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FEDERAL COMMUNICATIONS COMMISSION  
OFFICE OF THE SECRETARY

Magalie Roman Salas  
Secretary, Federal Communications Commission  
445 12th Street, S.W.  
Washington, D.C. 20554

**Re: ET Docket No. 00-258**

Dear Ms. Salas:

Transmitted herewith, on behalf of Illinois Institute of Technology, are an original and four (4) copies of its comments filed in response to the PUBLIC NOTICE, DA 01-786, released March 30, 2001 in the above-referenced proceeding. A copy of these comments is also submitted herewith on a 3.5 inch diskette in Word 97 format.

Should any questions arise in connection with this filing, kindly contact the undersigned.

Sincerely,



Francis E. Fletcher, Jr.

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than 1,000 students at nearly 60 receive sites in the Chicago, Illinois, metropolitan area. IIT has been an active participant in this proceeding, submitting comments and reply comments in response to the Commission's *Notice of Proposed Rulemaking*, FCC 00-455 (the "*Advanced Services NPRM*").<sup>2/</sup> The comments filed by IIT and others in this proceeding have shown the devastating impact that any reallocation of the 2500-2690 MHz band for advanced mobile wireless ("3G") services would have upon ITFS-based distance learning programs and emerging fixed wireless broadband services. IIT is concerned especially with the "human costs" that reallocation in this band would exact. Any curtailment in coverage or data throughput of ITFS systems, as well as the disruption of service attendant to any reallocation, will hurt real people and vital distance learning programs.

Accordingly, IIT has urged the Commission, assuming it decides that any additional candidate spectrum allocation for 3G is justified, to eliminate from consideration the 2500-2690 MHz band. The Final Report fully validates IIT's position -- a position that is supported by the entire MDS/ITFS community, providers of emerging fixed wireless broadband services, and even some mobile service providers -- that the 2500-2690 MHz band is unsuitable for reallocation for 3G.

Before addressing the Final Report, IIT would once again urge the Commission to consider as a threshold issue the need for reallocation of any of the "additional candidate" spectrum identified by the Commission in the *Advanced Services NPRM*. As noted in our comments and reply comments, the reallocation proponents have yet to make a convincing showing of demand for 3G services. They request reallocation of *all* of the additional candidate spectrum bands without any effort to quantify demand for service or to correlate spectrum

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<sup>2/</sup> *Notice of Proposed Rulemaking*, FCC 00-455, released January 5, 2001.

requirements to specific 3G services. Considering that “existing allocations are sufficient to begin the rollout” of 3G (AT&T Wireless Comments, p. 4), and that the reallocation proponents have been unable to present evidence of demand for 3G services requiring more spectrum, the Commission should take measured steps towards reallocation. The colossal service disruptions projected in the Final Report serve to emphasize the need for a deliberate approach toward reallocation in general and toward reallocation of the 2500-2690 band in particular.

**I. THE FINAL REPORT CONFIRMS THE STAFF’S INTERIM CONCLUSIONS THAT SHARING OR SEGMENTING THE 2500-2690 MHZ BAND TO ACCOMMODATE 3G IS NOT FEASIBLE**

In its Interim Report, the FCC staff concluded that sharing between 3G systems and ITFS/MDS operations would be extremely problematic, and that there did not appear to be enough spectrum in the 2500-2690 MHz band in populated areas to support a viable 3G service shared with ITFS/MDS.<sup>3/</sup> The staff also studied certain options for segmenting the band, all of which it concluded would have significant adverse effects upon existing MDS/ITFS operations. The Final Report confirms that sharing or segmenting this spectrum to accommodate 3G use is not feasible.

The Final Report’s technical analysis, which takes into account recent changes adopted in the Industry Association Group 3G Technical Characteristics Report, shows that if 3G were to share the same spectrum or channels in any given geographic area large co-channel separation distances would be needed between 3G systems and incumbent ITFS and MDS systems. Final Report, pp. 30-31. This was the same conclusion reached in the Interim Report. Accordingly, the Final Report affirms the conclusion reached in the Interim Report that there does not appear to be enough spectrum in the 2500-2690 MHz band in populated areas to support a viable 3G

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<sup>3/</sup> Spectrum Study of the 2500 to 2690 MHz Band, the Potential for Accommodating Third Generation Mobile Systems (Interim Report, Nov. 15, 2000), at 53 (the “*Interim Report*”).

service based on sharing of existing spectrum in this band. Final Report, p. 36. Further, the staff observed that “commenters from both the ITFS/MDS *and wireless industries* also concluded that sharing in the 2500-2690 MHz band was not feasible,” citing to comments filed by Verizon Wireless in response to the Advanced Services NPRM. Final Report, p. 31. Emphasis added. The Final Report removes any doubt that sharing of the 2500-2690 MHz band by ITFS/MDS and 3G services is not feasible.

With regard to segmenting the 2500-2690 MHz band, the Final Report reaffirms the conclusion reached by the staff in the Interim Report that over 60,000 transmitters would need to be accommodated in any 90 megahertz segment of spectrum in the 2500-2690 MHz band that is reallocated to 3G. Final Report, p. 44. The Final Report studied three segmentation options using 4 megahertz guardbands between ITFS/MDS and 3G systems. It concluded that in each segmentation option, the amount of spectrum available for two-way ITFS/MDS systems is sharply reduced from the approximately 156 megahertz that these systems have under the current allocation and channel plan, requiring drastic reductions in data rates and/or service coverage areas. Final Report, p. 53. In regard to reduced data rates, the staff notes:

It is evident that under current or projected service offerings two-way wireless broadband service offers downstream data rates in the low to mid range of DSL and at the low end of cable modem service. Upstream data rates compare very favorably with the best rates offered for DSL and slightly below those of cable modems. Based on these observations, it is likely that any decrease in two-way service data rates could reduce or eliminate that services’ ability to compete in the marketplace. Final Report, p. 53.

The alternative to suffering lower data speeds in order to offset the effects of segmenting would be to substantially reduce ITFS/MDS cell size. The staff estimates cell sizes would have to be reduced by almost forty percent “in the best case.” Such a reduction would require 3-5 transmitter sites to cover the same geographic area as the single main transmitter. Final Report,

p. 55. Increasing the number of cell sites by a factor of between three and five would be beyond the financial capability of IIT and most other non-profit educational institutions, and would destroy financial models relied upon by Sprint, Worldcom and Nucentrix in making their investments in fixed broadband wireless.

Finally, there is no single segmentation plan that could be imposed uniformly across the nation. As noted by the staff:

[B]ecause of the complex licensing scheme present in this band (*e.g.*, the mix of site-specific and wide-area licensing, channel swaps, and lease agreements), we cannot describe uniform impacts for each of the segmentation options studied. To fully understand the implications of any segmentation plan on the ITFS/MDS, one would need to analyze each geographic area individually. Final Report, p. 57.

The Final Report reaffirms that it will not be feasible for both ITFS/MDS and 3G systems to occupy the 2500-2690 MHz band either through sharing or alternative methods for segmenting the band.

**II. THE ABSENCE OF AN ALTERNATE FREQUENCY BAND THAT COULD ACCOMMODATE A SUBSTANTIAL RELOCATION OF INCUMBENT OPERATIONS IN THE 2500-2690 BAND, COMBINED WITH THE PROHIBITIVE COSTS ASSOCIATED WITH EITHER SEGMENTATION OF THE BAND OR RELOCATION OF THE INCUMBENTS, SHOULD ELIMINATE REALLOCATION OF THE 2500-2690 BAND FROM CONSIDERATION**

In addition to reaffirming the staff's earlier analysis with regard to sharing or segmenting the 2500-2690 MHz band, the Final Report evaluates relocation of the ITFS/MDS incumbents to alternative spectrum to accommodate 3G services. The Final Report also analyzes the costs associated with both segmenting the existing ITFS/MDS spectrum and relocating the incumbents. The FCC staff estimates that the cost to ITFS/MDS operations over a ten-year period could be up to \$19 billion. The relocation option also would require other services to relocate, and the time and costs to move those additional services would be significant, ranging from approximately \$10.2 to \$30.4 billion. Final Report, p. iii. These costs make the

segmenting or relocation options impractical on their face, even before considering the broad-based benefits to prospective users and the national economy of deploying fixed wireless broadband systems against which such costs would need to be balanced. The results of the staff's evaluation of relocation options and the costs associated with relocation or segmentation alternatives should be enough to eliminate any further consideration of the 2500-2690 MHz band for 3G reallocation.

The Final Report reflects the staff's careful and thorough examination of potential alternative spectral homes for ITFS/MDS incumbents. The staff's review of the 3700-4200 MHz, 5925-6425 MHz, 6425-7125 MHz, 7125-8500 MHz, and 10.7-13.25 GHz bands led it to conclude that "there is no readily identifiable alternative frequency band that could accommodate a relocation of the ITFS/MDS incumbents." Final Report, p. iii.

Most significantly, each of the alternatives would require migrating not only the ITFS/MDS licensees, but relocating the incumbent occupants. If nothing else, the incredible disruption of service and costs associated with such wholesale migration of services would be prohibitive. Beyond that, the bands studied by the staff do not have propagation characteristics necessary to maintain either existing ITFS/MDS operations or to accommodate emerging fixed wireless broadband services. As stated by the staff:

Furthermore, relocation of ITFS/MDS operations to a band above 3 GHz would affect deployment of these systems to account for changes in signal propagation in higher bands. Relocation to higher bands could affect significantly the economics of current and planned ITFS and MDS systems and lessen their ability to provide service to rural areas or smaller markets. In addition, incumbent users in those alternate bands would have to be relocated, causing serious disruption to other established services; and relocation of some incumbent users (*e.g.*, satellite systems) could significantly delay ITFS/MDS access to these alternate bands. Final Report, p. iii.

The “best” potential replacement spectrum for ITFS/MDS would need to be as close as possible to the 2 GHz frequencies now occupied by ITFS/MDS in order to have the least technical impact on the viability of ITFS/MDS operations. Thus, the staff first studied the 3700-4200 MHz and the 5925-6425 MHz bands currently licensed to FS and FSS users. Upon examination, however, the staff concluded that such spectrum definitely would not allow sharing or segmenting between ITFS/MDS licensees and incumbent FSS users, and that accordingly, “reallocation of spectrum to accommodate ITFS/MDS does not appear feasible for either the 3700-4200 MHz or the 5925-6425 MHz band.” Final Report, p. 65.

The technical shortcomings of the higher bands should eliminate them from consideration in all events. However, those bands as well were found unaccommodating to sharing or segmenting with existing users. Thus, the staff concludes that the technical problems associated with ITFS/MDS operations in the next highest band (6425-7125 MHz), while challenging, “would not be insurmountable.” Final Report, p. 68. However, the staff concedes that “the impact on coverage and equipment design begins to be more complicated at [these] higher frequency ranges.” Final Report, p. 70. Moreover, the Final Report concludes that “ITFS/MDS operations would not be compatible with incumbent FS, FSS, and mobile operations [in the 6425-7125 MHz band].” Final Report, p. 70. As to clearing the roughly 200 megahertz of spectrum that would be needed, through either segmentation of the band or relocation of the incumbents, the staff concludes as follows.

[O]ur investigations indicate that removing any significant amount of spectrum to accommodate ITFS/MDS would have a significant impact to the incumbent fixed and mobile services due to their extremely heavy use. Relocation of the satellite links to other spectrum would also be extremely disruptive, would take several years, and be extremely costly due to the need to construct new satellites and replace earth stations that are extensively deployed. While relocation of terrestrial fixed and mobile operations could be done in shorter time and at lesser costs, identification of alternative spectrum would be extremely difficult as discussed

above. Accordingly, relocating ITFS/MDS systems into the 6425-7125 MHz would significantly impact the incumbent fixed-satellite, fixed and mobile operations in this frequency band. Final Report, pp. 70-71.

The staff also concludes that the 10.7-13.25 GHz spectrum is “not practical as an alternate band for ITFS/MDS services.” Final Report, p. 79.<sup>4/</sup> This conclusion is based both upon the incompatibility of ITFS and MDS with the heavily populated incumbent services in this spectrum, and the fact that relocation of ITFS/MDS systems from the 2.5 GHz band to 10-13 GHz would require major changes to ITFS/MDS equipment and network design.

Completely apart from the service disruptions and the technical and practical difficulties inherent in sharing, segmenting or relocating incumbents, the cost of relocation in each of the potential migration bands, as estimated by the staff, are prohibitive.<sup>5/</sup> And, of course, these prospective costs do not include costs already incurred and investments made by ITFS/MDS entities for the current and planned deployment of services in the 2500-2690 MHz band.

[T]he auction of MDS wide-area licenses in 1995-1996 generated winning net bids of \$216.2 million. Sprint and WorldCom have spent over \$2 billion to acquire numerous incumbent MDS licenses after the FCC decided to allow the deployment of two-way systems in the 2500-2690 MHz band. MDS entities also have numerous lease arrangements with ITFS licensees. If these lease arrangements are not maintained, ITFS licensees could lose significant revenues and in-kind compensation to support their educational missions. These cost factors present legal and policy issues that are beyond the scope of this proceeding and estimates of the costs cannot reasonably be made at this time. Therefore, we do not include them in our analysis for purposes of this study. Final Report, p. 82.

The staff correctly concludes that implementation of either the segmentation or relocation options analyzed in its band study would significantly affect ITFS/MDS deployment and impose

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<sup>4/</sup> The staff conducted a cursory review of the 7125-8500 MHz band because the Commission has only limited information about the Federal Government’s use and loading of this band.

<sup>5/</sup> As noted, primary costs for ITFS/MDS licensees over 10 years are estimated at \$19 billion. The costs for relocating the displaced incumbents of the studied relocation bands would also be substantial: \$10.625 billion of the 3700-4200 MHz band; \$17.5 billion for the 5925-6425 MHz band; \$10.2 billion for the 6425-7125 MHz band; and \$30.4 billion for the 10.7-13.25 MHz band. Final Report, p. 92.

considerable costs on both private entities and the public. Final Report, p. 92. IIT completely concurs with the staff's conclusions that implementation of the segmentation or relocation options discussed in the study would mean that "delivery of fixed wireless broadband services to the public and educational users would be delayed and, in rural areas or smaller markets, may never be realized." Final Report, pp. 92-93.

The Final Report also refutes arguments made by some proponents of 2500-2690 MHz band reallocation that this spectrum block is not efficiently used by the incumbent ITFS/MDS licensees, and recognizes the importance of this use.

ITFS licensees make extensive use of the spectrum to provide formal classroom instruction, distance learning, and videoconference capability to a wide variety of educational users throughout the nation. Often supported by leasing arrangements to access excess capacity from ITFS licensed spectrum, MDS licensees provide a commercial video programming service in this frequency band. The frequency band is in a state of rapid evolution and development by both ITFS and MDS licensees so that they can provide high-speed, two-way access to the Internet. The MDS industry has invested several billion dollars to develop the band for broadband fixed wireless data systems. These systems will provide a significant opportunity for further competition with cable and digital subscriber line (DSL) services in the provision of broadband services in urban areas and deliver broadband services to rural areas. These systems also will enable ITFS operators to bring a wide variety of broadband services to educational users, often in cooperation with MDS operators in the band.

Final Report, p. 13.

As discussed in comments filed by IIT and others in response to the Advanced Services NPRM, the Commission should look to the 1710-1850 MHz band if it concludes that frequency reallocations are warranted to accommodate 3G. AT&T views this spectrum as a "first choice,"<sup>6/</sup> while the Cellular Telecommunications and Internet Association ("CTIA") believes that making

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<sup>6/</sup> AT&T Comments, p. 11.

this band available in two to three years is feasible.<sup>7/</sup> The equipment manufacturing community also generally supports looking to the 1.7 GHz band rather than the 2500-2690 MHz band.<sup>8/</sup>

For all of the foregoing reasons, the Commission should decline to reallocate spectrum in the 2500-2690 MHz band for 3G services.

Respectfully submitted,

**ILLINOIS INSTITUTE OF TECHNOLOGY**

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<sup>7/</sup> CTIA Comments, Executive Summary, p. v. Steven K. Berry, senior vice president-government affairs for CTIA, was recently quoted as stating that while DoD was skeptical about the chances of 3G services being used in its spectrum, NTIA's report "gave us some hope." He noted that the cost of relocating all federal operations from the 1755-1850 MHz band was estimated at \$4.6 billion. By contrast, the cost of relocating other services displaced by MDS/ITFS relocations could be more than \$30 billion.

<sup>8/</sup> See, Reply Comments of IIT, pp. 5-7.