

**S. 2454, WIRELESS HIGH SPEED INTERNET ACCESS
FOR RURAL AREAS**

HEARING
BEFORE THE
SUBCOMMITTEE ON COMMUNICATIONS
OF THE
COMMITTEE ON COMMERCE,
SCIENCE, AND TRANSPORTATION
UNITED STATES SENATE
ONE HUNDRED SIXTH CONGRESS
SECOND SESSION

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JUNE 14, 2000
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ONE HUNDRED SIXTH CONGRESS

SECOND SESSION

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**S. 2454, WIRELESS HIGH SPEED INTERNET
ACCESS FOR RURAL AREAS**

WEDNESDAY, JUNE 14, 2000

U.S. SENATE,
SUBCOMMITTEE ON COMMUNICATIONS,
COMMITTEE ON COMMERCE, SCIENCE, AND TRANSPORTATION,
Washington, DC.

The Subcommittee met, pursuant to notice, at 9:30 a.m. in room SR-253, Russell Senate Office Building, Hon. Conrad Burns, Chairman of the Subcommittee, presiding.

Staff members assigned to this hearing: Lauren Belvin, Republican Senior Counsel; Maureen McLaughlin, Republican Counsel; Paula Ford, Democratic Senior Counsel; and Alfred Mottur, Democratic Counsel.

**OPENING STATEMENT OF HON. CONRAD BURNS,
U.S. SENATOR FROM MONTANA**

Senator BURNS. Good morning. The Subcommittee on Communications of the Committee on Commerce, Science, and Transportation will come to order.

The topic today is wireless high speed Internet access for rural America. Today's hearing will focus specifically on S. 2454, the Low Power Television Internet Act, which I introduced with Senator Breaux. The Burns-Breaux bill would allow lower power television stations the flexibility to use their spectrum for wireless two-way high speed Internet service.

The pace of broadband deployment in rural America must be accelerated for the electronic commerce to meet its full potential. I am aware of the recent discussion regarding the digital divide, and I am very concerned that the pace of broadband deployment is greater in urban areas than in rural areas. The Internet has transformed the way we live, we work, we conduct our commerce and educate our children. It is without a doubt the engine that is driving the new economy. It has been the single greatest contributor to the extension of this economic cycle that we have ever known.

One look at the stock market clearly indicates that the new economy is fueling much of the current economic expansion, even though we have been through rough times here of late. I firmly believe the historic Telecommunications Act of 1996 also has helped foster that kind of growth and innovation that we are witnessing in the communications industry today.

It was once said that every child in America would have to learn how to read, write, and do 'rithmetic to stand a chance to succeed. Now we have to add surf the net to that list. Unfortunately, mil-

lions of Americans, many in my home State of Montana, are being left behind because they live too far from the urban centers to get wired. As I have often said, there is a lot of dirt between light bulbs in my State of Montana. Wiring these folks is an expensive proposition whether it is DSL technology or cable modem access to the Internet. This leaves large areas in my State of Montana left behind.

This legislation will bridge that digital divide by utilizing the spectrum of low power television stations to provide two-way wireless Internet service. We can bring low cost high speed Internet access to many rural areas, who are anxiously awaiting high speed service for their homes and, of course, their businesses.

The recent history of telecommunications aptly illustrates that demand and usefulness of wireless access. Wireless telecommunication has been an enormous benefit to the American economy. Wireless Internet access will be even more beneficial as the useful components of two wired services. The use of low-powered television station spectrum to provide low cost high speed Internet access will facilitate the best use of their facilities, provide a market acceptance to the stations' need. The FCC is required to ensure that this service will not in any way interfere with other users of the spectrum.

The legislation will allow these stations to provide two-way wireless digital service to areas that may not otherwise be served. It will provide another option to rural schools, libraries, and hospitals trying to provide the best service for their rural constituents.

The technology is here today to bring Americans fully into the digital era. I look forward, working with my colleagues, to move this bill out of committee and into final passage, and I have always said from the word go that I never thought years ago that there would be competition for rural telephones, the cooperatives and the independents, the small independents, but now I have changed my tune on that. I think wireless is going to be a competitor of those companies in rural areas, and I would also suggest that the only way that we can speed access to high speed Internet is wireless in rural areas, that they never will be wired really for the next generation.

So with that, I have my good friend here from Alaska who represents a frontier State, not just rural. Senator Stevens.

**STATEMENT OF HON. TED STEVENS,
U.S. SENATOR FROM ALASKA**

Senator STEVENS. Thank you, Mr. Chairman. I was pleased to meet Mr. Mosely with you when we were in Montana recently and, as you say, this system might work in Alaska.

I am concerned about the statements I have heard from the National Association of Broadcasters and the public television stations that they fear that this extension of rights to the low power television stations could interfere with their existing service or when they make the modifications that are required to go into the new mode of service.

I do hope that we can work that out and make certain that we work it out in this legislation and not leave it to interpretation of the FCC or the courts as we move forward. But I am pleased to

be with you and to tell you that I do think that this service could improve the lives of many people in very remote parts of our State. The distances in Alaska that people here do not even comprehend, could be addressed by this technology and so I look forward to working with you on the bill.

Senator BURNS. Thank you, Senator, and the concerns you raise are also concerns of our own, and that is the reason we have two of the probably most capable people that have devoted their lives to the Federal Communications Commission and probably are more knowledgeable on this than anybody else here today to speak with us.

Senator Wyden.

**STATEMENT OF HON. RON WYDEN,
U.S. SENATOR FROM OREGON**

Senator WYDEN. Thank you, Mr. Chairman. I want to commend you, Mr. Chairman, because once again you are initiating an extremely important effort. In this case, you are opening the door to what looks to be a very promising new technology, access to high speed data services, particularly Internet access is, of course, extraordinarily important in today's information economy.

Both you, Mr. Chairman, and Senator Stevens have noted not just today but on many other occasions that rural communities are frequently left stranded on the wrong side of the digital divide. It is very important that we look at every possibility for delivering high speed data services to rural communities at affordable prices.

At the same time, I think we do need to examine the issue of broadcast spectrum. Because it is limited we need to examine carefully the potential effects on this bill on the other services that use the spectrum, and so I look forward to examining the impact this bill would have on providers or consumers of free over-the-air broadcast services, including broadcasters who provide local programming or bring television signals to rural areas that otherwise may get no reception.

So this is an important hearing and, as always, an issue like this involves potential benefits and trade-offs, and so often we have been able to come up with solutions with respect to these issues that are bipartisan and balance the competing interests and work for our communities. I look forward to working with you, Mr. Chairman and, of course, Chairman Stevens on this issue that is so important to rural areas.

Senator BURNS. Thank you very much, Senator Wyden. We have with us this morning Mr. Roy Stewart, who is the bureau chief of the Mass Media Bureau at the Federal Communications Commission, and we look forward to hearing your testimony this morning, Mr. Stewart. We know that some areas have to be massaged and language has to be massaged in this thing and we are certainly looking forward to your views on that. Thank you for coming down this morning.

**STATEMENT OF ROY STEWART, CHIEF, MASS MEDIA BUREAU,
FEDERAL COMMUNICATIONS COMMISSION, ACCOMPANIED
BY DALE N. HATFIELD, CHIEF, OFFICE OF ENGINEERING
AND TECHNOLOGY, FEDERAL COMMUNICATIONS COMMISSION**

Mr. STEWART. Thank you, Mr. Chairman. I would like to summarize my testimony and then place the joint statement of Mr. Hatfield and myself in the record.

I am Roy Stewart, Chief of the Mass Media Bureau at the Federal Communications Commission. Accompanying me today is Dale Hatfield, Chief of the FCC's Office of Engineering Technology. I welcome this opportunity to discuss low power television and legislation S. 2454, intended to authorize low power television stations to provide digital data services.

S. 2454 presents both intriguing possibilities and some significant concerns. It would authorize low power television stations to provide an unlimited subscription-based data service on their broadcast television channel without regard to the broadcast nature of their authorization.

It would also preclude the commission from authorizing any new service, television broadcast station, or modification of any existing authority that would result in the displacement of or predicted interference with a low power television station providing such services. This innovative approach would permit low power television stations to provide broadband services, including one-way and two-way high speed Internet access that could be of particular value where such access is otherwise unavailable or severely limited in such very rural areas.

As a general matter, of course, providing broadband access to as many people as possible on reasonable terms is a goal the commission has made one of its higher priorities. Indeed, the commission has numerous initiatives underway intended to address this issue. Dale Hatfield is directly involved in many of these efforts and can address any questions you may have in this area. The use of LPTV stations as a means of achieving this objective, however, at least as it is now described in S. 2454, does raise issues that require careful consideration.

Let me just briefly describe the low power television service, and then turn to the specific concerns that we have identified in the proposed legislation.

As Chief of the Mass Media Bureau, and in my former position as Chief of the Video Services Division, I have been involved with low power television since its inception. It has always offered great possibilities for additional service to the public, and has often provided innovative highly local programming not easily provided by full service broadcasters. It has also been a service that was subject to displacement by others because of its secondary status.

There are currently 2,100 licensed low power TV stations. These operate in 1,000 communities of all sizes, and in all 50 States. They are operated by such diverse entities as schools, churches, community groups, and a variety of small businesses. Many low power television stations serve as a community's only local TV station and provide coverage of local news, weather, community affairs, and local elections. The low power television service also includes more

than 4,500 television translator stations, the majority of which operate in the western mountainous States.

Many rural communities in these areas depend upon translators as the only means of obtaining free television programming. Both the commission and the Congress have recognized that there is insufficient spectrum to guarantee the operation of all low power TV and translator stations during the transition to the new digital television service, which involves the temporary awarding of a second TV channel to more than 1,600 broadcast stations.

The FCC has changed its rules where it can to reduce the impact of the digital transition on the low power TV service, including permitting stations displaced by interference conflicts to seek replacement channels on a noncompetitive basis.

In the Community Broadcast Protection Act of 1999, the Congress also acted to preserve the services of low power TV stations that have provided locally produced programming in their communities. This statute provided for the creation of a Class A low power TV service affording qualifying low power TV stations with a measure of primary status, that is, some of the protections afforded full service stations.

The bureau has recently released a public notice granting to some 900 low power TV licensees eligibility to file Class A licenses, and we are now receiving those applications.

Against this backdrop, let me now turn to a brief description of some of the significant concerns that I believe are raised by S. 2454 as introduced. First, the bill would apparently permit a low power TV station to totally eliminate its broadcast service and convert to an all-data format. In some cases this could result in the withdrawal of broadcast service in areas with access to very few such services.

It could also have a serious impact on the availability of channels for translator-based broadcast services because existing translators would convert to nonbroadcast data mode, and applications for new translators would lose in any licensing contest with datacasting low power stations because the translators would be viewed as secondary facilities. Translators will continue to be needed to bring digital television to rural areas during the DTV transition.

Affording low power TV stations primary status based on a conversion to data delivery also seems at odds with the determination made by Congress in the Community Broadcast Protection Act that the uniquely valuable broadcast service of low power TV stations was a fundamental reason for providing these stations with Class A protection status.

Finally, this approach seems hard to reconcile with the provisions of section 336 of the Communications Act. That section provides in part that full service broadcast stations must limit their ancillary services, such as datacasting, so as to avoid derogation of their broadcast signal. The Commission has implemented this section by requiring full service broadcast television stations to provide at least one full channel of broadcast service before they can offer ancillary services such as datacasting on their digital stations.

Second, the bill as drafted has serious implications for and may undermine the transition to digital television service. For example, it does not specifically provide protection to the table of allotments

of full service DTV stations which was adopted by the commission to permit existing analog stations to operate digitally while continuing to broadcast on their analog channel.

Nor would the bill permit necessary adjustments by the commission to that table, as the transition to digital service proceeds. Thus, a datacasting LPTV station could preclude a change in the digital channel assignment of an analog broadcaster that might be necessary to permit the analog station to provide digital service.

Some of these issues we have raised may be addressed but not fully resolved by an approach that was taken in the Community Broadcasters Protection Act. That statute provided for protection of the digital television table of allotments which allowed the commission to continue the reclamation of spectrum for new broadband services. That approach expressly afforded the commission the flexibility necessary to adjust the table as needed during the digital transition.

Third, because S. 2454 would afford datacasting LPTV stations with primary spectrum rights, these stations would have a significant preclusive effect on future full service digital television stations. A similar preclusive effect was permitted under the Class A legislation, but in that case, unlike here, the LPTV station being protected was providing broadcast service.

There are various additional issues that the bill presents as well. For example, there is no commission application and approval process, and no mechanism for objecting parties, including individuals and local communities, to raise concerns. Moreover, the enumeration of the interference rights and obligations of datacasting LPTV stations is incomplete. It is not clear, for instance, whether a datacasting LPTV station is required to protect future Class A low power TV stations or existing non-Class A low power TV stations, translators, and mobile radio stations operating on television channels 14 to 20.

Finally, as introduced, S. 2454 does not limit datacast operations to the core television channels of 2 to 51.

In conclusion, we agree with the objective to facilitate broadband deployment in rural America. However, the approach taken in S. 2454 as introduced could undermine the digital transition, eliminate spectrum for new broadband services, and potentially decrease the availability of free over-the-air television in rural America.

We look forward to working with you, Mr. Chairman, to address the critical issues of broadband deployment in rural America.

Thank you, Mr. Chairman, for the opportunity to appear here today. This concludes my testimony, and Mr. Hatfield and I would be pleased to answer any questions you may have.

[The prepared statement of Mr. Stewart and Mr. Hatfield follows:]

PREPARED STATEMENT OF ROY STEWART, CHIEF, MASS MEDIA BUREAU, FEDERAL COMMUNICATIONS COMMISSION AND DALE N. HATFIELD, CHIEF, OFFICE OF ENGINEERING AND TECHNOLOGY, FEDERAL COMMUNICATIONS COMMISSION

Introduction

Good morning, Mr. Chairman, and Members of the Subcommittee. My name is Roy Stewart, Chief, Mass Media Bureau, Federal Communications Commission (FCC). I am accompanied by Dale Hatfield, Chief of the FCC's Office of Engineering and Technology. We welcome this opportunity to discuss the importance of

broadband deployment in rural areas. There is no question that this is an important issue that needs to be addressed. At the Commission, we have made it a top priority.

The Internet and the capability to transmit large quantities of data at very high speeds are transforming the telecommunications industry, and providing tremendous benefits to citizens around the world. We must make sure that the benefits of the communications revolution are experienced by all Americans. Those communities without access to broadband will be placed at enormous risk in the next century.

Directly or indirectly, through our information and telecommunications sectors, the Internet is linked to one-third of our country's real economic growth. But for the Internet economy to develop to its full potential in our country, there must be an available, affordable broadband telecommunications infrastructure throughout the country. To bring everyone into the Information Age, we must make sure that rural America reaps the benefits of broadband. As Chairman Burns knows from his participation in our rural field hearings, the Commission has been actively working with consumers, industry, the states and other parts of the federal government to ensure and facilitate broadband deployment to every community. We have embarked upon a series of outreach hearings so that consumers and small businesses can tell us in their own words about the broadband challenge. The Commission adopted an order that is already providing us firm data on the status of infrastructure deployment, so we do not have to rely on anecdotal or incomplete information when examining the issue. The Commission has asked a Federal-State Joint Board to review services supported by universal service, and to help the FCC keep up with the changes in telecommunications. The FCC and state regulators are also creating a national database to store, monitor, and disseminate information on broadband deployment. This database will be available on the Internet and is intended to be a clearinghouse for local communities to share information about their broadband deployment projects. An interactive survey will allow local governments, private industry and schools to provide broadband information. The survey will be accessible at www.nrri.ohio-state.edu/broadbandsurvey.php. The database will be available at www.nrri.ohio-state.edu/broadbandquery.php. Finally, the Commission is making spectrum available for wireless broadband and carving out a deregulatory zone for companies that want to deploy broadband in under-served markets.

While we commend Chairman Burns for attempting to address the issue of broadband deployment in rural America, we have serious concerns about the provisions in S. 2454 which would require the FCC to protect from interference low-power television broadcasting stations providing digital data services. Specifically, we are concerned that, as introduced, the bill does not adequately protect the rollout of digital television service (DTV). In addition, the legislation as introduced would permit primary low-power television services to operate on spectrum that has been reclaimed and reallocated for new services, including public safety and commercial wireless broadband. This could adversely impact the ability of the Commission to auction this spectrum as mandated by the Congress and thus have an equally adverse budgetary impact. The legislation could also hinder the expansion of DTV services provided by TV translators to rural areas, particularly in the western mountainous states.

Spectrum Management

Spectrum is a valuable and finite public resource that must be allocated and assigned in a manner that will provide the greatest possible benefit to the American public. The FCC's Office of Engineering and Technology is responsible for advising the Commission in carrying out its responsibilities for allocating the spectrum in the public interest. In order to do this, we must help to define policies that maximize the efficient use of the spectrum and promote the introduction of new services and technologies.

Over time, technological advances, growth in user demand, and the finite nature of spectrum have made our spectrum management responsibilities increasingly complex. To address the continuing growth of demand for radio services, we have focused our approach to spectrum management on allowing spectrum markets to make more efficient use of frequency bands through new technologies and on increasing the amount of spectrum available for use. In addition, we have sought to encourage the development and deployment of new, more spectrum-efficient technologies that will increase the amount of information that can be transmitted in a given amount of bandwidth and allow greater use of the spectrum occupied by existing services wherever possible.

Digital Television Transition

The efficiency of the digital television transmission standard has made it possible to reduce the amount of spectrum for television broadcasting while at the same time improving the quality of the service. The Commission provided a second channel for each existing full-service station to use for DTV service in making the transition from the existing analog, National Television System Committee (NTSC) TV technology to the new DTV technology. These second channels were provided to broadcasters on a temporary basis until the end of the DTV transition, which is currently scheduled for December 31, 2006. In developing the DTV channels, the Commission maintained the secondary status of TV translators and LPTV stations. The Commission also provided for recovery of a portion of the existing TV spectrum so that it can be reallocated to new uses. Specifically, the Commission provided for immediate recovery of channels 60–69 stations and for recovery of channels 52–59 at the end of the DTV transition.

The Low-Power Television Service

Low-power television (LPTV) stations are broadcast stations that operate on the standard VHF and UHF television channels, but at much lower power levels than conventional TV stations. LPTV stations may retransmit programming received from other sources or originate their own television programming. LPTV stations may also transmit subscription television broadcast programs intended to be received by the public for a fee. LPTV stations are secondary to full-power TV stations, which means that they may not interfere with, and must accept interference from, conventional “primary” TV stations.

The FCC created the LPTV Service in 1982 as a secondary service. The FCC believed that LPTV stations could increase television programming diversity in both urban and rural areas and that these stations would be particularly well suited to provide local programming.

The LPTV Service also includes television translator stations. There are more than 4,500 licensed television translator stations, the majority of which operate in the western mountainous states. Many rural communities in these areas depend on translators as the only means of obtaining free television programming.

Television translators rebroadcast the programs of full-service TV stations to geographic areas where full-service stations cannot be directly received. A translator generally receives the signal of a television station on one channel, amplifies it, and retransmits the signal on another channel. Translator stations may be converted to LPTV status at any time upon notification to the Commission.

The LPTV Service Today

There are currently more than 2,100 licensed LPTV stations. These stations operate in more than 1,000 communities of all sizes and in all 50 states. Station operators include such diverse entities as schools, colleges, churches, local governments, community groups and radio and TV broadcasters. The service has also provided first-time ownership opportunities to minority groups, women and a variety of small businesses. LPTV stations can be operated in a wide variety of ways. FCC rules do not require minimum hours of station operation or minimum amounts of locally produced programming. Some stations primarily retransmit programming imported from full-service television stations, satellites or other sources. Many others transmit locally oriented programming, including “niche” programming tailored to audiences with specific interests, as well as local news, weather, community affairs, local elections and events such as high school football games.

Digital Television Impact on LPTV

Despite their secondary status, until the arrival of the digital television era, primary television stations had displaced few stations in the LPTV service. Where interference from LPTV to full power stations occurred, the LPTV affected stations were usually able to find a suitable replacement channel on which to operate using an FCC “displacement relief” provision. That provision permits stations with an interference conflict to seek replacement channels at any time on a noncompetitive, “first-come” basis.

The prospects for LPTV service disruption are increased by the emergence of DTV service. The FCC concluded in its DTV proceeding that there was insufficient spectrum to protect the existing services of secondary LPTV and translator stations and to provide a second channel for DTV service to more than 1,600 full-service stations during the transition to DTV. It also concluded that LPTV and translator stations would remain secondary, and therefore, must not interfere with DTV service. The Commission, however, provided several measures designed to mitigate the impact of the DTV transition on the LPTV service. The channel displacement relief provi-

sions were extended to stations potentially affected by DTV and operating on channels 52–69. Applications for replacement channels were accorded the highest priority among applications in the LPTV service.

In addition, several of the interference protection provisions have been eliminated or relaxed. LPTV and translator stations were afforded additional operating flexibility and permitted to negotiate interference agreements with other stations in the LPTV service and the Commission also expanded its policy of granting waivers of the interference rules based on consideration of terrain shielding. Further, the Commission has increased LPTV maximum power limits primarily to enable LPTV and translator stations to operate on channels adjacent to those of full power stations operating at the same location. Finally, the Commission modified more than 60 DTV allotments to eliminate conflicts with one or more LPTV stations.

S. 2454

S. 2454, as introduced, seeks to create opportunities for LPTV stations to provide a variety of digital data services to subscribers, including one-way and two-way high speed Internet access, as well as to change the secondary status of those stations. As noted in our introduction, facilitating access to broadband technology is an important goal of Chairman Kennard and his fellow Commissioners, and the Commission has made substantial efforts in this regard. For instance, the Mass Media Bureau recently completed a comprehensive proceeding to enable two-way cellularized video and data communications in the Multipoint Distribution and Instructional Fixed Television Services. Our DTV rules also provide for the provision of data services on a supplementary or ancillary basis. Full-service television stations must provide a free video broadcast service of comparable quality to today's analog television, but may use their excess channel capacity for a variety of data services. The Commission has also created the Local Multipoint Distribution Service as another means of gaining access to broadband technology and has auctioned spectrum for such uses in the 24 GHz and 39 GHz frequency bands. Perhaps of greatest significance, the Congressional provisions for the reallocation and auction of approximately 20 percent of the television broadcast spectrum should create very substantial opportunities for new broadband services throughout the country.

We are greatly concerned about the implications of S. 2454, as introduced, particularly its potential to hinder or even cripple the roll out of DTV service, eliminate spectrum for new broadband services, and potentially decrease the availability of free, over-the-air television in rural America.

As introduced, S. 2454 provides that all LPTV stations may use their authorized broadcast channels to deliver data services to the public. The bill does not specify the amount of such service, nor does it appear to require LPTV stations to provide any free broadcast service. Presumably, all LPTV stations could provide Internet access either on a full-time basis, or to a very minimal extent. The Commission could not authorize new or modified broadcast facilities predicted to interfere with such LPTV stations. More than 2,100 LPTV stations are licensed to operate throughout the United States. Additionally, there are more than 4,500 licensed television translator stations that may convert their stations to LPTV status by a simple notification to the Commission. Thus, it is possible that thousands of stations could seek to qualify under the interference protections afforded by S. 2454. Significantly, the bill does not limit such protection to existing LPTV stations. The Mass Media Bureau recently announced an LPTV application filing window that will open later this summer. The window will geographically restrict where new LPTV and TV translator stations can be located. Its primary intent is to provide opportunities for translators to deliver additional TV programming services to rural communities, such as the new broadcast networks and the Fox network in some communities. This window could significantly increase the number of LPTV and potential LPTV stations in rural areas that could qualify for full interference protection under the LPTV datacasting provisions of S. 2454.

The FCC concluded in its DTV proceeding that there was insufficient spectrum to protect the existing services of all secondary LPTV and translator stations and to provide a second channel for DTV service to more than 1,600 full-service stations. It also concluded that LPTV and translator stations must not interfere with DTV service and must accept interference from existing and future DTV stations. We believe it is well established that there is insufficient broadcast spectrum to accommodate thousands of LPTV stations with full interference protection without substantially impacting the transition to digital television, particularly in the rural areas. This is evidenced by the more than 1,800 channel displacement applications we have received from LPTV and translator licensees who believe they cannot continue to operate on their authorized channels, mainly due to conflicts with DTV service or channel allotments.

The Community Broadcasters Protection Act of 1999

Congress recognized the spectrum impact and the paramount importance of protecting the digital transition when it enacted legislation to create the Class A LPTV service. On November 29, 1999, the President signed into law the "Community Broadcasters Protection Act of 1999" (CBPA). This new law created a Class A TV service which provides certain interference protections, but not full protection, for those LPTV stations that qualify by airing locally-produced programming in their communities and that will operate in the manner of full-service television stations. Noting that not all LPTV stations could be guaranteed a certain future, the CBPA limited eligibility for Class A status to a very specific group of LPTV stations: those that were broadcasting television programming produced in their communities. The Mass Media Bureau recently issued a public notice granting Class A eligibility to more than 900 LPTV stations that certified compliance with the qualification thresholds of the CBPA. The Mass Media Bureau is also now accepting applications for these new Class A LPTV licenses. It is yet unclear, however, how many of these stations can meet the interference protection requirements of the CBPA to obtain Class A licenses. Further, the proposed legislation could permit stations that received their Class A status because of their commitment to local television programming to abandon that programming.

In view of the complexities of the DTV rollout, Congress also found it necessary to limit the interference protections afforded to Class A stations by DTV stations. For instance, Congress stipulated a higher priority for certain application proposals to maximize (or enlarge) the service areas of DTV stations and provided DTV broadcasters the flexibility to make necessary adjustments to their facilities, including channel changes, without regard to protection of Class A LPTV stations. The Commission Report and Order implementing the CBPA further provided that Class A stations must protect and would not be protected from DTV operations on a broadcaster's assigned, in-core channel at the end of the transition period.

S. 2454, as introduced, provides none of these necessary safeguards, nor is it even clear that the Commission could authorize a station on a broadcaster's allotted DTV channel under this bill if the proposed facilities would be predicted to interfere with a protected LPTV station. Nor does the bill clearly define the requirements of LPTV stations to protect full-service television stations and station proposals, for example, DTV allotments, authorized service, and pending requests for DTV channel changes.

Even with the inclusion of the safeguards that were included in the Class A legislation, we believe that because of the much larger number of LPTV stations that would be protected, the current bill could affect the provision of television service, both analog and digital, in rural areas. If broadcasters convert their translators to LPTV service and then opt for protection under this legislation, many rural communities will lose free, over-the-air television services. Likewise, it is expected that DTV service will be delivered to many communities by television translator stations. Translator licensees will need additional channels for this purpose. We are concerned that entities seeking to provide LPTV data service will file applications in the forthcoming filing window and operate new LPTV stations that could preclude translator operators from obtaining channels for the rebroadcast of DTV stations.

The Commission is committed to ensuring that spectrum use is flexible and put to the maximum possible use. Accordingly, when the public interest demonstrates that testing new technology and sharing arrangements are warranted, the Commission will seek to accommodate such situations. We have granted experimental licenses to stations interested in providing data services on a secondary basis. For example, in Houston, Texas, the Commission authorized as an experiment the testing of a digitally based interactive broadcast service using low-power television. Following a year and one-half period during which no interference to other broadcast services was encountered, we authorized the station to provide a one-way Internet service to limited subscribers on a secondary basis. In Alaska, we similarly authorized on a secondary basis the provision of Internet service to secondary schools. These types of requests must be reviewed on a case-by-case basis.

Having to provide primary, interference-protected status to thousands of existing and potential LPTV stations would not be possible under the current proposed spectrum allocation for digital television. There simply is not enough room. The Commission would be forced to reduce the amount of spectrum being reclaimed for new services. This spectrum, the first segment of which is scheduled for auction in September of this year, has been allocated for advanced wireless services. FCC Chairman Kennard has repeatedly noted that this spectrum offers the potential for the third residential, two-way broadband pipe, a wireless pipe that will enable affordable broadband access, including to rural areas.

Conclusion

In conclusion, we agree with the Committee's objective to facilitate broadband deployment in rural America. However, the approach taken in S. 2454, as introduced, could undermine the digital transition, eliminate spectrum for new broadband services, and potentially decrease the availability of free, over-the-air television in rural America. Nonetheless, we look forward to working with Chairman Burns, his staff and the Congress to address the critical issue of broadband deployment in rural areas. This concludes our testimony and we would be pleased now to answer your questions.

Senator BURNS. Thank you, Mr. Stewart. I appreciate your statement today, and I want to start off in the area which you have great concerns, and we do, too, to be right honest with you—is the technology there for separation, and then what we can get done.

Your rules give broad authority to DTV stations to provide data services. In fact, your rules authorize DTV, digital television stations to provide any services other than video services. Your rules do not specify how the DTV stations may provide such services. You make no distinction between one-way wireless and two-way wireless. Is it true under this rule DTV stations can do exactly what LPTV stations can do under S. 2454 as long as the DTV stations maintain its video service?

Mr. STEWART. I would think that is a concern that we have, and it would appear to be so. Dale, do you agree?

Mr. HATFIELD. I want to make sure that I understand your question. What we are saying is that full power station would broadcast an NTSC-quality service and then could use the balance of the capacity for the data services. It was not clear in the bill whether the station, the low power station, that datacasting would have to also maintain the broadcast signal at the same time.

Mr. STEWART. That is the difference we saw between the two, that it looks like the low power TV datacasting station could just do that, primarily, or all the time, whereas we have said that the digital TV station must maintain that one channel of free over-the-air broadcast service and use the extra spectrum that is available for ancillary and supplementing purposes, so there is that difference, Mr. Chairman.

Senator BURNS. OK, and I think we can work that out. Also, tell me, Mr. Hatfield, in the separation of the using of spectrum interference is still a concern of mine and also of yours. Could you just give me your idea on the problems we face there technologically?

Mr. HATFIELD. There is a couple, and for example, the traditional broadcast service is a one-way service, so as soon as you say, we are going to introduce the possibility of two-way, where consumers would actually be then transmitting back to the broadcast station, if you will, that is, as we say, a different architecture. In that case we would have to develop rules to make sure that, in transmitting back to the broadcast station, the viewer does not cause interference to other services, or to other people nearby trying to watch the station.

There are various ways—I mean, I do not want to overemphasize this, but there are various ways of accomplishing that, and we would need to think about rules that would implement the law. That is the primary thing.

There is also, for example, the experimental licensee that has been using a different type of modulation than people are contem-

plating in terms of full digital television. There are some issues that us engineers have to worry about because of those differences, and so we would need to take them into account in the interference analysis.

Senator BURNS. But your main concern is in the area of the return signal?

Mr. HATFIELD. I do not want to overemphasize that, because some architectures would use spectrum in other bands for that return channel, and of course there the interference might be less, or conceivably could be more, but you would have to look at the architecture, how people intend to do it.

Senator BURNS. In terms of the digital television roll-out the Community Broadcasters Protection Act provided the FCC authority to displace a Class A LPTV station if necessary to implement digital television service. If we gave you a similar provision with respect to LPTV stations providing data services, would that not give you sufficient authority to ensure that DTV roll-out is not frustrated?

Mr. STEWART. I think it is hard to make up all the possibilities that may arise, but I remember when I testified in the House about the establishment of a Class A service I suggested that we have some kind of safety net that the commission have to be able to adjust problems that arise, so I think that would be helpful.

But I think one of the things, Mr. Chairman, that concerns me, there are 4,500 translators in the country. There is nothing to stop them tomorrow, if this statute gets adopted, to switch to low power television. They can just tell us they are now a low power television station. Rather than rebroadcasting the signal of a full service station, I elect to operate as a low power TV station, which then makes me qualified for the datacasting.

The effect may be draconian in that those translators basically provide off-air broadcast services to the more remote areas of our country, and if they switched to datacasting—now, one could argue, let the public make that determination as to whether they want datacasting access or want the full over-the-air broadcast services that each of the channels can give them on a translator.

But one of the concerns that I have is that that may take place, and unless we put something in there, it is not just rural areas, but it is in any part of the country, where there are 4,500 translators.

Or for that matter the low power stations that we have now, they could switch also, and instead of getting only local community broadcast service, or localism, or the status that we gave them—when I say we, the Congress and the commission—and created this Class A service because of the unique local programming that we did not want to see get knocked off the air, they could turn around and start datacasting, and we lose the benefits of the Class A status, and I do not know how you stop that.

A safety net might help some aspects of the interference to the transition to digital television, but there is that fundamental concern that exists about losing the translators, the only way, unless you are going to have satellite delivered in some areas, to provide programming right now to a great number of the rural areas in our country, and I am sure you are aware of that.

Senator BURNS. Well, we are aware of it, and just like I say, we want to work with you in providing that language, and technically if we can do it, that is the next thing, without interfering.

Senator STEVENS.

Senator STEVENS. I regret that I have to leave very soon because of a markup in another committee, but the conflict on this bill is going to be more acute in my State than any place else. You said there were 2,100 of these low power stations now, right?

Mr. STEWART. Yes.

Senator STEVENS. What is the cost to startup one of those? Do you have any idea?

Mr. STEWART. I do not know. Keith, do you know what the cost is? Keith Larson is the senior engineer in the bureau. He is the Associate Bureau Chief for Engineering, and he says, what, about \$100,000?

Mr. LARSON. \$50,000 to \$100,000.

Senator STEVENS. And there are churches and nonprofit groups, and then there are some that are local for-profit groups, but they are very local, right?

Mr. STEWART. Yes.

Senator STEVENS. And this new concept now, this new DTV, if they apply to these low powered stations, would permit them to do both digital and their local broadcast service at the same time?

Mr. STEWART. Well, not as we think is proposed in the bill right now. It is not clear that they still have to maintain some aspect of broadcast service.

Senator STEVENS. I am not asking whether they have to do it. I am asking could they do it.

Mr. STEWART. I would expect so.

Senator STEVENS. What kind of investment does that take?

Mr. HATFIELD. I think it would be still roughly the same order of magnitude here, because the television signal then would just occupy part of this digital bit stream. If you think of the transmitter as a big pipeline with lots of bits, what it would mean was, some of those bits would be allocated to maintain a television-like service, or television service, and the balance of those bits then could be feeding to a personal computer, for example.

Senator STEVENS. And the service area would be roughly the same?

Mr. HATFIELD. Yes.

Senator STEVENS. As I understand what you said, Mr. Stewart, they could avoid interference with their own operation by just putting in a second band and taking the return signal into a different system.

Mr. HATFIELD. I am in a little bit of a quandary here. It is not clear to me exactly how different people might architect it, but one of the ways is just to use your telephone line for return, and then the outbound for the broadband services. Another is to use a different band like IVDS, which is another band we have set aside for the signal that goes up from the subscriber. Trying to actually accommodate two-way services within the broadcast band itself is probably the most difficult to configure, and that is what we would need to consider in our rules.

Senator STEVENS. Is there a theoretical yardstick for the area currently served by low power stations? How far out do they go from their station?

Mr. STEWART. Well, I think it depends on the terrain. It could be 5, 10, 15 miles.

Mr. LARSON. 12 to 15 miles.

Senator STEVENS. So if I am in Fairbanks and I have an over-the-air station, a television station, public or private, and someone is out at the North Pole, roughly 12 miles away, they put up a low power station, there is a potential for interference, right?

Mr. STEWART. Assuming—well, I think we would not authorize it if we knew there was going to be any interference.

Senator STEVENS. But you have already authorized a low power station out there. Now, if they convert, is there a different kind of interference?

Mr. STEWART. The interference would not be to that full service station, I do not think, but the question would be, what would be the preclusionary effect on any digital channel we may have set aside for that full service station in terms of that channel?

You see, what we do now, Senator, as you know, is low power TV stations and translator stations under the commission's rules are secondary services. If they cause any interference they have to either find a new channel, or they go off the air. It may be that that low power station, since it is operating now, is not causing any interference to the full service station, but it may be that there is a channel in the digital table that that television station is going to match up to for the transition, and there may be some interference problems with that channel. It is not on the air yet.

Senator STEVENS. But do we need some demonstration areas to determine that? I think low power stations fill a void, and it appears to me that they were started for a particular purpose, and now this would give them a chance to go into an entirely different course of business. I do not know, have we had any demonstrations of these yet?

Mr. HATFIELD. There is two issues there. I do not think that—I think we understand the basic propagation mechanisms and so forth. I do not think we need tests.

Senator STEVENS. I mean in the conversion area. Have you had any low power stations operating in an area where the existing over-the-air station is converting as they are authorized to do at this time?

Mr. STEWART. And which resulted in interference? I am not aware of any. Those are in the major markets, the top 30 markets.

Senator STEVENS. By definition, Mr. Stewart, Alaska is not in the top 30 markets. We are about 450, I think.

Mr. STEWART. But our experience has only been in the top 30 markets with generally operating DTV stations. I am sorry, the top 30, outside the top 30 stations have more time to get on the air, so our experience has not been in the areas you are talking about.

Senator STEVENS. Well, I do not have much time, but I am worried about an outfit that gets together \$100,000 that is going to provide low power service, television service in an area that needs it for local information, local control, and suddenly it gets the right to convert and become a digital server for the Internet. What kind

of capability do they need for that that they would not need to run that low power TV station?

Mr. HATFIELD. Basically the tower and the RF equipment. It does not care whether that digital bit stream is a television digital stream or data. Parts of it would, if it is analog today, have to be changed to handle the digital bit stream. Thus while there are some changes, the nice thing about the digital world is, bits are bits.

Senator STEVENS. Well, Mr. Chairman, I am very interested in this, because you know, those areas served by low power stations are the ones that are totally left out of the digital world right now, but I am not sure this is the means to make the conversion. I really wonder about putting that service in the hands of people who entered this whole enterprise to provide fairly routine and I think low level expertise required to handle low powered television station as compared to that that is going to be required to be a server for the Internet.

Maybe I am not seeing something here, but I do think we need a lot more information before we get involved in this. I am with you, but I do not want to give up what I have got in order to hope that the reflection of the bone in the water is bigger than the one I have got, and that is the way I look at this right now.

Thank you very much.

Senator BURNS. Do you want to restate? That is easy for you to say.

Senator STEVENS. Maybe I need to get you the book on fables so you'll remember the dog walked over the bridge with a bone in his mouth, looked down into the reflection and saw a bigger bone, let go of the little one, and he lost them both, right?

Senator BURNS. Well, we have got to visit with that dog.

Senator you raise the same concerns we have raised in this legislation. The only thing we had to do, we had to fashion something. Now we get to move it along, and the dialog and the language will probably find the answer both in the technical world and in this, but I also want to recognize Senator Wyden. I am going to have to give some more thought to this next question. Senator Wyden.

Senator WYDEN. Thank you, Mr. Chairman.

Gentlemen, is the spectrum congestion problem less in rural areas than in urban areas?

Mr. STEWART. I am not an engineer. Let me give you my sense, and then I will defer to Mr. Hatfield, who is the senior engineer in the agency, that there is certainly more spectrum available in the rural areas. There may be as much or more demand, though, because they do not have the full service broadcast stations that can provide service to a wider area. When you get into the more remote areas you need translators and secondary type services, and those take up channel capacity.

Dale.

Mr. HATFIELD. I agree.

Senator WYDEN. I think one of the issues that we are undoubtedly going to examine is whether this bill ought to be limited to rural areas. There is not a rural service requirement. Obviously, you could hear from the questions asked by Chairman Burns and by Chairman Stevens that there are questions with respect to

squeezing out broadcast services, and there is going to be a question about whether there is sufficient spectrum to satisfy all desired uses.

I mean, supposing there were to be a procedural change requiring that licensees apply to the FCC and make the required showing that there is spectrum rather than just notification. Is that another step toward balancing the competing interest in your mind?

Mr. STEWART. As I understand, what you are saying, Senator, is that instead of my telling the commission I want to convert my low power to a data delivery service, make me be required to show you that there is in addition X number of channels available to backfill what I am moving away from, particularly if you do not require me to have some minimum amount of broadcast service.

Senator WYDEN. Moving beyond the notice requirement, what do you think of that?

Mr. STEWART. It is an interesting idea. I do not know what the impact would be in terms of the real world as to how much spectrum might be available.

Senator WYDEN. In the real world, somebody has got to have a showing. You have got to come in with a showing that you are not producing interference.

Mr. STEWART. Part of the problem I think, and I would defer to Dale, is that we are going to have more digital TV stations hopefully in the rural areas, and they might want translators to bring their signals into those areas, and I do not know how many they are going to need in order to be able to make certain that digital television service gets into those rural areas, and so you may say to me today there is enough channels, and I may say to you, yeah, but 2 years from now, or when those stations go on the air, will there be enough channels if we let you use them now for data.

Mr. HATFIELD. You picked up there, at the end, the point that I was going to make. And that is it is sometimes hard to foresee at the time the applicant is coming in what the other translator stations in the market will need in terms of digital facilities to enable them to make the transition. We also may need to make adjustments to fit in people later on. Here again, it would tie our hands if there are too many of these stations that are already locked in with what amounts to primary status.

Senator WYDEN. If this bill was not enacted, would there be any way for AccelerNet to get channels in the broadcast spectrum? Are there any existing policies, for example, that are going to make broadcast channels available to high speed data providers?

Mr. HATFIELD. I think I understand your question, but we have underway today a clearing of the spectrum 60 to 69 to allow that spectrum to be used for data services. In fact, we have already scheduled auctions for that to occur, and then later on there is additional spectrum, the channel 52 to 59 spectrum, which will eventually be made available for those types of data services as well.

Senator WYDEN. The answer to my question is yes.

Mr. HATFIELD. That is already underway. The question is, though, is whether doing some of these things might preclude us from doing that clearing. In other words, we have to clear that spectrum to enable the new services, the new data services. The

question is, would the stations, if they go in would they make it more difficult for us to do that clearing?

Mr. STEWART. If they had a primary status, could we remove them from that spectrum?

Senator WYDEN. I think you are making an argument, though, that this bill may make work that is ongoing at the commission more difficult. At least, that is the argument you just gave me. I asked specifically, are there existing policies that you could use to move forward now if this bill was not enacted? The answer was yes, and it seems to me you are saying that perhaps this bill as currently written would make that work more difficult. Is that right?

Mr. STEWART. I think that is fair. Obviously, you could have a place where you are going to allow these low-powered stations to convert, and maybe you will not let them convert if they are on the 60 to 69 channels, or the 52 to 59 channels, so that the auctions can take place and they can go to the highest valued use, and that we do not have to protect these kinds of services, so there are some adjustments, Senator, that could be made.

Senator WYDEN. The point we are touching on here is absolutely key. I think there has been some confusion about whether or not these changes that would accommodate AccelerNet and others could be made without the Burns/Breaux bill, and a lot of us were under the impression that AccelerNet and others could not go forward without this legislation.

Now I think you are saying that not only can a lot of this work get done, but that this bill might cause additional problems.

Mr. HATFIELD. Let me make it clear, of course, in the cleared spectrum they would have to then go to auction to be able to get access to the spectrum to be able to do that. As Roy said in his testimony and his conclusion, the bill as introduced could undermine the digital transition and eliminate spectrum for new broadband services. What we were just saying reflects the concern that he stated in his oral statement.

Senator WYDEN. Mr. Chairman, my time is up. I think what you and Senator Breaux want to do is definitely important. We have just got to get through the nuts and bolts to figure out how to do it, and there are a variety of issues that need to be examined. I look forward to working with you.

Senator BURNS. Senator Breaux.

**STATEMENT OF HON. JOHN B. BREAUX,
U.S. SENATOR FROM LOUISIANA**

Senator BREAUX. Thank you, Mr. Chairman, and I thank the members. I apologize for being late. We had the Senate Finance Committee marking up a bill at the same time, and it is difficult to be in two places at once. Thank you very much.

Obviously, as an author of the bill, I am a supporter of the legislation, but it is very important to have the FCC's views and recommendations. I was particularly interested in the line of questions from Senator Wyden with regard to whether the bill is necessary or not, and I guess the answer that you have said is that you grant low power stations authority to provide broadband Internet services, without this legislation. Is that correct?

Mr. STEWART. We have done it on an experimental basis, as I think you are aware, Senator, in Houston, Texas.

Senator BREAUX. With AccelerNet, did you not?

Mr. STEWART. Yes, but I am not sure that there was not some indication in that application when it was submitted that there would be some over-the-air broadcasts continued, but we have had some experiments to find out whether there was interference problems.

Senator BREAUX. Would you look at the application differently if it is one that would retain some free over-the-air services along with broadband services, as opposed to an applicant that would have just broadband Internet services on their low power station?

Mr. STEWART. I have to give you my personal view, and I am not here really representing the commission, and there has been no commission action in this area. My feeling is it would make it more acceptable, if this is broadcast spectrum, if, in fact, there was a continued broadcast service. If you were sitting in the community and that was the only local TV station, or low power television station, or if it was a translator bringing in, you know, Monday Night Football, or call it what you would want, and you suddenly did not get it, you might want to trade the data, but your next-door neighbor might not want to trade that for data.

So it seems to me without trying to piece together a piece of legislation right now, because I am not sure I have the ability to do that on behalf of the commission right now, but it seems to me that it would be more tenable to require that there continue to be some aspect of broadcast service provided by that facility, whether it is a translator that is converted to low power, or a low power station itself.

Senator BREAUX. But full power broadcasters can provide this data service on an ancillary basis. What do they have to do when they decide to use their full power station to provide the broadband services?

Mr. STEWART. Well, I am not sure there is anybody that is really doing it yet. We went through a proceeding because Congress had required us to assess a fee for the use of that excess digital capability, and I am not sure that anybody is actually doing it now, but they would just broadcast, whatever the mechanism is, and Dale could probably speak to that, as long as they maintain the one channel, Senator, of over-the-air broadcast service in a digital mode.

Senator BREAUX. You said Congress required a fee.

Mr. STEWART. Yes.

Senator BREAUX. Does that requirement of Congress not apply to low power stations if they decide to convert to a broadband Internet provider?

Mr. STEWART. I do not know. That is a good question. That is the next hearing, Senator.

[Laughter.]

Mr. STEWART. The Congress did not even tell us what the amount was. We did a proceeding and determined that 5 percent, I think, of the gross revenues was the appropriate amount for full service television licensees, commercial television licensees.

Mr. HATFIELD. If I could just add one thing, there are a number of broadcasters who have digital stations, DTV stations on the air now that are also sending data along with the digital television broadcast itself. For example, the company called I-Blast, that is currently doing that.

Senator BREAUX. Do they pay a fee for the right to do that or not?

Mr. STEWART. I would assume they would have to on a yearly basis give us information as to what the gross revenue was. I do not think we have made an exception based on that. I have not seen any report come in annually. The first one that came in I do not think had anybody on it.

Senator BREAUX. You do not know whether they are required to pay a fee?

Mr. STEWART. I would assume if they are operating a television station and they are using the excess capacity for ancillary and supplementary services, I know of no exemptions that we have given to that 5-percent fee for commercial television licensees, so I would assume at the end I think there is a period, maybe September or October of every year, where there is a form that they have to report to us information about that.

Senator BREAUX. A final point, if I may, Mr. Chairman. You point out in your testimony the bill does not add or really protect the roll-out of the digital television services, DTV. Can the legislation be modified to ensure that interference problems are corrected in some form or fashion? How would we modify the legislation if we wanted to protect the roll-out of digital television from full power stations?

Mr. STEWART. Well, I think again it is hard to put all the kinds of examples that may arise, but we could use, perhaps, as a back-drop the Community Broadcaster Act, where we created these Class A low power television stations and put in language to protect the digital roll-out in terms of future digital television stations and present digital television stations, and that would be a place where we could start.

And I think that is what we are going to focus on if we look at that, but obviously I do not have to tell you, Senator, that digital transition is something we promised the American public. We gave them a second channel, and we have to be careful we do not do anything to disrupt that.

I think the Community Broadcasters Act, we put in, or Congress put in a safety net provision that said the commission has the authority, irrespective of Class A status, to do what is necessary to protect that digital roll-out as it affected a particular station.

Senator BREAUX. Thank you, Mr. Chairman.

Senator BURNS. Well, let us take that one step further, Senator BreauX, and Mr. Stewart. 2454 provides that the FCC shall prevent interference from LPTV stations providing data services. That is not adequate.

Mr. STEWART. Is that to the full service broadcast stations? Is that to other low power TV stations? Is that to the Class A stations? It is the specificity I think I was concerned about, Senator. That is a phrase. What comes under that phrase?

Senator BURNS. Well, that is right. I take from this, and your testimony, and the answers to the questions this morning, that we are going to have to spend some more time on definitions and be more specific in our areas, and I have no problem with that.

We can get that dialog going and take care of that, because I do not think it is the wish of the low power people—they do not want to interfere with anybody else, either, and basically we are just fulfilling the FCC is fulfilling their primary responsibility, and that is to make sure that everybody stays in their lane that uses the spectrum and the airwaves, so I think we can massage that language, and we will work with you and want to work with you very closely before we ever clear this thing out of committee.

I would like to see it move, and I also see, now, your full power stations, they are going to offer datacasting?

Mr. STEWART. Yes.

Senator BURNS. And we do not want to interfere with what they want to do, either, but we would sure like to see robust competition out there in this area as far as the customers are concerned.

Mr. STEWART. I think, Mr. Chairman, we have to make certain we do not deprive citizens who now get over-the-air broadcast service via translators or local LPTV stations of their only broadcast service, and how we shape what the future is in this area.

Senator BURNS. I am very supportive also of my public radio station out there, and public radio in our State. We also have a problem with low power FM that we have to work out, and we will get that done, too.

That is all the questions I have for this panel. We thank you for coming down this morning, and look forward to working with you as this legislation moves along. Thank you very much.

Mr. STEWART. Thank you, Mr. Chairman.

Senator BURNS. We have now a panel, Larry Morton, director, Community Broadcasters Association from Little Rock, Arkansas, Mr. James Popham, vice president/general counsel, Association of Local Television Stations, Inc., here in town, and Dean Mosely, who is president and CEO of AccelerNet, from Houston, Texas.

We welcome these gentlemen this morning and look forward to their testimony, and Mr. Mosely, we will start with you once you get settled in.

**STATEMENT OF DEAN M. MOSELY, PRESIDENT AND CEO,
ACCELERNET**

Mr. MOSELY. Good morning, Mr. Chairman and Senator Breau. Mr. Chairman, my name is Dean M. Mosely. I am president and CEO of U.S. Interactor, which is doing business as AccelerNet. I thank the Committee for the opportunity to testify in support of Senate bill 2454. Senate bill 2454 will facilitate the deployment of high speed, cost-effective Internet access throughout the United States, including rural America.

S. 2454 will further the congressional commitment embodied in section 706 of the Telecommunications Act of 1996 to encourage deployment of advanced telecommunications capability to all Americans so that rural Americans can receive the same quality services as are available in urban areas and at a fair price, and Mr. Chairman, S. 2454 will do so without the need for any Federal subsidies.

In short, S. 2454 is a technological no-subsidy, free market solution to the digital divide. AccelerNet is a licensee of LPTV Station KHLM-LP, Channel 43, in Houston, Texas. AccelerNet is in the business of providing high speed Internet access. We do so from our Houston LPTV station in a one-way mode, using a wire line uplink pursuant to FCC digital authority. We offer downlink or downstream wireless burst speeds in excess of 4 megabits per second.

In part as a result of the cost savings our service offers over wired Internet service, Internet service provider access rates for T-1 speeds have come down appreciably in Houston, Texas. Exciting new technology is available to overcome the inherent limitations of our wireless one-way service. Two-way wireless service using timed division duplexing, also known as TDD, over a single 6 megahertz channel will enable the use of a richer content available on the Internet today, including streaming media and interactive services such as videoconferencing, telemedicine, and distance learning.

It will also enable portable access to the Internet. Today's business customer cannot be tied down to a wire for Internet service any more than he or she can be tied down to a wire for telephone service. As we speak, the majority of our country does not even have wire line access to high speed Internet service. For this majority of Americans in at least the near or medium-term future, wireless may offer their only access to the communications capability the rest of us take for granted.

The LPTV service was created to make use of television broadcast spectrum otherwise unusable, or full service television, due to the separation distances required between full service television stations. S. 2454 would allow this prime spectrum to be put to use to conquer the digital divide among Internet users in the United States.

Imagine what we could do if we could provide T-1 speed Internet service to every classroom in Montana or South Carolina without having to perform disruptive construction to run one wire through ceilings and walls. Imagine the ability to bring telemedicine to every Native American reservation.

Imagine the ability to make available to an isolated village in Alaska a complete K through 12 curriculum, with lectures, exercises, study guides, and tests prepared by the very best educators in America.

Wireless Internet can do this cost-effectively. Wireless Internet can do this with technology that exists today. Wireless Internet can do this using LPTV stations.

Section 336 of the Communications Act of 1934 as amended, and FCC Rule section 73.624(c) implementing that provision, granted full service television stations broad authority to provide digital data services. DTV stations are permitted under this rule to offer, quote, services of any nature, close quote, including data and interactive transmissions on a supplementary or ancillary basis.

The rule sets forth no limitation in the nature of one-way or two-way service, nor does it set forth how such service may be provided. That is left to the DTV stations, subject to not derogating DTV service. S. 2454 would allow similar flexibility for LPTV stations.

This Committee should be concerned to ensure that over-the-air television reception will not be subject to interference as a result

of S. 2454. As the chairman said, everybody needs to stay in their own lane.

As drafted, S. 2454 provides the FCC full authority to protect television reception. In Houston, we have never had a complaint of interference from our one-way high speed Internet access service ever. Moreover, I have appended to my testimony the analysis of Dr. Daniel L. Sharre, chief technical officer of Adaptive Broadband, which demonstrates that interference to television reception will not occur.

To attract capital to roll-out service across the Nation, we and other providers who may decide to provide a similar service need to be assured that we will not arbitrarily be displaced from our spectrum. We have attracted the interest of rural telephone companies, electric cooperative associations, and other organizations, who see the service we intend to offer as a means of providing rural America with the high speed Internet access which it is currently denied.

Absent a clear congressional policy declaration in favor of rapid deployment of innovative high speed wireless services, low power television licensees face years of regulatory uncertainty and delay in making these services available to average Americans.

The adoption of S. 2454 will allow AccelerNet and other service providers to bridge the digital divide in rural America and in other areas currently lacking high speed Internet access. I urge you to support passage of this legislation.

Thank you.

[The prepared statement of Mr. Mosely follows:]

PREPARED STATEMENT OF DEAN M. MOSELY, PRESIDENT AND CEO, ACCELERNET

Mr. Chairman, my name is Dean M. Mosely. I am President and CEO of U.S. Interactive, L.L.C. d/b/a AccelerNet. I thank the Committee for the opportunity to testify in support of S. 2454.

AccelerNet is the licensee of LPTV station KHLM-LP (Channel 43) in Houston, Texas. AccelerNet is in the business of providing high-speed Internet access. We do so from our Houston LPTV station in a one-way mode, using a wireline uplink pursuant to FCC digital authority. We offer downlink or downstream wireless burst speeds in excess of 4 mbps. In part as a result of the cost savings our service offers over wired Internet service, Internet service provider access rates for T-1 speeds have come down substantially in Houston, Texas.

There are inherent limitations, however, with our wireless one-way service. The principal limitation is that our service is asymmetrical in speed, with tremendous wireless downstream speed but relatively slow wired upstream speed. Our customers have told us repeatedly that they need higher upstream access speeds which a two-way wireless service would facilitate, and countless potential customers have told our sales staff that they would subscribe to our service as soon as AccelerNet offered two-way wireless service.

Two-way wireless service will enable the use of the richer content available on the Internet today, including streaming media and interactive services such as video conferencing, telemedicine, and distance learning. It will also enable portable access to the Internet, a service that our customers are demanding. Today's business customer cannot be tied down to a wire for Internet service any more than he or she can be tied down to a wire for telephone service. Whether it is the real estate agent who needs to check the latest listings for her clients who desire to see just one more prospective home, the architect who wishes to check a design during a lull in his vacation, or the Senator needing to check his email while back home to give a speech, more and more of us would not think of traveling without our laptops.

Moreover, as Mr. Morton will explain in his testimony, as we speak, the majority of our country does not even have wireline access to high speed Internet service. For this majority of Americans in at least the near or medium term future, wireless

may offer their only access to the communications capability the rest of us take for granted.

The LPTV service was created to make use of television broadcast spectrum otherwise unusable for full service television due to the separation distances required between full service television stations. S. 2454 would allow this prime spectrum to be put to use to conquer this digital divide among Internet users in the U.S. Imagine what we could do if we could provide T-1 speed Internet service to every classroom in Montana or South Carolina without having to perform disruptive construction to run one wire through ceilings and walls. Imagine the ability to bring telemedicine to every native American reservation. Imagine the ability to make available to an isolated village in Alaska a complete K-12 curriculum, with lectures, exercises, study guides and tests prepared by the very best educators in America. Wireless Internet can do this cost effectively. Wireless Internet can do this with technology that exists today. Wireless Internet can do this using LPTV stations.

The technology necessary to bring high-speed wireless Internet service to the public exists today and is in use in the United States, in Japan and in Europe. It can operate over a single television channel without causing interference to television reception. It is called Time Division Duplexing ("TDD"). TDD allows both the uplink and downlink of a wireless signal to be transmitted over the same spectrum without interfering with itself. TDD can achieve spectral efficiencies of between four to 20 times that achieved with more traditional FDD (frequency division duplexing), which requires separate transmit and receive frequencies. TDD systems have been developed and deployed by TRW and Adaptive Broadband, formerly California Microwave. Several other companies are in various stages of development of TDD systems.

I have appended to my testimony a statement prepared by Mr. Alfred Boschulte, former President of NYNEX Mobile Communications, explaining in more detail, the capabilities of TDD technology. In addition, I have appended the cover story from the April 2000 edition of RF Design, by Dr. Adel Ghanem, which discusses the difficulties of providing fixed wireless services using microwave frequencies and which delineates the numerous advantages of transmission in the lower frequency bands, including eliminating in most instances the requisite of a professionally installed subscriber terminal. What Dr. Ghanem is describing is what we at AccelerNet have been advocating for some time: a "plug and play" high speed, cost effective wireless Internet delivery system. Upon passage of S. 2454, this system can be implemented in the very near future.

Section 336 of the Communications Act of 1934, as amended, and FCC Rule Section 73.624(c), implementing that provision, granted full service television stations broad authority to provide digital data services. DTV stations are permitted under this rule to offer "services of any nature," including data and interactive transmissions, on a supplementary or ancillary basis. The rule sets forth no limitation in the nature of one-way or two-way service, nor does it set forth how such service may be provided. That is left to the DTV station, subject to not derogating DTV service. S. 2454 would allow similar flexibility to LPTV stations.

The Committee should be concerned to ensure that over the air television reception will not be subject to interference as a result of S. 2454. As drafted, S. 2454 provides the FCC full authority to protect television reception. We have never had a complaint of interference from our one-way high speed Internet access service in Houston. Moreover, I have appended to my testimony the analysis of Dr. Daniel L. Sharre, Chief Technical Officer of Adaptive Broadband, which demonstrates that interference to television reception will not occur.

AccelerNet currently holds or has the right to acquire LPTV stations in various cities in the states of Arkansas, Arizona, Florida, Idaho, Montana, New York, Tennessee, Texas and Hawaii. We are currently in negotiations to acquire stations in Kansas, Virginia, Michigan and elsewhere throughout the U.S. Ultimately, it is our goal to be a part of providing every community in the nation with high-speed wireless Internet access. To attract sufficient capital to roll out service across the nation, we and other providers who may decide to provide a similar service need to be assured that we will not arbitrarily be displaced from our spectrum. We have attracted the interest of rural telephone companies, electric co-operative associations and other organizations who see the service we intend to offer as a means of providing rural America with the high-speed Internet access which it is currently denied.

The adoption of S. 2454 will allow AccelerNet and other service providers to bridge the digital divide in rural America and in other areas currently lacking high-speed Internet access. I urge you to support passage of this legislation.

DETECON, INC.,
Reston, VA, June 12, 2000.

Hon. CONRAD BURNS,
Washington, DC.

Dear Senator Burns,

I am the President of DETECON Incorporated, part of the DETECON Worldwide Telecommunications Consulting Organization. We specialize in Telecommunications Engineering, Technical Consultation and Management Services and are members of International Worldwide Standards Organizations, and have been particularly engaged in the United States in current and future generations wireless communications. AccelerNet, Inc. is one of our clients and we have been working with the AccelerNet team in developing the UHF low power television broadcast spectrum opportunity for 2 way high speed internet communications. I want to offer our insight as to the appropriateness of utilizing this spectrum and the assurance that can be given as to inference concerns and the feasibility of this approach.

Wireless Data is expected to undergo an explosive growth over the next several years and Internet access is an integral part of that market. data needs of the emerging The people of the United States use the Internet. Consumers and businesses use this important vehicle to communicate with families, friends and colleagues; to perform research and to purchase and sell goods. They are able to send and receive short messages and transmit large data files. However, there is a growing need for the ability to effectively transmit and receive larger files incorporating video and graphic applications. As a result, there is an ever-growing demand for high-speed access to meet the emerging data needs in the United States. One readily adaptable and cost effective alternative to the traditional landline network is to provide high-speed Internet access and services via wireless technology. As the industry struggles with an ever-expanding search for better use of the radio spectrum, providing high-speed Internet access from the UHF spectrum is a reasonable avenue to pursue.

Television channels in the Ultra-High Frequency (UHF) range are of interest to private industry because many are either available or are becoming available in major metropolitan markets across the USA. There is a great demand for spectrum in the United States as private industry attempts to meet the consumer demand for wireless services offering newer and better features. An UHF TV channel offers a desirable amount of spectrum in a frequency range that exhibits desirable propagation characteristics, in comparison to frequencies which other technologies are forced to amount of spectrum in a frequency range that exhibits desirable propagation characteristics, in comparison to frequencies which other technologies are forced to operate at. The UHF TV channels not already in use for NTSC (analog) UHF TV stations or for ATSC (digital) UHF DTV stations are currently under evaluation by a number of private companies for uses other than those originally intended; that is, for services other than television transmission.

AccelerNet would like to purchase UHF television channels, as allotted by the FCC,¹ for the purpose of delivering two-way high-speed Internet services. AccelerNet wishes to use one 6 MHz UHF TV channel in a given market to compete with the incumbents already offering these services, e.g. the local telephone company, independent Internet Service Providers (ISPs), Local Multipoint Distribution Service (LMDS), etc. AccelerNet would like to be able to offer their customers these fixed two-way high-speed data services in a totally wireless manner in the near future while assuring the FCC that no interference will be caused by the utilization of these UHF TV frequencies to existing or future UHF TV channels, e.g. existing National Television System Committee (NTSC) UHF TV channels, existing Advanced Television Systems Committee (ATSC) UHF DTV channels, and planned ATSC UHF HDTV channels.

¹<http://www.fcc.gov>.

The operating frequency range of this equipment will be, using one 6 MHz UHF TV channel, from 470 MHz to 698 MHz (channels 14–51), as specified for the geographical area for which it is allocated (typically a metropolitan area). AccelerNet will utilize existing technology in order to provide their service. There is a precedent for using the types of modulation and data transmittal that AccelerNet is currently evaluating for offering their service; LMDS, Multichannel Multipoint Distribution Service (MMDS), and Personal Communication Services (PCS) systems utilize the modulation and transmittal types that AccelerNet is considering. However, the frequencies that LMDS, MMDS, and PCS operate at have different propagation characteristics from those in the UHF range. LMDS operates in several bands in the 28–31 GHz range, the A band with 1.15 GHz of spectrum and the B band with 150 MHz of spectrum, this is a great deal of spectrum when compared to the 6 MHz of one UHF TV channel. However, the frequency range in which LMDS operates is strictly Line-Of-Sight (LOS), as everything in the environment severely attenuates the signal including inclement weather; these disadvantages severely limit the range of LMDS to a maximum of 15 km., although operational use can typically be around 2–8 km. MMDS operates in the 2.1–2.7 GHz range, utilizing multiple 6 MHz channels. PCS operates in the 1.9 GHz range, operating in several bands utilizing blocks of spectrum of either 10 MHz or 30 MHz. Both MMDS and PCS suffer from similar limitations due to their operating frequencies, they are essentially LOS but offer much greater ranges than LMDS. A UHF TV channel, while limited in the amount of spectrum, 6 MHz, has very desirable propagation characteristics, much greater than those of LMDS, MMDS, or PCS, and so, a fewer number of antenna sites is required to cover a given geographical area than with the other technologies.

The methods of modulation and data transmittal in LMDS, MMDS, PCS, and other wireless methods are: Frequency Division Duplexing (FDD), Time Division Duplexing (TDD), Code Division Multiple Access (CDMA), Quadrature Amplitude Modulation (QAM), and Phase Shift Keying (PSK). FDD is a less spectrally efficient method than TDD but is ideal for voice traffic when available bandwidth is not a concern. TDD is very good at utilizing existing spectrum in an efficient manner and is very well suited for Internet-type data traffic. CDMA is spectrally efficient, and well suited to either voice or data traffic, CDMA also utilizes its own methods of modulating data. TDD and FDD must utilize modulation methods such as QAM and PSK to transmit data; there are different types of QAM and PSK that they can utilize, for data 16-QAM, 64-QAM, an even 256-QAM have been utilized, as well as 8-PSK, the modulation method chosen depends on the available spectrum and the desired speed of the connection. These are accepted and proven methods of communicating both voice and data and have been utilized commercially at different frequencies and bandwidth allocations than the one for which AccelerNet plans to operate. In particular, systems utilizing TDD and CDMA are currently in use within spectrum-limited situations, where adjacent channel interference is a major concern (as it is with UHF TV), and these methods have performed very well in reducing interference and allowing the spectrum to be fully utilized. DETECON, Inc. feels strongly that some or all of these technologies can be adapted for the use of AccelerNet on a 6 MHz UHF TV channel. In particular, AccelerNet plans to utilize TDD for service introduction. In DETECON's opinion there is no impeding technological issue to applying currently used modulation approaches to the two-way high speed Internet application in a 6 MHz UHF low power television spectrum.

We would like to assure the FCC that no undue interference to any other radio-frequency (RF) services will be caused by the utilization of an UHF TV channel for the service that AccelerNet proposes. We propose to adhere to the specifications proposed by the ATSC,² the organization that formalized the HDTV standard for the United States of America. ATSC document A/64, Transmission Measurement and Compliance for Digital Television, Section 4.1.1,³ specifies the guidelines which must be met in order to avoid interference with existing NTSC TV channels, AccelerNet will comply with these guidelines in order to avoid interfering with other carriers utilizing TV channels and other radio frequencies.

In conclusion, in DETECON'S opinion, we feel very strongly that AccelerNet can take commercial advantage of an UHF TV channel and effectively compete with other technologies to offer two-way high-speed data services in a given market.

² <http://www.atsc.org>.

³ <http://www.atsc.org/standards/A64/>.

DETECON, Inc. also believes that AccelerNet can comply with any and all guidelines with regards to interference and spurious emissions so that the proposed modulation techniques AccelerNet uses will not interfere with operators in other parts of the radio spectrum.

Sincerely,

ALFRED F. BOSCHULTE,
President & CEO.

Attachment 2

Fixed wireless communications for the mass market

RF design, April 2000

By Adel Ghanem, Ph.D.

With an open market for many communications services, the current challenge is to offer a cost-effective package of services to both consumers and small businesses.

Fixed wireless could provide the best opportunity for a competitive alternative to wireline communications services but so far has had a minimal impact. The obvious competitive “no-brainer” has become an implementation and success story “no-gainer.”

A closer look at the reasons why suggests the opportunity has not passed us by. We’ve merely been focusing attentions on selling solutions destined for mediocre success—and/or failure—from the start.

It’s time to take advantage of the lessons learned from past successes and failures. By concentrating efforts on sound RF principles, innovative technology, efficient design and pro-competitive public policy and regulations, we can provide fixed wireless solutions that offer an economic and competitive alternative to everything the wireline public network has to offer—voice, data, even video

What’s needed

First and foremost, a competitive fixed wireless offering needs to be focused on the mass market as opposed to the current focus on the high-end, large business users. A solution that isn’t designed with the residential and small office home office (SOHO) market in mind at the outset is less likely to be an economic alternative in hindsight.

There is no lack of telecommunications alternatives for high-end business customers. And as these solutions—wireline and wireless—become more and more competitive, they could become economic options for medium-size businesses. But they will likely never become an economic alternative for the residential and SOHO markets. From the capacity, functionality, and ease of installation points of view, they weren’t designed with those customers in mind—a major distinction.

The economics of the mass market are all about cost and price. This isn’t a new or major revelation. Cellular and personal communications system (PCS) carriers have proven that we sell a lot more wireless service with free or \$49 phones than with \$249 or \$1,499 phones.

But it’s a well known fact that cellular networks and service weren’t, initially, designed for the mass market. Actually, cellular was once viewed as having very limited market potential. It is a good example of a technology application which found/developed a sizeable market and continues to reinvent itself to become more acceptable and affordable to a wider audience.

Fixed wireless solutions, designed for the mass market, need special attention paid to technologies and specifications that allow cost effective networks to be built. PCS carriers helped drive efforts to incorporate cost-saving technologies into their networks because without a lower operating cost—and corresponding lower overall service costs—there was little hope of attracting customers away from cellular.

Fixed wireless networks present similar challenges and bigger opportunities. By definition, fixed wireless requires the installation of a “fixed” subscriber terminal—a costly consideration if installed by a qualified technician. But if the subscriber terminal could be self-installed, the service economics would change considerably.

Subscriber-installed terminals could have the same impact on fixed wireless as they had on the direct broadcast satellite (DBS) market, where a similar problem existed. Initially, special technicians were required for all satellite installations, which delayed the overall service penetration. The solution to this dilemma was a self-installation kit and a bit of innovative technology.

Today, the self-directing installation kit guides the subscriber through the process. A signal at the set-top receiver tells them when the satellite dish is positioned properly for the strongest signal strength. By removing a major implementation cost and hurdle, the service is applicable and appealing to a wider audience, while improving the overall economics of the business plan.

All of the above-described factors play a role today in fixed wireless implementations. And they further suggest what else needs to change. Meeting these conditions for economic, competitive, self-installed fixed wireless equipment and services suggests efforts should be concentrated on finding solutions that operate in lower, rather than higher, frequency bands—counter to all existing efforts to date.

Wireless systems operating in lower frequency bands reduce the point-to-point or line-of-sight requirements, making self-installation possible and eliminating a major cost and implementation hurdle. And that factor alone will have a major impact on the economics of fixed wireless infrastructure and implementations.

Furthermore, the availability of spectrum in the lower or sub-2.5 GHz frequency bands suggests other RF technologies, such as time-division duplexing (TDD), must be considered for fixed wireless applications. Lower frequencies allow for a less complex RF solution and TDD implementations worldwide have proven efficient, cost-effective and viable for mass-market applications.

Fixed wireless systems based on TDD technology and operating in sub-2.5 GHz offer the best opportunity for a cost-effective, competitive alternative to wireline telecommunications services. And competitive service providers—wireless or wireline—should concentrate efforts on seeing these solutions are given a fair opportunity to be brought to market.

The search for higher ground: an historical perspective

Prior to the Telecommunications Act of 1996 there wasn't much emphasis on mass-market competitive local exchange services. And given the state-of-the-art in wireless technology, lower frequencies weren't a fixed wireless service option. It is difficult to say—from a chicken-and-egg perspective—which came first or mattered most, but both prevented serious consideration and development of cost-effective fixed wireless solutions.

The lack of competitive incentive prior to 1996 is perhaps easiest to explain. Although fixed wireless offers no-brainer status as a competitive local exchange alternative, there wasn't a carrier group particularly interested in pursuing the residential opportunity—wireless or wireline.

From 1992 on, most of the wireless attention was centered on PCS spectrum auctions and bringing competitive alternatives to the “cellular” duopoly. Mobility was key in every wireless business plan and although fixed wireless was not prohibited in any way, it did not reflect the interests of auction participants or the best perceived market opportunity for the available spectrum.

Likewise, in the same time frame on the wireline side, competitive local exchange carriers (CLECs) were still known as competitive access providers (CAPs). All their efforts were concentrated on constructing fiber optic rings and providing lower cost and reliable wireline telecommunications service alternatives for lucrative business customers. Residential and SOHO subscribers were not on the radar screen.

Cable TV companies expressed interest and “dabbled” in telecommunications trials but the complexities of providing high-reliability telephone services ran counter to their existing operations. So despite their interest in expanding the service offerings to their residential customer base, their existing cable plant prevented execution of the strategy.

With the only available lower frequency spectrum being “reserved” for mobility applications and a general lack of interest in competitive residential local exchange services, fixed wireless applications garnered very little service interest.

The impact of available wireless technologies factored into the fixed wireless development equation as well. At the time, most wireless equipment manufacturers developed solutions based on state-of-the-art frequency division duplexing (FDD) access schemes to support the needed high-speed mobility.

In contrast to TDD, FDD divides its transmission into transmit (upband) and receive (downband) frequencies separated by a guard band of a specific size. The use of FDD for wireless applications was widely accepted and in many respects the defacto standard. In fact, the PCS spectrum allocations were established with FDD duplexing in mind.

The selection of FDD by equipment manufacturers for mobility applications led to the same choice for fixed wireless. Despite the lack of interest within the U.S., fixed wireless became a preferred solution for basic telecommunications in many competitive offerings worldwide, especially in underdeveloped regions. To compete for these worldwide contracts, vendors needed to include fixed wireless systems in

their product line. For obvious reasons of convenience and economies of scale, equipment manufacturers developed fixed wireless solutions, from their stable of available mobility solutions, that were already based on FDD technology.

In turn, the use of FDD in product offerings pushed fixed wireless applications into higher and higher frequency bands where paired-bands can still be allocated. The lack of large blocks of spectrum—required for FDD—in the U.S. and most of the world prevented consideration of lower frequency applications.

This fluke of logic, convenience and/or progression of events, is why fixed wireless solutions have encountered only mediocre success from the start. Fixed wireless developed into a higher frequency wireless mobility “adaptation” instead of a lower frequency “designed for the masses” efficient, economic alternative to wireline’s hold on residential access.

Low frequency advantages

It’s not that it isn’t possible to construct an efficient, cost-effective fixed wireless system at higher frequencies. But given the alternative of lower versus higher frequency solutions who wouldn’t choose sub-2.5 GHz?

Wireless technology gets better and more stable every day but some basic facts and laws of physics will never change. A rainstorm still wipes out wireless transmission at 24 GHz and even a simple rainy day can block signals at 3 GHz.

Even foliage and building obstructions have a greater impact at higher frequencies. For example, a 3.6 GHz fixed wireless installation in Poland worked perfectly following its fall installation but ground to a halt in spring. The strange phenomenon design engineers failed to account for was the annual reappearance of tree leaves.

At lower frequencies, Mother Nature would not have had an impact. And while design options include raising antennas to “see” over the trees, trees will continue to grow and the problem will likely reoccur.

Urban fixed wireless deployments can be even more disconcerting. Building heights and other obstructions force the use of sophisticated modeling tools and experienced technicians for mapping and installation on a sight-by-sight basis. Certainly not an economic, low-cost alternative.

In-building penetration could also benefit from lower frequency transmission and impact fixed wireless applications. Who hasn’t noticed the difference between in-building penetration of cellular and PCS frequencies in the U.S.? Because of its sub 1.0 GHz frequency, cellular exhibits greater in-building penetration when compared to PCS at 1.9 GHz. Even in the middle of a building you will likely receive a cellular call, whereas PCS transmission in the lobby of many high-rise buildings gets dicey. Now consider the implications of these same frequencies on fixed wireless where you don’t have the option of “walking” the antenna for better reception.

In fact, all wireless applications at high frequencies require line-of-sight transmission for optimal performance. This restriction alone can kill the economics of an urban or even suburban fixed wireless application.

In contrast, lower frequencies don’t require line-of-sight, nor is it necessary to pinpoint antennas with laser-beam precision. Signals are more tolerant and can bend around and penetrate a wider range of structures. And imagine the impact on a fixed wireless business case if the subscriber terminal could be self-installed or placed within the home or business.

The business case drives all wireless ventures and the “numbers” have to work. Low frequency fixed wireless has a business case advantage in the overall cost of system equipment. For the same output power, the cell size is larger at lower frequencies, requiring fewer base stations and reducing infrastructure costs.

For example, a fixed wireless application in a sub-2.5 GHz frequency provides a cell size range of 15–25 km. With that coverage, many urban and suburban applications could be handled with a single cell and base station.

In contrast, at higher frequencies the laws of physics shrink the cell radius and coverage for the same system output power. It forces operating in a micro rather than macro cellular environment with corresponding effects on design, equipment costs and ease of installation. Not to mention that high-frequency transceivers are just more complex and require greater attention to detail.

In totality, the combination of all these factors suggest lower frequencies are the economic choice for fixed wireless applications if providers are serious about providing a “competitive” alternative to wireline.

Enter TDD

Yet, that assertion contains a Catch-22 of sorts. With the last sub-2.5 GHz spectrum going to PCS mobility applications there hasn’t been sufficient lower frequency spectrum available.

Taken at face value, the assertion is true. There isn't sufficient lower frequency spectrum to accommodate fixed wireless or even other mobility applications—if FDD is the duplexing assumption.

That frequency quandary forced manufacturers, carriers, governments and regulators worldwide to search, select and set-aside spectrum blocks at higher frequencies for fixed wireless applications. But the logic behind the search for a frequency “home” that meets the needs and requirements of a particular wireless “technology” is counterintuitive. FDD isn't required or necessary for many fixed wireless applications.

Selecting wireless technologies and frequencies that maximize the economics and business case of a mass-market application should have been the thrust. And under those assumptions, time division duplexing in sub-2.5 GHz frequency bands is the logical choice.

For starters, TDD spectrum could be squeezed into any available contiguous spectrum. Because the transmission is time-slot, rather than frequency-based, it requires a single contiguous chunk of spectrum for transmitting and receiving. Its “Ping-Pong” transmission approach is very effective for fixed applications and slow-speed mobility.

TDD transceivers are also significantly less complex and more cost effective than FDD transceivers on both the subscriber and base station side. For the base station, TDD eliminates the need for expensive duplexers. With subscriber equipment, the transceiver is much simpler and more cost effective to implement.

One reason is TDD's channel reciprocity. Because it uses the same channel for transmitting and receiving, channel characteristics seen at the base station could be considered as identical to those of the subscriber unit. This channel reciprocity simplifies the TDD equipment design considerably.

There have been past concerns about TDD and its susceptibility to echo and difficulty with synchronization. But the industry and technology has evolved to ensure these concerns are no longer valid. Proper system design and technology innovations have significantly reduced the potential of echo in even the longest TDD links. Further, with global positioning satellite (GPS) technology, all cells can be synchronized to the same clock, guaranteeing the synchronization between the transmit and receive time slots in all adjacent cells, thereby eliminating possible inter-cell interference.

The only remaining concern surrounding TDD technology is that it hasn't received sufficient market attention as a competitive fixed wireless alternative. It's not that there aren't successful TDD implementations worldwide. In fact, TDD success stories include wireless PBX technologies (like personal handiphone systems (PHS) in Japan, digital European cordless telephone (DECT) in Europe) and a number of fixed wireless advanced code-division multiple access (ACDMA) implementations around the world. By design, PHS and DECT take a micro-cellular approach while ACDMA offers the wide-area and high capacity coverage of a macro-cellular design.

The encouraging fact is that TDD can offer an efficient, cost-effective infrastructure alternative for competitive fixed wireless applications targeted at a mass market—if lower frequencies can be made available.

What needs to happen

The challenge of finding lower-frequency available spectrum isn't as large an “if” as it might first appear. But there are a number of factors needing sufficient attention to bring lower frequency fixed wireless TDD applications to market.

First and foremost we need to generate more serious attention to providing a competitive alternative to incumbent local exchange carrier (ILEC) telecommunications services. And that attention should be concentrated on encouraging fixed wireless applications.

Regional bell operating companies (RBOCs) are slowly being allowed into the long distance market because local exchange competition “exists.” But that competition is hardly ubiquitous and there are really no serious alternatives available for the mass-market residential customer aside from using the RBOCs own outside plant facilities.

AT&T has switched local exchange access strategies a number of times from the wireless “Project Angel” to a \$100 billion gamble on cable TV infrastructure. Apparently it is “serious” about local exchange alternatives, but hasn't yet hit on a killer, cost-effective strategy (perhaps we should take another look at recently announced fixed wireless products using newly developed CDMA/TDD technologies).

Making lower frequency fixed wireless TDD applications a possibility requires cooperation from the FCC and other regulatory bodies to ensure rules and regulations support rather than hinder the opportunity for a mass-market success story. That could include removing requirements that suggest, dictate or favor specific tech-

nologies, such as FDD. Taking a bold step and encouraging or specifying the use of TDD for specific spectrum allocations is another option.

Existing unintentional restrictions include mobile antenna output power requirements. Because mobile applications use omnidirectional antennas, output power is restricted to reduce radiation patterns and possible interference among the mobile units. But the same requirements aren't necessary for fixed wireless applications.

With fixed wireless using directional antennas, transmit power can remain high without creating the same interference problems. The results are increased link budgets, resulting in wider and better coverage for the same or reduced cost—a plus for cost-effective, mass-market implementations.

Eliminating the restriction could open up D, E and F allocations in the PCS bands for fixed wireless consideration. Many of these PCS auction winners have yet to deploy because the spectrum allocations are limited in size to support high capacity mobile networks. Rather than sit on valuable spectrum or introduce yet another risky mobile application, perhaps TDD-based fixed wireless deserves a second look.

Additional lower frequency spectrum is now available with more to come in the future. Examples include the upcoming 700 MHz auction of vacated television channel frequencies and spectrum in the 400 MHz range now used by analog services being phased out.

Recent moves by the FCC regarding the 700 MHz frequencies suggest more of an FDD slant. But while it is possible to construct a paired band out of the available 30 MHz to allow for FDD applications, using the band for TDD implementations eliminates the need for significant guard bands and hence increases the available spectrum for wireless communications services.

Lastly, a concerted effort by equipment manufacturers to explore and expand TDD options is warranted. Carriers have been “pushed” into higher frequency applications because FDD solutions are what wireless equipment manufacturers have had to offer.

The future

Wireless equipment vendors need to focus energies on turning out TDD applications that ensure the competitive success of a mass-market fixed wireless alternative to wireline. That translates to modular equipment configurations that offer a “pay as you grow” philosophy for prospective carriers without the deep pockets of an AT&T or MCI WorldComm.

Carriers can not depend on a “build it and they will come” wireless equipment mentality. As sure a bet as alternative residential and SOHO local exchange service may appear—considering the unmet demand for inexpensive, high-bandwidth Internet connections—carriers still need scalable solutions, providing cost-effective implementations and realistic returns for 100 or 100,000 subscribers.

These equipment, regulatory and competitive environment goals are attainable and the alternative of TDD-based fixed wireless access solutions is realistic. But the cycle of technology dictating wireless solutions needs to end.

Communications services for the mass-market require solutions designed to incorporate every frequency, wireless technology and implementation advantage possible. Lower frequency TDD fixed wireless applications are the real competitive opportunity. Adapting what's convenient and available should not be an option.

Attachment 3

ADAPTIVE BROADBAND CORPORATION,
Sunnyvale, CA, June 12, 2000.

Hon. CONRAD BURNS,
Washington, DC.

Re: AccelerNet

Dear Senator Burns:

I have been asked to explain why the two-way wireless Internet access service using low-power television stations proposed by U.S. Interactive, LLC d/b/a AccelerNet is not a risk for causing interference to other television licenses in the UHF band. This letter will address that subject, as well as present to you information demonstrating that the technology we would supply AccelerNet is proven and workable.

By way of background, I am Executive Vice President and Chief Technical Officer of Adaptive Broadband Corporation, and have served as such since September of 1997. I hold a Ph.D. in physics from the University of California, Berkeley, an MBA from Santa Clara University, and a BA from the California Institute of Technology.

Prior to September 1997, I was Vice President and Chief Technical Officer of ComStream Inc. Prior to that position, I held various executive and management positions at Ilex Systems; Loral Western Development Labs, and Space Applications Corporation. In 1985 I founded Theta Corporation and served as its President and Chief Executive Officer. From 1977 to 1982 I was an assistant professor of high energy particle physics at Stanford University.

Adaptive Broadband is a pioneer in the wireless broadband access market. Founded in 1968, as California Microwave, we are a leading supplier of terrestrial wireless systems that support ultra high-speed Internet access. In 1998, we acquired Adaptive Broadband Limited of Cambridge, U.K. The new AB-Access system developed from that acquisition offers a solution that provides wireless broadband access delivering up to 25 Mbps to each user based upon demand, which is 400 times faster than conventional modem networks. This product is made possible by a patent-pending packet algorithm that adjusts efficiently to the ebb and flow of asymmetric Internet data traffic and supports the widest range of available spectrum.

AccelerNet's plan for delivering two-way wireless high-speed Internet access using low-power television stations is an innovative and very workable concept that we are very excited to assist. The likelihood that operation would cause interference to existing television or other users of the UHF band is extremely remote for a number of reasons.

As I understand the plan, AccelerNet would utilize existing low power television stations and certain newly licensed additional stations as base stations only where they fit under the FCC's current rules. Thus, these base stations would comply with current FCC interference protection requirements with respect to full power, other low power television stations, and any other authorized users in the UHF band. Thus, there is no question of interference from the base station transmissions themselves. Hence, the only real question is one of whether the subscriber units, consisting of wireless modems which would talk back to the low-power stations with specific requests for Internet data, could cause interference. This is also not a meaningful possibility.

Interference might only occur in the circumstance where a television receiver is: (1) near the edge of the service contour of a broadcast station operating adjacent to the system's transmitting channel, and (2) in proximity to an operating subscriber unit. This in itself, is highly improbable. Moreover, several circumstances combine to render interference even in this scenario, extremely remote:

First, AccelerNet has indicated that the subscriber units will operate with low power, in the neighborhood of one watt or less. This plainly limits the potential for interference from these units.

Second, system design will provide that the subscriber unit will operate with the minimum power necessary to carry on communication, similar to how the cellular and PCS services operate. Thus, actual operating power of subscriber units will almost always be well below the peak power of the unit.

Third, if I understand the AccelerNet service model, the wireless access is such that more than 99 percent of transmission time for the system will be in the downlink mode from the base station to the thousands of subscriber units located in the system's service area. The individual subscriber unit's operating time (uplink mode) will be greatly limited, consisting of sporadic transmissions of a length of a few microseconds each, which will be insufficient to have any substantial affect upon even extremely proximate television reception.

Fourth, prevention of interference in this case is primarily a function of the emission mask applicable to signal transmissions. The emission mask which will be employed for the subscriber units for AccelerNet will result in lower absolute power emission levels than that specified for full service DIV operation by the FCC in FCC Rule Section 73.622(h). This is a stringent emission limitation. The tighter the emission limitation, the less likely the potential of interference to adjacent channel television reception.

Fifth, in the extremely unlikely situation where an interference problem actually occurs, it would be handled as it currently is handled—for example, when high power television stations interfere with TV reception in the areas immediately around their transmitters—with the installation of an inexpensive filter.

In light of the circumstances set forth above, I am confident that AccelerNet's operation will not result in interference to other authorized licensees in the UHF band. In this connection, one additional observation is appropriate. The FCC has authorized in its rules full power digital television stations (DTV) to provide digital data services, including Internet access, on an ancillary or supplementary basis. FCC Rule Section 73.624(c) states that

provided that DTV stations comply with paragraph (b) of this section [which is not relevant to this discussion], DTV broadcast stations are permitted to offer services of any nature, consistent with the public interest convenience, and necessity, on an ancillary or supplementary basis. The kinds of services that may be provided include, but are not limited to, computer software distribution, data transmissions, teletext, interactive materials, aural messages, paging services, audio signals, subscription video, and any other services that do not derogate DTV broadcast stations' obligations under paragraph (b) of this section. Such services may be provided on a broadcast, point-to-point or point-to-multipoint basis, provided, however, that any video broadcast signal provided at no direct charge to viewers shall not be considered ancillary or supplementary.

The FCC's rules thus appear to give broad authority to DTV stations to offer data services of their choice, and leave technical design for these digital data services to their discretion, subject to compliance with the emission mask set by the DTV rules in order to prevent interference, in line with the approach required of full power DTV stations, AccelerNet would comply with the DTV emission mask and take such other action as necessary to ensure it will not cause interference. Moreover, the FCC will have full authority to require remediation in the unlikely event interference may occur, just as with full service DTV operation.

You have also raised a question concerning whether the service AccelerNet will provide will actually work.

I can assure you that the TDD technology Adaptive Broadband would provide AccelerNet will work. Adaptive Broadband is currently producing TDD equipment operating in the 2.5 to 2.686 GHz MMDS band, and in the 5.25 to 5.825 GHz U-NII (unlicensed) band. This equipment provides a two-way wireless Internet I access service very similar to what AccelerNet would be implementing. Modifying this equipment for UHF operation will be straightforward. It will essentially require re-channeling the radio to the UHF band and fashioning an integral antenna for the subscriber unit. Those are relatively simple engineering tasks.

In fact, Adaptive Broadband will have TDD product available for use by high bidders in the FCC's upcoming 700 MHz band auction, should such licensees desire to provide digital data services and should these licenses contract with Adaptive Broadband for development and manufacture of such product. There are no material differences in radio system design and implementation in that 700 MHz band, compared with operation in the lower portions of the UHF band used by low-power TV stations. Thus, there is no question but that this technology will work on low-power TV spectrum.

Specifically, the TDD technology AccelerNet would employ from Adaptive Broadband is particularly suited to Internet access applications compared to conventional wireless technology. Current wireless technology, such as that used by cellular, PCS and other systems such as Nextel's employs Frequency Division Duplexing (FDD). FDD systems require separate dedicated transmit and receive spectrum. They are thus comparably inefficient because at least one-half of the spectrum must be silent while the other half of the spectrum is used for transmission. With Internet access, and other digital data services, the inefficiency of FDD technology is even more pronounced. This is because—unlike voice—data transmissions are highly asynchronous. Thus, although a 58 Kbps plain old telephone (POTS) line can, in many instances, adequately handle the uplink for Internet access, today's marketplace frequently requires the downlink side to provide data rates of more than 1 Mbps. Hence, an FDD system becomes even more inefficient when employed for delivery of data.

TDD systems solve this problem of spectral inefficiency by employing the same spectrum to transmit both the downlink and uplink segments of a two-way transmission. With TDD, no aspect of bandwidth is committed, allowing dynamic allocation of spectral resources to serve users with data to transmit and dynamically altering direction according to traffic load. This greatly increases the efficiency of spectrum use, with spectrum use dynamically altering from upstream to downstream in less than a millisecond, as compared to traditional FDD systems, which allocate fixed partitions of spectrum to upstream and downstream traffic thereby resulting in unused spectrum. TDD, therefore, results in an improvement in efficiency by a factor of two to eight times. It is, therefore, estimated that just one site of a TDD system can adequately serve some 12,000 users. By contrast, cellular systems have a much smaller capacity per cell. TDD systems are thus more cost effective than FDD systems for data transmission, to the benefit of both the service provider and the consuming public.

Moreover, UHF offers certain advantages compared to MMDS and U-NII bands in terms of propagation and building penetration. Thus, it is expected that sub-

scriber units will be able to operate effectively without the need for outdoor antennas. Currently MIMDS and U-NII subscriber equipment generally require outdoor antennas. UHF operation thus has considerable benefit to the public in terms of increased utility and reliability compared to existing applications.

We are aware that other TDD equipment suppliers, such as TRW and Arraycomm, Inc. have publicly announced plans to offer UHF equipment for TDD operation. Thus, this is not an issue where there should be any substantial question in the industry but that the technology works.

Copies of materials you may find of interest relating to the points covered in this letter are enclosed for your information.

I would be pleased to discuss this matter directly with you at your convenience.

Very truly yours,

DANIEL L. SCHARRE,
Executive Vice President.

Senator BURNS. Thank you.

Mr. Morton, director of Community Broadcasters Association.

**STATEMENT OF LARRY MORTON, DIRECTOR, COMMUNITY
BROADCASTERS ASSOCIATION**

Mr. MORTON. Mr. Chairman, thank you.

My name is Larry Morton. I am a member of the board of directors of the Community Broadcasters Association, and president of Equity Broadcasting Corporation. I appreciate the opportunity the Committee has given me today to come here and testify in support of passage of S. 2454. The CBA is the principal trade association of low power television broadcasters.

We supported and appreciated the efforts of the Members of Congress who enacted the Community Broadcasters Protection Act into law last year. As a result of that act, community broadcasters with a record of substantial public service now have been given some measure of certainty that the investment they make to provide service to their local communities will not be subject to loss at the whim of the FCC.

Previously, the FCC could, or had the ability to authorize Class A legislation. Frankly, I believe it is questionable this would have happened today had it not been for the legislative action the Congress did to support this. We really thank you for your consideration and support in this effort.

S. 2454 would expand the class of LPTV stations entitled to protection to include those LPTV stations which provide the public digital data services, including wireless Internet. The CBA enthusiastically supports this legislation. However, we do believe there are two issues that need to be clarified.

The first of these issues is to create a public service guideline for future Class A stations to avoid owners leaving the broadcast spectrum solely for digital transmission as a safe harbor to protect their license, and second to limit the initial transition to digital data services to existing licensees and permittees to avoid mass speculation in the pending filing window.

These issues are discussed in detail in my written testimony.

Now, briefly, I would like to put on my other hat as the president of Equity Broadcasting Corporation. Equity Broadcasting Corporation owns and operates two full power television stations, has two more under construction, and has an additional full power station under contract.

In addition to that, we have an interest in more than 20 full power television station construction permits and applications. We also own and operate 12 radio stations, and have 35 low power television stations.

To some degree I have a foot in each one of these arenas, and so I think I am in a unique situation to look at this objectively. From this position, I firmly believe that low power television is a very unique situation, and is very vital to our country. Low power television is probably the most effective use of the broadcast spectrum there is.

Something I often do in talking about this, I use an analogy, and I am sorry Senator Stevens is not here for this. He has better ones than I do. But it is like a bucketful of rocks. That bucket seems to be full. It weighs a lot. But if you look at it, you see all these gaps in between where the rocks fit together, and if you want to pour some sand in there, you can actually probably put another half a bucket of sand in between those gaps.

And that is what low power television has done and community broadcasters have done. They have taken the gaps that were initially in the spectrum, gaps that other people overlooked and thought to be not worth much, or even worthless, and brought vital services to the community. The usage of this spectrum for wireless digital data services is another way to maximize this usage for the good of the public.

Obviously, the importance of Internet access is obvious to even the most casual observer. In its short existence, the Internet has grown to become an important medium for the conduct of commerce, the education of our children, and the maintenance of the informed and enlightened electorate necessary for our free society.

As Alan Greenspan pointed out this week, the Internet is one of the engines which is driving the United States economy to record levels of productivity and employment. Recent estimates are that e-commerce will total some \$300 billion by 2002. Enactment of 2454 will help facilitate full public access to the Internet, which in turn will promote the continued expansion of our economy.

As Congress, the administration, and the FCC have all recognized, not every American enjoys the benefits of the Internet, especially high speed Internet service. As Chairman Kennard said last week in a speech in Atlanta, the Internet can either be the great equalizer, or just another missed opportunity. Access makes the difference. Access to high speed Internet services is severely restricted in this Nation. Indeed, it has been suggested that we confront a digital divide.

In its recent report on advanced telecommunications in rural America, NTIA found that rural areas are currently lagging far behind urban areas in access to high speed Internet. The economics of wireless operation in rural areas are much more favorable than wired operations.

There is obviously a major problem in achieving the potential for wireless high speed Internet access which this Committee may help resolve by favorable action on S. 2454. That problem is the lack of sufficient and adequate spectrum.

Currently, spectrum available for two-way wireless high speed data services is restricted to LMDS, MMDS, and unlicensed PCS

spectrum. Other wireless spectrum suffers from technical or practical problems, including the high demand for mobile voice service and narrow band configuration. The currently available bands, however, are in the microwave area of the electromagnetic spectrum.

Microwave spectrum is particularly unsuited for this type of service. It suffers signal degradation from rain. It is impeded by trees and foliage, and it cannot easily penetrate building structures. LPTV stations operating in the UHF band, however, can deliver high speed wireless Internet access to homes, offices, and classrooms without facing these problems, and in most cases without the need for exterior antenna.

The need to provide high speed DSL quality Internet services to areas not currently served at a cost-effective price is a key public interest concern. As the FCC has repeatedly recognized, as Chairman Kennard said, our challenge is not just to build the Internet that goes faster, but that goes farther, that reaches all Americans.

We need to make sure that the opportunities that the Internet and communications technologies provided are available to all Americans. This high priority initiative is fully consistent with Congress' direction to the FCC in the Telecommunications Act of 1996 to promote the goal of widespread deployment of advanced services. This proposed legislation is directly responsive to this goal, and will facilitate its achievement.

As I previously stated, Community Broadcasters' board of directors has unanimously supported this legislation, and as president of Equity Broadcasting Company, a company that has a uniquely unbiased view of this industry, we all support the legislation, the passage of this legislation and hope you will expedite its process.

Thank you.

[The prepared statement of Mr. Morton follows:]

PREPARED STATEMENT OF LARRY MORTON, DIRECTOR,
COMMUNITY BROADCASTERS ASSOCIATION

Mr. Chairman, my name is Larry Morton. I am a member of the board of directors of the Community Broadcasters Association ("CBA") and President of Equity Broadcasting Corporation. I appreciate the opportunity the Committee has given me today to come here and support the passage of S. 2454.

The CBA is the principal trade association of Low Power Television broadcasters. We supported and we appreciated the efforts of members of Congress who enacted the Community Broadcasters Protection Act into law last year. As a result of that Act, LPTV broadcasters with a record of substantial public service now have been given some measure of certainty that the investments they make to provide service to their local communities will not be subject to loss at the whim of the FCC. We thank you for that consideration.

S. 2454 would expand the class of LPTV stations entitled to Class A protection to include those LPTV stations which provide the public digital data services, including wireless Internet access. The CBA enthusiastically supports this legislation; however we believe there are two issues that need to be clarified.

First, on May 1, 2000, the Commission announced an auction filing window for new LPTV and translator station applications. The filing period is July 30–August 4 of this year. Although this filing opportunity was intended principally to allow for new applications in rural areas that have limited television service, this legislation could change the dynamics of this filing period. The result could be the filing of speculative applications which would ultimately compete and conflict with those who are trying to provide a few more basic channels of broadcast television in highly rural areas.

There is a solution to this problem. CBA proposes a modification to Sec. (h)(1) of this legislation to limit eligibility under this Act to existing licensees and holders

of construction permits. We suggest a cutoff date of June 30, 2000. This would effectively eliminate speculators from the upcoming filing window.

Secondly, CBA is also concerned that this legislation could provide incentives to non-Class A LPTV broadcast stations to become data service providers because this legislation would provide them the only pathway to protect their license. That clearly isn't the purpose of this legislation and CBA wants to be certain that this is not an unintended result.

Mr. Chairman, in S. 1547, the Community Broadcasters Protection Act of 1999 which you authored last year and which became law on November 29, 1999, you provided LPTV licensees two opportunities to qualify for a permanent, Class A license. First, a station was eligible if for 90 days before enactment it was on the air 18 hours per day and averaged no fewer than 3-hours of locally originated programming on a weekly basis. Second, a station could become eligible if the Commission determined it was in the public interest.

I believe you understood and we shared that view, that the Commission would develop, through its regulatory process, a public interest test so that stations that did not initially qualify, would have a future opportunity to file a petition with the Commission and become a Class A station.

In its March 28, 2000, Class A Report and Order, the Commission determined mistakenly that the purpose of the legislation was to provide a single window of opportunity to existing LPTV stations. On that basis the Commission decided not to grant additional Class A licenses beyond those who qualified during the 90 days prior to enactment of the CBPA.

CBA believes that decision was wrong. With this misinterpretation of S.1547, this legislation now creates the circumstances where a LPTV licensee can gain Class A status if it is engaged in digital data services but cannot gain Class A status as a television broadcast station. To correct this problem, CBA recommends the Committee simply include in this legislation clarifying language on the purpose of Sec. (f)(2)(c) of the CBPA and direct the Commission to implement public interest standards and appropriate regulations within a reasonable period not to exceed 12 months. The CBA board strongly recommends expedited approval of this legislation.

To understand the value of data services and the importance of this legislation to underserved areas, you only need to look at the impact of the Internet on society. In its short period of existence, the Internet has grown to become an important medium for the conduct of commerce, the education of our children, and the maintenance of the informed and enlightened electorate necessary to our free society. Given its status in the United States as a substantial educational, promotional, sales and distribution channel, the Internet is one of the engines which is driving the United States economy to record levels of productivity and employment. Recent estimates are that e-commerce will total some \$300 billion by 2002. Enactment of S. 2454 will serve to facilitate full public access to the Internet which will, in turn, inure to the continued expansion of the economy.

As Congress, the administration, and the FCC have all recognized, not every American has been able to enjoy fully the benefits of the Internet, especially high-speed Internet service. As FCC Chairman Kennard said just last week in a speech in Atlanta, "The Internet can either be the great equalizer, or just another missed opportunity. Access . . . access makes the difference."¹

Access to high speed Internet service is severely restricted in this nation. Indeed, it has been suggested that we confront a "digital divide." In its recent report on Advanced Telecommunications in Rural America, NTIA found that rural areas are currently lagging far behind urban areas in access to high-speed Internet service. The report found that broadband services were essentially limited to two technologies: cable modem and digital subscriber line ("DSL"). The report also pointed out that these technologies were primarily available only in urban areas. The report found that less than five percent of towns of 10,000 or fewer have cable modem service, while 65 percent of cities of 250,000 or more had such service. Both of those figures I submit are plainly inadequate.

DSL service was likewise found chiefly limited to urban areas. Of cities of more than 100,000, only 56 percent had DSL service. However, fewer than five percent of cities of 10,000 or less had such service. And deployment of either cable modem or DSL service in rural areas was found to be even lower. The reason for these abysmally low rates of service in the rural areas was found to be economic. According to the Report, "For wireline construction, the cost to serve a customer increases the greater the distance among customers."

¹ Remark of William E. Kennard at The Supercomm 2000 International Dinner, Atlanta, GA (June 5, 2000).

The economics of wireless operations in rural areas, however, are much more favorable. However, there is a major problem in achieving the potential for wireless high-speed Internet access, which this Committee may help resolve by favorable action on S. 2454: the lack of sufficient and adequate spectrum. Currently, spectrum available for two-way wireless high-speed data services is restricted to LMDS/MMDS and unlicensed PCS spectrum. Other wireless spectrum suffers from technical or practical problems, including the high demand for mobile voice service. These currently available bands, however, are in the microwave area of the electromagnetic spectrum. Microwave spectrum is particularly unsuited to this type of service. It suffers signal degradation from rain; it is impeded by trees and foliage; and it cannot easily penetrate into building structures. Thus, existing wireless data applications require a relatively expensive outdoor antenna to bring signals into the home, the office or the classroom. And even then, there are distance limitations due to the lower propagation characteristics of the signal at those frequencies. LPTV stations operating in the UHF band, however, can deliver high-speed wireless Internet access to homes, offices and classrooms in most cases without the need for exterior antennae.

The recent history of the telecommunications industry aptly illustrates the demand and utility of unwired access to digital services. Wireless telecommunications has been a substantial enhancement to the United States economy. Wireless Internet access promises similar economic benefits. The use of low-power television stations to provide high-speed digital Internet access is particularly appropriate given that such stations have struggled for market acceptance. Allowing their facilities to be used for wireless Internet access would facilitate the highest and best use of their facilities. Moreover, use of low-power television stations for wireless Internet access would facilitate the national priority of the provision of Internet access to schools and public libraries across the nation without the necessity for expensive and disruptive rewiring of those facilities. Rewiring the existing base of schools and public libraries runs the further substantial risk of adverse environmental consequences stemming from, among other things, asbestos release. Moreover, among the other uses for this novel service is to make available telemedicine of digital television quality. Telemedicine will enhance the ability of physicians and emergency room personnel to treat injured or ill patients from rural and remote areas.

Allowing LPTV stations to provide digital data services—while it is certainly innovative—is fully in keeping with the policy goals the FCC has announced. In a July 20, 1999, speech, FCC Chairman Kennard described the Commission's program for flexible use of wireless spectrum as an effort aimed at promoting competition. Specifically, he stated, "Since the early 1990s, the FCC has given holders of wireless licenses flexibility in their use. This opened the door for wireless Internet access, which is now available in dedicated modems or even in wireless phones themselves. We've continued to promote competition by making more spectrum available and doing so without restrictions as to [its] use." S. 2454 would provide that flexibility to LPTV operators as well.

Furthermore, in a report to Congress, the FCC stated, "It has become clear that wireless licensees providing fixed wireless services have the potential to create facilities-based competition beyond the traditional mobile markets."² One example the Commission gave of entities promoting competition in this way were low-power TV licensees providing Internet access. According to the Commission, "In addition to the traditional wireless cable operators, there are several wireless cable licensees who were not previously video programming distributors, but which instead provide Internet access. These entities tend to be start-up companies using MMDS or low-power television licenses."³

The need to provide high speed DSL quality Internet service to areas not currently served at a cost effective price is a key public interest concern as the FCC has repeatedly recognized. In a July 20, 1999 speech, Chairman Kennard said, "Our challenge is not just to build an Internet that goes faster, but that goes farther—that reaches all Americans. . . . We need to make sure that the opportunities that the Internet and new communications technologies provide are available to all Americans."⁴ This high priority initiative is also fully consistent with Congress's direction to the FCC in the Telecommunications Act of 1996 to promote the goal of widespread deployment of "advanced services."

² *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, 14 FCC Red 10145, Appendix F at 10255 (June 24, 1999).

³ *Id.*

⁴ Remarks by FCC Chairman William E. Kennard Before the Federal Communications Bar, Northern California Chapter, San Francisco (July 20, 1999).

“Advanced Services” have been defined “without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology.”⁵ The FCC states it is “committed to carrying out Congress’s directive to ensure that advanced telecommunications capability is deployed in a reasonable and timely manner to all Americans.”⁶

The proposed legislation is directly responsive to this goal and will facilitate its achievement. The CBA urges its passage forthwith.

Senator BURNS. Thank you very much. Mr. Popham.

**STATEMENT OF JAMES J. POPHAM, VICE PRESIDENT/
GENERAL COUNSEL, ASSOCIATION OF LOCAL TELEVISION
STATIONS, INC. (ALTV)**

Mr. POPHAM. Thank you, Mr. Chairman. It is a pleasure to be here today, and we appreciate the opportunity to express the views of local television stations on this legislation. ALTV, as you well know, represents the interests of stations not affiliated with ABC, CBS, and NBC, but I dare say virtually every television station shares the concerns we will express today.

Let me start out by emphasizing that we are not here necessarily to rain on anyone’s parade. We may want to rain down a few lightning bolts here and there. We may want to show you where the dark clouds on the horizon are, but our hope would be ultimately, I believe, to get that parade to the same point everyone wants it to get, but by a route that will not trample on our interests.

Let me try to clarify the issue just a little bit. Certainly we do have a concern about interference. Certainly we want to be sure that everyone stays in their own lane. Everybody that is using spectrum in any way has that interest, and we share that.

But the real issue, the more significant issue for us in this bill is not staying in the lane, but who gets the lane when two people want to use the same lane, and what this legislation in its present form would do would give first claim to that lane to an LPTV station providing digital data service, and that would have a preclusive effect on the use of that lane, or that channel, by any local television station in implementing the digital television convergence and transition.

Let me set that a little bit in context and add a little detail to it. I think Roy Stewart from the commission also spoke very well on this issue. We are in some rough air now on the digital transition, and that maybe is not really a surprise, because we had many of the same problems when we converted from black and white to color television. We all remember green faces and brown sky and purple grass, but we have gotten beyond all of that, and we are facing some similar problems now in the DTV transition.

We are not sure—there are many questions about over-the-air transmission with the current modulation scheme. There is virtually no cable carriage of any of the 134 digital channels which are now operating. The FCC has at best dragged its feet on adopting must-carry rules to require carriage of local stations’ digital signals.

⁵Telecommunications Act of 1996, Pub.L. 104–104, Title VII, § 706(c)(1), February 8, 1996, 110 Stat. 153, reproduced in the notes under 47 U.S.C. § 157.

⁶*Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion*, 14 FCC Red 2398 at 2402, (Feb. 2, 1999).

Continuing controversy continues to erupt over cable compatibility standards and labeling of sets, over copy protection, and all the related issues that go to being sure that the signal is processed in a way that stations can actually be seen by viewers in their receivers and that the receivers will actually connect to the set-top boxes, and to the systems, et cetera, et cetera, et cetera.

All these issues remain pending, and are creating a great deal of uncertainty and risk for local stations in the digital transition. I have characterized it I think as something like an airplane in a critical stage of take-off. We are kind of just off the ground, but there are only so many obstacles that we can deal with, only so many problems we can have before we start wondering about whether we are really going to be able to fly or not.

Unfortunately, as now written, this legislation would just create another problem. In particular what it would do, as I think Mr. Stewart said, it is going to prevent our stations, if need be, from using channels which might otherwise be available to maximize their service. This is a critical issue in particular to our member stations. Because many of our stations are UHF stations, we pushed very hard for the concept of maximization, and it is very critical for us to be able to provide service to the widest area possible.

Many stations will also need to modify their facilities to accommodate interference concerns, to accommodate local zoning concerns, and for a number of other reasons.

All stations are going to have to elect a channel as between their analog and their digital channel for their final operation at the end of the transition. There are a number of stations, 17 we believe, which have at this point channels that are in—or, rather, outside the core of channels that will be used for DTV, so neither of their channels will be available to them at the end of the transition.

They are going to have to find a channel within the core channels and, to the extent there are low power services which have primary rights on those channels, it is going to limit their options considerably. They also foreclose options of other stations which are going to have to pick between their two core channels for their final digital channel.

This is another bump in the road which frankly we do not need, in what has become the very difficult digital conversion.

As Roy Stewart also recognized, what we are looking at here is a very dramatic change in the nature of low power television. We are moving it from a free television service to a subscription data service. It is a very different animal from what low power has always claimed itself to be, and has promoted itself as being, and that sort of thing I think takes a very hard look, because it is a very fundamental reallocation of broadcast spectrum.

I would also point out that it is very possible and, indeed, is already being provided, to provide broadband services via satellite to rural and nonrural areas. Indeed, there are services, including DirecTV, EchoStar, Pegasus, Gilatt Satellite Systems, I-Skynet, EMS Technologies and others, which are now developing systems to provide satellite-delivered broadband Internet access and, in fact, two of those services, DirecPC and Skyblaster, are available

using KU band satellites. With the future development of spot beam KA band satellite that service will only grow and expand.

So again, we urge you to take a hard look at the reallocation issue. We ask you to take a very hard look at our concerns about who gets precedence in the various lanes. We are anxious that you not invoke the law of unintended consequences here, and perhaps in the words of the song that came to mind, give us land, lots of land with starry skies above, but don't fence us in. Thank you.

[The prepared statement of Mr. Popham follows:]

PREPARED STATEMENT OF JAMES J. POPHAM, VICE PRESIDENT/GENERAL COUNSEL,
ASSOCIATION OF LOCAL TELEVISION STATIONS, INC. (ALTV)

Introduction

We greatly appreciate this opportunity to make our views known to the Subcommittee. The Association of Local Television Stations, Inc. ("ALTV") represents the interests of full service local broadcast television stations not affiliated with ABC, CBS, or NBC. Most of our member stations are affiliates of either the Fox, UPN, WB, or PaxTV networks. Some remain traditional "independent" stations, which continue to offer innovative programming to their communities.¹ ALTV's membership includes stations from every region of the country. Their ownership spans the continuum from local single station owners to large media conglomerates. Their interests range from those of nationally distributed "superstations" to those of small home shopping and "infomercial" stations. All of our member stations are now involved heavily in the transition to digital television. As of today, 134 Of the nation's local television stations already have begun broadcasting from their new multimillion dollar digital broadcast facilities. The rest will be commencing operation in digital broadcasting between now and the FCC-imposed deadline of May 1, 2002. We would note at the outset that full power local digital television stations will enjoy the ability to provide digital data services, as well as free broadcast television service. Thus, the perspective of our membership is multi-faceted and wide-ranging, and we respectfully submit that consideration of their concerns will add materially to the debate on S. 2454.

ALTV considers the basic goal of S. 2454 laudable. Provision of digital data services via wireless transmissions offers the opportunity for more widespread availability of new avenues of data and information transmission to American consumers. Moreover, the inherent efficiency of point-to-multipoint wireless transmission—whether provided by satellite, MMDS, full power television, or low power television ("LPTV")—might be exploited most readily to provide such services in rural and other low-population density areas. Indeed, all things' being equal, the wide open door to provision of digital data services via LPTV facilities offered by S. 2454 would draw only praise and support. However, all things are not equal. Therefore, ALTV must express its serious reservations about this legislation in its Present form.

ALTV respectfully submits that S. 2454 in its original form would invoke the "law of unintended consequences." Placed in the current' context of the ongoing transition to digital broadcasting, it would achieve, perhaps, short-run progress in expanding the availability of digital data services, but at the ultimate expense of attenuating the ability of many full power local broadcast television stations to provide truly full digital service to their communities.

The troublesome provision of S. 2454 in ALTV's view is new paragraph 336(h)(3), embodied in section (2) of the bill. It directs the Federal Communications Commission to refuse to authorize "any new service, television broadcast station, or modification of any existing authority that would result in the displacement of, or predicted interference with, a low power television station providing (digital data services)." That provision essentially would protect any LPTV station offering digital data services from interference from or displacement by a new, full power television station, the modified facilities of an existing full power television station, or even any new, now unknown service. In simplest terms, such an LPTV station, operating on a particular channel, could preclude any use of that channel (or an adjacent channel) that would displace the LPTV station or interfere with the LPTV station's signal.

¹ Indeed, ALTV previously was "INTV," the Association of Independent Television Stations.

This preclusive effect stands to be compounded by the use of “multiple transmitters at multiple locations” as contemplated by new paragraph 336(h)(5) in section (2) of S. 2454. Thus, for example, such an LPTV station, using multiple transmitters on six different channels in a particular geographic area would preclude use of those six channels for full power service in that area. The preclusive effect of using these six channels for an LPTV-based service, however, does not stop there. Their use for full power television in surrounding areas also will be limited because use of the channels for full power service still would interfere with six LPTV channels in use nearby (and not so nearby) areas. This interference is a product of the simple fact that a television signal too weak to provide a viewable signal still will cause interference to signals on the same or adjacent channels.² This problem is exacerbated by the fact that the LPTV station will be operating at a relatively low power level. Because the potential for interference is measured by the relative strength of the LPTV signal versus the potentially interfering signal from the full power station, a very weak full power signal would cause interference to an LPTV signal. In sum, the use of a channel by an LPTV station has widespread preclusive effect on the use of that channel and adjacent channels in the same and contiguous areas.

ALTV’s inability to support S. 2454 is rooted in the impact of these preclusive effects on the digital broadcast conversion. To avoid an abrupt changeover from analog to digital broadcasting, the FCC has implemented a transition scheme. During the transition, scheduled to end in 2006, local television stations were granted authority to operate on an additional channel. Thus, during the transition, they will continue to provide analog service on their existing channels and initiate digital broadcasting on the second channel. Providing every local television station with two channels, of course, presented an enormous challenge. In congested areas like the Northeast, for example, finding a second channel for every station represented a near miracle. Even so, the FCC succeeded in providing most local television stations with a digital television channel that would enable them to replicate their current analog coverage areas.³ In the case of many existing UHF stations, however, replication alone still left them with materially smaller DTV coverage areas than those of the VHF television stations in their markets. To address this competitive disparity, the FCC, at ALTV’s urging, adopted procedures whereby UHF stations could apply to the FCC for authority to “maximize” their DTV facilities, thereby expanding their coverage areas. Such authorizations were subject to stringent limitations on interference which might be caused to existing analog stations and new DTV facilities.

At the close of the transition, all local television stations must return one of their channels and continue digital broadcasting only on the remaining channel. Recognizing that this would create a number of vacant channels at the close of the transition, the FCC determined to reduce the amount of spectrum allotted to broadcasting. Consequently, at the close of the transition, part of the spectrum now allotted to broadcasting no longer will be available. Specifically, channels 52–69 will be lopped off the broadcast spectrum. Whereas all stations’ DTV facilities can be accommodated in channels 2–51 after the transition, the need to provide all stations a second channel during the transition has necessitated using channels 52–69 to provide some stations with a DTV “loaner” channel. Additionally, some stations already had been authorized to use channels between 52 and 69 for their analog service. None of these analog or DTV facilities will be able to remain on channels 52–69 after the transition.

The ability of local television stations to select the optimum channel for their DTV facilities *post*-transition and/or to maximize or optimize their DTV facilities during and after the transition is critical to many local television stations. As noted above, coverage equals audience equals revenue equals viability and profitability equals service to the public. The locus of ALTV’s concern with S. 2454 is the potential for widespread preclusive use of channels by digital data LPTV facilities. Such preemptive use of television channels would place the following constraints on the development and expansion of full service DTV stations:

²Thus, under FCC rules, a television signal on channel 11, which provides coverage in an approximately 83 mile radius, may not be used by another station within 152 miles. 47 CFR Section 73.623(d).

³Coverage area is important to consumers because the larger a station’s coverage area, the more consumers have access to its signal and programming. From the station’s perspective, the larger its coverage area, the larger, its potential audience. Because audience and revenue are virtually in direct proportion for local television stations, a station’s ability to operate profitably and provide an attractive and responsive program service to its community is directly affected by the size of its coverage area.

- **The number of local television stations able to maximize or otherwise modify their DTV facilities would be reduced.** No improvement in their DTV facilities would be permitted if it interfered with an LPTV station providing digital data service. This problem would be particularly acute for Stations with DTV facilities forced to migrate from out-of-core channels (52–69) to core channels at the conclusion of the transition. These stations have no core DTV channel assigned to them today. Until such time as stations are required to elect either their current analog or DTV channels for permanent DTV operation, no permanent channel can be assigned these stations. Therefore, no means currently exists for them to apply for an authorization to maximize their facilities. Their ability to maximize, thus, will be constrained, if not eliminated, by the preclusive effect of construction of digital data LPTV stations in the interim. Some stations also may need to modify their DTV facilities to address such problems as local zoning restrictions. Their ability to do so also could be imperiled by the preclusive effect of construction of digital data LPTV stations.
- **The channels available for the DTV facilities of stations currently assigned out-of-core analog and DTV channels would be diminished.**⁴ Just finding them any channel might become problematic, much less a channel suited to their circumstances. For example, a station might be assigned a channel which would permit the station to continue to use its existing DTV transmitter, antenna, and tower site, although on a different channel. On the other hand, the preclusive effect of LPTV digital data deployment might force it to use a channel requiring a new transmitter, antenna, or tower site, or resort to a more expensive and technically complex directional antenna.
- **DTV channel selection options could be negated by preclusive use of channels for LPTV digital data services.** The many local television stations with analog and DTV channel assignments in the core (channels 2–51) are permitted to elect one or the other of their channels for permanent DTV operation. This election could be negated if, for example, preclusive LPTV facilities hem in one of the channels and prevent maximization or any improvement in facilities on that channel.
- **The number of potential new *post-transition* DTV stations could be reduced, perhaps, significantly.** The preclusive use of television channels by digital data LPTVs also could and, likely, would, reduce the number of channels available for new full service DTV stations. These channels, made available by the return of numerous core channels at the conclusion of the transition, offer the prospect for additional full service broadcast DTV stations. New stations offer many potential benefits, including more consumer choice and more entrepreneurial opportunities, just to name a few.

Therefore, ALTV sees the potential for widespread preclusive effects on local television stations' DTV channel selection and facilities upgrades as the "tragic flaw" in S. 2454.

In a similar vein, ALTV also is concerned about the difficulties of enforcing the "no interference" prescription in new section 336(h)(4). It is one thing to forbid interference. It is quite another to police it. How many viewers will just watch another channel rather than complain to a station that its signal suddenly is not providing the same quality picture they have become accustomed to? Once interference is reported, isolating it and identifying its source is no slam dunk. If the interference then can be traced back to an LPTV station, then the full service station can expect a raft of denials, even if its calls are returned. If controversy remains and the FCC enters the fracas, then more testing, denials, and contretemps are likely to ensue before a remedy can be effectuated. Such disputes are a headache to the full service station, the LPTV station, and the FCC. Moreover, they represent dashed consumer expectations about the reliable availability of good quality reception of its local stations.

ALTV also emphasizes that this hardly is the time to burden local television stations' digital conversion efforts with more uncertainty and limitations. Digital broadcasting has just left the ground after an extended, sometimes tortuous take-off roll. Now it begins its ascent toward a dark and roiling horizon. The path to success is obstructed by uncertainty on many fronts. Nonetheless, local television stations are confident of the ultimate appeal of new digital broadcasting services. At the same time, they also remain painfully aware that, as in the case of a plane only hundreds

⁴Seventeen local television stations currently suffer dual out-of-core channel assignments.

of feet off the ground, only so many things can go wrong before continued progress in flight is placed in jeopardy.

As the FCC recognized when it launched an aggressive transition schedule, “while the opportunities afforded by digital technology are great, so are the risks.”⁵ Local television stations already are coping with considerable risks, many of which were anticipated, some of which were not. The transition to digital broadcasting remains plagued and delayed by uncertainty:

- Demonstrable off-air reception problems are under investigation. The Commission itself recently sought comment on this critical issue. More recently, the Advanced Television Standards Committee (“ATSC”), which developed the current 8VSB transmission standard, initiated its own investigation and analysis of reception problems.⁶ ATSC Chairman Robert Graves reportedly stated, “We know this debate is going on and there’s going to be a lot more debate and a lot more study. The reliable reception issue has not gone away.”⁷ Meanwhile, one major set maker has halted new DTV receiver production in light of this and other uncertainties (*see below*).
- Cable carriage of local television stations’ digital signals is all but nonexistent. The Commission is into the second year of its proceeding looking towards implementation of the digital must carry requirement with resolution of the matter as elusive as ever. In short, the ability of consumers to receive digital broadcast signals today is in no way assured.
- Even if a reliable signal could be assured either off-air or via cable, consumers still face uncertainty with respect to the roll out of digital receivers. Delays in standard setting have arrested receiver manufacture and sales. Negotiations over such critical matters as standards and labels for cable-ready sets have plodded to partial success, but only after the Commission finally prodded the parties with threatened, then real proceedings. As a result, cable-ready digital receivers likely will be available for major retail sale campaigns no sooner than the pre-Christmas sales period in 2001 or, perhaps, the following year. In short, no link in the distribution chain—from program acquisition by local television stations to the availability of a picture to view—is secure at this point.
- Many local television stations already have been forced to apply for maximized facilities just to assure that their upgrades would not be precluded by authorization of the new Class A LPTV facilities. Notably, the dimension of the threat of potential preclusion was limited in the case of Class A LPTV stations. Only a finite number of existing LPTV stations were eligible. Therefore, assessing the need to file a maximization application was more manageable. In the case of new digital data LPTV stations, the effect would be more widespread and less predictable. Any number of existing or future LPTV stations could elect to provide digital data services and thereby have a preclusive effect on a station’s need to modify its facilities.

The appearance of such unanticipated bumps in the road hardly is a surprise. Anyone who remembers purple hair on green faces (in a pre-*Simpsons* era) during the early years of color television could attest to the inevitability of debugging and improving the system. Nonetheless, now simply is not the time to complicate the DTV transition and curtail full power television stations’ flexibility to secure authorizations for facilities enabling them to provide the best possible service to the public. Local television stations are facing enough problems in effectuating the transition to a fully digital local broadcast television service. S. 2454 in its present form would just add to the list.

Finally, ALTV wishes to raise a matter of deep concern, although less of immediate practical consequence. S. 2454 essentially changes the nature of low power television. What is now a free broadcast service could evolve rapidly into a subscription digital service. In a digital environment distinctions between data and video disappear. Both are bitstreams. Few doubt that Streaming video someday (even someday soon) will provide the same quality full motion video picture as broadcast television. S. 2454, therefore, could open a door to widespread use of LPTV to provide subscription video services. Unlike full power DTV stations, such LPTV stations would have no concomitant obligation to provide even one channel free broadcast service. Congress has every right to direct the FCC to reallocate spectrum. However,

⁵ *Fifth Report and Order*, 12 FCC Rcd 12809, 12811 (1997).

⁶ “ATSC Forms Task Force to Study RF System Performance,” *Communications Daily* (March 22, 2000) at 1–2.

⁷ *Id.* at 2.

such matters are weighty and deserve careful study. Again, ALTV urges a harder look at S. 2454 and its implications and consequences for free broadcast television service.⁸

Conclusion

The concerns ALTV has expressed counsel a harder look at S. 2454. In particular, new sections 336(h)(3) and (h)(5) require substantial revision to assure that full power broadcast DTV service is not inadvertently undermined by preemptive and preclusive deployment of LPTV digital data services. As beneficial as such services may be, they should not be implemented in such way as to place yet another stumbling block in the path of the broadcast digital transition.

Therefore, ALTV very much looks forward to working with the Subcommittee on this legislation. If the Subcommittee is in need of any particular information which might be at our disposal, we would be happy to compile and provide it to you. Again, we greatly appreciate this opportunity to make our views known to you and the Subcommittee.

Senator BURNS. Thank you, Mr. Popham.

Senator Breaux.

Senator BREAU. Thank you, Mr. Chairman. I thank the panel.

Mr. Popham, let me perhaps start with you, since you just concluded. I know that you start off in your summary saying the bill is laudable, but then you spend the rest of your time telling us why it is not so laudable.

I take it that the principal concern, at least it seems to me, is this question of interference or displacement of the new full power stations that may be modified in the digital broadcast by what you call, I guess, the exclusive nature of what the low power stations would be granted by this legislation.

Is there any way to protect, on the interference question, that the bill could address that perhaps does not address now? I mean, Mr. Mosely said he has been operating in Houston and has not had a single complaint about interference, and you have a number of major high power broadcast channels in the Houston area, and with all the millions of people, not to have any interference complaints seems fairly significant that it is not a problem.

But is there anything in the legislation that could be included that would give you some relief about that concern that you have expressed on interference?

Mr. POPHAM. Well, I do not want to denigrate the interference issue as a nonissue, because we do have concerns about it. I think as Mr. Hatfield testified it is a little more complicated issue than it is with just today's analog broadcast-to-broadcast, because we are dealing with one versus two channels, perhaps. We are dealing with digital versus analog. We are dealing with various sorts of modulation schemes, 8VSB, COFDM, QPSK, QAM, and now TDD, and all of these affect propagation, and they affect how interference might occur.

So it is a more complicated process, and we would want to be sure that the legislation does give the commission complete authority to prevent interference, but I would point out the practical side of interference problems.

⁸A matter of peripheral concern in this regard is the disparity between LPTV stations which offer digital data services and full service stations which offer such services. Full power stations must pay a five per cent gross revenue fee if they offer subscription services on their DTV channel during the transition. LPTV stations offering such services not only would have no obligation to provide free service; they also might have no obligation to pay the five per cent fee.

When they do occur, it really creates a headache for the FCC, for the station involved, and for the station against whom a complaint might be lodged, and you end up going and almost looking at subscribers, or viewers' television sets, trying to figure out where is the source of interference, what kind of interference is it, how are we really going to fix this, and you almost end up with a food fight at the FCC every time this occurs. Certainly in one situation it has not happened yet, but that is not to say it cannot happen.

But I really want to draw the emphasis back to the problem of not staying in the lane, but who gets the lane, and the difficulty again that we have is the preclusive effect of prohibiting the FCC from authorizing the new digital broadcast station, or modification, or maximization of one of those stations when it would cause interference to a data broadcasting LPTV station.

The Community Broadcasters Act did include provisions which provided some protection, fairly substantial protection against incursions of DTV into our flexibility in the DTV environment. Protections along those lines, perhaps a little broader, because we are in a little different situation, but that is where we would look for some changes in the legislation.

Senator BREAU. Mr. Mosely, what about that suggestion? Do you think anything like that is feasible to include in the legislation, or do you feel that it is really not necessary?

Mr. MOSELY. We have no problem with that sort of modification. It is our intention to protect existing television reception. We intend to. We will.

Attached to my testimony are several letters from noted technologists that state that there will be no interference. We have no problem in additional language, if such is warranted, to protect existing and planned DTV roll-out.

For example, when we acquire a station we make sure it fits within the table, the DTV channel table of allotments. We make sure that we are not going to interfere with either existing NTSC reception, nor will we be in conflict with the DTV-allocated station, so we have no problem, if it is deemed necessary by the Committee and by Congress, to beef up the language. We would not have a problem with that.

Senator BURNS. Maybe if we just added the language out of the Community Television Protection Act, just add that language.

Mr. MOSELY. We have no problem with that, Senator.

Senator BREAU. What everybody is trying to do is to ensure that you can go forward with this type of new utilization of the spectrum and yet make sure you do not interfere with anybody else who has their spectrum allocated, much of it through auction.

Mr. Popham, I am just curious, why haven't any other stations that you represent used their spectrum for this type of digital broadband services?

Mr. POPHAM. At this point, again, we are very early in the transition. We just have a few stations on the air. There are a relative handful of receivers at this point, and I think the plans that most broadcast entities have to provide data services are just now coming off the drawing board and getting into what I would call the entrepreneurial phase, where they are really putting them to-

gether, so I think we will see that develop very rapidly over the next several years.

Senator BREAUX. Mr. Morton, you talked about the public interest test, or public interest standard. What are you talking about when you are suggesting that?

Mr. MORTON. The Community Broadcaster Protection Act, there was a provision in Congress, two ways that a station could achieve a Class A license, and the commission in implementing this eliminated the second test of the public service, and just established a certain number of Class A stations, and kind of closed the door.

The public service test needs to be brought in to allow future broadcasters who either were not on the air at the time or were not set up to broadcast the 18 hours a week, 3 hours of local programming, to give them a chance to fulfill the public service needs and become a Class A station and protect their spectrum.

This is necessary, we feel, because under this bill if that does not happen they will quit broadcasting, because they can obtain permanent status by being a wireless Internet provider as opposed to a broadcaster, and that is not the intent of the bill, and we do not believe it was Congress' intent to ignore the public interest guidelines down the road and establish this, but the FCC has today done that. We would just like to see that mandated to establish that so the broadcaster will continue to be able to broadcast.

Senator BREAUX. Mr. Mosely, do you have any problems with that?

Mr. MOSELY. I do not believe so.

Senator BREAUX. Thank you.

Senator BURNS. I guess I have one question for Mr. Mosely. You are operating in Houston. Can you just give us an overview of any regulatory problems you have experienced in developing that service down there? Give us some challenges that you had that were of particular interest.

Mr. MOSELY. Well, the time delay, not so much with respect to our Houston operations, but with respect to rolling out future expansion cities is a concern, Mr. Chairman.

We got our permanent license in May 1999 for Houston, and we filed for a similar authorization with the commission with respect to our Tampa operations, I think it was March 16 of 1999. Well, it took 14 months to get that authorization from the FCC with respect to Tampa. It is that sort of regulatory delay that I think would be a severe impediment to our expansion.

As you well know, wireless services are being rolled out across the country, and the pace of development is very rapid. For our company to have to file with the commission a request for expansion on a case-by-case basis would virtually render our expansion plans inoperable.

Senator BURNS. In your written testimony you mentioned the interest in rural telephone companies and electric cooperatives and associations in providing service. What involvement have these organizations had to date in terms of developing the type of service you would like to provide?

Mr. MOSELY. Well, we happen to have some rural telephone companies in New England that are investors in our company. They believe that what we want to do is an outstanding use of the spec-

trum and is an ideal way to deploy high speed wireless Internet access, especially in rural areas.

Most of these telephone companies come from very small areas. I mean, very small population base areas of the country, and these are also sophisticated investors that have DSL operations, and yet notwithstanding that fact, they still feel that what we are doing is a superior method of delivering access.

Senator BURNS. Are there sufficient numbers of low power stations in rural areas to allow you to actually serve a significant number of people to make it profitable?

Mr. MOSELY. Yes, sir.

Senator BURNS. There is?

Mr. MOSELY. Yes, sir, there are. There definitely are.

Senator BURNS. Well, that is all the questions I have.

Yes, go ahead, Senator Breaux.

Senator BREAUX. We are talking about the rural areas, and yet your first operation is in Houston, Texas. I was wondering, who are you serving in that area that would not have access to broadband over a wire service by one of the broadband carriers in the Houston area? I mean, you are talking about bringing services to rural areas, and yet you first started in the city of Houston.

Mr. MOSELY. Well, we are providing service in many areas that primarily are not even accessed by DSL, because they find that our service is superior with respect to the download speeds that we facilitate, but we had to start somewhere, and we wanted to start in a big city and establish the fact that our product would sell.

Senator BREAUX. I take it your customers in the Houston area would also have access to some other type of broadband Internet services over a wire carrier, perhaps.

Mr. MOSELY. Yes, sir.

Senator BREAUX. You are competing against them?

Mr. MOSELY. Yes, we are, and as we have primarily business customers, almost exclusively business customers in Houston, but upon passage of S. 2454 the bandwidth that would be available would facilitate our serving homeowners as well and, I might add, at a tremendous price reduction.

We, for example, offer an information rate of T-1 download speed burstable to 4 megabits in Houston for \$4.99 a month, and that is inclusive of all Internet access provider charges. Our plan is, assuming passage of S. 2454, is to slash our prices upon implementation of the two-way system to \$199 a month for businesses, and \$59 a month for homeowners, and that down the road in 5 years we are projecting that we would slash prices to \$79 for businesses or thereabouts, and then down below \$20 for consumers, and this is affording consumers tremendous bandwidth and burstable speeds up to 5 megabits a second.

So Senator, we did start in Houston, but very frankly, the real power of what we have to offer is really evidenced in the rural areas, because those are areas that will likely not get wired service for many years.

Senator BREAUX. While you are providing Internet services over the air through wireless transmission, the consumer, I take it, is responding back through a wire line?

Mr. MOSELY. Yes, sir. Under the present configuration, the one-way configuration, yes. Upon passage of the legislation we would be able to have a high-speed symmetrical two-way communication within a single 6 megahertz channel. We would not get out of the lane, as the chairman has stated.

This is done through what is called time division duplexing, and the bandwidth is allocated as the load is presented, so whoever needs the bandwidth gets it, and it is very efficient. It is a brilliant technology that gives, it is about 4 to 20 times the efficiency, or efficacy of frequency division duplexing, so the good thing about it is that we only have to acquire a single channel.

Mr. STEWART AND MR. Hatfield were alluding to the fact that you may need a separate channel. The fact is that I think that is not going to be necessary. I know it will not be necessary with time division duplexing technology.

Senator BURNS. Have you visited with them on that? Have you and Mr. Hatfield had a private conversation to be sure that is possible, the technology that you are talking about, two-way within your same lane, without establishing another one for the return?

Mr. MOSELY. Mr. Chairman, are you inquiring whether we have talked with them?

Senator BURNS. Yes.

Mr. MOSELY. No, we have not. I would welcome the opportunity to discuss it with them and even bring in the technologist that adapted broadband to visit with them about that.

Let me say that the technology is available at higher frequencies by adaptive broadband in Japan and Europe, and really in other areas throughout the world, and so this is not a technology that is speculative. It is merely a case of adapting the technology to a lower frequency, which we have been assured is an absolute no-brainer, and that there is no technological risk in making the technology available in the UHF spectrum, and Dr. Sharre points that out in his letter, which is attached to my statement.

Senator BURNS. Mr. Popham, do you agree with that?

Mr. POPHAM. I believe—I do not think we can say for certain that interference would not be a problem. I think the technology would work, and I risk saying more as a lawyer and not an engineer at this point, and sometimes discretion is the better part of valor.

Senator BURNS. Well, that is all the questions I have, and I know there will be other Senators on this Committee that will have other questions, and we will leave the record open for 2 weeks, and if other testimony is submitted, why, you will also be updated on that.

Thank you for coming today, and I appreciate your coming. The Committee is adjourned.

[Whereupon, at 11 a.m., the Subcommittee adjourned.]

APPENDIX

FOX BROADCASTING COMPANY,
June 28, 2000.

Hon. CONRAD BURNS,
United States Senate,
Washington, DC.

Re: S. 2454

Dear Senator Burns:

Fox Broadcasting Company, together with other television broadcasters, continues to have serious concerns over the draft legislation (S. 2454) that would permit low power television (LPTV) stations to provide "digital data services" without regard to the technology or modulation employed in delivering such service. While representatives of Fox and other broadcasters have had several cordial meetings with the representatives of AccelerNet to discuss broadcasters' concerns with S. 2454, we have not yet reached agreement on any of the major issues. Moreover, we remain troubled by the fact that our engineers have not yet been afforded an opportunity to discuss certain technical issues with AccelerNet's engineering representatives. A summary of Fox's chief concerns with S. 2454 is attached.

As you are aware, Congress and the FCC have placed the highest priority on completing the transition from analog to digital television (DTV) in a timely manner. Although we support your goal to bridge the digital divide in rural areas, spectrum management and conversion to DTV is already an extremely complex task. Broadcasters are intensely concerned that permitting LPTVs to provide digital data-casting services on a two-way basis using any technology or modulation technique whatsoever could lead to interference that would cripple the DTV conversion.

We look forward to continue working with you on S. 2454.

Very truly yours,

Maureen O'Connell

Attachments

Fox Broadcasting Company's Concerns on S. 2454 Low Power TV Digital Data Services Bill

- The goal of S. 2454, to bring broadband Internet services to rural areas, is a laudable goal. Broadband Internet, however, can be provided by a variety of technological means, including wired (telephone or cable) and wireless technologies (satellite or non-satellite). Wireless technologies—satellite and non-satellite—provide the most promising means of serving less populated rural areas. In fact, such service is already available NATIONWIDE to rural and urban subscribers alike, by DirecTV, through its DirecPC service (see www.direcpc.com). A second service offering 2-way broadband Internet access will be available nationwide from Gilat through a partnership with Echostar and Microsoft beginning in the fall of 2000 (see www.gilat2home.com).
- ◆ Attached is a sample list of companies that are already bridging the digital divide and providing terrestrial wireless Internet access to rural areas in Montana.
- ◆ In addition, 13 certified eligible Class A stations in Montana could provide digital data services (see attached).
- LPTV stations often provide vital broadcast service to rural areas. It would be most unfortunate if rural television viewers were deprived of free over-the-air television in the pursuit of expanded Internet access. Indeed, in authorizing full-power television stations to provide data services, the FCC mandated that such data services not interfere with the provision of at least one free over-the-air

broadcast channel. Use of LPTV spectrum to provide broadband Internet and other digital services therefore should be allowed only if it does not affect the primary broadcast purpose of the LPTV service, or negatively impact the integrity of other broadcast services.

- ◆ As drafted, S. 2454 would not require LPTV stations to provide ANY video programming to local viewers.
- Congress and the FCC have placed the highest priority on completing the conversion to DTV. LPTVs providing digital data services should not be protected from interference or displacement from applicants seeking to facilitate and complete their conversion to DTV. Flexibility is required if DTV conversion is to become reality. For example, 17 full-service television stations have been allotted both analog and DTV channels that lie outside the core DTV spectrum; these licensees must be assigned new channels within the core from spectrum recovered after the DTV transition.¹
 - ◆ As drafted, S. 2454 does not even require LPTVs that provide digital data-casting services to protect the DTV Table of Allotments—much less maximization and other modification applications filed pursuant to existing FCC rules or those 17 full-service television licensees who have yet to receive a channel allotment within the DTV core spectrum.
- The spectrum allocated to broadcast services is already extremely congested. And DTV conversion has only compounded the complexities of spectrum management. Yet S. 2454 would permit the use of this broadcast spectrum to provide two-way digital data services without regard to the technology or modulation employed. Because LPTV provision of digital data services on a two-way basis has not even been tested in the U.S., further study and analysis is required to determine whether operation of digital data-casting services on a two-way basis would cause objectionable interference to full-power television stations or otherwise hinder the conversion to DTV.
 - ◆ As drafted, S. 2454 would permit LPTVs without any prior approval of the FCC to provide immediately digital data services using two-way technology that has NEVER been tested in the U.S. broadcast environment.
 - ◆ As drafted, S. 2454 would permit LPTVs to use multiple transmitters at multiple locations. This reference would authorize the provision of cellular service on LPTV spectrum. Cellular service or any other service employing multiple transmitters at multiple locations would cause chaos in the broadcast service, which was specifically designed and constructed for service by a single transmitter at a single location.
 - ◆ As drafted, S. 2454 would permit LPTVs to use any modulation technique in their provision of digital data services—8VSB, COFDM, QAM, or any other modulation.
- Television broadcasters that use their digital channels to provide digital data services to subscribers for a fee must pay 5% of gross revenues from such services to the federal Treasury. Fairness requires that LPTVs engaging in digital data services should incur the same fee. S. 2454 should be modified to require that Class A stations providing digital data services be subject to the fees imposed by the FCC pursuant to section 336(e) of the Communications Act.

¹These 17 stations are located in the following cities: Riverside, CA; San Mateo, CA; Stockton, CA; Aurora, IL; Joliet, IL; Springfield, MA; Newark, NJ; Vineland, NJ; Riverhead, NY; Bethlehem, PA; two stations in Arecibo, PR; Caguas, PR; Naranjito, PR; Providence, RI; Lake Dallas, TX; and Fairfax, VA.

Companies Providing Wireless Internet Service in Montana

Provider	Location	Phone	Domain Name	Backbone	Bandwidth	Ports	T1	ISDN	Wireless	Cable	56kbps	monthly rate
Access Montana/Ronan Telephone Company	Ronan, MT	406-676-2777	ronan.net	Sprint IP	1.544	—	—	—	—	—	\$15.95	
Avicom Inc	Bozeman, MT	406-587-6177	AVICOM.NET	Cable & Wi	1.544	—	Yes	—	—	—	\$20.00	
BOSS Internet Group		509-547-8896	CBYCP.COM	MCI Worldc							\$19.95	
BOSS Internet Group/Televar		509-664-9004	TELEVAR.COM	MCI Worldc	45						\$19.95	
BIG SKY INTERNET	MISSOULA, MT	406-543-8544	B-S-I.NET	UUNET	13.088	—	—	—	—	—	—	
Big Sky Net	Missoula, MT	406-728-3737	BIGSKY.NET	Cable & Wi	0.000	—	Yes	Yes	—	—	—	
Bozeman Daily Chronicle	Bozeman, MT	406-582-2654	GOMONTANA.COM	Cable & Wi	1.544	—	Yes	—	—	—	\$24.95	
Corporate SystemHouse Internet	Great Falls, MT	406-268-0000	systemhouse.net	—	—	—	Yes	Yes	—	—	—	
C-Systems Inc.		208-769-7003	C-SYSTEMS.NET	AT/CW/FG/GT/MW	45						\$21.95	
Cteck Internet Services		402-470-3983	nebraskaweb	PS	45							
CyberHighway Internet Services		208-323-9214	CYBERHIGHWAY.NET	EL/GS	45						\$19.95	
CyberPort Montana LLC	Whitefish, MT	406-863-3221	CYBERPORT.NET	MCI-Worldc	6.144	—	Yes	—	—	—	\$17.76	
CyberWorld Internet Services	Laurel, MT	406-628-2331	CW2.COM	Sprint	0.256	—	—	—	—	—	—	
Dakota Internet Access, Inc.		701-774-3421	DIA.NET		1.544						\$19.95	
DigitSys Inc	Kalispell, MT	406-257-4638	DIGISYS.NET	Cable & Wi	6.144	—	Yes	—	—	Yes	—	\$19.95
G.V. Net	Helena, MT	406-443-8057	GOMER.NET	MCI	1.672	—	—	—	—	—	—	

Companies Providing Wireless Internet Service in Montana—Continued

Provider	Location	Phone	Domain Name	Backbone	Bandwidth	Ports	T1	ISDN	Wireless	xDSL	Cable	56kbps	monthly rate
Global Net l.l.c.	Bozeman, MT	406-587-5095	THEGLOBAL.NET	AT&T	3.088	—	Yes	—	—	—	—	—	—
Great Falls Internet	Great Falls, MT	406-727-5450	gf-inter.net	Sprint IP	10.000	—	Yes	—	—	—	—	—	—
Inter-Tech Inc.	Lewistown, MT	406-538-7891	Lewistown On Line	AT&T	128	—	—	—	—	—	—	—	—
InterTech USA	Missoula, MT	406-549-8998	IT-USA.COM	Cable & Wi	128	—	Yes	Yes	—	—	—	—	—
Intermountain Internet Corp	Helena, MT	406-449-3930	INTCO.NET	Sprint IP	1.544	—	Yes	Yes	—	—	—	—	—
Interconnections Inc	Helena, MT	406-443-7847	IXI.NET	Verio	1.544	—	Yes	—	—	—	—	—	—
Internet Connect Services	Missoula, MT	406-541-4952	MONTANA.COM	AT&T	6.144	—	Yes	Yes	—	Yes	—	—	—
Internet Montana	Billings, MT	406-255-9699	IMT.NET	—	6.144	—	Yes	—	—	—	—	—	—
Kootenai	Libby, MT	406-293-3534	LIBBY.ORG	Cable & Wi	1.544	—	—	—	—	—	—	—	—
MARSweb Internet Services Montana	Missoula, MT	406-721-6277	MARSWEB.COM	—	—	—	—	—	—	—	—	—	—
Montana Communications Network	Billings, MT	406-254-9413	MCN.NET	MCI/UUNET	8.448	—	—	Yes	—	Yes	—	—	—
MOCC, Inc.	Great Falls, MT	406-453-6622	mocc.net	Cable & Wi	6.144	—	Yes	—	—	—	—	—	—
Montana Internet	Helena, MT	406-443-3347	MT.NET	Cable & Wi	3.088	—	Yes	Yes	Yes	Yes	—	—	—
Multi-Band Communications, Inc	Bozeman, MT	406-587-5353	www.rockymountainidsl.com	MCI/UUNET	0.000	—	Yes	—	—	Yes	—	—	—
Nemont Communications, Inc.	Glasgow, MT	406-228-9866	nemontel.net	MCI Worldc	3.088	—	—	—	—	—	—	—	—
Net Tech	Lewistown, MT	406-538-6161	TEIN.NET	MW	1.544	—	Yes	—	Yes	—	—	—	—

Rocky Mountain Digital Biterroot Service	Hamilton, MT	406-363-0055	www.rmdbs.net	AT&T	45	—	—	—	—	—	—	—	—
Scoblaeo		253-838-8281	MACPLUS.COM		3.088								
Sofast Internet Services	Great Falls, MT	406-268-0000	sofast.net	Frontier G	0.000	Yes	—	Yes	—	—	—	—	—
Stellar Computer Consulting Co.	Havre, MT	406-265-6333	hi-line.net	—	—	Yes	—	—	—	—	—	—	—
TMComputers	Helena, MT	406-449-2702	TMCOM.COM	MCI Worldc	2.048	—	—	—	—	—	—	—	—
The Billings Gazette	Billings, MT	406-657-1354	billingsgazette.com	—	10.0	Yes	—	—	—	—	—	\$15.00	—
The Internet Store	Missoula, MT	406-721-3386	CENTRIC.NET	Sprint IP	0.000	—	—	Yes	—	—	—	—	—
West Yellowstone Web Works	West Yellowstone, MT	406-646-7006	WYELLOWSTON- E.COM	—	45	—	—	—	—	—	—	—	—
Western Technology Partners	Billings, MT	406-256-9575	WTP.NET	Cable & Wi	3.088	—	Yes	—	—	—	—	—	—
In-State ISPs With Service in Area Code													
Blue Moon Technologies, Inc	Dillon, MT	406-683-9816	bmt.net	—	—	Yes	—	—	—	—	—	—	—
Interconnections	Helena, MT	866-663-9378	ixi.net	Verio	0.000	—	Yes	—	—	—	—	—	—
SoFast Internet Services	Great Falls, MT	406-268-0000	sofast.net	Frontier G	0.000	—	—	Yes	—	—	—	—	—

LPTVs CERTIFIED ELIGIBLE FOR CLASS A LICENSES IN MONTANA

