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

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MAY 17 1996

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF SECRETARY

In the Matter of)
)
)
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
RM-7927

To: The Commission

COMMENTS ON COMSAT'S SUPPLEMENTAL COMMENTS

FIXED POINT-TO-POINT COMMUNICATIONS
SECTION, NETWORK EQUIPMENT DIVISION OF
THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION

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SUMMARY

This rule making involves the proposed reallocation of certain segments in the 2 GHz band for mobile-satellite service ("MSS"). One of the issues involved in this proceeding is the feasibility of fixed point-to-point microwave service ("FS") and MSS users sharing a portion of the 2 GHz band, on a co-primary basis, for a limited duration to accommodate this reallocation.

COMSAT Corporation ("COMSAT"), in Supplemental Comments on the proposed 2 GHz band reallocation, claims that the 1995 World Radiocommunication Conference ("WRC-95") concluded such FS/MSS sharing is feasible based upon international ITU-R standards. As demonstrated herein, COMSAT's claim is unjustified.

First, WRC-95 did not specify the process for coordinating or sharing the 2 GHz band between FS and MSS users on a co-primary basis. Second, international criteria are inappropriate to determine if such sharing is possible for domestic operations because material differences in performance characteristics exist between U.S. and foreign FS and MSS systems.

Recently, however, COMSAT and other MSS interests acknowledged the need to study sharing standards which would incorporate domestic operating criteria. These parties are to conduct such studies in conjunction with the Fixed Point-to-Point Communications Section, Network Equipment Division of the Telecommunications Industry Association ("TIA"), committee, TR14.11, which has developed the industry standard interference criteria for microwave systems (the most recent version is the June 1994 "Telecommunications Systems Bulletin No. 10-F, Interference Criteria for Microwave Systems").

Given the problems attendant on FS/MSS sharing and given the agreement by MSS industry representatives to participate in studies so that a determination can be made if these problems could be resolved, TIA strongly recommends that the Commission rely upon TR14.11 to:

- establish appropriate criteria for determining if FS paths could share the 2165-2200 MHz band with MSS users; and
- establish appropriate channel plans and other technical restrictions on MSS users to protect FS users in the same band if such sharing were to occur.

Until these issues are resolved satisfactorily, the Commission must not take any action that would require FS/MSS co-primary sharing of the 2 GHz band.

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COMMENTS ON COMSAT'S SUPPLEMENTAL COMMENTS

Pursuant to Section 1.415 of the Commission's Rules,¹ the Fixed Point-to-Point Communications Section, Network Equipment Division of the Telecommunications Industry Association ("TIA"),² hereby comments on COMSAT Corporation's ("COMSAT") Supplemental

¹47 C.F.R. Section 1.415 (1996).

²TIA is the principal industry association representing fixed point-to-point microwave service ("FS") radio manufacturers. TIA members serve, among others, companies, including telephone carriers, utilities, railroads, state and local governments, and cellular carriers, licensed by the Commission to use private and common carrier bands for provision of important and essential telecommunications services. In June 1994, TIA's committee, TR14.11, completed its "Telecommunications Systems Bulletin No. 10-F, Interference Criteria for Microwave Systems," which prescribes standards for implementing the new channel plan for the bands above 3 GHz and for establishing criteria regarding 2 GHz band PCS-to-microwave interference protection. As part of its ongoing standard-setting process, TIA is updating Bulletin 10-F, and Bulletin 10-G is in draft (inasmuch as this standard will be updated, it shall be referenced herein as "Bulletin 10"). Furthermore, TIA, along with the National Spectrum Managers Association, was responsible for most of the technical rule proposals recently adopted by the Commission in its consolidation of Parts 21 and 94 into new Part 101. See Reorganization and Revision of Parts 1, 2, 21, and 94 of the Rules to Establish a New Part 101 Governing Terrestrial Microwave Fixed Radio Services, Report and Order, WT Dkt. No. 94-148 (FCC 96-51, released Feb. 29, 1996).

Comments ("Supplemental Comments")³ on the above-captioned Notice of Proposed Rule Making ("NPRM").⁴

In the NPRM, the Commission proposes reallocating additional spectrum from the 2 GHz band for the mobile-satellite service ("MSS"). COMSAT, in its Supplemental Comments, claims that, based upon international ITU-R standards, the 1995 World Radiocommunication Conference ("WRC-95") concluded that FS and MSS users could share the 2 GHz band, on a co-primary basis, for a limited period as part of the transition to implement this reallocation.

The record of this proceeding clearly does not support COMSAT's "spin" on WRC-95. Material differences in performance characteristics exist between U.S. and international FS and MSS systems. Reliance upon ITU-R, or other international sharing criteria, consequently is inappropriate as a platform for evaluating if FS and MSS users could share the 2 GHz band in the U.S. Indeed, neither COMSAT, nor any other MSS representative, has shown that, based upon U.S. standards, FS/MSS 2 GHz band sharing is feasible.

Fortunately, at a recent meeting convened by COMSAT,⁵ MSS interests recognized the need to study sharing standards in the context of domestic operations. The FS and MSS interests attending

³In an April 17, 1996, Public Notice, the Commission solicited comments on COMSAT's Supplemental Comments. Public Notice, FCC Seeks Comments In the Proceeding to Allocate 70 Megahertz of Spectrum to the Mobile-Satellite Service (DA 96-577, released April 17, 1996). Several parties already have responded to COMSAT's Supplemental Comments: (i) on March 27, 1996, Motorola Satellite Communications, Inc. ("Motorola") filed its Partial Opposition of Motorola to COMSAT's Motion for Leave to File Supplemental Comments; (ii) on April 1, 1996, UTC, The Telecommunications Association ("UTC"), filed the UTC Opposition to Motion ("UTC Opposition"); and (iii) on April 5, 1996, the American Petroleum Institute ("API") filed the Response of the American Petroleum Institute to Supplemental Comments of COMSAT Corporation ("API Response"). On April 11, 1996, COMSAT filed a Reply of COMSAT Corporation to Motorola and UTC ("COMSAT Reply").

⁴10 FCC Rcd 3230 (1995).

⁵This meeting took place April 25-26, 1996, at COMSAT Corporation in Bethesda, Maryland.

this meeting, including representatives from TIA and from COMSAT, agreed to cooperate in determining if appropriate system performance objectives and interference criteria could be developed to permit their 2 GHz band sharing. These parties intend to work with TIA's TR14.11 committee in resolving these issues.

Based upon the serious questions concerning the feasibility of band sharing, TIA recommends that the Commission defer any reallocation of the 2 GHz band for MSS. Instead, consistent with the recent agreement between FS and MSS interests, TIA urges that the Commission rely upon TR14.11, which developed the FS/PCS sharing criteria in Bulletin 10, to: (i) establish appropriate criteria for determining whether FS paths could share the 2165-2200 MHz band with MSS users; and (ii) establish appropriate channel plans and other technical restrictions on MSS users to protect FS users in the same band if such sharing were to occur.

**THE PROPOSED 2 GHz BAND REALLOCATION
IS ANOTHER THREAT TO FS**

The Commission, in the NPRM, seeks to provide additional spectrum for MSS consistent with international allocations. While TIA does not object to promoting MSS, it should not be accomplished at the expense of FS.

The demand for FS spectrum is great. Public health and safety users depend upon reliable and available FS frequencies for delivery of their services to the public. Local exchange carriers and new Competitive Access Providers, cellular telephone companies, utilities, railroads, petroleum companies, financial institutions, and federal, state and local governments, use FS to support their network operations. Emerging wireless telecommunications, especially PCS, will rely upon FS users for spectrum to provide their services and will rely upon FS facilities in other bands to support their operations. These FS users frequently are the cornerstone of supervisory and operational programs designed to deliver essential products and services to the public. Thus, FS users serve specific

industrial, public safety, and commercial requirements of many companies and public agencies that constitute much of this nation's infrastructure.

Specifically, in the NPRM, the Commission proposes:

- Reallocating the 1990-2025 MHz (Earth-to-space) and 2165-2200 MHz (space-to-Earth) bands for MSS. These bands would be allocated for both geostationary ("GSO") and for non-geostationary (low-Earth orbit or "LEO") satellites.
- Relocating the Broadcast Auxiliary Service ("BAS") licensees from the 1990-2110 MHz portion of the 1990-2025 MHz band to the 2110-2145 MHz band. This relocation would clear the 1990-2025 MHz band for MSS, because the Commission assumes that MSS and BAS users could not share the same band.
- Relocating common carrier and private terrestrial FS users: (i) from the 2110-2145 MHz band to clear spectrum for the BAS licensees migrated off the 1990-2110 MHz band, because it assumes that BAS and FS users could not share this band; and (ii) from the 2165-2200 MHz band to clear spectrum for MSS users, because it assumes that MSS and FS users could not share this band. The FS users would be compensated for their move under the same terms as they are to be compensated for the ongoing move off the 2 GHz band to accommodate PCS.⁶

Several assumptions have prompted the Commission to make these proposals. First, the Commission assumes that BAS and MSS users could not share the 1990-2025 MHz band, so it proposes relocating BAS users from the 1990-2110 MHz portion of that band to the 2110-2145 MHz band. Similarly, after being subjected to one forced relocation off the 2 GHz band, FS users would be forced to move from the 2110-2145 MHz band, because the Commission assumes that they could not share that band with newly relocated BAS users, and from the paired 2165-2200 MHz band, because the Commission assumes that they could not share that band with MSS users.

In making this proposal, the Commission ignores the acute spectrum shortage facing FS users. It cavalierly proposes that FS users in the 2110-2145 MHz and the 2165-2200 MHz bands join the already overcrowded bands above 3 GHz, which were reallocated for the 2 GHz FS users relocated

⁶NPRM, 10 FCC Rcd at 3231-33.

in ET Docket No. 92-9 to clear spectrum for PCS. Spectrum available for FS users is being eroded substantially by Commission actions in other proceedings. The reallocations for MSS, proposed by the Commission in the NPRM, would make matters much worse.⁷

The Commission's proposed "extended" allocation of 70 MHz in the 1990-2025 and 2165-2200 MHz bands was not supported in the record of the NPRM. Although several parties acknowledge that some additional spectrum should be allocated for MSS, the Commission's proposed

⁷Unfortunately, as demand for these essential FS services increases, available spectrum does not. First, FS users have been required to clear the 2 GHz band for PCS and to relocate in bands above 3 GHz. Redevelopment of Spectrum to Encourage Innovation In the Use of New Telecommunications Technologies, Second Report and Order, ET Docket No. 92-9, 8 FCC Rcd 6495, 6519-20 (1993), modified, Memorandum Opinion and Order, 9 FCC Rcd 1943 (1994). The bands designated for the relocating 2 GHz FS users, primarily the 6 and 11 GHz bands, already are quite congested, and no relief is in sight. These bands could become largely unusable since the upper 6 and 18 GHz bands recently were reallocated at WRC-95 so that FS users are co-primary with non-geostationary ("NGSO") MSS feeder links. Final Acts of the World Radiocommunication Conference (WRC-95), Geneva, 1995 at Article 55. Needed relief from this spectrum congestion is not provided in other recent Commission allocation decisions. Newly available spectrum in the 4 GHz band from the federal government will not be allocated so that this band is feasible as a substitute for the FS users being migrated off the 2 GHz band. Allocation of Spectrum Below 5 GHz Transferred from Federal Government Use, First Report and Order and Second Notice of Proposed Rule Making, 10 FCC Rcd 4769 (1995). Availability of the 18 GHz band could be diminished as the result of the recent reallocation resulting in it being shared with government users. Amendment of Part 2 of the Commission's Rules to Allocate Spectrum for the Fixed-Satellite Service in the 17.8-20.2 GHz Band for Government Use, Memorandum Opinion and Order, 10 FCC Rcd 9931 (1995). Current plans to use the 18.8-19.3 GHz band for NGSO fixed satellite service are likely to decrease FS use of that band. Both the 23 GHz and 26 GHz bands are becoming much less available to FS users due to restrictive demands of Inter-Satellite Link and Data Relay Satellite Services. A currently pending proposal to channelize the 27.5-29.5 GHz band for the co-primary FS users is unlikely to be adopted because the Commission recently proposed reallocating the 28 GHz band only for LMDS systems, Fixed Satellite Service and MSS system feeder links. See Rulemaking to Amend Parts 1, 2, 21 and 25 of the Commission's Rules to Redesignate the 27.5-29.5 GHz Frequency Band, to Reallocate the 29.5-30.0 GHz Band, to Establish Rules and Policies for Local Multipoint Distribution Service and for Fixed Satellite Services, Third Notice of Proposed Rulemaking, 11 FCC Rcd 53 (1995). Availability of FS spectrum in the bands above 40 GHz also is quite uncertain at this time. See Amendment of Parts 2 and 15 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, Notice of Proposed Rule Making, 9 FCC Rcd 7078 (1994); Amendment of Parts 2, 15, and 97 of the Commission's Rules to Permit Use of Radio Frequencies Above 40 GHz for New Radio Applications, First Report and Order and Second Notice of Proposed Rule Making, ET Dkt. No. 94-124 (FCC 95-499, released Dec. 15, 1995).

spectrum reallocations are rejected by MSS, BAS and FS interests alike. This opposition was based upon several factors, including the highly questionable ability of FS and MSS users to operate on a co-primary basis in the 2 GHz band. As the industry representative for FS equipment manufacturers, TIA shares these concerns.

The issue of 2 GHz band sharing between FS and MSS users now has been resurrected in COMSAT's Supplemental Comments. In this filing, COMSAT claims that the Final Acts, adopted at WRC-95, recognize that MSS and FS users can share certain portions of the 2 GHz band for a limited time as part of an overall transition plan. COMSAT argues that WRC-95 provides a "workable framework for the Commission to allocate spectrum at 2 GHz for use by MSS" in the U.S.⁸

COMSAT is wrong. Based upon a review of the WRC-95 Final Acts, the sharing criteria proffered by COMSAT, and the studies conducted to revise Bulletin 10, there is no evidence at this time to support COMSAT's contention that domestic FS and MSS users could operate on a co-primary basis in the 2 GHz band for any period of time.

**COMSAT'S CLAIM THAT WRC-95 ENDORSED
MSS/FS 2 GHz BAND SHARING IS INCORRECT**

In comments on the NPRM, COMSAT argues that relocation of FS users in the 2 GHz band is unnecessary to accomplish any spectrum reallocation for MSS.⁹ Rather, COMSAT claims that "[t]echnical interference studies," that it conducted or that the ITU-R sponsored, "show that for some period of time MSS can share the downlink band at 2160-2200 MHz without causing harmful degradations to the quality of existing FS operations in the 2 GHz band."¹⁰ Thus, based upon this

⁸Supplemental Comments at 2.

⁹See Supplemental Comments at 3.

¹⁰Supplemental Comments at 3.

assumption, that FS/MSS users could share the 2 GHz band for a limited period, COMSAT offered a "phased transition plan," which it claims would result in less incumbent license relocations.¹¹

COMSAT has previously demonstrated in the record of this proceeding that it is feasible for MSS to share the downlink band at 2165-2200 MHz with existing fixed microwave systems for an extended period of time. Technical interference studies conducted by COMSAT Labs, and other studies performed in the ITU-R Task Group 2/2 and as part of the Conference Preparatory Meeting for WRC-95, show that MSS can share the downlink band for an extended period of time without causing harmful degradations to the internationally agreed performance standards of existing FS operations in the 2 GHz band.

* * * * *

As indicated in our Supplemental Comments, the Final Acts of WRC-95 support these conclusions and provide a framework to coordinate MSS downlinks with terrestrial fixed microwave under a gradual transition plan. At WRC-95 the conferees agreed to Final Acts that provide for the early implementation of global MSS systems by year 2000 on a co-primary basis with existing FS operations. The WRC-95 Final Acts reflect the international consensus that sharing between MSS and existing FS systems at 2 GHz is feasible and that Administrations should take certain steps to implement the gradual transfer of FS operations from the overlapping portions of the 2 GHz band. To ensure that there is no unacceptable interference to FS operations during the extended sharing/transition period, the Conference directed the ITU-R and the Radiocommunication Bureau to develop the system specific methodology to assess the impact of interference to FS operations in the detailed coordination of MSS systems.¹²

COMSAT thus urges the Commission to adopt its transition plan so that relocation of FS users would be limited and its obligations to finance such relocation would be minimized:

[T]he results of WRC-95 establish that MSS and existing FS facilities can share certain band segments at 2 GHz and that interference criteria, consistent with internationally agreed to ITU-R FS performance objectives, can be devised to reasonably protect existing FS microwave systems and provide for their gradual transfer out of the MSS downlink band. Given the decisions at WRC-95, the Commission's proposal to immediately clear all FS operations

¹¹Supplemental Comments at 3-4.

¹²COMSAT Reply at 7-8 (footnotes omitted). See also WRC-95 Final Acts (Part I), International Table of Frequency Allocations at 135; WRC-95 Final Acts (Part II), Res. COM 5-10, Resolves 4.1 & 4.3; WRC-95 Final Acts (Part II), Res. COM 5-10, Requests 1-1.2 and Resolution 46, Annex 2.

from the portions of the 2 GHz band overlapping with MSS--in a move paid for by the MSS licensees--is unnecessary and would impose an impossible economic burden on the MSS industry which is very likely to jeopardize the delivery of a valuable, competitive service to the public.¹³

As the record of this proceeding demonstrates, COMSAT's version of decisions made at WRC-95 regarding FS/MSS 2 GHz band sharing is self-serving. Furthermore, COMSAT clearly is using this "sharing" proposal as a means of avoiding the payment of relocation costs.¹⁴

API correctly states that WRC-95 did not conclude that sharing between MSS and FS users is feasible in the 2 GHz band.¹⁵ Instead, WRC-95 developed preliminary criteria for power flux density and other parameters to be used in conducting sharing studies. In addition, WRC-95 called upon the international community to develop and submit sharing studies at WRC-97.¹⁶

Moreover, API accurately points out that WRC-95 merely concluded that further studies must be undertaken to determine if sharing could work:

COMSAT attempts to end-run the engineering problems presented by coordination of thousands of portable, handheld MSS units with fixed terrestrial microwave links. Specifically, COMSAT represents that WRC-95 concluded that sharing was feasible, when in fact **WRC-95 concluded that further study of the feasibility of sharing is needed.** COMSAT apparently overlooks three vital documents contained in the WRC-95 Final Report: Recommendation 717 . . . Section 1.9.1 of Resolution GT PLEN-3 . . . and the Annex to Resolution GT PLEN-4 These three documents clearly

¹³Supplemental Comments at 12.

¹⁴The obligation of emerging technologies licensees to compensate incumbents was a fundamental and integral part of the Commission's decision to clear the 2 GHz band, which is occupied by thousands of communication facilities that often provide vital services. One of the fundamental premises of the 2 GHz reallocation plan is that existing communications facilities in the band would not be discontinued or even phased out, but that they would be relocated to higher microwave bands or to other comparable communication services and that the new occupants of the 2 GHz band would pay the relocation costs. Thus, Comsat's proposal, which would eliminate this essential relocation reimbursement obligation, is inconsistent with the Commission's 2 GHz reallocation decision, is unfair, and is inconsistent with the public interest.

¹⁵API Response at 3-4.

¹⁶API Response at 4.

explain that additional studies are "urgently" needed to resolve the question of the feasibility of sharing between MSS and FS in bands below 3 GHz, including the 2.1 GHz band, in preparation for WRC-97.

* * * * *

[Furthermore, ITU-R declared that] Recommendation 717 is included in Section 1.9.1 of the WRC-97 agenda . . . and that Resolution COM5-10 [which COMSAT relies upon as a conclusive document] is referred to as an urgent issue in the annex to Resolution GT PLEN-4. Therefore, an input to the CPM-97 on this issue should be prepared.¹⁷

UTC concurs with API that COMSAT mischaracterizes the impact of decisions made at WRC-95:

Similarly Comsat's characterization of the WRC-95 as specifying the process for coordinating MSS and FS operations at 2 GHz is a gross distortion of the Final Acts. The Final Acts in no way specify the process for coordinating or sharing spectrum between fixed microwave and MSS. At most, Resolution Com5-10 references unnamed theoretical studies concerning the feasibility of sharing during the short term, and actually goes on to state that "in the long term sharing will be complex and difficult in both bands . . ."

* * * * *

As UTC has indicated previously, it does not believe that Comsat or any other MSS proponent has been able to conclusively demonstrate that MSS and microwave can coexist. Prior to the adoption of any rules allowing shared use of the 2 GHz band between microwave and MSS, interference and coordination standards would have to be established through an appropriate body such as the Telecommunications Industry Association.¹⁸

TIA totally agrees with API and UTC. The Commission must not accept COMSAT's incorrect version of WRC-95.

¹⁷API Response at 4-5.

¹⁸UTC at 3 (footnote omitted).

**U.S. INDUSTRY CONSENSUS ON FS/MSS SHARING
MUST BE REACHED BEFORE THE PROPOSED REALLOCATION CAN BE ADOPTED**

There is disagreement between the MSS and FS industries as to the viability of sharing on the 2 GHz band. Myriad issues must be reviewed to determine if sharing between FS and MSS users in the 2165-2200 MHz band could occur or if a specific relocation plan should be adopted. These issues include establishing criteria for: (i) MSS and FS power levels; (ii) FS systems using Automatic Transmitter Power Control; (iii) allowable maximum receiver threshold degradation limits for digital systems; (iv) acceptable levels of total accumulated noise for analog systems; (v) criteria for measuring interference into FS receivers from all satellites;¹⁹ and (vi) maintaining consistency with the ITU-R channeling plans for the 1980-2010 and 2170-2200 MHz bands.

TIA acknowledges the impact that MSS systems would have on FS systems in the 2 GHz band and the corresponding difficulty in developing viable sharing criteria. Nevertheless, with enough "breathing room," it is quite possible that industry groups, with the cooperation of the Commission, could develop criteria that would minimize the number of evicted FS users and that would delay the move of others.

At the April 1996 industry meeting, COMSAT displayed software showing some specific cases where calculations indicate that sharing works. However, these calculations were based upon international performance objectives that **ARE NOT** agreed to by the U.S. FS community because the equipment characteristics involved are significantly different.

Generally, international analog radios at 2 GHz carry primarily voice traffic, whereas many U.S. FS radios carry 256 QAM data modem traffic. This difference means that U.S. FS users have much less system gain than the original coordinations may indicate. The difference between U.S. and

¹⁹Typically, FS receivers are vulnerable to interference from 1-2 transmitters. However, with MSS, FS receivers are vulnerable to interference from the entire array of satellites. Thus, interference from MSS satellites into FS receivers should be calculated in the aggregate.

international radios also means that traffic can be interrupted by peak levels of interference which cause digital modems to lose frame.

International digital radios at 2 GHz employ BPSK or QPSK modulation, whereas U.S. FS digital radios utilize at least 16 QAM modulation with many thousands of transceivers utilizing 256 QAM modulation in the 3.5 MHz cellular bandwidths. With these different configurations, U.S. digital radios are up to 30 db more sensitive to peak interference levels than international radios.

Currently, TIA's Bulletin 10 addresses the interference criteria necessary for analog and digital radio systems operating in the U.S. The MSS interests attending the April COMSAT meeting agreed to review Bulletin 10 and become involved with the TR14.11 committee in order to understand and resolve MSS/FS interference issues.

TIA is pleased that the MSS interests acknowledge the need to evaluate sharing based upon the appropriate U.S. technology, and not upon inapplicable international standards. TIA will make every effort to include MSS interests in this evaluation. However, given the significant uncertainty concerning the feasibility of sharing, it is critical that an agreement be reached between both industries before any frequency sharing can be approved.

CONCLUSION

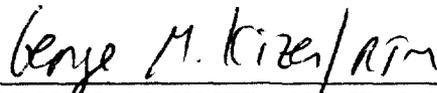
Accommodating MSS users is in the public interest. It is a technology that will provide great benefits and should be provided the opportunity to evolve.

As demonstrated herein, however, numerous critical issues still must be resolved before reallocating the 2 GHz band for MSS can be adopted. The impact upon existing services needs to be considered thoroughly prior to making the sweeping decisions on spectrum allocations proposed in the NPRM. One critical ingredient in this decision-making process is evaluating the possibility of FS and MSS users sharing the 2165-2200 MHz band on a co-primary basis.

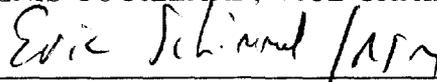
Answers to these questions will take some time to achieve. TIA thus urges the Commission to defer further consideration of this NPRM until the necessary studies discussed herein have been completed and until a determination has been made that FS/MSS 2 GHz band sharing is, in fact, feasible.

Respectfully submitted,

FIXED POINT-TO-POINT COMMUNICATIONS
SECTION, NETWORK EQUIPMENT DIVISION OF THE
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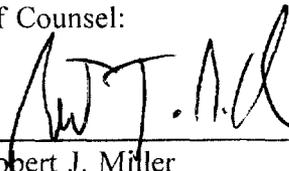


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251486/gw03

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I hereby certify that a true and correct copy of the foregoing Comments on COMSAT's Supplemental Comments was sent via first class mail, postage prepaid, to the following parties on the 16th day of May, 1996:

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