June 24, 1999

Re: The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band
IB Docket No. 99-81

Dear Ms. Salas:

I enclose for filing with the Commission the original and nine copies of "Comments of the Fixed Wireless Communications Coalition" in the above-captioned proceeding.

Kindly date-stamp and return the extra copy of this cover letter.

If there are any questions about this filing, please call me at the number above.

Sincerely,

Mitchell Lazarus
Counsel for the
Fixed Wireless Communications Coalition

ML:deb

Enclosures

cc: Thomas A. Keller, Esquire
Leonard R. Raish, Esquire
In the Matter of
The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band
IB Docket No. 99-81, RM-9328

COMMENTS OF THE FIXED WIRELESS COMMUNICATIONS COALITION

The Fixed Wireless Communications Coalition (FWCC)\(^1\) hereby submits these Comments in response to the Notice of Proposed Rulemaking (Notice) in the above-captioned proceeding.\(^2\)

The 2 GHz MSS applicants have proposed a variety of feeder link schemes to support their operations.\(^3\) Most of these requests seek frequencies that are heavily used by the Fixed Service. (Appendix B identifies terrestrial spectrum targeted for MSS feeder links.) Yet the Notice omits any discussion of the likely impact on Fixed Service operations and expansion.

\(^1\) The FWCC is a coalition of equipment manufacturers and users interested in terrestrial fixed microwave communications. Its membership includes manufacturers of microwave equipment, licensees of terrestrial fixed microwave systems and their associations, and communication service providers and their associations. Its membership also includes railroads, public utilities, petroleum and pipeline entities, public safety agencies, the broadcast industry and their respective associations, telecommunications carriers, landline and wireless, local, and interexchange carriers, and others. A list of members is attached as Appendix A.


\(^3\) See Notice at ¶ 49-66, and particularly the table at ¶ 50.
A. The Commission Should Not Designate Fixed Service Spectrum for MSS Feeder Links.

The Fixed Services are an unsung but vital part of the Nation's infrastructure. They provide communications essential to the energy, transportation, and telecommunications industries, among others, and play a key role in public safety and other governmental operations. A grant of the MSS applicants' requests for frequencies that impinge on Fixed Service spectrum would exacerbate the shrinkage of spectrum for these important functions.

Recent history justifies the Fixed Services' alarm. A sequence of apparently independent policy decisions in several bands has seriously curtailed Fixed Service operators' access to spectrum for forced relocation and to accommodate needed growth. First came a reallocation of 2 GHz band frequencies from the Fixed Service to mobile satellite services. Then, despite having identified the 6 GHz band as a primary relocation site for 2 GHz users, the Commission proposed designating the upper 6 GHz band (6700-7075 MHz) for mobile satellite feeder links—a proposal reiterated here. The Commission also proposed a similarly severe reduction of spectrum available to the Fixed Service in the 18 GHz band. The ongoing Ku-band proceeding

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5 Second Report and Order, supra, 8 FCC Rcd at 6506, ¶ 28 ("We believe that 6 GHz will be the primary relocation band for 2 GHz licensees, and therefore efficiently accommodating these licensees in this band is of the utmost importance.")


7 See Appendix B.

threatens to move NGSO gateway stations into the already-congested 11 GHz band, and to expand GSO FSS downlink operations from half that band to the full band. The "shared" 3.7-4.2 GHz band has become effectively unavailable to the Fixed Service due to the extremely difficult problems of coordinating new Fixed Service stations with existing licensed earth stations. In the 36-51 GHz band, satellite interests have filed petitions to overturn an equitable distribution of spectrum between satellite systems and wireless operations, including the Fixed Service.  

These actions and proposals have left the Fixed Service with insufficient spectrum for the reasonable expansion it needs to meet the requirements of the industries and governmental agencies that rely on it for essential services. The Commission should not worsen the problem by cutting further into critical spectrum.

**B. If the Commission Designates Fixed Service Spectrum for MSS Feeder Links, It Must Promulgate Sharing and Coordination Rules that Adequately Protect Fixed Service Operation and Expansion.**

In the alternative, any move toward designating Fixed Service spectrum for MSS feeder links must be accompanied by rules that permit equitable sharing by the Fixed Service in practice, as well as in principle, in bands that are co-primary to satellite operations and the Fixed Services.

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The sharing issue is especially critical with regard to NGSO facilities. Coordinating and sharing with GSO earth stations has cost Fixed Service operators access to huge geographical areas, but sharing with NGSO feeder link earth stations will be even more difficult. Because NGSO antennas move continuously over much of the sky, each site "sterilizes" a much larger area against Fixed Service operations than a GSO earth station does.

1. The Commission must constrain the deployment and design of MSS feeder link earth stations.

Certain limitations are needed on feeder link earth stations that use Fixed Service spectrum to promote equitable band sharing:

- **Limit total numbers of feeder link earth stations.** A single earth station can require a Fixed Service applicant to coordinate anywhere within 100 to 150 miles, depending on terrain, latitude, and other factors. The resulting coordination area is larger than some states. If each of the nine MSS applicants listed in Appendix B were to deploy several feeder link earth stations, they would close vast territories to Fixed Service use.

- **Collocate the feeder link earth stations of various MSS providers.** This step will limit the total areas that require coordination, and hence help to control the impact on the Fixed Service by multiple MSS providers.

- **Site feeder link earth stations away from population centers and intercity routes.** The demand for Fixed Service facilities is highest in the population centers and along the major routes connecting them. MSS feeder link earth stations in contrast, can be sited anywhere fiber optic links can reach. Locating them away from high-concentration Fixed Service operations will promote efficient sharing.

- **Require use of the largest feasible antennas for feeder link earth stations.** Larger antennas permit locating Fixed Service facilities over a larger part of the earth station's coordination area.

- **Shield feeder link earth stations.** Shielding permits Fixed Service operation in closer proximity to earth stations.\(^{11}\)

\(^{11}\) In the alternative, the Commission can require "virtual shielding" around feeder link earth stations. This means that Fixed Service users can always assume a specified degree of
Set standards for earth station spectrum efficiency. Maximizing the use of shared spectrum requires each user to occupy as little of it as possible. The fixed services have been a technology leader in the efficient use of ever-scarcer spectrum. At the very least, MSS feeder link operations should be required to reach the equivalent of 16-QAM, or 4 bits/second/Hertz.

2. The Commission must establish coordination procedures that give the Fixed Service equitable access to shared spectrum.

Existing coordination procedures severely disadvantage Fixed Service operators vis-a-vis earth stations, even in spectrum that in principle is allocated coequally. To be sure, Fixed Service users and satellite users are subject to frequency coordination procedures that look similar in writing. A proposed station, whether terrestrial or satellite earth station, must show it will not cause interference to a previously licensed station in either service, and must accept interference from previously licensed stations in either service. In principle, these requirements are the same for the two services.

In practice, however, all similarity vanishes. A terrestrial applicant must usually coordinate if it seeks to locate anywhere in an area of 50,000-200,000 square miles (!) around each earth station. Moreover, at least since 1967, the Commission has routinely licensed an earth shielding for coordination purposes, whether or not it is actually in place. The MSS provider retains the option of whether to construct the shielding. This allows the MSS provider to minimize its expenses, while still giving Fixed Service operators reasonable flexibility in coordinating growth of their services.

The Fixed Service introduced 16-QAM (at 4 bits/second/Hertz) in the early 1980s. It advanced to 64-QAM (6 bits/second/Hertz) a few years later, and today typically uses 128-QAM (7 bits/second/Hertz). Modulation technologies that permit up to 9 bits/second/Hertz are becoming available. Additionally, through the Telecommunications Industry Association (TIA) and the National Spectrum Managers Association (NSMA), the Fixed Service has developed comprehensive and effective methodologies for coordination of Fixed Service routes with maximum frequency re-use.

See generally 47 C.F.R. § 25.203(c), 101.103.
station for its entire allocated band without any inquiry into the actual amount of traffic to be carried. The application form for an earth station does not even ask for information that would let the Commission determine how much spectrum the applicant reasonably needs. Earth stations routinely license hundreds of megahertz for which they have no traffic, and by doing so, maintain preemption rights for that unused spectrum over tens of thousands of square miles.

If the Commission requires sharing between MSS feeder link earth stations and Fixed Service facilities, it should adopt rules to improve the equity in coordination.

First, where there is significant overlap between MSS designations and the Fixed Service, feeder link earth stations should be required to specify half of the overlap to be left available for Fixed Service growth.

Second, Fixed Service operators should have to coordinate only over the azimuths actually used by an earth station. If a provider's satellite geometry dictates that its feeder link earth stations will never point within X degrees of north, for example, then a Fixed Service station within that range of azimuths should not have to coordinate with the earth station, even if it otherwise lies within the coordination distance.

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14 See Communications Satellite Corp., 8 F.C.C.2d 1001, 1003 (1967) (consistent practice in the United States to "coordinate[] the entire bands 5925-6425 MHz (transmit) and 3700-4200 MHz (receive) and all azimuths from 0°-360° and all elevation angles from 5° and above, in order to allow for flexibility of operation."). Although this opinion found "little or no adverse affect upon terrestrial systems in the areas concerned," id., that is no longer true 32 years later.

15 Where satellite services are secondary to the Fixed Services, as at 27.5-28.35 GHz, no coordination is required, because Fixed Service users have priority over the spectrum and MSS providers must operate on a secondary, non-interference basis.

16 The FWCC opposes the alternative of coordinating within the unused azimuths, on the assumption the coordination will clear. Frequency coordination is expensive and entails delays. Fixed Service users should not have to coordinate where interference cannot arise.
Third, if an earth station accepts a higher-than-desired interference objective when coordinating, then a Fixed Service facility that subsequently coordinates should have the benefit of the same higher level. The present rules permit a new earth station to accept interference cases that exceed the desired objective by a significant amount — and then to bar new Fixed Service users that fail to meet the same objective that the earth station waived. The Commission should change this practice and restore symmetry between the two services. For example:

- If an earth station accepts a higher level of interference because it does not plan to use the frequencies on which the interference is present, it must specify that a future incoming Fixed Service station need not coordinate on those frequencies.

- If an earth station accepts a higher level of interference because it is shielded by a local feature such as a building or a hill, it must accept a new Fixed Service station coordinated at the same higher level, if it is shielded by the same feature.

- If an earth station accepts a higher level of interference without explanation, then a future incoming Fixed Service station located in the same general area can coordinate at that same higher level.\(^7\)

These rules will permit maximally efficient use of the spectrum by both MSS providers and Fixed Service operators, while minimizing significant harmful interference to both.

**CONCLUSION**

A major part of the U.S. domestic infrastructure, including railroads, pipelines, utilities, state and local governments, public safety agencies, and cable TV systems, depend on terrestrial fixed systems for safe, efficient, and reliable operation. As explained above, a sequence of apparently unrelated Commission decisions affecting several frequency bands between 2 and 30 GHz has already seriously curtailed Fixed Service operators' access to spectrum needed for

\(^7\) See also Request for Declaratory Ruling and Petition for Rule Making of The Fixed Wireless Communications Coalition, RM-9649 (filed May 5, 1999).
new terrestrial systems and for growth of existing ones. If MSS feeder links are to be
superimposed on spectrum already used for terrestrial fixed systems, any such action should be
delayed until sharing criteria and coordination rules can be developed and promulgated,
especially in light of spectrum already lost to accommodate the satellite services.

Finally, if the Commission does require sharing in these bands, it must prevent the same
kind of sterilization that occurred at 4 GHz. To that end, the FWCC asks the Commission to
impose reasonable restrictions on MSS feeder link earth station numbers, collocation, siting,
antenna size, shielding, and spectrum efficiency. The FWCC also requests coordination
procedures that will yield equitable sharing of geography and spectrum.

Respectfully submitted,

Leonard R. Raish
Mitchell Lazarus
FLETCHER, HEALD & HILDRETH, P.L.C.
1300 North 17th Street, 11th Floor
Arlington, VA 22209
703-812-0400

June 24, 1999

Counsel for the Fixed Wireless
Communications Coalition

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Appendix A

MEMBERS OF FIXED WIRELESS COMMUNICATIONS COALITION

USERS

Association of Public-Safety Communications Officials
American Mobile Telephone Association
UTC - The Telecommunications Association
National Association of Broadcasters
Independent Cable Telecommunications Association
American Petroleum Institute
International Wireless Cable Association
Personal Communications Industry Association
CBS Communications Services
Norfolk-Southern Railroad
Union Pacific Railroad
Burlington-Northern Railroad
BellSouth
Bell Atlantic
SBC Communications, Inc.
People’s Choice TV
Association of American Railroads
Nortel Networks

MANUFACTURERS

Harris Corporation -- Farinon Division
Alcatel Network Systems Inc.
Digital Microwave Corporation
Sierra Digital Communications
California Microwave, Microwave Data Systems
Tadiran Microwave Networks
Bosch Telecom.

June 24, 1999
## Appendix B

### MSS FEEDER LINK REQUESTS IN TERRESTRIAL SPECTRUM

<table>
<thead>
<tr>
<th>Band</th>
<th>Applicant</th>
<th>Feeder Links</th>
<th>Terrestrial Use</th>
</tr>
</thead>
<tbody>
<tr>
<td>5091-5250 MHz</td>
<td>Constellation II</td>
<td>NGSO uplink</td>
<td>Unlicensed U-NII</td>
</tr>
<tr>
<td>5150-5250 MHz</td>
<td>ICO</td>
<td>NGSO uplink</td>
<td>Unlicensed U-NII</td>
</tr>
<tr>
<td>6425-6575 MHz</td>
<td>Inmarsat Horizons</td>
<td>GSO downlink</td>
<td>CC, LTTS, OFS, BAS, CARS</td>
</tr>
<tr>
<td>6700-6875 MHz</td>
<td>Globalstar</td>
<td>NGSO downlink</td>
<td>CC, OFS</td>
</tr>
<tr>
<td>6700-7075 MHz</td>
<td>Constellation II</td>
<td>NGSO downlink</td>
<td>CC, OFS</td>
</tr>
<tr>
<td>6775-7075 MHz</td>
<td>MCHI Ellipso 2G</td>
<td>NGSO uplink</td>
<td>CC, OFS</td>
</tr>
<tr>
<td>10.70-10.95 &amp;</td>
<td>TMI Cansat-M3</td>
<td>GSO uplink</td>
<td>CC, LTTS, OFS, LTTS</td>
</tr>
<tr>
<td>11.20-11.45 GHz</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11.597-1.700 GHz</td>
<td>Boeing</td>
<td>NGSO downlink</td>
<td>CC, LTTS, OFS</td>
</tr>
<tr>
<td>11.70-12.20 GHz</td>
<td>Globalstar</td>
<td>GSO downlink</td>
<td>LTTS</td>
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<tr>
<td>12.75-13.25 GHz</td>
<td>TMI Cansat-M3</td>
<td>GSO downlink</td>
<td>CC, LTTS, OFS, BAS, CARS</td>
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<td>14.0-14.4 GHz</td>
<td>Globalstar</td>
<td>GSO uplink</td>
<td>LTTS</td>
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<tr>
<td>14.391-14.500 GHz</td>
<td>Boeing</td>
<td>NGSO uplink</td>
<td>LTTS</td>
</tr>
<tr>
<td>17.70-18.35 GHz</td>
<td>Celsat</td>
<td>GSO downlink</td>
<td>CC, OFS, BAS, CARS</td>
</tr>
<tr>
<td>19.30-19.70 GHz</td>
<td>Iridium Macrocell</td>
<td>NGSO downlink</td>
<td>CC, OFS, BAS, CARS</td>
</tr>
<tr>
<td>27.50-28.35 GHz</td>
<td>Celsat</td>
<td>GSO uplink</td>
<td>LMDS</td>
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<tr>
<td>29.10-29.50 GHz</td>
<td>Iridium Macrocell</td>
<td>NGSO uplink</td>
<td>LMDS</td>
</tr>
</tbody>
</table>

### Notes


2. The Commission indicated it will consider the Boeing requests as part of the SkyBridge rulemaking in FT Docket No. 98-206 and related application proceedings. Notice at ¶ 61.

3. See preceding Note.
4. In IB Docket No. 98-172, the Commission proposed to designate 17.7-18.3 GHz on a primary basis for terrestrial fixed service. GSO FSS would have secondary access.

5. IB Docket 98-172 proposes to retain 19.3-19.7 GHz on a co-primary basis for both terrestrial fixed use and MSS feeder links.

6. The 29.10-29.25 GHz segment is allocated on a co-primary basis to LMDS and NGSO MSS feeder links. This is the LMDS "hub-to-sub segment," intended for to forward transmissions from the LMDS operator to subscribers. The 29.25-29.50 GHz segment is allocated to GSO FSS, co-primary with MSS. See Redesignation of the 27.5-29.5 GHz Frequency Band, 11 FCC Rd 1 9005, 19033-34 (1996).
CERTIFICATE OF SERVICE

I, Deborah N. Lunt, a secretary for the law firm of Fletcher, Heald & Hildreth, P.L.C., hereby certify that a true copy of the foregoing "Comments of the Fixed Wireless Communications Coalition" was sent this 24th day of June, 1999, via Hand-Delivery to the following:

Chairman William E. Kennard
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Commissioner Harold Furchtgott-Roth
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Commissioner Michael Powell
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Commissioner Susan Ness
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Commissioner Gloria Tristani
Federal Communications Commission
445 12th Street, S.W.
Washington, D.C. 20554

Donald Abelson, Chief
International Bureau
Federal Communications Commission
445 12th Street, S.W., 6th Floor
Washington, D.C. 20554

Roderick Kelvin Porter, Deputy Chief
International Bureau
Federal Communications Commission
445 12th Street, S.W., 6th Floor
Washington, D.C. 20554

Richard B. Engelman, Chief
Planning & Negotiations Division
International Bureau
Federal Communications Commission
445 12th Street, S.W., Room 7A-760
Washington, D.C. 20554

Damon Ladson, Deputy Chief
Planning & Negotiations Division
International Bureau
Federal Communications Commission
445 12th Street, S.W., Room 7A-761
Washington, D.C. 20554

Ronald Repasi, Chief
Satellite Engineering Branch
International Bureau
Federal Communications Commission
445 12th Street, S.W., Room 6A-505
Washington, D.C. 20554

Kimberly Braum
Satellite Engineering Branch
International Bureau
Federal Communications Commission
445 12th Street, S.W., Room 6B-540
Washington, D.C. 20554

Julie A. Garcia
Satellite Engineering Branch
International Bureau
Federal Communications Commission
445 12th Street, S.W., Room 6B-554
Washington, D.C. 20554
Charles Iseman, Chief  
Spectrum Policy Branch  
Office of Engineering and Technology  
Federal Communications Commission  
445 12th Street, S.W., 7th Floor  
Washington, D.C. 20554

International Transcription Service  
1231 20th Street, N.W.  
Washington, D.C. 20037

Tom Derenge  
Spectrum Policy Branch  
Office of Engineering and Technology  
Federal Communications Commission  
445 12th Street, S.W., 7th Floor  
Washington, D.C. 20554

Deborah N. Lunt