

Academic Component Institutions:
 The University of Texas at Arlington
 The University of Texas at Austin
 The University of Texas at Brownsville
 The University of Texas at Dallas
 The University of Texas at El Paso
 The University of Texas-Pan American
 The University of Texas of the Permian Basin
 The University of Texas at San Antonio
 The University of Texas Institute of Texan Cultures at San Antonio
 The University of Texas at Tyler



Health Component Institutions:
 The University of Texas Southwestern Medical Center at Dallas
 The University of Texas Medical Branch at Galveston
 The University of Texas Health Science Center at Houston
 The University of Texas Health Science Center at San Antonio
 The University of Texas M.D. Anderson Cancer Center
 The University of Texas Health Center at Tyler

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MAR 12 1993

FEDERAL COMMUNICATIONS COMMISSION
OFFICE OF THE SECRETARY

THE UNIVERSITY OF TEXAS SYSTEM

Office of General Counsel

201 WEST SEVENTH STREET AUSTIN, TEXAS 78701-2981

TELEPHONE (512) 499-4462

FAX (512) 499-4523

March 11, 1993

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J. Robert Giddings
Attorney

MAR 12 1993

AIRBORNE EXPRESS

FCC - MAIL ROOM

Office of the Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

RE: *Comments of The University of Texas System Regarding Proposed Rulemaking to Amend Part 1 and Part 21 of the Commission's Rules to Redesignate the 27.5 - 29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service*

Dear Sir or Madam:

The University of Texas System submits the enclosed original and nine copies of comments for the consideration of the Federal Communications Commission in the proposed allocation of the 28 GHz frequency during 1993. If there are questions regarding these comments, please contact me at the telephone number and address listed above.

Thank you for this opportunity to comment on these rules.

Very truly yours,

Robert Giddings

JRG:
Enclosures

No. of Copies rec'd
List A B C D E

041

Office of the Secretary
March 11, 1993
Page 2

xc: Hon. Lloyd Bentsen
Secretary of the Treasury

Hon. Phil Gramm
United States Senator

Hon. Bob Krueger
United States Senator

Hon. John Bryant
United States Congressman

Hon. Jim Chapman
United States Congressman

Dr. Michael Nelson (*AIRBORNE EXPRESS*)
Senior Policy Analyst
Office of Science and Technology Policies
Executive Office of the President
Washington, D.C. 20500

Ms. Cheryl A. Tritt (*AIRBORNE EXPRESS*)
Bureau Chief
Common Carrier Division
Federal Communications Commission

Ms. Susan Magnotti (*AIRBORNE EXPRESS*)
Attorney
Federal Communications Commission

Mr. Sheldon Steinbach (*AIRBORNE EXPRESS*)
Vice President and General Counsel
American Council on Education

Mr. Richard West (*AIRBORNE EXPRESS*)
Associate Vice President
The University of California

Mr. Ron Maines
Maines & Harshman, Chartered

Mr. Jon Schill (*FAX*)
Tri-County Communications, Inc. dba
RioVision

Office of the Secretary
March 11, 1993
Page 3

xc: Dr. Diana S. Natalicio
President
The University of Texas at El Paso

Dr. Miguel Nevarez
President
The University of Texas - Pan American

Dr. Charles B. Mullins
Executive Vice Chancellor for Health Affairs
The University of Texas System

Dr. James P. Duncan
Executive Vice Chancellor for Academic Affairs
The University of Texas System

Mr. R. Dan Burck
Executive Vice Chancellor for Business Affairs
The University of Texas System

Dr. Charles Warlick
Office of Academic Information Systems
The University of Texas System

Mr. Dan Reiss (*AIRBORNE EXPRESS*)
General Counsel
Suite 12 Group

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MAR 12 1993

COMMENTS

COMMENTS of THE UNIVERSITY OF TEXAS SYSTEM regarding ~~FCC~~ ^{F.C.C.} Proposed Rulemaking to Amend Part 1 and Part 21 of the Commission's Rules to Redesignate the 27.5 - 29.5 GHz Frequency Band and to Establish Rules and Policies for Local Multipoint Distribution Service (LMDS); CC Docket No. 92-297; RM-7872; RM-7722; PP-22; FCC 92-538; released January 8, 1993.

In response to the above referenced notice of proposed rulemaking and request for comments, The University of Texas System submits the following comments on behalf of all component institutions in the University of Texas System and makes its request for a non-commercial designation for band B of the 28 GHz frequency for a priority use by institutions of higher education, to hold in trust, for future educational use by all levels of education within each licensed Basic Trading Area (BTA).

The University urges the Commission to adopt the educational preference approach because it will be in the public interest and it will serve the greatest public good. Institutions of higher education will obtain the licenses for band B and share the channel capacity with public school districts, junior colleges, community colleges, technical and trade schools, and other non-commercial entities, such as hospitals or medical research facilities.

AN EDUCATIONAL PREFERENCE FOR INSTITUTIONS OF HIGHER EDUCATION TO APPLY FOR ONE-HALF OF THE BAND WIDTH SERVES THE PUBLIC INTEREST

Higher education must play a major role in the re-invention of America under the Clinton Administration. Education is the key to the reduction of poverty by retraining the work force to meet the challenges of the next century and distance learning will play a key role in the future of American education.

Distance learning can overcome the lack of:

- (1) public transportation in many areas of the country;
- (2) classroom space and instructors;
- (3) remedial courses to prepare students for college; and
- (4) remote access to library resources.

Institutions of higher education and the public schools in general, have been hit hard by the current economic environment. Increasing enrollment occurs at the same time of budget reductions. A solution must be found to alleviate the pressure being placed on existing institutional resources, while insuring that quality educational material is delivered to those individuals most in need.

In accordance with President Clinton's call for real change in existing structures, The University of Texas proposes an innovative and entirely new way of delivering educational material that is not merely quantitatively equal, but qualitatively comparable to any course offered on-campus. These benefits will also help higher education reach certain segments of the American population that have, historically, been denied these opportunities.

In the past, wireless cable was not an appropriate technology to deliver high quality educational services because it lacked real time two-way interaction. The Texas State Higher Education Coordinating Board mandates prior approval for all recognized, "for credit", course work delivered by means of telecommunications. This is further defined as the delivery of curricular material by non-conventional methods. These rules are rigidly enforced.

The burden of proof concerning the qualitative aspects of a given course is substantial. Experience gained in providing educational material through fully interactive two-way systems has provided a strong base of evidence that teaching effectiveness is not diminished when both two-way video as well as two-way audio is incorporated into the technology.

After evidence was presented to the Coordinating Board, it ruled that courses listed in the catalogs of the component institutions of The University of Texas System are essentially treated as though they are being delivered via conventional means if technology that incorporates full two-way interaction is utilized. Experience has clearly demonstrated that teaching effectiveness is enhanced exponentially through the addition of two-way video versus two-way audio with one-way video. The communication that is available between the instructor and the students at the remote site cannot be replicated without full two-way interaction.

The two-way capability afforded by the LMDS technology will permit a level of academic flexibility and expansion previously unheard of in American education. Experience has shown that if the technology can deliver the educational material, any suitable public room can be, in a matter of moments, converted to a setting suitable for conducting classes, seminars, or provide a variety of other services to the citizens of the region. Higher education has the experience required in the delivery of distance learning to insure that the public interest will be properly served.

Educational applications for the LMDS technology, as outlined in the Petition For Pioneer's Preference previously filed by The University of Texas - Pan American have already been tested through leased T-1 service. However, the associated costs for delivery of the service to the public schools are unacceptable.

The University of Texas System presently operates an interactive compressed digital video network distributed to most of our campuses state-wide via T-1 fiber and microwave services. Curricular material is delivered by this network on a daily basis between the individual component institutions. The system provides the capability to deliver and

receive the compressed and digitized audio and video signals between any two points in the network.

In spite of this capability, the current system is, however, not without its problems. Chief among these caveats is a very limited point-to-point delivery capability due to the serial nature of the network's configuration. In some cases, students may have to travel as far as 100 miles in order to reach a receiving site. Additionally, as the existing video system is solely point-to-point, classroom space and network access are severely restricted. As a result, faculty members are forced to teach multiple sessions of the course in order to accommodate all of the students wishing to enroll due to space restrictions and geographic dislocation.

The multipoint and two-way capabilities of the LMDS technology, utilized within the proposed cross-polarized cellular system, will completely eliminate these barriers and provide an unprecedented level of public access to the University's educational resources. LMDS can provide the pipeline for the delivery of this educational product to the public in their homes at an acceptable cost.

LMDS provides a high quality means of achieving distance learning when it is carried in conjunction with a commercial wireless cable operation to subscribers throughout a metropolitan area. The cells can be tailored to fit a specific area, such as the Texas Medical Center in Houston (where the University of Texas Health Science Center is located) that has a high demand for data transmission between hospitals and research facilities, or in a rural area where the population is clustered in several small towns.

LMDS technology can be adapted as a two-way distribution system for continuing education courses offered by colleges and universities across the nation. This will provide a prodigious capability to distribute basic skills improvement courses throughout the Basic Trading Areas. Transmission of this material through the LMDS system will provide access to large segments of the population currently unable to enroll in these courses due to geographic isolation and the lack of availability of a wired cable system in their area.

The improvement of language skills is a subject of major social, economic, and political concern in many areas of the country. This is an excellent example of the type of programming higher education can make available to the public without a loss of teaching effectiveness in the process.

The rapidly escalating level of technological development in America, and the need for retraining the work force, only serve to amplify the existing difficulties involved in providing the public with courses in adequate quantities while simultaneously insuring the quality of the educational product. LMDS will also provide a platform for the distribution of other adult continuing education programs to receive sites throughout the country.

In addition to the rapid technological growth America is experiencing, a substantial and increasing demand has developed for continuing education in the professional disciplines. A few of the highly specialized areas higher education will serve with LMDS delivered continuing education programming include, the legal community, the medical community, and a host of corporate entities desiring additional training for their engineering and computing professionals. Higher education already has many of these programs in place and only needs a means of delivery.

Many of these disciplines are critical to the continued growth and economic development of the United States. The availability of these continuing education courses for professionals in localized areas will, in many cases, make a financial difference to the ability of a minority student to complete his or her education. The distances involved in reaching the originating sites make direct attendance prohibitive for many prospective college students in America.

Perhaps the most important benefit LMDS offers the nation is the prospect for increased levels of concurrent enrollment for high schools students in ongoing college programs. For example, Texas public schools currently support tracks identified as the College Prep and Honors programs. By establishing send and receive sites at high schools throughout the State, The University of Texas System component institutions will be able to provide college bound students with freshman level courses allowing them to earn semester credit hours while still in high school. This serves two worthy goals.

First, it accelerates the individual student's progress and enrolls him or her in the University earlier than otherwise possible. Additionally, it will eventually serve to relieve a great deal of pressure being placed upon public institutions of higher education by effectively reducing the amount of time much of the freshman population will spend on campus. A direct by-product of this relief will be the increased potential for significant redistribution of fiscal resources. Most importantly, however, will be increased graduation rates due to better preparation of public school students for moving into the demanding environment of a four-year university. This aspect of our implementation plan, perhaps more than any other area, will go the furthest toward the Administration's desire to radically revise our existing system of public education.

Due to the cellular nature of the LMDS system, the ability to use the technology to conduct remote site teleconferences offers tremendous educational opportunities. The appearance of a Pulitzer Prize winning author on the campus of an institution of higher education will no longer be limited to the number of students that can be seated in a single auditorium. Rather, it will be expanded to include the number of facilities that could be made available to send and receive interactive signals within the cellular network.

Additionally, other feeds from the existing digital video network gathered from around the nation will be aired interactively throughout the LMDS system, taking full advantage of the system's ability to provide unique programming to individual cells. This type of

programming will include a wide variety of topics ranging from clinical assessment to professional development programs. LMDS offers America the ultimate in the "electronic town hall" concept.

Granting institutions of higher education an educational preference will establish a precedent that has the potential to reverse the trend of declining academic achievement. The low end-user's cost of quickly installing a send/receive site, combined with the minimal load that will be placed upon critical existing resources will guarantee wide acceptance by institutions and the public alike. In accelerating the curricular goals of high school students, the University will make significant strides toward placing the youth of our nation on the path back to a position of international leadership in educational development.

The new administration is promoting the completion of a new "data highway" to link research centers throughout the nation. Many of the terminal ends of this highway will be institutions of higher education. Indeed, existing data links, such as the InterNet, already exist. The significance of LMDS as a metropolitan extension of the data highways is equivalent to replacing headphones with large speakers so that the entire community can receive educational programming.

While it is easy to envision a great variety of academic uses for the video portion of the system, we have also taken great care to explore the system's capability to handle data and voice as well as video in an interactive mode. The term "last mile technology" is often used to describe the means employed to bridge the gaps which are commonly encountered in delivering institutional services to small facilities and individual users. For a number of years there has been an ongoing discussion of a concept known as "the library without walls and clocks." This implies having the resources of the library in your office and your home by way of a personal computer or a remote terminal.

The limiting factors, in most cases, in realizing this concept have been the speed limitations of wire networks and the high costs involved in installing fiber networks. LMDS effectively eliminates much of this barrier of speed and funding. The technology offers the potential for fiber speed over a transmitted medium while making extremely efficient use of the available spectrum. In essence, LMDS technology will provide higher education with the required tools for crossing the gaps so often encountered when dealing with last mile technologies. Higher education will be capable of elevating the idea of "the library without walls and clocks" to "the university without walls and clocks" by using the LMDS distribution system.

A non-commercial reservation of one-half of the bandwidth for priority use by institutions of higher education, to hold in trust, for future educational uses by all levels of education within a BTA is in the public interest and will serve the greatest public good. Although institutions of higher education will hold the licenses for band B, they will share the channel capacity with public school districts in joint programs, with junior colleges,

community colleges, and with technical and trade schools that produce educational programming.

Specific authority for institutions of higher education to hold the licenses for band B and to enter into lease-back of excess channel capacity agreements with commercial wireless cable companies and other commercial operations is also in the public interest when the lease agreements provide for ready recapture of the excess channel capacity to meet future educational needs. The commercial operations provide the transmission capacity to distribute the educational programming throughout the metropolitan area and this educational programming can become a vital adjunct to the entertainment programming available to subscribers throughout the BTA. The addressability of the LMDS technology as well as the two-way capability creates an ideal situation for continuing education courses for professionals, English language training, extension courses, as well as courses taken for academic credit at the University.

The F.C.C. can encourage agreements between commercial wireless cable operations and institutions of higher education by exempting applicants for a license for band A in the 28 GHz spectrum from the random selection or lottery process if the commercial applicant holds a lease-back agreement with the institution of higher education holding a non-commercial license for band B in the BTA. Agreements between business and education can benefit both parties as well as the public. Commercial operations leasing excess capacity benefit through greater channel capacity and access to educational programming. Placing public service programming on the leased bandwidth releases channels for more profitable programming, such as premium channels and pay per view. Higher education institutions benefit by a revenue stream from the lease of excess channel capacity as well as by obtaining a transmission capacity to cover the BTA without a large capital investment by the University. The public benefits because the 28 GHz spectrum is fully utilized.

The University of Texas System Office of Telecommunication Services (OTS) provides voice, video, and computer telecommunication services to all fifteen component institutions of The University of Texas System. In this role, OTS coordinates the introduction of new communication technology within The University of Texas System and across the membership of the state-wide regional network, THENet, the Texas Higher Education Network. OTS views the LMDS technology as a viable medium for the connection of metropolitan education and research organizations to the emerging National Research and Education Network (NREN).

Specifically, OTS is interested in pursuing the possibility of offering Switched Multimegabit Data Services (SMDS) and Frame Relay connections via this medium. Today, these effective networking technologies have minimal presence in many of the states because of the lead time required for establishing public utility tariffs. LMDS offers a valuable and timely alternative to local exchange carrier services for conducting experiments in the testing of these new high bandwidth packet based communications methods.

As a development vehicle, OTS intends to work with other university systems, and appropriate packet switch providers, to establish test links between existing inter-exchange carrier points of presence and the campuses. These links will enable the testing of overall LMDS performance for these protocols including throughput and reliability. If the tests verify that LMDS is indeed useful for these purposes, efforts will be taken to introduce similar links in other major cities across the State of Texas and throughout the country.

The University of California System, The California State System, and The University of Wisconsin System have all expressed a strong desire to participate in these research efforts. In addition, The University of California has previously voiced its support of the request by The University of Texas that the F.C.C. set aside part of the 28 GHz spectrum for local educational institutions in the same manner as the F.C.C. has handled ITFS and non-commercial FM radio licenses in the past. See "Attachment A".

By granting a preference to educational license applicants seeking to use LMDS technology, in a manner similar to that used to grant ITFS licenses, the F.C.C. will enhance and broaden opportunities to develop educational applications for LMDS systems. This will occur not only in Texas, but throughout the United States and will serve the public interest better than the exclusive allocation of this range of the spectrum to commercial operators and common carriers.

In concert with existing ITFS guidelines, 1000MHz of bandwidth should be reserved for use by institutions of higher education in each Basic Trading Area, with the option to lease back excess airtime to commercial wireless cable operators or other commercial operators holding the license for the "A" channel. Higher education's interest in seeking an educational preference stems from its ability to develop highly specialized educational services in the context of a technology that is virtually made to order for their delivery.

Institutions of higher education face many special problems in our efforts to provide enormous population groups with adequate levels of high quality educational material. LMDS technology offers the promise of solving a number of these challenges while simultaneously serving the greater public interest.

SPECIFIC COMMENTS IN RESPONSE TO THE F.C.C. PROPOSED RULES

The University of Texas System concurs with the statement of Suite 12 (page 4) that the technology is "capable of immediately providing interactive high quality video, voice, and data services" and that "the public will benefit from having an innovative and competitive two-way interactive communications system capable of providing the equivalent of fiber cable service without the need to wire a community". Indeed, recent communications between Suite 12 and The University of Texas reflect a desire on the part of Suite 12 to join with the higher education community in a request that the F.C.C. dedicate one-half of

the 28 GHz spectrum for non-commercial use, with a specific educational preference to be stated in the rules.

The University of Texas System concurs with the comments of Video/Phone with regard to growing demands for video conferencing, telecommuting, telemedicine, and education (page 5) and submits that many of these demands will be met through this dedication of band B for educational use either directly or indirectly when existing commercial cable networks leased to institutions of higher education become available for commercial use.

The University of Texas System concurs with the decision of the F.C.C. not to set aside 28 GHz spectrum for MMDS system operators, as well as the F.C.C. decision regarding the structure of the 28 GHz band (pages 7-8) and the flexibility proposed for licensees, as reflected in paragraphs numbered 23 and 24 (page 9). With regard to the comments made in footnote 7 on page 9, The University of Texas System would point out that the 28 GHz is a fallow frequency in Mexico, that no broadcasting in Mexico is currently using this frequency, and that the proposed "coordination" is unnecessary at the current time since there are no interference problems.

The University of Texas System concurs with the decision by the F.C.C. (page 10) that LMDS licensees will have a choice regarding common carrier or non-common carrier status, on a channel-by-channel basis and/or cell-by-cell basis, particularly in light of the ability to tailor the LMDS cells to fit certain unique areas, such as the Houston Medical Center, which might have special needs for data transmission within the cell and few private residential reception sites.

With regard to the proposed Basic Trading Areas (page 12), there are significant problems created by the geography of the State of Texas that are not addressed by the decision to delegate the license areas to a private map-maker. For example, the Dallas/Ft. Worth area is combined, whereas the Dallas County and Tarrant County divisions would be appropriate; the East Texas BTA around Tyler consists of many communities that are isolated and unique but have been combined; the West Texas BTA's have low populations; are widely separated and the size may hamper compliance with the requirements for the timely provision of service (pages 13 and 16) as required in numbered paragraphs 32 and 47. In that regard, the modification of Texas BTA's upon request by an applicant to fit local needs and the revision of the timely service requirements from 90% service within three years to 50% service within three years and 90% service within five years would be a more realistic approach in rural areas.

The University of Texas System proposes a waiver of the proposed fee (page 17) of \$455/radio channel per station for all non-commercial channels in band B that actually carry non-commercial or educational programming, including, but not limited to C-Span.

Regarding the text of the proposed rules (page 1) The University of Texas System opposes a random selection under 1.826 for applicants for band B and requests an educational

preference for license applications filed by institutions of higher education which propose a non-commercial use of this band. Specific authority for lease-back agreements should also be contained in the rules.

Attached as "Attachment B" to these comments is a draft of a revision of proposed rule 21.1012 that incorporates this educational preference in band B, as well as a preference for commercial applicants for band A who contract with institutions of higher education holding band B licenses in the same BTA.

On page two of the proposed rules, under 21.1001, the educational preference should be identified as a priority for use of band B. On page six, under 21.1005, the rule should be revised to permit the applicant to subdivide or otherwise modify the Rand McNally BTA proposed as the license area in order to meet local conditions.

Attachments

92-297
ATTACHMENT 'A'

UNIVERSITY OF CALIFORNIA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



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J.W. PELTASON
President

OFFICE OF THE PRESIDENT
300 Lakeside Drive
Oakland, California 94612-3550

RONALD W. BRADY
Senior Vice President—
Administration

January 27, 1993
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Andrew Barrett
Commissioner
Federal Communications Commission
1919 M Street, NW
Washington, D.C. 20554

Educational Use of the 28 GHz Spectrum

Dear Commissioner Barrett:

Because the 28 GHz radio spectrum is currently underutilized, we are pleased to know that the Commission is proposing to open this spectrum to a new local multipoint distribution service (LMDS) for interactive data and video transmissions. However, since the University of California is a potential LMDS licensee, we are concerned that maximum educational use will not be achieved unless a portion of this spectrum is set aside to license to local educational institutions, just as the Commission set aside part of the 2 GHz spectrum for ITFS and part of the FM spectrum for noncommercial educational FM radio stations.

We commend the University of Texas, Pan-American initiative in proving through its experimental LMDS station that the 28 GHz spectrum is a viable means of disseminating instructional, educational and informational programs and databases in an interactive mode using both video and data formats.



One hundred twenty-five years of service.

Andrew Barrett
January 27, 1993
Page Two

Although we are unable to participate in the meeting on this topic on January 28, 1983 which Bob Giddings and Steve Copold of the University of Texas arranged with you, please be assured that we support their efforts to ensure that a portion of the 28 GHz spectrum will be set aside for licensing to educational institutions. If there is additional information on potential educational use of interactive 28 GHz which we can provide you, please contact Ms. Willi Bokenkamp of my staff at (510) 987-0373.

Sincerely,

A handwritten signature in black ink that reads "Richard West" followed by a stylized monogram "MES".

Richard West
Associate Vice President
Information Systems and
Administrative Services

cc: Robert Giddings, University of Texas
Steve Copold, University of Texas, Pan-American
Beverly McDonald, University of California
Willi Bokenkamp, University of California



J.W. PELTASON
President

RONALD W. BRADY
Senior Vice President—
Administration

OFFICE OF THE PRESIDENT
300 Lakeside Drive
Oakland, California 94612-3550

January 27, 1993

RECEIVED

MAR 12 1993

FCC - MAIL ROOM

Ervin Duggan
Commissioner
Federal Communications Commission
1919 M Street, NW
Washington, D.C. 20554

Educational Use of the 28 GHz Spectrum

Dear Commissioner Duggan:

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Ervin Duggan
January 27, 1993
Page Two

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Sincerely,



Richard West
Associate Vice President
Information Systems and
Administrative Services

cc: Robert Giddings, University of Texas
Steve Copold, University of Texas, Pan-American
Beverly McDonald, University of California
Willi Bokenkamp, University of California



J.W. PELTASON
President

OFFICE OF THE PRESIDENT
300 Lakeside Drive
Oakland, California 94612-3550

RONALD W. BRADY
Senior Vice President—
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James Quello
Commissioner
Federal Communications Commission
1919 M Street, NW
Washington, D.C. 20554

Educational Use of the 28 GHz Spectrum

Dear Commissioner Quello:

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James Quello
January 27, 1993
Page Two

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Sincerely,



Richard West
Associate Vice President
Information Systems and
Administrative Services

cc: Robert Giddings, University of Texas
Steve Copold, University of Texas, Pan-American
Beverly McDonald, University of California
Willi Bokenkamp, University of California

ATTACHMENT 'B'

Section 21.1012 Spectrum Utilization and Permissible Use

- (a) Within each service area, the frequency band 28.5 - 29.5 GHz, band B, is hereby reserved for use by public and private accredited institutions of higher education to hold in trust for all educational institutions in the BTA and to transmit formal educational programming as well as other educational applications of the voice, data and video technology available for use in this frequency band, including, but not limited to, visual and aural educational, instructional and cultural material to selected receiving locations, in-service training and instruction in special skills and safety programs, extension of professional training, informing persons and groups engaged in professional and technical activities of current developments in their particular fields, dissemination of scientific knowledge and advances in the delivery of health care services, and other similar endeavors. Applications for band B licenses by institutions of higher education will automatically receive an educational preference under 21.1001, and shall be exempt from random selection under 1.826.
- (b) To ensure full spectrum utilization, a licensee in the 28.5 - 29.5 GHz frequency may use or lease excess capacity to transmit material not qualifying as education programming, such as entertainment video transmitted by a commercial wireless cable operation, so long as the licensee preserves, through actual use and ready recapture, most of the 28.5 - 29.5 GHz frequency for educational and cultural programming.
- (c) Within each service area, the frequency band 27.5 - 28.5 GHz, band A, is reserved for the delivery of entertainment video programming as well as voice, data and other video uses to multiple locations throughout the service area. A licensee in this frequency is authorized to lease excess capacity from institutions of higher education for the purpose of a combined transmission over the entire 27.5 - 29.5 GHz (28 GHz) band, and the existence of such a leasing agreement shall entitle the applicant for a band A license to receive a preference under 21.1001 and exempt the applicant from the random selection process under 1.826.
- (d) All applicants for LMDS must submit as part of the application a detailed plan indicating how the bandwidth requested will be utilized. In particular, the application must contain detailed descriptions of the cellular configuration with polarization diversity, the modulation method, the channel time sharing method, any error detecting and/or correcting codes, any spatial frequency reuse system and the total data throughput capacity in each of the links in the system. Further, the application must include a separate analysis of the spectral efficiency including both information bits per unit bandwidth and the total bits per unit bandwidth.