>44</sup> CITELE has also directed its members "to take all practicable steps to implement new Fixed Service systems in bands not overlapping with MSS allocations" and "to plan to migrate the existing 2 GHz Fixed Service systems to bands not overlapping with MSS allocations."<sup>45</sup>

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<sup>44</sup>See *Revisions to Microwave Spectrum Utilization Policies in the Range of 1-20 GHz*, Telecommunications Policy Branch, Industry Canada (January 1995).

<sup>45</sup>Consideration of the Introduction of MSS in the 2 GHz Bands, Ad Hoc Sub-Working Group on Agenda Item 2.1b, Permanent Consultative Committee III: Radiocommunications, CITELE (Aug. 24, 1995).