

**BEFORE THE
FEDERAL COMMUNICATIONS COMMISSION
WASHINGTON, D.C. 20554**

In the Matter of)	
)	
Amendment of Part 2 of the Commission's Rules to)	
Allocate Spectrum Below 3 GHz for Mobile and)	ET Docket No. 00-258
Fixed Services to Support the Introduction of New)	
Advanced Wireless Services, including Third)	
Generation Wireless Systems)	

To the Commission:

COMMENTS OF NUCENTRIX BROADBAND NETWORKS, INC.

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SUMMARY

Nucentrix Broadband Networks, Inc. is the third largest holder of spectrum rights in the MDS/ITFS bands at 2.1 GHz and 2.5 GHz. Nucentrix's mission is to provide low-cost, reliable, broadband data and voice service in rural markets. Nucentrix's service will provide much needed local loop competition, consistent with the pro-competitive mandate of the Telecommunications Act of 1996. Given Nucentrix's focus on rural and underserved areas where advanced wireline services are severely limited or completely unavailable, Nucentrix's fixed wireless service is likely to be the *only* broadband service available to many of the homes, offices, and businesses in its region for the foreseeable future. In addition, through its partnerships with educational ITFS licensees, Nucentrix contributes to the support of education and allows educators to incorporate broadband wireless technologies into their distance learning plans.

In these comments, Nucentrix demonstrates that 3G mobile services cannot be accommodated in the MDS/ITFS bands without severely compromising the advanced fixed wireless services currently provided in the bands. The same spectrum cannot be shared between 3G and fixed services, because the substantial separation distances that would be required to avoid inter-system interference would not leave room for both services to be ubiquitously deployed. Segmenting the spectrum to allow 3G to be fenced off from fixed service would not leave sufficient spectrum for Nucentrix and other operators to deploy an economically viable service in most areas. Relocating incumbent licensees into new spectrum, assuming a sufficient amount of replacement spectrum could be found, would be extremely costly and would cause an unconscionable delay in the introduction of broadband service to the public.

While the FCC's Interim Report studying some of the problems of accommodating 3G services in the MDS/ITFS bands focused exclusively on the 2.5 GHz band, the same conclusions are applicable to the 2.1 GHz band. The 2.1 GHz channels already are used extensively for upstream transmissions (from subscriber units to base stations), and form the foundation for nationwide interference coordination agreements among MDS/ITFS operators. Any attempt to accommodate 3G in those channels would destroy their usefulness for these purposes.

The purpose of this proceeding is to allocate spectrum for advanced wireless services, both fixed and mobile. Since fixed broadband and 3G are both advanced wireless services, it would be inexcusable to compromise the former in order to accommodate the latter, particularly in view of the enormous public benefits that fixed broadband service provides. There is ample spectrum to support a viable 3G service without cannibalizing the MDS/ITFS bands. Nucentrix urges the Commission to honor its commitment to the deployment of advanced fixed wireless services in the MDS/ITFS bands, and allocate other spectrum for 3G mobile services.

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To the Commission:

COMMENTS OF NUCENTRIX BROADBAND NETWORKS, INC.

Nucentrix Broadband Networks, Inc. (“Nucentrix”) hereby submits its comments on the Notice of Proposed Rulemaking (“NPRM”) in the above-captioned proceeding.¹ In this proceeding, the Commission seeks to allocate spectrum for advanced wireless services, both fixed and mobile. Nucentrix urges the Commission not to move new third-generation (“3G”) mobile wireless services into the 2500-2690 MHz (“2.5 GHz”) or 2150-2162 MHz (“2.1 GHz”) bands (collectively, the “MDS/ITFS bands”), now occupied by Multipoint Distribution Service (MDS)² and Instructional Television Fixed Service (ITFS) licensees. Any attempt to do so would have a devastating effect on the continued deployment of advanced

¹ Amendment of Part 2 of the Commission’s Rules to Allocate Spectrum Below 3 GHz for Mobile and Fixed Services to Support the Introduction of New Advanced Services, including Third Generation Wireless Systems, *Notice of Proposed Rulemaking*, FCC 00-455 (rel. January 5, 2001) (“NPRM”).

² In these comments, we refer to Multipoint Distribution Service (“MDS”) and Multichannel Multipoint Distribution Service (“MMDS”) collectively as “MDS.”

fixed wireless service in those bands. Moreover, any such action would directly contradict Congressional and FCC mandates to advance competition, promote service to rural and underserved areas, and deliver broadband services to schools, all of which are furthered by advanced fixed wireless services in the MDS/ITFS bands.

I. INTRODUCTION

Nucentrix is the third largest holder of spectrum rights in the MDS/ITFS bands in the United States. Nucentrix holds MDS/ITFS licenses and spectrum leases in over 90 primarily rural markets across Texas, Oklahoma and 12 other states,³ covering an estimated 9 million households. Nucentrix currently provides advanced, high-speed wireless Internet access in Austin and Sherman-Denison, Texas to over 2,000 end users, and is conducting field tests of new, second-generation fixed wireless radio technology in Amarillo, Texas. Nucentrix also provides multichannel video service to over 100,000 subscribers in 58 markets in nine states, making it the largest provider of “wireless cable” services in the United States.

MDS/ITFS spectrum rights are at the very core of Nucentrix’s business. Nucentrix’s sole mission is to provide low cost, reliable, advanced fixed wireless data and voice service over frequencies in the MDS/ITFS bands. Advanced fixed wireless services will provide a much-needed competitive alternative to wireline services such as digital subscriber line (DSL) and cable modem service currently being deployed in more densely populated regions of the country. More importantly, given Nucentrix’s focus on rural and underserved areas where advanced wireline services are severely limited or completely unavailable,

³ Other states in which Nucentrix holds licenses and spectrum leases are Arkansas, Arizona, Florida, Illinois, Iowa, Kansas, Kentucky, Missouri, Ohio, Pennsylvania, West Virginia and Wyoming.

Nucentrix's fixed wireless service is likely to be the *only* broadband service available to many of the homes, offices, and businesses in its region for the foreseeable future.⁴ Through its partnerships with over 400 ITFS licensees, Nucentrix also contributes directly to the support of education, and supplies the infrastructure to enable schools to satisfy their communications needs and use the latest in distance learning technologies.

Nucentrix urges the Commission to retain the current rules, licenses, contractual arrangements, and spectrum allocations in the MDS/ITFS bands. Mobile services cannot be accommodated in these bands without devastating consequences to the provision of advanced fixed wireless services, including the loss of broadband service in many markets altogether. This outcome cannot be reconciled with the pro-competitive mandates of Congress, especially with regard to rural and underserved areas, or with the Commission's own spectrum management policies. Since ample spectrum has been identified for the deployment of 3G mobile services without recourse to the MDS/ITFS bands, the Commission must look elsewhere for any 3G allocation.

II. AFTER A MASSIVE SPECTRUM REDEVELOPMENT EFFORT, THE MDS/ITFS BANDS ARE FULLY AND EFFICIENTLY DEVOTED TO THE PROVISION OF ADVANCED FIXED WIRELESS SERVICES.

In making the difficult policy decisions that are called for in the NPRM, a full understanding of the scope and scale of the spectrum redevelopment effort and the nature of the services provided in the MDS/ITFS bands is crucial. In 1996, the Commission began the process of increasing transmission

⁴ See FCC Staff Report, *Spectrum Study of the 2500-2690 MHz Band: The Potential for Accommodating Third Generation Mobile Systems, Interim Report* at 22 (Nov. 15, 2000) ("Interim Report") ("in rural or otherwise underserved markets in the country, ITFS/MDS may be the sole provider of broadband service").

capacity and maximizing spectrum efficiency in these bands by granting licensees authority to use digital modulation.⁵ Over the next three years the Commission conducted one of the most technically complex proceedings it has ever undertaken, to craft rules for advanced fixed wireless services in the MDS/ITFS bands.⁶ In this cooperative industry and government effort, MDS/ITFS licensees, operators, and the Commission together devoted thousands of hours to ensuring that the rules would properly balance the differing needs of the educators and commercial operators who share the MDS/ITFS bands. The result was an engineering and administrative platform that supports the delivery of advanced services to all regions of the country.

In reliance on the ability of the MDS/ITFS bands to support advanced fixed wireless services, commercial operators have spent many billions of dollars to acquire the licenses, lease rights, and infrastructure of existing MDS/ITFS operations. Nucentrix itself has invested over \$330 million in licenses, spectrum leases, and infrastructure for its point-to-multipoint operations. Nucentrix also engineered band plans and network designs for more than 400 applications in 70 markets which it filed with the Commission in the first two-way filing window in August, 2000. In addition, Nucentrix devoted substantial human and

⁵ Request for Declaratory Ruling on the Use of Digital Modulation by Multipoint Distribution Service and Instructional Television Fixed Service Stations, *Declaratory Ruling and Order*, 11 FCC Rcd 18839 (1996).

⁶ Amendment of Parts 21 and 74 to Enable Multipoint Distribution Service and Instructional Television Fixed Service Licensees to Engage in Fixed Two-Way Transmissions, *Report and Order*, 13 FCC Rcd 19112 (1998) (“Two-Way Order”), *recon.*, 14 FCC Rcd 12764 (1999), *further recon.*, 15 FCC Rcd 14566 (2000).

capital resources in renegotiating spectrum lease agreements to accommodate advanced fixed wireless services and comply with FCC rules.

Finally, as noted above, Nucentrix and Cisco Systems, Inc. are currently conducting field tests of new, second-generation fixed wireless technology in Amarillo, Texas. The technology being developed is expected to support not only broadband wireless Internet access, but also voice services in the MDS/ITFS bands on an efficient and cost-effective basis. As the technology matures, Nucentrix plans to offer wireless “local loop” and long-distance service bundled with its broadband access service, breaking down the “last-mile” barrier to full competition for virtually all telecommunications services in rural America.

III. THE 2.5 GHZ BAND CANNOT ACCOMMODATE 3G MOBILE TRANSMISSIONS WITHOUT THREATENING THE VIABILITY OF ADVANCED FIXED WIRELESS SERVICES PROVIDED IN THE BAND.

The FCC’s Interim Report on the use of the 2.5 GHz band identified a number of impediments to the use of the band for 3G mobile systems,⁷ but left the possibility open that some accommodation with incumbent licensees could be reached.⁸ However, as shown below, 3G mobile services cannot be accommodated in the 2.5 GHz band without threatening the viability of the advanced fixed wireless services currently being provided in the band.

⁷ Interim Report at iii (“Segmenting the 2500-2690 MHz band to enable third generation mobile wireless systems access to this spectrum would raise technical and economic difficulties for incumbents”).

⁸ *Id.* at 62 (in any segmentation option “a substantial number of licensees would need to be accommodated”).

Unless the entire 2.5 GHz band is cleared of incumbents, any 3G systems authorized in the band must be authorized either on the *same* channels used by incumbent systems or on channels cleared from incumbent use and made available for 3G systems. In the FCC's Interim Report, co-channel operation of 3G and incumbent systems is referred to as band *sharing*, and dividing the 2.5 GHz band to provide separate allocations for 3G systems is referred to as band *segmentation*.⁹ Implementation of either a band sharing or band segmentation plan may entail relocation of incumbents to other spectrum, which raises serious issues discussed in Section IV below. However, whether or not accompanied by relocation, neither band sharing nor band segmentation can be accomplished without disrupting existing services and leaving many markets without a viable broadband service.

A. The Interim Report correctly concluded that sharing the 2.5 GHz band between 3G mobile and existing fixed services faces severe technical constraints, and would leave no room for a viable 3G or fixed service.

The FCC's Interim Report analyzed the potential of 3G mobile services to operate on a shared basis using the same spectrum as incumbent MDS/ITFS licensees. The Interim Report excluded mobile transmitters, and focused on the separation distance required between a 3G base station and an MDS/ITFS base station sharing the same channel. Making reasonable assumptions regarding the characteristics of 3G and MDS/ITFS systems, the Commission concluded that the 3G base station must be located at least 100 miles from the hypothetical receiver to avoid interference.¹⁰ A subsequent study shows that comparable

⁹ Interim Report at 39 (sharing), 54 (segmentation).

¹⁰ Interim Report at 39-42. 100 miles is the distance from the transmitter to the earth's horizon, beyond which there is effectively no reception of the signal.

separation is required to maintain acceptable desired to undesired signal ratios for interference from MDS/ITFS transmitters to 3G transmitters.¹¹ Maintaining these separations effectively leaves no channel in the 2.5 GHz band for a 3G system to operate, since irrespective of which channel is chosen, nearly every point in the continental U.S. is less than the required separation distance from an MDS/ITFS service area operating on that channel.¹² Conversely, locating a 3G base station almost anywhere in the continental U.S. would be sure to place an interfering signal within the service area of an MDS/ITFS system.

Since there is no room for new 3G mobile systems given the present distribution of existing advanced fixed wireless systems in the 2.5 GHz band, 3G could be accommodated in this band on a shared or co-channel basis *only* if incumbent systems are either relocated or converted to 3G. Relocating MDS/ITFS incumbents would be extremely costly and administratively burdensome, as discussed in Section IV below. The alternative, allowing the conversion of existing MDS/ITFS systems to 3G without relicensing the band or relocating incumbents, would require adding a mobile allocation to the band.¹³ Although Nucentrix generally supports the principle of flexible spectrum use, Nucentrix does not seek a mobile allocation for its licensed or leased spectrum at present. Nucentrix is committed to the deployment of ubiquitous advanced fixed wireless services, for which significant demand currently exists and equipment

¹¹ See George W. Harter, *Interference to 3G Systems from ITFS/MMDS Systems Sharing the Same Frequencies*, attached to Comments of the Wireless Communications Association International in this proceeding (Feb. 22, 2001) (“MSI 3G Interference Study”).

¹² See Interim Report at 49, Figure 5.16.

¹³ See NPRM at ¶ 64 (soliciting comment on “the costs and benefits of adding a mobile allocation to [the MDS/ITFS band] without any mandatory relocation”).

is currently available, and intends to follow through on that commitment. While Nucentrix would not oppose the initiation of a proceeding to further study the interference implications of mobile transmissions in the 2.5 GHz band, such a proceeding would have to overcome the serious technical constraints on band sharing identified in the Interim Report and subsequently confirmed.¹⁴ Deployment of mobile service at this time would only complicate interference coordination between the services and continue to delay deployment of fixed wireless services, frustrating current broadband demand in unserved and underserved areas.

B. Segmenting the 2.5 GHz band to accommodate 3G would threaten the viability of the advanced fixed wireless services being provided in the band and would face serious legal obstacles.

The FCC's Interim Report also considered the possibility of dividing the 2.5 GHz band into one or more segments, with certain band segments to be reallocated for use by new 3G systems. However, the Interim Report understated the problems associated with segmentation. Any band segmentation plan would have to be individually tailored on a market-by-market basis. It would raise the cost of providing advanced fixed wireless services, and render these services economically non-viable in most areas. In addition, band segmentation raises serious legal and policy issues with respect to spectrum rights purchased at auction, even if reallocation is limited only to ITFS spectrum.

¹⁴ See MSI 3G Interference Study, *supra*, note 10. Before adding a mobile allocation in furtherance of "flexible use," the Commission must conclude that it can be accomplished without harmful interference to existing services. 47 U.S.C. § 303(y).

1. No simple band segmentation plan can result in an equitable spectrum distribution in all markets.

The problem common to the three band segmentation options first identified in the FCC's Interim Report is that they would leave different amounts of spectrum available for both 3G and fixed broadband services in every market. Indeed, this is the defect of any *a priori* attempt to identify one contiguous block of spectrum with the goal of making a consistent allocation available nationwide. The scope of the problem is illustrated in the channel grids in Exhibit 1. The top grid shows actual current usable channels available to Nucentrix in eight sample markets. Because of limitations arising from adjacent market interference, incumbent licensees, spectrum lease availability, and existing educational video use, not all spectrum is available in all markets, and the pattern in which those channels are available varies from market to market.¹⁵ Thus, any single band segmentation plan will affect individual markets in vastly different ways.

The channel grids go on to demonstrate the real-world impact of the Commission's various band segmentation options. Under any of the Commission's three segmentation options, the number of channels that can be devoted to advanced fixed wireless service varies sometimes drastically from market to market. For example, Option 2 (90 MHz at the lower end of the band) would leave a minimum of 24 MHz and a maximum of 87 MHz for fixed wireless service in the sample markets, excluding any additional bandwidth required for channel separation for two-way transmissions. As discussed below, any such spectrum reduction would be disastrous for broadband wireless deployment plans. In addition, it would betray the

¹⁵ In markets with limited initial bandwidth, Nucentrix expects to secure additional spectrum rights as demand increases.

FCC's obligation to ensure a fair and equitable distribution of services nationwide.¹⁶ There is no simple fix for the problems raised by the irregular MDS/ITFS channel distribution. No segmentation plan can hope to make consistent allocations nationwide without addressing complex market-specific issues dictated by existing use.

2. Band segmentation would raise operators' deployment and operating costs and effectively deny service to many communities.

Band segmentation would effectively remove spectrum from advanced fixed wireless services and reallocate it to 3G mobile services. In many communities, loss of access to any spectrum available for advanced fixed wireless services would deprive residential customers, business users, and schools of their only hope for high-speed service. This is because the economics of providing service change fundamentally when less spectrum is available.

The Commission correctly recognized that reducing available spectrum by segmentation will require additional infrastructure to be constructed to reuse spectrum more frequently in the same coverage area.¹⁷

Spectrum can be reused by subdividing a service area into a number of smaller service areas or "cells," and constructing transmit stations and receive hubs to serve each of these cells. Such a multi-cell architecture may be appropriate for initial deployment in densely populated areas where subscribership will be large enough to support the greater infrastructure costs required by the construction of such a system.

¹⁶ See 47 U.S.C. §§ 151, 307(b); *National Ass'n of Broadcasters v. FCC*, 740 F.2d 1190 (D.C. Cir. 1984) (distribution of service is "[t]he ultimate touchstone for the FCC").

¹⁷ See Interim Report at 61.

However, the small cities and rural areas that form the heart of Nucentrix's service area will not generate sufficient network traffic demand to support multicell designs. In these markets, service can only be deployed economically using a "supercell" architecture with a single high-powered transmitter and a receive hub generally located on a tall tower or building. Any band segmentation plan would remove bandwidth from the supercell, and thus limit the number of subscribers capable of being served and require additional infrastructure to be developed. Indeed, in a number of Nucentrix's markets, there is just enough spectrum currently available through lease and license rights to deliver service economically. Any loss of spectrum in those markets would render service uneconomic, and force cancellation of Nucentrix's deployment plans.¹⁸ Since, as discussed above, fixed wireless service represents the only way in which many homes, businesses and schools throughout Nucentrix's service area can receive high-speed service, band segmentation would leave much of rural America without a broadband service.

Requiring licensees to increase the spectral efficiency of existing transmission systems would not, as the Commission suggests, assist in any band segmentation effort.¹⁹ First, the Commission's suggestion dealt only with analog video transmissions. Nucentrix and other operators have invested enormous resources to be able to deliver advanced two-way fixed wireless data and voice services over the MDS/ITFS bands with efficient OFDM and high-order QAM modulations, and any discussion of spectral

¹⁸ See HAI Consulting, Inc. White Paper, *MMDS/ITFS Two-Way Fixed Wireless Broadband Service: Spectrum Requirements and Business Case Analysis*, attached to Comments of the Wireless Communications Association International in this proceeding (Feb. 22, 2001) ("HAI White Paper"); Comments of Cisco Systems, Inc. in this proceeding (Feb. 22, 2001).

¹⁹ See Interim Report at 60.

efficiency should focus on these services, not legacy systems. Second, Nucentrix and other commercial operators already have every incentive to make the most efficient possible use of the spectrum in providing commercial service, because they face only forward-looking costs in purchasing equipment and deploying facilities. The equipment currently being developed for commercial use is expected to reduce line-of-sight, multipath, and narrowband interference issues that historically have been present in wireless environments, and will support aggregate data rates as high as most other point-to-multipoint access media.²⁰ It is appropriate for the industry, and not the Commission, to make the engineering choices that will allow the spectrum to be used most efficiently. However, let there be no misunderstanding: advanced fixed wireless services will use the MDS/ITFS band at least as efficiently, and in all likelihood far more efficiently, than the reported estimates for 3G mobile services.²¹

3. Band segmentation raises serious legal issues with respect to the rights of incumbents purchased at auction.

The Commission also acknowledges the existence of potential legal problems that could stand in the way of an auction of the MDS/ITFS bands.²² In 1996, the Commission completed a nationwide auction

²⁰ See, e.g., “White Paper – Overcoming Multipath in Non-Line-of-Sight High-Speed Microwave Communications Links” (July 2, 2000), available at http://www.cisco.com/warp/public/cc/pd/witc/wt2700/mulpt_wp.htm; “Hybrid Networks Introduces ThruWAVE Wireless Broadband Router” (Feb. 19, 2001), available at <http://www.hybrid.com/investor/19a-Feb-2001.htm>.

²¹ See NTIA, *Federal Operations in the 1755-1850 MHz Band: The Potential for Accommodating Third Generation Mobile Systems, Interim Report* at 9-10 (Tables 2, 3) (“NTIA Interim Report”) (proposed modulation densities for 3G ranging from BPSK to 8-PSK). In contrast, MDS/ITFS broadband systems are being deployed using 64-QAM downstream, with the potential to use 256-QAM in the future.

²² NPRM at ¶ 64.

of MDS authorizations in 493 Basic Trading Area (“BTA”) and BTA-like geographic areas.²³ Nucentrix was the winning bidder in 93 BTAs, more than any other auction participant. Obviously the Commission, having once sold the rights to the MDS spectrum to the highest bidders, cannot now reclaim those rights and attempt to sell them again to a new set of bidders. To do so would make a mockery of the auction process. However, the legal issues with respect to an auction of spectrum in the MDS/ITFS bands are by no means limited only to the MDS spectrum within the bands.

BTA holders paid for rights that extend to *all* of the spectrum within the MDS/ITFS bands. The rights of a BTA holder include the exclusive right to apply for authority to construct and operate new MDS facilities within the BTA.²⁴ BTA rights extend to any ITFS channels that have been swapped for MDS channels through a channel-for-channel exchange pursuant to the Commission’s rules permitting channel swaps between MDS and ITFS licensees.²⁵ In addition, the rights of a BTA holder include the exclusive right to apply for authority to construct and operate a commercial station on ITFS channels.²⁶ Indeed, Nucentrix utilizes a number of commercial ITFS licenses, and plans to file applications for additional commercial ITFS licenses in the future. If any portion of the ITFS spectrum were auctioned for 3G

²³ Public Notice, “Winning Bidders in the Auction of Authorizations to Provide Multipoint Distribution Service in 493 Basic Trading Areas” (March 29, 1996).

²⁴ See 47 C.F.R. §21.930(b).

²⁵ See Two-Way Order, 13 FCC Rcd 19112 at ¶¶ 106 (ITFS channels may be swapped for MDS channels including MDS 1 and 2).

²⁶ See Amendment of Parts 21 and 74 of the Commission’s Rules With Regard to Filing Procedures in the Multipoint Distribution Service and in the Instructional Television Fixed Service and Implementation of Section 309(j) of the Communications Act – Competitive Bidding, *Report and*

services, BTA authorization holders would lose the right to continue to operate any *existing* commercial stations that may have been constructed on the auctioned ITFS frequencies, and to apply for any *new* commercial stations on those frequencies. They would also lose the exclusivity for which they paid at auction, and find themselves in competition with others who are authorized to provide advanced wireless services, both fixed and mobile, within the bands. This would obviously diminish the value of BTA authorizations, since BTA authorization holders purchased them with the justifiable expectation that they would be able to provide advanced fixed wireless services in the MDS/ITFS bands.²⁷

In addition, and perhaps most importantly, BTA holders have obtained transmission rights to much of the ITFS spectrum within their BTAs through long-term spectrum leases with ITFS licensees. The investment decisions made in the BTA auction and in the secondary markets were based on the collective value of these spectrum rights. For the Commission to arbitrarily reduce usable spectrum available to BTA auction winners would unfairly compromise the value of their prior investment and would destroy the credibility of the auction process altogether.

Order, 10 FCC Rcd 9589, 9612 (1995).

²⁷ See 47 C.F.R. § 21.903(b) (providing that, subject to certain common carriage restrictions, “[MDS] stations may render any kind of communications services consistent with the Commission’s Rules”).

IV. RELOCATING INCUMBENTS FROM THE 2.5 GHZ BAND IN ORDER TO PROVIDE 3G SERVICE WOULD BE INCALCULABLY EXPENSIVE AND VIRTUALLY IMPOSSIBLE GIVEN ADMINISTRATIVE CONCERNS AND SPECTRUM CONSTRAINTS.

The Commission seeks comment on the costs of relocating ITFS and MDS incumbents from the 2.5 GHz band to other spectrum.²⁸ No target spectrum has been identified, and prospects for identifying any spectrum are bleak.²⁹ Nevertheless, any plan to reallocate spectrum from the 2.5 GHz band to 3G mobile service would have to specify means for relocating thousands of incumbent licensees to new spectrum and compensating the incumbent licensees and lessees of spectrum for the losses they would incur in relocation. In discussing the possibility of such a process, the Commission appears to focus on out-of-pocket equipment costs, such as retuning or replacing equipment.³⁰ However, such costs, although significant, pale in comparison to the cost to the public and industry of the delays and loss of service due

²⁸ NPRM at ¶ 64.

²⁹ There is no block of spectrum below 3 GHz that is currently available for the relocation of incumbents in the MDS/ITFS bands. If there were, the Commission would have identified it in the NPRM. Spectrum above 3 GHz is not suitable for the relocation of incumbent MDS/ITFS licensees because of its inferior propagation characteristics, as the Commission has previously recognized. *See* Redevelopment of Spectrum to Encourage Innovation in the Use of New Telecommunications Technologies, *First Report and Order and Third Notice of Proposed Rulemaking*, 7 FCC Rcd 6886 at ¶ 17 (1992) (“there are no frequency allocations above 3 GHz that could readily support the requirements of MDS, which are wide-area and point-to-multipoint in nature”). Because of less favorable propagation characteristics and increased equipment costs, the economics of providing service at 3 GHz are fundamentally changed. *See* Comments of Cisco Systems, Inc. in this proceeding (Feb. 22, 2001). Therefore, relocating incumbents to spectrum above 3 GHz would force operators to overhaul their business plans, and would threaten deployment in many underserved areas where the economics of service already are stretched to their limits at 2.5 GHz.

³⁰ *Id.*

to relocation. With such huge intangible costs, the decision whether to retune or replace equipment is virtually irrelevant.

A. Relocation would impose enormous intangible costs upon the public and incumbent operators.

First among the intangible costs of any relocation effort is the cost of lost service to the public if service is delayed or prevented altogether. Any relocation plan will affect nearly every market across the country, since every ITFS and MDS channel is licensed substantially on a nationwide basis.³¹ Thus, every deployment will be put on hold while new band plans are developed on a market-by-market basis, engineering and economic models are revised and validated (if possible) under new assumptions, spectrum lease and interference coordination agreements renegotiated, applications withdrawn or authorizations returned, and new applications prepared and filed. Moreover, new equipment must be designed and developed around different frequencies. Estimates of the time to market for new equipment are as long as two to three years.³² Each potential subscriber in the nation – a home or business owner who would have subscribed to advanced fixed wireless service if it had been available – will be deprived of service during this time.

Second, operators would incur enormous opportunity costs and loss of goodwill arising from any relocation effort. During the time in which system deployment is on hold due to reengineering associated with the relocation, system operators will be deprived of the revenues that would have accrued to them from

³¹ See Interim Report at 51, Figure 5.18 (geographical licensing of single Channel A1).

³² See HAI White Paper, *supra*, note 17.

the provision of service. Some operators may be forced out of business altogether. Moreover, any relocation effort will inevitably result in service outages, interruptions, and delays for current subscribers to legacy video and broadband services as they are switched to new frequencies. The resulting loss in goodwill may permanently and irreparably impair operators' ability to market and sell their services.

Finally, because advanced fixed wireless services in the MDS/ITFS bands will provide a competitive alternative to incumbent LECs and cable modem providers, a relocation of MDS/ITFS licensees will result in lost opportunities to compete. In the absence of competition, prices exceed the marginal cost of providing service, leading to what economists term "deadweight loss" – the loss to producers and consumers from inefficient pricing. Competition from advanced fixed wireless services can be expected to lower prices for broadband services, bringing them closer to their marginal costs of delivery, and thus reducing or eliminating deadweight loss.

B. Relocating and compensating incumbents would be an administrative and logistical nightmare.

The NPRM solicits comment on the use of band-clearing procedures previously adopted for fixed point-to-point incumbents as a model for the relocation of incumbent licensees in the MDS/ITFS bands.³³

However, this model is hopelessly inadequate, since it completely ignores a number of fundamental technical, operational, and legal differences between MDS/ITFS licensees and the fixed microwave service

³³ NPRM at ¶¶ 54, 65. *See generally* Amendment of Section 2.106 of the Commission's Rules to Allocate Spectrum at 2 GHz for Use by the Mobile-Satellite Service, *Second Report and Order and Second Memorandum Opinion and Order*, 15 FCC Rcd 12315, 12346 ¶ 97 (2000) ("MSS Second Report and Order").

incumbents for whom the model was devised. The Commission has never required the relocation of complex multichannel, point-to-multipoint systems, or subscriber-based information delivery systems like those operating in the MDS/ITFS bands.

The technical concerns associated with relocation of MDS/ITFS licensees are far more complex than those associated with the relocation of point-to-point links. In the case of point-to-point links, the transmitters and receivers are fixed and identifiable by the terms of the license. In contrast, each MDS or ITFS license has the characteristics of a blanket authorization, defining either a protected service area in which receivers can be located or a response service area in which transmitters can be located. Likewise, a BTA authorization grants territorial service rights. Thus, any relocation plan must preserve the rights of each relocated licensee as to any possible future operation as well as its present operation. Moreover, each MDS/ITFS licensee controls only a certain number of interleaved channels that are integrated into a much larger system occupying contiguous blocks of spectrum. These channels may or may not be co-located, and even if co-located they may have different service areas. Any plan to relocate MDS/ITFS licensees would have to recognize that the loss of one or more channels will have a significant impact on the entire wireless system of which they are a part and may render the entire system useless.

At the system level, MDS/ITFS is far more complex than point-to-point relocation as well. An MDS/ITFS relocation plan would have to be compatible with legacy video distribution systems, fixed broadband data communications networks, and wireless local loop service. Each of these services may have thousands or tens of thousands of subscribers in a market. Legacy video distribution systems alone

have over 700,000 subscribers nationwide.³⁴ It is a different matter entirely to coordinate the orderly transfer of hundreds of thousands of subscribers to a new set of frequencies than to switch over the two ends of a simple point-to-point transmission link simultaneously. A relocation plan would have to accommodate the rights of subscribers to reliable, uninterrupted service during the relocation.

Finally, any plan to relocate MDS/ITFS licensees will have to address the issue of existing spectrum lease rights. The Commission has already acknowledged the complexity of this issue.³⁵ Nucentrix, like other system operators, leases the majority of its spectrum capacity under long-term contracts with ITFS licensees. ITFS licensees, in return, receive a minimum regular revenue stream, additional revenue potential from a percentage of the operator's gross revenues, network infrastructure, and technical support.³⁶ At best, these contracts would be disrupted and thrown into legal disarray if incumbent licensees were relocated. At worst, the contracts would be deemed abrogated by government action, leading to prolonged litigation among multiple parties that could put any relocation plan on hold indefinitely.

³⁴ Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, *Seventh Annual Report*, FCC 01-1, at ¶ 88 (rel. January 8, 2001).

³⁵ Interim Report at 18 (MDS and ITFS licensees share the 2.5 GHz band through “complex licensing and leasing arrangements that have evolved over time and that are not uniform in all geographic areas”).

³⁶ See Interim Report at 24-25 (describing symbiotic relationship between MDS and ITFS).

V. REALLOCATION OF MDS CHANNELS 1 AND 2/2A (2150-2162 MHZ) WOULD HAVE A SEVERE NEGATIVE IMPACT ON THE IMMINENT DEPLOYMENT OF ADVANCED FIXED WIRELESS SERVICES.

In the NPRM, the Commission for the first time raises questions about the reallocation of the 2.1 GHz band for 3G mobile services.³⁷ The NPRM treats the 2.1 GHz band separately from the 2.5 GHz band, but in reality the two bands are inseparable.³⁸ While it may be tempting to view the 2.1 GHz band as a mere appendage that could be severed and removed from the much larger 2.5 GHz band with little or no adverse effect, in fact the opposite is true. The use of the 2.1 GHz band is essential to the success of two-way broadband services in the MDS/ITFS bands.

Because of unique advantages of the 2.1 GHz band, no other channel group in the MDS/ITFS bands is as well suited for upstream use. The 2.1 GHz band is the foundation of Nucentrix's existing and planned fixed wireless systems. All of Nucentrix's existing two-way markets use this band for upstream communications, and over 94 percent of Nucentrix's systems for which two-way applications are on file with the Commission have been designed around the use of *both* MDS channels in the 2.1 GHz band for that purpose. There is no plan to transition these systems out of the 2.1 GHz band, and indeed, finding alternate spectrum within or outside of the 2.5 GHz band for upstream use would greatly complicate market-to-market coordination and increase adjacent market interference. Moreover, relocating

³⁷ NPRM at ¶¶ 52, 55.

³⁸ MDS Channel 2, from 2156-2162 MHz, is allocated only in the 50 largest metropolitan areas. *See* 47 C.F.R. § 22.901(c). Outside those areas, only the lower 4 MHz, from 2156-2160 MHz, designated as MDS Channel 2A, is available. The Commission has separately solicited comment on the reallocation of the upper 2 MHz of Channel 2 (2160-2162 MHz), from MDS to 3G mobile services. *See* NPRM at ¶ 52. For the reasons stated herein, neither Channel 2 nor 2A should be reallocated.

incumbents in the 2.1 GHz band would present the same host of problems as relocating incumbents in the 2.5 GHz band – enormous expense, irreparable harm, complex administrative difficulties, and significant legal obstacles. Accordingly, reallocating any portion of the 2.1 GHz band would have an even more disastrous impact than reallocating any portion of the 2.5 GHz band.

The 2.1 GHz band is necessary for upstream use because the nearly 400 MHz between the 2.1 GHz and the 2.5 GHz band provides a natural band separation between the upstream and downstream bands of an advanced fixed wireless system. The 400 MHz separation ensures that upstream and downstream transmissions will not interfere with each other, and permits transceivers operating simultaneously in both bands to employ effective filtering techniques to separate incoming and outgoing communications. As a result, these channels lend themselves to regional and national band plan coordination. Nucentrix is a signatory to system coordination agreements among the three major MDS/ITFS operators, among others, which *require* the operators to make use of the 2.1 GHz band wherever it is available, as a first priority, to satisfy upstream transmission capacity needs.³⁹ When upstream communications can be placed in the same frequencies throughout an entire region, encompassing many separate systems, market-to-market frequency coordination is simplified and interference between adjacent markets is minimized. The result is that broadband services to the end user will be delivered more quickly and efficiently.

³⁹ See “Nucentrix, Sprint and WorldCom Announce Spectrum Management Plans,” Joint Press Release (July 10, 2000) (announcing frequency coordination agreements).

Reallocating the 2.1 GHz band would raise serious legal issues with respect to the auction process, because BTA authorization holders already paid for the majority of the station licenses in this band at auction. Before the BTA auction the 2.1 GHz band was vacant in many areas, and a substantial number of the current licenses in this band were applied for and obtained by BTA authorization holders after the auction. Therefore, in the 2.1 GHz band, BTA authorization holders were able to convert their inchoate right to apply for stations into actual station licenses on a widespread basis. For the Commission to take back the very licenses that auction winners paid for, in order to auction them again, would destroy the credibility of auctions as a means for allotting spectrum licenses.

VI. FIXED WIRELESS SERVICES SHOULD NOT BE SACRIFICED IN FAVOR OF 3G, BECAUSE THE DEPLOYMENT OF FIXED WIRELESS SERVICE FURTHERS CONGRESSIONAL AND FCC MANDATES AS WELL AS CLEAR U.S. POLICY GOALS.

As we have shown, allowing 3G to occupy the MDS/ITFS bands would have devastating consequences on the fixed wireless services provided in the bands. The Commission should not let this happen, because it would be contrary to the clear mandate of Congress and the Commission's own precedents. Instead, the Commission has a duty to follow through on its commitment to the industry and allow the deployment of fixed wireless broadband services to continue unhindered, because this will enhance local competition, help equalize access to technology for all Americans, and make a lasting contribution to education, each a cornerstone of U.S. communications policy.

A. Taking any action to hinder the deployment of advanced fixed wireless services in the MDS/ITFS bands would contradict the mandate of the 1996 Act and inexplicably reverse FCC precedent.

In enacting the Telecommunications Act of 1996 (the “1996 Act”),⁴⁰ Congress established a pro-competitive national policy designed to accelerate the deployment of advanced technologies, in order to secure lower prices and higher quality services for American telecommunications consumers.⁴¹ Congress directed the Commission to ensure that *all* Americans, including those in rural and underserved areas, have access to advanced telecommunications services.⁴² As has been amply demonstrated in this proceeding, fixed broadband wireless service is the only way in which many rural and underserved areas can be economically served. Sacrificing fixed wireless services in favor of 3G would directly contradict this Congressional mandate.

As directed by Congress, the Commission has established a pro-competitive policy to support the expeditious rollout of broadband services and to eliminate the bottleneck of the “last-mile,” one of the most

⁴⁰ Pub. L. No. 104-104, 110 Stat. 56 (codified at 47 U.S.C. §§ 151 *et seq.*).

⁴¹ *Id.*, preamble.

⁴² See 47 U.S.C. § 245(b)(2)-(3) (“Access to advanced telecommunications and information services should be provided in all regions of the Nation. . . . Consumers in all regions of the Nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services, that are reasonably comparable to those services provided in urban areas”); 47 U.S.C. § 714(a)(3) (establishing fund to “promote delivery of telecommunications services to underserved rural and urban areas”); Section 706 of the 1996 Act (“The Commission . . . shall encourage the deployment on a reasonable and timely basis of advanced telecommunications capability to all Americans (including, in particular, elementary and secondary schools and classrooms”). See also Statement of Sen. Burns accompanying 1996 Act (1996 Act will have the effect of “expanding the competitive choices available to all Americans, including rural and small town residents”).

deep-seated barriers to full and open competition in the telecommunications marketplace.⁴³ The Commission has remained steadfast in its commitment to ensure that advanced services are available to all Americans, and has taken steps to increase competition in the market for advanced services.⁴⁴

For the Commission now to take any action that would jeopardize the deployment of advanced fixed wireless services in the MDS/ITFS bands in furtherance of 3G would represent an abrupt and unexplained change of course for the agency. It would contradict the Commission's previous pronouncement that this deployment is the most efficient use of the MDS/ITFS spectrum and best serves the public interest.⁴⁵ It would contradict the Commission's report to Congress describing how it is implementing Section 706 of the 1996 Act.⁴⁶ It is irreconcilable with the Commission's recent effort to encourage secondary spectrum transactions by providing stability and continuity among licensees,⁴⁷ and the

⁴³ See Local Competition and Broadband Reporting, Report and Order, 15 FCC Rcd 7717 at ¶ 2 (2000) (a central task in the framework of the 1996 Act is "the opening of previously monopolized local telecommunications markets"); Public Notice, *Commission to Hold Bandwidth En Banc Hearing* (rel. July 9, 1998) (en banc hearing on bandwidth issues in the last mile of nation's telecommunications infrastructure); Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, *Report*, 14 FCC Rcd 2398 at ¶ 34 (1999) ("the connection to ordinary consumers has traditionally been the least competitive and bandwidth-constrained part of the communications network").

⁴⁴ Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion, and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996, *Second Report*, FCC 00-290 (rel. Aug 21, 2000) at ¶¶ 8, 246 ("Second Section 706 Report").

⁴⁵ Two-Way Order, 13 FCC Rcd 19112 at ¶ 6.

⁴⁶ See Second Section 706 Report at ¶¶ 260-63 (taking steps to advance MDS/ITFS fixed broadband service in furtherance of Congressional mandate).

⁴⁷ Principles for Promoting the Efficient Use of Spectrum by Encouraging the Development of

Commission’s own statements in the same proceeding holding up *MDS/ITFS spectrum leasing* as an example of the efficient operation of secondary markets.⁴⁸ It would violate the Commission’s explicit spectrum management policy with regard to 3G, which does not include any proposal to allocate any part of the MDS/ITFS bands for 3G use, and in fact recognizes the heavily encumbered nature of the 2.5 GHz band and the valuable services provided in the band.⁴⁹ Finally, it would also betray the trust that the MDS/ITFS industry has placed in the Commission, with the Commission’s encouragement, and would undermine the credibility of the Commission’s spectrum management policies.⁵⁰

B. Allowing the deployment of advanced fixed wireless services to continue unhindered will further key U.S. policy goals.

The Commission must follow through on its commitment to the industry to encourage the rapid deployment of fixed broadband wireless services in the MDS/ITFS bands because these services are uniquely positioned at the intersection of a number of communications policy goals.

Secondary Markets, Policy Statement, FCC 00-401 at ¶ 20 (rel. Dec. 1, 2000) (“Secondary Markets”) (“Licensees should have clearly defined usage rights to their spectrum . . . to encourage investment”).

⁴⁸ *Id.* at ¶ 14.

⁴⁹ Reallocation of Spectrum to Encourage the Development of Telecommunications Technologies for the new Millennium, *Policy Statement*, 14 FCC Rcd 19868 at ¶ 23 (1999) (proposing to allocate 90 MHz for 3G in the 1717-1755 MHz, 2160-2165 MHz, and 2110-2150 MHz bands); *id.* at ¶ 27 (discussing existing services).

⁵⁰ Such a change of course, in addition to being directly contrary to the 1996 Act, would face severe legal difficulties under principles of administrative law. *See Office of Communication of the United Church of Christ v. FCC*, 707 F.2d 1413, 1425 (D.C. Cir. 1983) (“abrupt shifts in policy . . . constitute ‘danger signals’ that the Commission may be acting inconsistently with its statutory mandate” and subject Commission action to a heightened level of scrutiny).

1. Advanced fixed wireless services provide much-needed local competition.

Broadband competition today is primarily limited to DSL and cable modem service, with two-way satellite service just being introduced. However, each of these other technologies suffers from significant limitations, which restrict their ability to provide full broadband competition.

DSL providers face the basic structural problem that they must rely on the facilities of incumbent local exchange carriers (LECs) to obtain access to the unbundled loops over which they provide service to their own customers. This prevents DSL from being a true competitor in the local loop, since DSL pricing is tied to the provision of a regulated monopoly service. In addition to requiring copper wires for signal delivery, DSL signals are incapable of traveling great distances to reach customers who do not live near the incumbent LEC's central office. In general, DSL is incapable of reaching customers whose telephone lines are more than 18,000 feet long.⁵¹ As a result, even at full deployment, DSL has limited ability to provide broadband competition.

Similarly, cable modem service providers face serious challenges to achieve widespread deployment. Upgrading a cable system for two-way broadband service requires substantial financial investment.⁵² It has been estimated that the cable industry will need to spend \$21 billion to upgrade cable systems to reach roughly one half of the homes passed in the United States, and an additional \$31 billion

⁵¹ See Second Section 706 Report at ¶¶ 38-39.

⁵² NTIA and Rural Utilities Service, *Advanced Telecommunications in Rural America: The Challenge of Bringing Broadband Service to All Americans*, at 10 (April 2000).

to upgrade cable systems to reach all homes passed.⁵³ Even three years from now, it is estimated that only about 21% of homes will be cable modem-ready.⁵⁴ Also, because cable is a shared medium, it is not likely to fill the needs of businesses, which generally require guaranteed access to bandwidth on demand.

Two-way satellite service suffers from quality and bandwidth limitations in the upstream transmission link (*i.e.*, from subscriber to the satellite) thus making the service unsuitable for multimedia or interactive services, peer-to-peer networking, or e-commerce.⁵⁵ Moreover, the interference caused by rain and other atmospheric conditions, which currently disrupts satellite television services, will likely cause the same problems for voice applications. Service interruptions, while a nuisance in video-only service, are unacceptable for primary telephone service. These limitations mean that two-way mass market satellite services are likely to be incapable of supporting voice transmission, and thus cannot fall within the definition of advanced telecommunications services.⁵⁶

⁵³ *Id.*

⁵⁴ Second Section 706 Report at ¶ 189.

⁵⁵ See Applications for Consent to the Transfer of Control of Licenses and Section 214 Authorizations by Time Warner, Inc. and America Online, Inc., Transferors, to AOL Time Warner, Inc., Transferee, *Memorandum Opinion and Order*, FCC 01-12, at ¶ 66 (rel. Jan. 22, 2001) (noting lack of high-speed capability in the upstream direction); Peter J. Brown, “Two-Way Satellite Broadband,” *Broadband Week* (Jan. 22, 2001), available at http://www.broadbandweek.com/news/010122/010122_wireless_two.htm.

⁵⁶ See 47 U.S.C. § 706(c) (1) (“advanced telecommunications capability” means “high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications”) (emphasis added). The Commission requires “advanced services” to support speeds of 200 kilobits per second in both directions. Second Section 706 Report at ¶ 11.

The ability of advanced fixed wireless services provided in the MDS/ITFS bands to remedy the deficiencies in the current competitive environment for advanced telecommunications services is illustrated in the accompanying Exhibit 2. The exhibit depicts the Lubbock, Texas market area, which is representative of many communities in Nucentrix's service area. The most optimistic potential for DSL at full deployment is shown by constructing 18,000-foot circles around each telephone central office, graphically demonstrating that the vast majority of the area would be left without access to broadband service if wireline services were the only means of access. In contrast, the map also depicts Nucentrix's broadband wireless service area, as specified in recently filed FCC applications, covering a 30-mile circle around its transmitter and hub site. As shown on the map, Nucentrix's advanced fixed wireless service will provide a substantial portion of the population in Lubbock and outlying areas with its only opportunity for broadband service.⁵⁷

2. Advanced fixed wireless services in the MDS/ITFS bands are helping to close the information technology gap.

Not only does the deployment of advanced fixed wireless services in the MDS/ITFS bands further the mandates and pro-competitive policy goals of Congress and the Commission, it also promotes equal access to information technology for all Americans. The dramatic difference in broadband access between urban and rural America, and between affluent and poor Americans, has been identified and addressed in a series of NTIA publications, which use the term "digital divide" to describe the information technology

⁵⁷ Cable modem service only recently became available in the Lubbock area. The extent of the availability of cable modem service in this market is difficult to accurately confirm, but appears to be limited to the area in and around the central city.

gap.⁵⁸ NTIA estimates that those who are poor and live in rural areas are about 20 times more in danger of being left behind than wealthier residents of urban areas.⁵⁹ In Texas, for example, where approximately one-third of Nucentrix's markets are located, there are no competitive LECs providing DSL access lines in rural areas, and incumbent LECs have largely ignored rural subscribers.⁶⁰ Only nine out of 186 rural counties in Texas have cable modem service.⁶¹ Because those who do not have access to broadband services are deprived of an opportunity to take part in the information-based economy, NTIA has taken a proactive role to ensure that advanced services are being deployed where they are most needed. NTIA has recognized that advanced fixed wireless services in the MDS/ITFS bands may be the best choice for broadband access in rural areas.⁶²

The deployment of advanced fixed wireless services in the MDS/ITFS bands will help close the information technology gap for two reasons. First, fixed wireless technology is especially well-suited for

⁵⁸ See NTIA, U.S. Department of Commerce, *Falling Through the Net: Toward Digital Inclusion* (October 2000); NTIA, U.S. Department of Education, *Falling Through the Net: Defining the Digital Divide*, (July 1999).

⁵⁹ NTIA, U.S. Department of Education, *Falling Through the Net: Defining the Digital Divide*, Executive Summary (July 1999).

⁶⁰ Public Utility Commission of Texas, *Report to the 77th Texas Legislature: Availability of Advanced Services in Rural and High Cost Areas* (January 2001) ("Texas PUC Report"); Public Utility Commission of Texas News Release, "Rural Phone Customers Hurt by Poor Service" (Feb. 13, 2001) (noting poor quality and slow initiation of ILEC service to rural customers)

⁶¹ Texas PUC Report, *supra*.

⁶² U.S. Department Of Agriculture, NTIA, *Advanced Telecommunications in Rural America* at 26-28 (April, 2000) (describing the advantages of MDS/ITFS over wireline, high-frequency wireless, and 3G services in bringing broadband access to rural areas).

ubiquitous coverage in rural areas, where the distances between customers render wireline technologies cost-prohibitive.⁶³ Approximately 85 percent of the markets for which Nucentrix filed applications in the initial two-way filing window are for a “single-cell” or “supercell” configuration. This simple network design, which specifies a single co-located base station and receiver hub, allows Nucentrix to provide service economically to the areas of low population density which form the core of its service area.

Second, by providing an additional competitive alternative with relatively low capital investment in infrastructure, advanced fixed wireless services will help keep prices for broadband access in check. Even in urban areas, the information technology gap will remain wide open if broadband access is not affordable. Advanced fixed wireless services help ensure that broadband access remains affordable by putting pressure on competitors to adopt cost-cutting measures and service quality improvements.

3. Advanced fixed wireless services in the MDS/ITFS bands are helping to deliver much-needed services and funding for education.

In addition to bringing critically needed competition to the marketplace and broadband services to unserved and underserved areas, the deployment of advanced fixed wireless services in the MDS/ITFS bands will have an enormous beneficial impact on education. Through long-term leases, ITFS licensees furnish the majority of the spectrum that commercial operators need to provide service. Just as importantly,

⁶³ See Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993, Annual Report and Analysis of Competitive Market Conditions with Respect to Commercial Mobile Services, *Fourth Report*, 14 FCC Rcd 10145, 10267 (1999) (describing substantial costs of installing and maintaining wires to customer premises).

commercial operators furnish the technology, equipment, infrastructure, and funding that enable ITFS licensees to make beneficial use of their licensed spectrum.

The importance of the relationship between commercial operators and educators cannot be understated. Nearly twenty years ago the Commission found leasing of ITFS excess capacity to commercial operators to be in the public interest, and the Commission's findings remain fundamentally unchanged today.⁶⁴ For years, ITFS has helped educators deliver live and videotaped lectures and other materials to students throughout the United States. Today, by incorporating broadband technology, educators are building plans to deliver a multimedia, interactive, self-paced learning environment to students at all levels and in all settings – urban and rural, rich and poor. The relationship between educators and operators has evolved just as the Commission intended, and continues to provide educators with a rich set of technological and financial resources.

ITFS licensees generally cannot tap the potential of distance learning on their own. Nucentrix and other commercial partners provide crucial support in several areas. First, by stimulating demand for technology capable of operating in the MDS/ITFS bands, commercial operators have spurred the development of equipment that would have been too expensive or would not have been developed at all

⁶⁴ See Amendment of Parts 2, 21, 74 and 94 of the Commission's Rules and Regulations with regard to frequency allocation to the Instructional Television Fixed Service, the Multipoint Distribution Service, and the Private Operational Fixed Microwave Service, *Report and Order*, 94 F.C.C.2d 1203 at ¶ 114 (1983) (“As the excess capacity of ITFS operators is put to use serving the public, greater use of the available spectrum should result”); Two-Way Order, 13 FCC Rcd 19112 at ¶ 133 (extending lease terms to 15 years provides greater certainty and enhanced access to capital markets); Secondary Markets, FCC 00-401 at ¶¶ 13 (mid-term and long-term spectrum leasing benefits the public interest through greater and more efficient use of spectrum).

for use by educators alone. Second, commercial operators provide services, such as video and data transmission, local and wide-area networking, and voice and videoconferencing, that form the basis for many distance learning programs. Third, the revenue stream that educators derive from the lease of their excess capacity helps to fund their distance learning activities, curriculum development, and administration. It bears emphasizing that this funding is achieved through private educator/operator partnerships, thus helping to free educators from dependence on government subsidies or entitlement programs.

Nucentrix leases spectrum from over 400 ITFS licensees. In each case, in exchange for spectrum rights, Nucentrix has agreed to construct and maintain the licensee's facilities, supply network and transmission services, furnish the legal and engineering services necessary to maintain and improve the licenses and authorizations, and commit to a stream of lease payments. Each licensee is able to draw on the capacity of Nucentrix's network for their distance learning and other educational activities. Neither the commercial value nor the educational value of the spectrum can be realized without the educator/operator partnerships.

VII. THE COMMISSION CAN AND SHOULD ACCOMMODATE 3G WITH NO REALLOCATION OF THE MDS/ITFS BANDS.

This proceeding is not only about 3G. It is about allocating spectrum for advanced wireless services, both fixed *and* mobile. This purpose would be ill-served by jeopardizing one advanced wireless service in order to make room for another.

The Commission need not let 3G stand in the way of fixed broadband deployment, since there is ample spectrum in which to locate 3G services *without* threatening the MDS/ITFS bands. The NPRM

tentatively identifies 235 MHz of spectrum that can be allocated to 3G.⁶⁵ Although 120 MHz of this spectrum is already allocated to PCS (1850-1910/1930-1990 MHz), several major industry participants have acknowledged that much of the demand for 3G services can be satisfied through in-band migration of existing cellular and PCS systems.⁶⁶ Also, portions of the PCS C and F blocks, with approximately 40 MHz of spectrum below 2 GHz, recently were reaucted,⁶⁷ with some of the world's largest mobile service providers participating in this auction. Accordingly, it also is appropriate to count this spectrum toward additional bandwidth for 3G. Moreover, NTIA is investigating the possibility of locating 3G services within the 1755-1850 MHz band.⁶⁸ Given that the 3G industry's best estimate of the amount of spectrum needed for full deployment in ten years is 160 MHz,⁶⁹ any further examination of spectrum should be unnecessary.

VIII. CONCLUSION

The Commission and the MDS/ITFS industry have gone to extraordinary lengths to create an advanced fixed wireless service that will place affordable broadband access within the reach of all

⁶⁵ See NPRM at ¶ 37 (120 MHz in 1850-1910/1930-1990 MHz band); ¶ 38 (30 MHz in 746-806 MHz band); ¶ 41 (45 MHz in 1710-1755 MHz band); ¶ 52 (40 MHz in 2110-2150 MHz band).

⁶⁶ David Pringle and Kevin J. Delaney, "Next Generation of Cellphones Becomes Murky," *The Wall Street Journal* (Feb. 21, 2001) at B1-B4 (Verizon, Sprint PCS, and other companies state that 3G is not necessary for making mobile multimedia applications available); see also *Communications Daily* (Dec. 1, 2000) (AT&T plans to use its existing PCS licenses and does not need additional spectrum to provide 3G services.)

⁶⁷ See Public Notice, C and F Block Broadband PCS Auction Closes, DA 01-211 (rel. Jan 29, 2001).

⁶⁸ See NPRM at ¶¶ 45-49.

⁶⁹ NPRM at ¶ 26.

Americans. Any attempt to accommodate 3G mobile service in the 2.1 GHz or 2.5 GHz bands would severely hamper the ability of MDS/ITFS operators to deploy advanced fixed wireless service on a reasonable and timely basis nationwide. Given the recognized need for fixed broadband service today, particularly in rural America where broadband alternatives are limited or unavailable altogether, it would be a disastrous mistake to compromise that service in order to devote extra spectrum to 3G. Ample spectrum has been identified in which to deploy a viable 3G service with no need to cannibalize the MDS/ITFS bands.

Nucentrix urges the Commission not to change course and reverse its commitment to the MDS/ITFS community, with which it has worked closely for years to encourage the provision of competitive broadband services. By accommodating the needs of 3G outside the 2.1 GHz and 2.5 GHz bands, the Commission can remove the regulatory uncertainty hanging over these bands, honor its Congressional mandate to facilitate rural broadband deployment, maintain the integrity of its spectrum management policies and auction procedures, and avoid further delays in the full utilization of this spectrum for broadband competition.

Respectfully submitted,

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EXHIBIT 1

**Channel Grids From Sample Markets
Effect of Commission's Segmentation Options**

EXHIBIT 2

**Comparison of Broadband Service Coverage
Lubbock, Texas Area**

Lubbock, TX

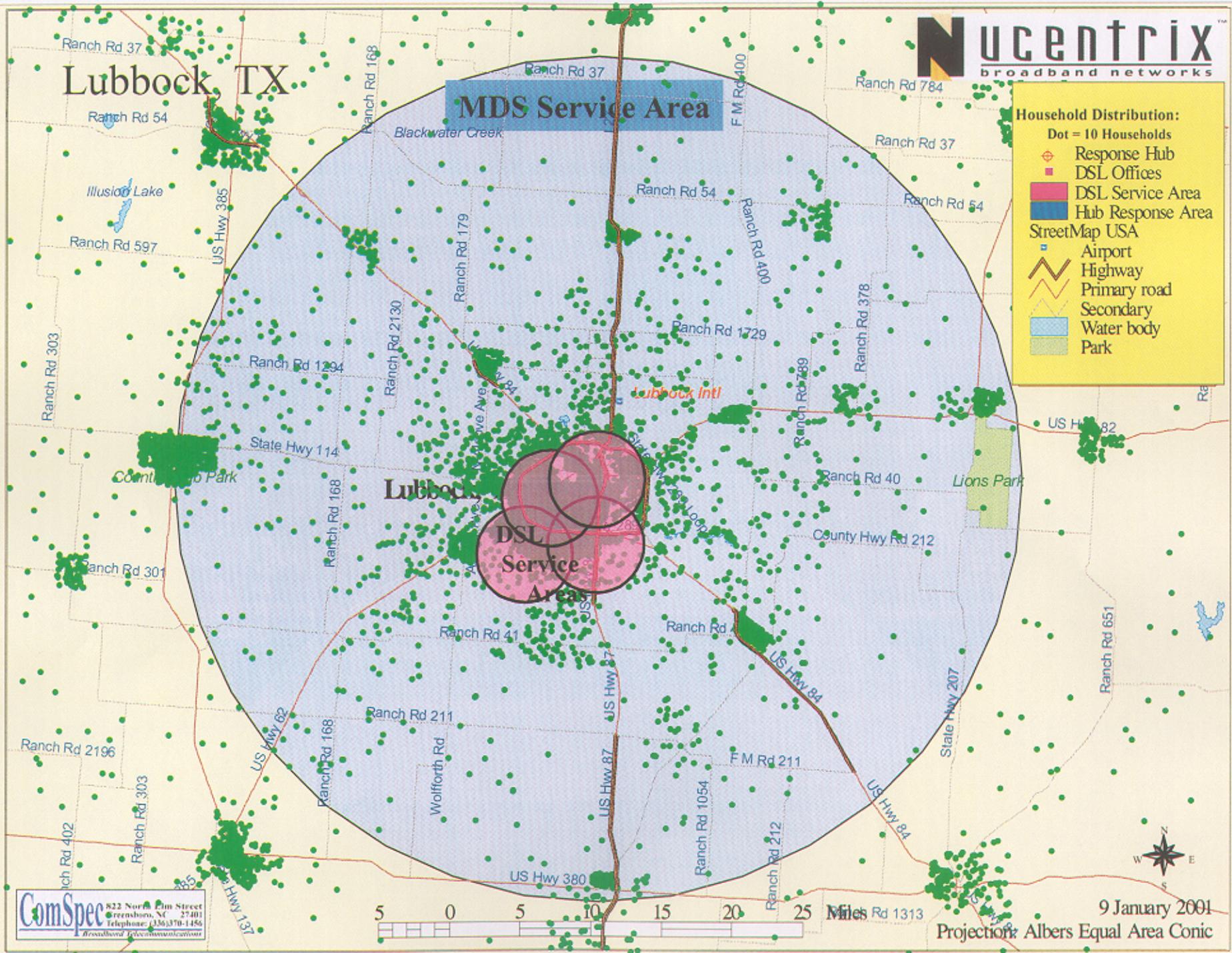
MDS Service Area

Household Distribution:

- Dot = 10 Households
- ⊕ Response Hub
- DSL Offices
- DSL Service Area
- Hub Response Area

StreetMap USA

- ✈ Airport
- ⚡ Highway
- Primary road
- Secondary
- Water body
- Park



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9 January 2001
Projection: Albers Equal Area Conic