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FLETCHER, HEALD & HILDRETH, P.L.C.

ATTORNEYS AT LAW

11th FLOOR, 1300 NORTH 17th STREET

ARLINGTON, VIRGINIA 22209-3801

(703) 812-0400

TELECOPIER

(703) 812-0486

INTERNET

www.fhh-telcomlaw.com

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

June 24, 1999

FRANK U. FLETCHER
(1939-1985)
ROBERT L. HEALD
(1956-1983)
PAUL D. P. SPEARMAN
(1936-1962)
FRANK ROBERSON
(1936-1961)
RUSSELL ROWELL
(1948-1977)
EDWARD F. KENEHAN
(1960-1978)

CONSULTANT FOR INTERNATIONAL AND
INTERGOVERNMENTAL AFFAIRS
SHELDON J. KRYS
U. S. AMBASSADOR (ret.)

OF COUNSEL
EDWARD A. CAINE*
MITCHELL LAZARUS*
EDWARD S. O'NEILL*
JOHN JOSEPH SMITH
WRITER'S DIRECT

703-812-0440

lazarus@fhh-telcomlaw.com

ANN BAVENDER*
ANNE GOODWIN CRUMP
VINCENT J. CURTIS, JR.
RICHARD J. ESTEVEZ
PAUL J. FELDMAN
RICHARD HILDRETH
FRANK R. JAZZO
ANDREW S. KERSTING
EUGENE M. LAWSON, JR.
SUSAN A. MARSHALL*
HARRY C. MARTIN
GEORGE PETRUTSAS
RAYMOND J. QUIANZON
LEONARD R. RAISH
JAMES P. RILEY
KATHLEEN VICTORY
HOWARD M. WEISS

* NOT ADMITTED IN VIRGINIA

BY HAND DELIVERY

Magalie Salas, Esq.
Federal Communications Commission
445 12th Street, SW, Room TW-B204
Washington, DC 20554

**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

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Before the
Federal Communications Commission
Washington DC 20554

In the Matter of)	
)	
The Establishment of Policies and)	IB Docket No. 99-81
Service Rules for the Mobile Satellite)	RM-9328
Service in the 2 GHz Band)	
)	

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.

² The Establishment of Policies and Service Rules for the Mobile Satellite Service in the 2 GHz Band, IB Docket No. 99-81, Notice of Proposed Rulemaking, FCC 99-50 (released March 25, 1999) (Notice).

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.⁴ Then, despite having identified the 6 GHz band as a primary relocation site for 2 GHz users,⁵ the Commission proposed designating the upper 6 GHz band (6700-7075 MHz) for mobile satellite feeder links⁶ — a proposal reiterated here.⁷ The Commission also proposed a similarly severe reduction of spectrum available to the Fixed Service in the 18 GHz band.⁸ The ongoing Ku-band proceeding

⁴ Redevelopment of the Spectrum to Encourage Innovation in New Telecommunications Technology, ET Docket No. 92-2, First Report and Order, 7 FCC Rcd 6886 (1992), Second Report and Order, 8 FCC Rcd 6495 (1993), Third Report and Order, 8 FCC Rcd 6589 (1993). The same proceeding also allocated 2 GHz frequencies to PCS.

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.")

⁶ Amendment of Parts 2, 25 and 97 of the Commission's Rules with Regard to Mobile Satellite Service Above 1 GHz, 13 FCC Rcd 17107 (1998).

⁷ See Appendix B.

⁸ Redesignation of the 17.7-19.7 GHz Frequency Band, 13 FCC Rcd 19923 (1998).

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.⁹ 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.¹⁰

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.

⁹ NGSO FSS Systems Co-Frequency with GSO and Terrestrial Systems, ET Docket No. 98-206, Notice of Proposed Rulemaking, FCC 98-310 (released Nov. 24, 1998). The proposal to expand GSO FSS operations is not discussed in text, but appears in Appendix A, C.F.R. § 25.202(a)(1) (proposed).

¹⁰ Petition for Reconsideration of Hughes Communications, Inc. (filed Feb. 16, 1999); Petition for Reconsideration of GE American Communications, Inc. (filed Feb. 16, 1999); and Petition for Reconsideration/Clarification of TRW, Inc. (filed Feb. 16, 1999). These seek reconsideration of Allocation and Designation of Spectrum, IB Docket No. 97-95, Report and Order, FCC 98-336 (released Dec. 23, 1998).

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.¹² 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.¹³ 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.

¹² 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.

¹³ 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.¹⁴ 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.¹⁵

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.¹⁶

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.¹⁷

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

¹⁷ 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

Counsel for the Fixed Wireless
Communications Coalition

June 24, 1999

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 SPECTRUM¹

Band	Applicant	Feeder Links	Terrestrial Use
5091-5250 MHz	Constellation II	NGSO uplink	Unlicensed U-NII
5150-5250 MHz	ICO	NGSO uplink	Unlicensed U-NII
6425-6575 MHz	Inmarsat Horizons	GSO downlink	CC, LTTS, OFS, BAS, CARS
6700-6875 MHz	Globalstar	NGSO downlink	CC, OFS
6700-7075 MHz	Constellation II	NGSO downlink	CC, OFS
6775-7075 MHz	MCHI Ellipso 2G	NGSO uplink	CC, OFS
10.70-10.95 & 11.20-11.45 GHz	TMI Cansat-M3	GSO uplink	CC, LTTS, OFS,
11.597-1.700 GHz ²	Boeing	NGSO downlink	CC, LTTS, OFS
11.70-12.20 GHz	Globalstar	GSO downlink	LTTS
12.75-13.25 GHz	TMI Cansat-M3	GSO downlink	CC, LTTS, OFS, BAS, CARS
14.0-14.4 GHz	Globalstar	GSO uplink	LTTS
14.391-14.500 GHz ³	Boeing	NGSO uplink	LTTS
17.70-18.35 GHz ⁴	Celsat	GSO downlink	CC, OFS, BAS, CARS
19.30-19.70 GHz ⁵	Iridium Macrocell	NGSO downlink	CC, OFS, BAS, CARS
27.50-28.35 GHz	Celsat	GSO uplink	LMDS
29.10-29.50 GHz ⁶	Iridium Macrocell	NGSO uplink	LMDS

Notes

1. MSS requests are from The Establishment of Polices and Service Rules for the Mobile Satellite Service in the 2 GHz Band, IB Docket No. 99-81, Notice of Proposed Rulemaking, FCC 99-50 (released March 25, 1999) (Notice). Fixed Service data are from 47 C.F.R. § 101.101.
2. The Commission indicated it will consider the Boeing requests as part of the SkyBridge rulemaking in ET 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 Rcd 19005, 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

Jennifer Gilsonan
Satellite Policy Branch
International Bureau
Federal Communications Commission
445 12th Street, S.W., Room 6A-520
Washington, D.C. 20554

Harry Ng
Satellite & Radiocommunication Branch
International Bureau
Federal Communications Commission
445 12th Street, S.W., Room 6A-668
Washington, D.C. 2055

Thomas J. Sugrue, Chief
Wireless Telecommunications Bureau
Federal Communications Commission
445 12th Street, S.W., Room 3C252
Washington, D.C. 20554

D'Wana Terry, Chief
Public Safety & Private Wireless Division
Wireless Telecommunications Bureau
Federal Communications Commission
445 12th Street, SW, 4th Floor
Washington, D.C. 20554

Herb Zeiler, Deputy Chief
Public Safety & Private Wireless Division
Wireless Telecommunications Bureau
Federal Communications Commission
445 12th Street, SW, 4th Floor
Washington, D.C. 20554

John Cimko, Chief
Policy Division
Wireless Telecommunications Bureau
Federal Communications Commission
445 12th Street, S.W., Room 3C124
Washington, D.C. 20554

Ed Jacobs
Policy Division
Wireless Telecommunications Bureau
Federal Communications Commission
445 12th Street, S.W., Room 3C1620
Washington, D.C. 20554

Dale Hatfield, Bureau Chief
Office of Engineering and Technology
Federal Communications Commission
445 12th Street, S.W., Room 7C-155
Washington, D.C. 20554

Rebecca Dorch, Deputy Chief
Office of Engineering and Technology
Federal Communications Commission
445 12th Street, S.W., 7th Floor
Washington, D.C. 20554

Bruce Franca, Deputy Chief
Office of Engineering and Technology
Federal Communications Commission
445 12th Street, S.W., 7th Floor
Washington, D.C. 20554

Julius Knapp, Chief
Policy & Rules Division
Office of Engineering and Technology
Federal Communications Commission
445 12th Street, S.W., 7th Floor
Washington, D.C. 20554

Geraldine Matise, Deputy Chief
Policy & Rules Division
Office of Engineering and Technology
Federal Communications Commission
445 12th Street, S.W., 7th Floor
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

A handwritten signature in black ink, appearing to read 'D. Lunt', with a horizontal line underneath it.

Deborah N. Lunt