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FEDERAL COMMUNICATIONS COMMISSION
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November 19, 1998

VIA HAND DELIVERY
Magalie Salas, Esquire
Secretary
Federal Communications Commission
1919 M Street, N.W. - Room 222
Washington, D.C. 20554

Re: Redesignation of the 17.7-19.7 GHz Frequency Band
IB Docket No. 98-172

Dear Ms. Salas:

On behalf of the Fixed Point-to-Point Communications Section, Wireless Communications Division of the Telecommunications Industry Association, we are filing an original and nine (9) copies of its Comments in the above-referenced proceeding.

If additional information is required, please communicate with us.

Very truly yours,

FLETCHER, HEALD & HILDRETH, PLC

Leonard R. Raish
George Petrutsas
Of Counsel

GP:cej
Enclosures
cc: All Commissioners (w/enc.)
Chief, International Bureau (w/enc.)
Chief, WTB (w/enc.)
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BEFORE THE

Federal Communications Commission

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FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

In the Matter of	)	
	)	
Redesignation of the 17.7-19.7 GHz Frequency	)	
Band, Blanket Licensing of Satellite	)	IB Docket No. 98-172
Earth Stations in the 17.7-20.2 GHz and	)	RM-9005
27.5-30.0 GHz Frequency Bands,	)	RM-9818
and the Allocation of Additional Spectrum	)	
in the 17.3-17.8 GHz and 24.75-25.25 GHz	)	
Frequency Bands for Broadcast	)	
Satellite-Service Use	)	

COMMENTS OF THE
FIXED POINT-TO-POINT COMMUNICATIONS SECTION,
WIRELESS COMMUNICATIONS DIVISION OF THE
TELECOMMUNUNICATIONS INDUSTRY ASSOCIATION

Respectfully submitted,

FIXED POINT-TO-POINT COMMUNICATIONS
SECTION, WIRELESS COMMUNICATIONS
DIVISION OF THE TELECOMMUNICATIONS
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Date: November 19, 1998

TABLE OF CONTENTS

SUMMARY i

COMMENTS 1

I. The Commission's proposed band segmentation plan for the 18 GHz band raises serious concerns 2

II. The Fixed Section proposes a reasonable alternative segmentation plan for the 18 GHz Band 3

III. The proposals in this proceeding would reduce SIGNIFICANTLY the spectrum available to the FS, continuing the trend of erosion of FS spectrum by the Commission over the last several years 4

IV. Proposed "grandfathered" digital and analog FS systems would suffer interference and serious performance degradation 6

V. The proposed ubiquitous satellite receivers in the 18.3-18.55 GHz, and 18.92-19.16 GHz will be unable to co-exist with the "grandfathered" FS systems . . . 11

VI. While new wireless services should of course be accommodated in the radio spectrum, they must be required to use the spectrum efficiently . . . 11

VII. The Commission's band segmentation proposals should be modified 12

VIII. The FS segments of the 18 GHz band should be re-channelized for more efficient use 15

IX. Sharing by FS and MSS/FL systems must be well managed 15

X. CONCLUSION 16

APPENDIX A

Responses to specific requests for comments in the NPRM

APPENDIX B

Summary of US 18 GHz fixed service deployment

Summary

The Fixed Point-to-Point Communications Section, Wireless Communications Division of the Telecommunications Industry Association has studied carefully the Commission's band segmentation and sharing proposals in this proceeding and, while it appreciates the Commission's desire to provide specific allocations to the satellite services in the 18 GHz band, the Section believes that the specific segmentation and sharing proposals in the Notice raise serious concerns about the potential for mutually unacceptable interference between services, and about immediate injuries to FS services, if these proposals are implemented.

Briefly, the Fixed Section believes that adoption of the Commission's proposals would result in widespread intolerable interference to terrestrial fixed services and to satellite earth stations and cause costly dislocations of thousands of existing systems, and would seriously restrict the ability of the fixed services to continue to serve the many communications requirements of existing and emerging communications providers and users.

It is clearly desirable that all categories of services be able to meet their respective spectrum requirements. However, as we have learned from past experience, sharing the same spectrum by incompatible services becomes increasingly difficult, and in many cases this ultimately results in one of the sharing services having to vacate the shared bands. This generally has resulted in the relocated services having to move to a less desirable frequency allocation. As we are now approaching frequency gridlock, there are no new suitable alternative frequency allocations, other than those that would require sharing with other services. The Fixed Section, therefore,

believes that, as a matter of policy where a new service is proposed, the new service should share with similar services in the same category. In this reallocation proceeding, the new satellite fixed services (FSS) should be required to share spectrum with other FSS services.

The Fixed Section agrees that band segmentation will solve difficult sharing problems. Therefore, the Section proposes a modified version of the Commission's proposed band segmentation plan which would minimally accommodate Fixed Services (FS) needs and, at the same time, provide significant specific allocations for GSO/FSS, NGSO/FSS and MSS/FL proposed systems.

BEFORE THE

Federal Communications Commission

WASHINGTON, D.C. 20554

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in the 17.3-17.8 GHz and 24.75-25.25 GHz	)	
Frequency Bands for Broadcast	)	
Satellite-Service Use	)	

COMMENTS OF THE FIXED POINT-TO-POINT COMMUNICATIONS SECTION, WIRELESS COMMUNICATIONS DIVISION OF THE TELECOMMUNICATIONS INDUSTRY ASSOCIATION

The Fixed Point-to-Point Communications Section, Wireless Communications Division of the Telecommunications Industry Association ("Fixed Section" or "Section")[1] files its comments in response to the Commission's Notice of Proposed Rulemaking ("NPRM" or "Notice") in the above-referenced proceeding.[2] The Section's responses

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[1]The Telecommunications Industry Association is the principal industry association representing telecommunications equipment manufacturers, including manufacturers of terrestrial fixed point-to-point microwave radio service equipment. Fixed Section members serve, among others, companies - including telephone carriers, emerging communications carriers, PCS carriers, cellular carriers, public safety operations, utilities, railroads, and governments - which are licensed by the Commission to use private and common carrier bands for provision of important and essential telecommunications services. These comments reflect only the views of the Fixed Point-to-Point Section and does not necessarily reflect the views of any other member of the Association.

[2]In the Matter of Redesignation of the 17.7-19.7 GHz Frequency Band, Notice of Proposed Rulemaking, released September 18, 1998, FCC 98-235; 63 Fed. Reg. 54100, October 8, 1998 ("Notice" or "NPRM").

to the Commission's requests for comments on specific issues are in Appendix A. Briefly, the Section agrees with the Commission's basic approach in the proceeding, which is to provide specific spectrum allocations for the fixed satellite and for the terrestrial fixed services. However, the Section disagrees with the Commission's specific proposals and offers a number of changes which would make the Commission's final decision more technically sound and would better serve the interests of all of the services now sharing the 18 GHz band.

I. The Commission's proposed band segmentation plan for the 18 GHz band raises serious concerns

The Fixed Section is concerned about the Commission's unrealistic expectations in this proceeding. If its proposals are adopted without change, the Fixed Section believes that the terrestrial fixed services ("FS") will not have access to spectrum they require for their continued viability. In its Notice, the Commission proposes to reduce the spectrum available to the FS by 53.3%. Further, in the 46.7% of the spectrum remaining, FS point-to-point services would be required to share with FS point-to-multi-point one way VIDEO distribution services, something that is not done today. This effectively reduces the FS point-to-point and point-to multi-point available frequencies because sharing is virtually impossible due to the coordination difficulties between these services in the metropolitan areas where these services both reside. This point is clearly acknowledged by the Commission.[3] Finally, whereas the VIDEO distribution

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[3]See Notice, Par. 27, where the Commission states: "Due to the difficulties of coordination these point-to-multipoint operations with typical point-to-point terrestrial fixed service operations, these services have generally been licensed in separate

services only require one-way frequencies, the frequencies paired with the one-way frequencies would be lost to the point-to-point FS services. The total impact of this could be a loss of an additional 560 MHz of FS point-to-point spectrum in areas where video distribution services operate. The ultimate impact of this action would be either the loss of 84% of FS point-to-point frequencies where full video distribution services are deployed, or the loss of 53% of FS point-to-point frequencies and the loss of 100% of the VIDEO distribution services. This is clearly unacceptable to both of these services.

II. The Fixed Section proposes a reasonable alternative segmentation plan for the 18 GHz Band

As an alternative to the Commission's proposed segmentation plan,[4] and as more fully discussed in Section VII below, the Fixed Section proposes a modified plan which would:

1. Preserve the existing 17.7-18.14 and 19.26-19.76 GHz paired FS primary allocations.
2. Preserve the existing 18.14-18.58 GHz primary private cable allocation.[5]

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portions of the 17.7-19.7 GHz band."

[4]The Commission's proposed band segmentation plan is summarized in Par. 29 of the NPRM.

[5] Although this band is available to both private cable operators and traditional franchised cable operators, it is used primarily by the former. Also, this band is the only one available to private cable operator (PCO) industry, which is an effective and growing source of competition to franchised cable operators. The 12.7-13.2 GHz band is not available to private cable operators.

3. Grandfather incumbent licensees as primary in the paired 18.58-18.82 and 18.92-19.16 GHz FS allocation.

4. Allocate the 18.58-18.8 GHz band as primary for GSO/FSS gateways and ubiquitous blanket licensed satellite receivers.

5. Allocate the 18.8-19.26 GHz band as primary for NGSO/FSS ubiquitous blanket licensed receivers.

6. Rechannelize the 17.7-18.14 and 19.26-19.76 GHz paired FS primary allocation to (a) accommodate growth from the narrow band grandfathered systems in the paired 18.58 18.82 and 18.92-19.16 GHz FS band and (b) accommodate the demand for new systems in this band.

7. Lift de facto freeze.

As discussed in Section VII below, the Fixed Section believes this plan, which represents a loss of 35% of FS spectrum in this band, will provide the minimum necessary spectrum for continued viability of 18 GHz band FS and CARS services while providing significant allocations to the proposed satellite services. In summary, the modified band segmentation plan provides 880 MHz for FS needs, 440 MHz for CARS/PCO licensees and 1120 MHz for proposed satellite systems.

III. The proposals in this proceeding would reduce SIGNIFICANTLY the spectrum available to the FS, continuing the trend of erosion of FS spectrum by the Commission over the last several years.

The FS currently has 440 MHz paired go/return (880 MHz total) spectrum (17.7-18.14 GHz, 19.26-19.7 GHz), and 240 MHz paired go/return (480 MHz total) spectrum

(18.58-18.82 GHz, 18.92-19.16 GHz) for a total of 680 MHz paired (1360 MHz total) spectrum for two-way communications. Additionally, there is 440 MHz of spectrum (18.14-18.58 GHz) available for one-way video distribution.

The proposals in the proceeding would make FS access to the 18.92-19.16 GHz band secondary since the Commission has correctly determined that FS sharing with ubiquitous satellite earth stations is impossible, a lesson well learned by the FS community through its inability to coordinate new FS links in the 3.7-4.2 GHz band. While the Commission would leave the FS co-primary in the 18.55-18.8 GHz band, this would be of no use to the FS since this is half of a go/return frequency band and reallocation of the upper part to secondary status results in the elimination of pairing capability and consequent loss of the lower part as well. Additionally, co-primary status in the 18.55-18.8 GHz spectrum for the FS will lead to the elimination of the FS for future growth as experienced by the FS at 4 GHz due to the ubiquitous nature of the GSO/FSS gateway locations. This one proposed action would result in an immediate loss of 35% of the available FS go/return frequencies in the 18 GHz band.

The proposed plan would place the FS into a secondary status in the 19.26-19.3 GHz frequency range. This effectively eliminates use of the 17.7-17.74 GHz band since this is also a PAIRED band. This is another 5% loss of frequencies to the FS.

The proposed plan would also eliminate 280 MHz, or 64% of the one-way video distribution band. But as a practical matter, this step would render the band unuseable to private cable operators. This service cannot operate competitively with a reduced bandwidth since it needs the full 72 channel complement for video distribution in

metropolitan areas. Sharing between point-to-point and full band point-to-multi-point services is virtually impossible. Therefore, adoption of this one element of the reallocation proposal would eliminate one of these services in any given geographical area. This represents another 16% loss of the currently available FS frequencies at 18 GHz.

Finally, the Commission proposes to allocate 17.7-17.8 GHz to the Broadcast Satellite Service (BSS) in the year 2007 on a co-primary basis with the FS. Ubiquitously deployed BSS earth receiving stations CANNOT share with the FS, as the Commission acknowledges in Paragraph 19 of the NPRM. Therefore, the allocation of 17.7-17.8 GHz would require FS stations to be relocated, and would also freeze future FS growth in this band. Additionally, allocation of this frequency range would also effectively eliminate use of the PAIRED frequencies from 19.3-19.36 GHz. This would represent another 7% loss of FS 18 GHz frequencies.

IV. Proposed "grandfathered" digital and analog FS systems would suffer interference and serious performance degradation

The Commission proposes to grandfather FS systems now operating on frequencies in the band segments to be re-designated for primary satellite use. However, as shown below, both analog and digital grandfathered FS systems will be harmfully interfered with by the proposed satellite systems. GSO/FSS systems will cause continuous interference for certain antenna alignments, and the NGSO/FSS systems will unacceptably degrade FS performance periodically. Thus, even under the current pfd limits, grandfathered digital and analog FS systems will suffer serious

performance degradation in the presence of the proposed satellite systems.

The proposed pfd allowed to illuminate the earth by the satellites is - 118 dBW/m^2/MHz. This level of interference causes a significant degradation of the threshold of a digital receiver, and makes an AM video distribution receiver unworkable. This is illustrated by the following example:

FS digital receiver example: A 12-DS1 receiver with a 10 MHz bandwidth is assumed. This receiver has a thermal Noise floor of -100 dBm, and a corresponding threshold of -89 dB. A 4-foot diameter antenna is used in these calculations.

First, convert -118 dbw/m^2/MHz to an interference noise floor of the digital receiver.

-118 dBw/m2/MHz = -118 + 10 dB(BW) + 30 dB (dBw-to-dBm) -2 dB (4-ft antenna) = -80 dBm

The new receiver threshold is -80 dBm + 13 dB C/N = -67 dBm.

The FS digital receiver has lost 22 dB of threshold due to the interference. It is interesting to note that this level exceeds the 20 dB I/N short-term interference criteria proposed by the satellite industry. And while the satellite industry claims that this short-term interference occurs rarely, computer simulations have shown that interference levels 20 dB above the thermal noise floor will occur approximately every 40 minutes.[6] It

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[6]See, ITU-R Document 4-9S/44-E, submitted to the September international meetings of ITU-R WP4-9S.

should be noted that the antennas used in this simulation are 6-foot antennas; whereas antennas commonly used by the digital FS service in the U.S. are normally a 2-and 4-foot antennas, which will make the interference worse due to the larger look angles of these smaller antennas. Further, the bulk of the existing digital radios currently in service are older technology 4 FSK radios which have minimal or no error correction. Therefore, at the very least, the interference levels will cause degradation of the background error rate of these radios.

Finally, high interference levels lasting more than two seconds cause the channel bank and switch Carrier Group Alarms (CGA) which terminates system traffic for a minimum of 20 seconds. However, it is not unusual for a cell-site switch to take from 10-30 minutes to recover from a 2-second CGA!

Thus, high interference levels from satellite systems into grandfathered digital systems can cause not only per-hop outages, but also total system outages.

Next consider the analog AM video receiver example: A per-channel (6 MHz) video distribution receiver has a 4 MHz noise bandwidth resulting in a typical thermal noise floor of -108 dBm. With a noise floor of -108 dBm, the video receiver is operating at approximately a 52 dB CtN. This is 6 dB above where visible picture "graininess" is observed in the picture, and 17 dB above a complete system outage (35 dB C/N). Currently, the FCC Rules require a subscriber terminal C/N of no worse than 43 dB.[7]

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[7]See 47 CFR § 76.605(a)(7).

As of January 1999, this is to change to 46 dB C/N).

Assuming that the video distribution service providers are willing to accept a l-dB degradation of C/N (putting them only 6 dB from "graininess"), the maximum permissible interference power into the receiver would be -114 dBm.

The interference noise floor of -114 dBm will determine the effective aperture of the antenna as follows:

-118 dBw/m^2/MHz + 6 dB (BW) + Effective aperture (dB) + 30 dB (dBw-to-dBm) -3 dB (circular polarization).= -114 dBm

Rearranging, the Effective Aperture (dB) required = -31 dB.

Therefore, any antenna look angles that give an effective aperture loss of less than 31 dB will cause unacceptable interference to the video distribution providers.

Simulations by satellite interests purporting to show minimal interference into FS receivers have not taken into account terrain scatter. In particular, metallized glass buildings have been shown to be efficient reflectors of RF energy. Energy from satellites at any elevation can be reflected directly into the boresite of an FS antenna due to terrain scatter.[8]

Simulations by satellite interests purporting to show minimal interference into FS receivers also have not taken into account the frequent 6 dB upfades that occur due to

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[8]This effect is discussed by Dr. Joseph Shapira in his paper, Interference from Mobile Satellite Systems Through Terrain Scattering, published in International Journal of Wireless Information Networks, Vol. 3, No. 3. In that paper, Dr. Shapira concludes: "This type of interference has the potential to exceed the directly coupled interference by far, not to be strongly angle dependant, and only mildly dependant on small uptilt of the antenna."

multipath conditions for in-phase reflections. This is a high occurrence phenomenon well known by the FS community. The phenomenon has also been noted by the FSS interests in Document ITU-R 4-9S/38, liaison statement from Working Party 3Mof ITU-R Study Group 3, submitted to the September 1998 meetings of ITU-R WP4-9S as information to be taken into consideration in the development of the PFD limits.

It is very important to note that any type of interference, and especially intermittent interference, is EXTREMELY difficult to identify, locate, and resolve. An interfering signal 14-30 dB (depending on modulation complexity and error-correct coding employed) BELOW a digital radio spectrum can cause complete loss of synchronization of the radio. This interference is not visible with a spectrum analyzer since it is completely obscured up by the desired digital radio received spectrum. Most of the many thousands of 18 GHz FS users would be unaware of the satellite interference. This is known primarily by the frequency coordination houses. In general, cases of intermittent interference usually result in users spending many weeks or months changing out suspected defective radio modules. Finally, in frustration, the user calls the equipment manufacturer who dedicates field service engineers for extended periods of time to the problem. These field service engineers first must check out the radio (again) before looking for interference. Finding interference normally entails taking the hop off the air for an extended period of time thereby disrupting the customer's traffic. Therefore, the Commission's proposal that new satellite users would have to protect FS operations from interference is illusory and cannot be relied on to be effective in the real world.

V. The proposed ubiquitous satellite receivers in the 18.3-18.55 GHz, and 18.92-19.16 GHz bands will be unable to co-exist with the "grandfathered" FS systems

FS transmitters operate with relatively high effective EIRPs (up to +55 dBw), whereas satellite receivers are very sensitive and operate very close to threshold. The band segmentation proposal of this proceeding is based on the fact that sensitive satellite receivers cannot co-exist with the high EIRP FS transmitters. This incompatibility between the FS transmitters and satellite receivers is well known to the FS and has been demonstrated time and again by the inability of FS applicants to coordinate new FS transmitters in the 3.7-4.2 GHz FS/Satellite "shared" band, due to the ubiquitous nature of licensed satellite receivers in that band. At 18 GHz, there is a large number of high EIRP point-to-point FS transmitters as well as a large number of high EIRP point-to-multipoint video distribution transmitters. The effect of these high power FS transmitters will cause large "exclusion zones" in which the satellite receivers will be unable to operate. This is exactly the problem experienced at 3.7-4.2 GHz; however, since the satellite receivers were already in place at 4 GHz, new FS systems have been kept out of that band. Obviously, this is not acceptable either to the FS or satellite interests.

VI. While new wireless services should of course be accommodated in the radio spectrum, they must be required to use the spectrum efficiently

The Fixed Section supports fully the Commission's policy to provide frequencies for new emerging technologies, but points out that new technologies must compete for access to finite radio spectrum. No new spectrum is being created and, therefore, more

efficient use of the spectrum is required. The FS has been a technology leader in the efficient use of the diminishing spectrum available to it. FS radio manufacturers have implemented modulation technologies which permit up to 9 bits/sec/Hz of spectrum efficiency in the bands below 12 GHz. The technology to implement spectral efficiency greater than 1 b/s/Hz, currently required by the Commission for Part 101 digital radios above 12 GHz, is becoming available at reasonable cost for radios operating above 12 GHz. Additionally, through the Telecommunications Industry Association (TIA) and the National Spectrum Managers Association (NSMA), the FS has developed comprehensive and effective coordination methodologies for coordination of FS routes with maximum frequency re-use. The Fixed Section believes that the satellite systems must be held to reasonable spectral efficiency standards and to efficient coordination methods as well, although this step will not by itself avoid destructive interference.

VII. The Commission's band segmentation proposals should be modified

The Fixed Section applauds the Commission in its efforts to provide frequencies for emerging new services. In recognition of the necessity for substantial compromises so as to accommodate new and emerging satellite services, Fixed Section proposes a modification of the Commission's proposal that will provide for future growth of the FS and will also allow the different satellite services to be accommodated at 18 GHz. Towards that end, the Fixed Section proposes the following:

FS should be given primary status from 17.7-18.58 GHz, and co-primary status with MSS/FL from 19.26-19.7 GHz. This would permit paired (go/return) FS operation

with 17.7-18.14 GHz paired with 19.26-19.7 GHz. These bands will accommodate (1) the growth of existing wideband systems, (2) new wideband systems, (3) growth of the grandfathered narrowband systems, (4) new narrowband systems, and (5) dispaced grandfathered FS systems. The Fixed Section believes that the satellite services will find that interference into their systems from grandfathered narrow band FS transmitters is unacceptable, and will opt to sponsor relocation of grandfathered narrowband FS systems.

Video distribution services would retain their primary status from 18.14 - 18.58 GHz. Since point-to-point bi-directional FS cannot share with point-to-multi-point one-way video distribution services, these two types of FS services must have their own separate frequency allocations. FS spectrum loss from 19.26-19.3 GHz is NOT AN OPTION because this would also cause the paired loss of FS spectrum from 17.7-17.74 (80 MHz total additional FS loss). Similarly, the loss of FS spectrum below 17.8 GHz in 2007 would cause a loss of spectrum in the paired band below 19.36 GHz resulting in loss of an additional 120 MHz to the FS.

FS would give up 18.58-18.82 GHz, and 18.92-19.16 GHz. The Fixed Section agrees with the Commission that sharing between FS and the NGSO/FSS ubiquitous terminals from 18.92 - 19.16 GHz is not possible. Accordingly, since the 18.92-19.16 GHz band is paired with the 18.58-18.82 GHz band, the 18.58-18.82 GHz band is of no future use to the FS once the 18.92-19.16 GHz band becomes unavailable. Additionally, due to the expected effective ubiquitous nature of the licensed GSO/FSS gateways between 18.55-18.8 GHz, the Section believes that this frequency range will

become unavailable for future growth of the FS due to the same exclusion zone problem experienced by FS at 4 GHz. Existing FS systems between 18.58-18.82 GHz and 18.92-19.16 GHz must be grandfathered on a co-primary basis. Relocation of these existing links should be at the expense of the satellite services as the Commission indicates in the NPRM.

The 18.3-18.55 GHz allocation proposed in the NPRM for GSO/FSS ubiquitous satellite terminals should be moved to the 18.58-18.8 GHz range. This would place GSO/FSS ubiquitous terminals in a "sharing" scenario with the GSO/FSS coordinated gateways. This should be possible if the coordinated gateways can be remotely located, and the bulk of the ubiquitous terminals would more likely be located in high population areas. For remote areas, where ubiquitous terminals are required, some frequencies could be set aside specifically for these ubiquitous terminals. Even with simple QPSK modulation, the 220 MHz from 18.58 - 18.8 GHz would provide a data capacity of over 400 Mb/s. Surely this entire capacity is not needed by each licensed earth station terminal. More effective modulation technologies such as those being introduced by the FS today at 18 GHz in new FS products, would permit up to three times this data capacity (over 1.2 Gb/s). There would no longer be co-primary usage by the FS in this band, other than the grandfathered existing FS links. This should further facilitate sharing between the GSO/FSS ubiquitous and gateway terminals since they would not also have to share with co-primary FS systems.

VIII. The FS segments of the 18 GHz band should be re-channelized for more efficient use

The Fixed Section proposes that the 17.7-18.14 GHz and 19.26-19.7 GHz frequency ranges be re-channelized in 2.5, 5, 10, 20, and 40 MHz channels, and permit concatenation. With the current spectral efficiency rules in Part 101, radio capacities of less than 8-DSIs would be spectrally inefficient in the existing 10 MHz channel bandwidths. These low capacity radios have been used effectively in the 18.58-18.82 GHz and 18.92-19.16 GHz range where 5 MHz channels have been available. Additionally, the Fixed Section believes that higher spectral efficiency radios will be required as demands for spectrum continue to increase and, therefore, a 2.5 MHz channeling plan is also recommended.

IX. Sharing by FS and MSS/FL systems must be well managed

In order for the FS to ensure reasonably reliable operation and growth in the significantly reduced spectrum at 18 GHz, the MSS/FL co-primary users in the 19.26-19.7 GHz band must be required to use the available spectrum efficiently, and so as to not hinder growth of the co-primary Fixed Service. Therefore, the FCC should requires that:

(1) MSS/FL sites be located in remote areas. This will minimize the "exclusion zone"problem experienced by the FS at 4 GHz, which effectively eliminated the FS from the 4 GHz band;

(2) MSS/FL sites must include 360 degree integral shielding of at least 25 dB for protection from FS transmitters; and

(3) MSS/FL sites must only coordinate the frequencies and arcs necessary.

Full-band, full-arc coordination is nothing short of spectrum warehousing and cannot be tolerated when spectrum is at such a premium. While the satellite interests may argue that they need full band coordination for growth, terrestrial fixed licensees may only coordinate frequencies they can justify. And yet, the FS has been able to successfully grow in bands where they do not share with satellite services.

X. CONCLUSION

Notwithstanding the desirability to provide spectrum for emerging satellite services and to harmonize domestic US spectrum allocations for these different services, in so doing, the Commission must consider the impact of its proposal on all services to be affected. The FS community is proposing significant concessions in the interests of spectrum efficiency and in order to accommodate future services. Under the modifications proposed by the Fixed Section 1/3 of the currently available FS frequencies at 18 GHz would be reallocated.

As an overall policy matter, the Commission should require the proponents of new services that propose to use spectrum currently fully utilized by existing services, to develop and use technologies which will permit the new services to operate in an interference environment by the use of interference cancellation techniques.

Finally, the Commission must grant the terrestrial services immediate relief by lifting the de facto freeze and resume authorizing terrestrial fixed systems on a regular

basis, while it considers the comments on its proposals and adopt its decision in this proceeding.

The Fixed Section respectfully submits the foregoing Comments and requests that the Commission act in a manner consistent with the views expressed herein.

Respectfully submitted,

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

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Date: November 19, 1998

APPENDIX A

Responses to specific requests for comments in the NPRM

Para. 2

Q: Request Comments on the proposed band plan

Answer: While the Fixed Section agrees in principle that the band should be segmented, it disagrees with the specific segmentation proposal and has offered a modification to the Commission's proposed plan. The Section believes that its modified plan is more technically sound, would result in less dislocation of existing systems, and would accommodate more reasonably the requirements of the terrestrial fixed and of the satellite services.

Q: Whether there are any means by which terrestrial fixed services and FSS could continue to share the entire band

Answer: We support the principle of dedicated sub-bands proposed in this NPRM, for the reasons described in paras. 19, 20, and 21 of this NPRM. The Fixed Section does not believe it will be feasible for the FS and FSS to share the entire band, certainly not with blanket licensing of earth stations. We understand that the difference between FSS small antenna earth stations and gateway terminals is a matter of capacity. Satellite proponents have indicated that gateway terminals may also be ubiquitously deployed, depending on market demand.

Para. 23

Q: Feasibility of alternative proposals

Answer: While the Section concurs with the Commission's basic proposal, which would separate the terrestrial fixed services from satellite operation with low capacity and gateway earth stations, the Section's proposed modified band plan addresses other FS capacity and compatibility problems as well which are sufficiently serious to prevent the further development of the terrestrial fixed services.

Para. 24

Q: ". . . have fully identified the requirements of the various services . . . band plans that best meet the public interest"

Answer: The band plan proposed in the NPRM does not meet the requirements of the Fixed Service because of sharing difficulties and inadequate bandwidth as explained in subsequent responses.

Para. 27

Q: Whether the spectrum to be designated under the Commission's proposal for terrestrial fixed (point-to-multipoint and point-to-point) would be sufficient to accommodate terrestrial fixed service needs

Answer: The Section disagrees strongly with the Commission's tentative conclusion. The 18 GHz band will have to accommodate a myriad of needs, including the growth of a competitive video distribution service, CARS relays, broadcast auxiliary and backbone and infrastructure links of existing, new, and emerging communication services. In addition, the band will accommodate such traditional microwave users as public safety agencies, public utilities, railroad, and the general business community. Traditional short-haul private operational fixed microwave remains extremely important to the U.S. economy and its uses continue to expand, sponsored in part by significant structural changes in such basic industries as banking and health care. Microwave facilities in the 18 GHz band provide increasingly essential links for PCS backbone networks, local area and competitive network interconnection, high speed internet access, and other advanced technology applications. The 18 GHz band will also serve as a relocation band for the 2 GHz systems that now provide medium to short-haul services. The Commission's proposal, as more fully explained in the main text, will not provide enough spectrum to the fixed services to accommodate adequately these needs.

Para. 30

Q: Whether FSS operators will be able to design their systems around existing grandfathered terrestrial fixed operations

Answer: The Section does not believe that FSS operators will be able to design their systems successfully around existing FS systems, certainly not in or near urban centers, because of the extensive deployment of video distribution and of narrowband (18.58-18.82 and 18.92-19.16 GHz) point-to-point systems in urban areas. There are 2,480 licensed frequency paths authorized for video distribution systems, and 6,558 private and common carrier point-to-point systems, according to data provided by Comsearch, the frequency coordination house. Therefore, separate spectrum is required for FSS terminals, be they small antenna or gateway terminals.

Para. 33

Q: Effective way to demonstrate that a terrestrial system to be authorized on a secondary basis will not in fact interfere with a primary FSS operation

Answer: Secondary status for FS would be of little practical use to the fixed service. Fixed terrestrial links are used for critical communications systems serving such important services as public safety, utilities, broadcast, cellular, PCS, among others. All of these users require highly reliable links. They require stability of network design, which makes secondary status unacceptable. The question of pfd limits is being actively studied in various ITU-R groups.

Therefore, the inquiry is academic because terrestrial fixed facilities cannot be secondary. As provided in Section 101.103 of the Commission's Rules, such facilities can only operate effectively on an interference-free basis and are so authorized. In sum, secondary basis is not appropriate for the operational requirements of the fixed service.

Para. 34

Q: Whether the Commission's proposed band segmentation and related proposals would meet adequately the spectrum requirements of the fixed services

Answer: The Section does not believe that the Commission's band segmentation and related proposals would meet the spectrum requirements of the terrestrial fixed services. As previously stated, the Section supports designation of separate bands for satellite and for the terrestrial services. The Commission's proposals for spectrum sharing raise serious concerns: Video distribution simply cannot share the same spectrum with point-to-point operations. Video distribution requires the use of the full 440 MHz at every transmit location. Also video distribution systems are typically deployed in "hub and spoke" configuration. Thus, exclusion zones are created over the complete band and in several directions. Therefore, as indicated in paragraph 27 of the NPRM, it is not practical for video systems to share the same spectrum with point-to-point fixed because either video distribution would be excluded from much of the 18 GHz band or point-to-point fixed systems would be excluded from much of the proposed FS band.

Q: <u">. . . future BSS allocation in the 17.7 to 17.8 GHz band segment . . ."</u>

Answer: The Section strongly opposes the proposal to allocate the 17.7 to 17.8 band to BSS down links on a co-primary basis. The direct-to-home video services will result in ubiquitously deployed receive only terminals. These terminals cannot share with the FS for precisely the reasons explained in paragraph 19 of this NPRM. Thus, allocating this segment to BSS could result in the FS losing access to this 100 MHz. Since the FS point-to-point band plan pairs the 17.76 to 17.8 segment with the corresponding high band, 19.26 to 19.36, the loss of 100 MHz in the low band would result in a loss of the corresponding 100 MHz in the high band for a total loss of 200 MHz. Note that the point-to-point fixed service will have to accommodate all of the following in the wide band segment of the band:

1. Existing wide band channels
2. New narrow band channels (presently 18.58 to 18.82 and 18.92 to 19.16 MHz) in the wide band segment of the band (presently 17.7 to 18.14 and 19.26 to 19.7 MHz).
3. Any narrow band channels which require relocation
4. Growth in wideband usage

Note that in the year 2007, the BSS service provider will not find this a practical solution. There is presently a substantial number of links deployed, and many more will be deployed over the next several years. Most of those links are in urban areas, which coincides with the location of potential BSS customers. Thus, we can expect the BSS will experience severe difficulties in coordinating receive terminals. The identical problem was previously faced in the 12.2 to 12.7 GHz band and the ultimate solution was relocations of terrestrial links. In sum, this sharing is not practical, and the FS cannot afford to give up 200 MHz.

It is pointed out that, instead of asking for more spectrum, BSS interests should use the time between now and the year 2007 to develop spectrum conservation technology so that they can accommodate the services they plan to provide within the 400 MHz already allocated for BSS in the band 17.3-17.7 GHz.

Q: Whether continued sharing the 19.3-19.7 GHz band by terrestrial and MSS/FL will be feasible

Answer: If there is a limited number of MSS/FL terminals deployed, and operating under the constraints the Section proposes in Section H of the main text, and deployed as described in para. 32 of the NPRM, and if the low band end (17.7 to 18.14) is free from constraints of sharing with other services, we believe FS can share with MSS/FL operations. The Section agrees with the comments in para. 17 of the NPRM, regarding the exclusion zones which are created by receive FSS terminals. The description "limited number" is too vague, and thus the FS requires some combination of specific limitations on the number of MSS feeder terminals, such as those adopted in CC Docket No. 92-297 for LMDS/MSS/FL shared use of the 29 GHz band. See 47 CFR § 101.147(y)(2). Siting guidelines are also needed to ensure that the FS can continue to coordinate new links in this band. To make sharing effective, the FS links can be designed such that the low band end faces the earth station direction, thus minimizing interference potential. However, this requires that there be no sharing constraints on the low band end of the link.

Q: Comments on a modified terrestrial fixed channelization plan

Answer: As stated in the response to para. 34 above, the Section proposes to leave the video distribution band intact and to use the present wide band point-to-point segment of the band (presently 17.7 to 18.14 and 19.26 to 19.7 MHz) to accommodate the new narrow band channels (presently 18.58 to 18.82 and 18.92 to 19.16 MHz). The Section also proposes rechannelization of the non-video distribution fixed band into 2.5, 5, 10, 20 and 40 MHz channels with concatenation permitted. This would further promote spectrum efficiency and would provide a variety of channel widths to accommodate a range of capacities. This plan gives a maximum flexibility to the frequency coordination companies, and will resemble the plan adopted in the 6 GHz band, which has worked well. See Section G of the main text.

Para. 35

Q: Whether designation of an additional 100 MHz from 18.3 to 18.4 for co-primary use by FS and GSO/FSS would more fully meet FS needs

Answer: The Section believes that this alternative proposal would not be an improvement for FS. As previously stated and as the Commission has recognized, sharing between ubiquitously deployed FSS terminals and FS systems is simply not feasible.

Para. 36

Q: Whether the 17.7-18.8 GHz portion of the 18 GHz band should be designated for co-primary shared use by FS and GSO/FSS

Answer: To avoid the impossibility of sharing between FS and ubiquitously deployed FSS terminals, we support the FCC's proposal of dedicated sub-bands as the most effective, spectrally efficient solution.

It is pointed out that coordination is used as a solution to the problem of FS sharing with GSO gateways, and it does manage the problem of interference into sensitive gateway receivers. However, each gateway earth station creates a

large exclusion zone, which prevents further FS deployment. In addition, the present practice of coordinating earth stations for the entire frequency band, rather than the actual channel(s) used, creates an exclusion zone over the entire band, rather than the actual channels used, which makes co-primary sharing untenable. Since the Section opposes the suggested co-primary status of FS and GSO/FSS in the band 17.7 to 18.3 GHz, we do not propose a channeling plan. Note that, with the exception of the video distribution service, which is one way, any point-to-point allocations from 17.7 to 18.8 will require a corresponding high band segment. Beyond the present 19.26 to 19.7 GHz there is no additional high band FS spectrum proposed.

Para. 37

Q: ". . . whether either of these is an effective approach . . ."

Answer: For the reasons explained in para. 19 of this NPRM, we believe that the FS and ubiquitously deployed terminals, GSO or NGSO, are best served by dedicated sub bands, which in turn facilitates blanket licensing of FSS user and gateway terminals.

Q: Whether current interservice sharing criteria should be amended

Answer: While the Fixed Section is not prepared to recommend change to the FS/FSS technical sharing criteria, as such, the Section strongly recommends that the coordination practices for satellite earth facilities be changed. At a minimum, satellite applicants must coordinate only the amount of radio spectrum and arc necessary for immediate use and for modest growth. The current practice of locking up the entire available band and excluding from that band any fixed system within a large exclusion zone must be discontinued.

Should the Commission choose to implement any band sharing arrangement in this band, the Section would welcome the opportunity to participate in a full review of the current criteria and practice for coordinating satellite gateway earth stations in order to optimize the shared use of the limited spectrum.

Para. 39

Q: Whether a detailed terrestrial fixed service channelization plan would be necessary to facilitate the cost-effective manufacturing of microwave transmitters and receivers for domestic and international markets

Answer: The Section's proposal for FS point-to-point channelization will result in subdividing the present wide band channels for narrow band requirements. The design changes to accomplish this are minimal.

We propose to leave the video distribution band unchanged, and continue to use the same equipment design.

It does not appear feasible at 18 GHz to harmonize equipment for both domestic and international markets because international frequency plans use different duplex spacings.

Para. 40

Q: Comments on grandfathering proposal

Answer: The Section concurs with the grandfathering proposal, with one major exception. The choice of September 18, 1998 as the effective date is inappropriate. The impact of this date is to freeze the development of the FS, particularly in the narrow band point-to-point segment and the video distribution bands, until such time as the final Order is issued. Licensees will not risk capital investment in new systems, because of the uncertainty created and the possibility of being reduced to secondary status, with a real possibility of having to purchase equipment again to comply with the new plan. This represents a real hardship to 18 GHz user community, and is contrary to the FCC's mission of fostering competition and public safety.

The Section filed on Nov. 2, 1998, a Petition for Interim Relief, proposing the effective date for grandfathering FS links be changed to the date of the final decision in this proceeding. The density of 18 GHz terrestrial links is already quite high in certain urban areas, to the extent that satellite operators may find it necessary to relocate

narrowband FS links in order to deploy ubiquitous terminals. Relocation can only be made following re-channelization of the wide band point-to-point bands. Accordingly, the effective date for grandfathering purposes should be the date on which a final decision in this proceeding including channelization becomes effective.

Para. 41

Q: Comments on the conditions under which grandfathered fixed systems are to be relocated

Answer: In geographical areas where satellite terminals will be ubiquitously deployed, the satellite systems will be severely constrained unless FS links are relocated to another segment of the band. The condition that would require relocation is interference from FS transmitters into satellite receiver terminals. The Section proposes that those links be relocated which are likely to cause, or do cause interference. This provides a natural prioritization to relocation. The cost should be born by the satellite operator. The Fixed Section opposes the wholesale relocation of incumbent links. Since there are many links in this band, it would be unnecessarily disruptive to the operators to undertake wholesale relocation of these links.

Q: Whether the Commission should allow satellite operators to force relocation of individual terrestrial fixed stations

Answer: The Fixed Section recommends that the Commission adopt the relocation rules and procedures developed for the relocation of incumbent systems in the 2 GHz band. Those rules and procedures are specified in Sections 101.69 to 101.79 of the Commission's Rules.

Para. 65

Q: ". . . current coordination procedures between FS and GSO/FSS downlinks . . ."

Answer: Ubiquitous deployed earth stations cannot share with the FS. Our proposal, if adopted, would eliminate the problem and would allow blanket licensing of the GSO/FSS ubiquitous terminals.

Q: Comments on any possible changes to sharing criteria, such as antenna performance standards power limits, or geographic restrictions that might permit blanket licensing of GSO/FSS earth stations in this band

Answer: The current inter-service sharing criteria should be amended. There are many examples of inefficient use of scarce spectrum created by the current criteria. An important one is the practice of GSO/FSS earth stations being coordinated on a full band, full arc basis, regardless of their immediate requirements, compared with the FS having to coordinate on a per channel, as required, basis.

We are particularly concerned with situations where new earth stations are located close to existing FS routes, on the basis of being prepared to accept all existing FS interference. These earth stations then require new FS entrants to protect that station from interference to the higher protection level. As a consequence, future growth on the existing FS route is stymied. There is a need to embed the requirement for the earth stations to employ appropriate natural or manmade shielding in order to permit the continued growth of the adjacent FS routes.

We would welcome the opportunity to provide the Commission with specific proposals to amend the current sharing criteria, outside of this specific response.

Q: Comments on whether blanket licensing can be implemented with coordination prior to deployment

Answer: As stated previously, blanket licensed satellite systems cannot share with the FS.

One major benefit to GSO satellite operators of our proposal is an exclusive GSO satellite band which permits blanket licensing of ubiquitous user terminals.

Para. 73

Q: ". . . requests that the Commission allocate spectrum in the 17.3 to 17.8 GHz band to BSS downlinks"

Answer: For reasons explained in para. 19 of this NPRM, the fixed service cannot share on a co-primary basis with BSS ubiquitous receive earth terminals, in the band 17.7 to 17.8 GHz. Moreover, for the reasons stated above, the FS cannot afford to give up this 100 MHz spectrum that is also paired with the upper band making a potential total loss of 200 MHz. The decision taken at WRC-92 does not account for developments in technology in the 15 year interval between WRC-92 and deployment in 2007. The Section believes that the 400 MHz is adequate for the BSS service.

Para. 74

Q: Comments on claim of DIRECTV that the potential for harmful interference to terrestrial fixed service does not exist as long as BSS transmissions comply with the existing PFD limits prescribed in Section 25.202 of the Commission's Rules

Answer: The Fixed Section disagrees with DIRECTV. The ITU-R studies on pfd limits are not yet complete. The pfd limits are not the important element in this sharing problem. The overriding issue is the exclusion zone created by receive earth stations. Ubiquitous earth station terminals cannot coexist with the FS as the Commission acknowledges in para. 19 of this NPRM. Experience in the 12 GHz band showed that sharing between FS and FSS links is not feasible. This is why the terrestrial fixed service was expelled from the 12.2-12.7 GHz band after that band was reallocated to BSS.

Para. 76

Answer: We agree with the Joint Commenters that BSS use of the 17.7 to 17.8 GHz band is incompatible with existing terrestrial operations in this band.

Para. 78

Q: DIRECTV TV seems to have argued that terrestrial fixed interests did not oppose the proposed allocation of the 17.7-17.8 band for co-primary use.

Answer: The fact that the fixed service industry did not file comments on the DIRECTV petition cannot be taken to mean that the Industry agrees that sharing is possible. As the Commission

knows, the FS had to vacate the 12 GHz band years ago, because it was determined that the terrestrial services and BSS downlinks could not share. This fact contradicts the comments quoted here by DIRECTV. As shown in our comments re para. 34 above, the allocation of the 100 MHz between 17.7-17.8 GHz is also paired with the upper 18 GHz frequency band which would make a total loss of 200 MHz.

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APPENDIX B

Summary of US 18 GHz fixed service deployment

Point-to-point licensed frequencies (Note 1)

Narrow band channels (18.58-18.82 and 18.92-19.16 GHz)	3355
Wide band channels (17.7-18.14 and 19.26-19.7 GHz)	3203

CARS band

CARS band licensed and coordinated paths	2,480
Auxiliary broadcast (licensed frequencies)	416

Note 1: The date for the data for narrow and wide band channels, and broadcast auxiliary is Nov. 12, 1998. Date for the data for CARS band is mid-October, 1998, and includes coordinated paths as well as licensed paths. Virtually all CARS band transmitters are licensed for the maximum 72 video point to point and auxiliary broadcast data is Comsearch. Data for CARS band is from Micronet.