

Approved: March 7, 2003 Carl Dean Holmes  
Date

MINUTES OF THE HOUSE COMMITTEE ON UTILITIES.

The meeting was called to order by Chairman Carl D. Holmes at 9:05 a.m. on January 21, 2003 in Room 526-S of the Capitol.

All members were present except: Representative Nile Dillmore

Committee staff present: Mary Galligan, Legislative Research  
Dennis Hodgins, Legislative Research  
Mary Torrence, Revisor of Statutes  
Jo Cook, Administrative Assistant

Conferees appearing before the committee:

April Holman, Legislative Research  
Guy McDonald, Kansas Corporation Commission  
Tom Gleason, Gleason & Doty Chartered

Others attending: See Attached List

Chairman Holmes welcomed April Holman, Research Analyst for the Legislative Research Department, who presented an overview of the interim report on broadband deployment from the Joint Committee on economic Development (Attachment 1). Ms. Holman detailed the meetings that took place regarding broadband deployment and the committee conclusions. The conclusions included that the need for further study, inquiry, and legislative action in the area of broadband deployment may be necessary and identified the issues central to the broadband deployment debate as economic benefits, demand for access and supply of services. She also included a brief update on the KAN-ED program during her remarks. Ms. Holman responded to questions from the committee.

Chairman Holmes introduced Tom Gleason, who provided an general overview on telecommunications that could provide a better understanding of Kansas telecommunication companies and the development of the legal and regulatory environment in which specific policy decisions may be made (Attachment 2). Mr. Gleason provided a brief history of telecommunications and how the network was built and broaden. Next he addressed the change in direction under federal and statue statutes that promoted competition in the industry. Finally, Mr. Gleason addressed the needs of the future, going beyond dial tone and into cyberspace comparing the availability of advanced services. Mr. Gleason responded to questions from the committee.

Guy McDonald, Senior Telecommunications Analyst for the Kansas Corporation Commission, appeared before the committee to provide a description of broadband service, an illustration of a common broadband network architecture, a status report on broadband deployment and a listing of Rural Utility Service (RUS) programs that offer funding for deployment in rural areas (Attachment 3). Mr. McDonald responded to questions from the committee. Additionally, Tom Bahnen and Janet Buchanan responded to questions.

Also distributed to the committee members was a booklet titled "Evolving Telecommunications Competition in Kansas - A Brief Overview," and a map showing the telephone exchange areas in the stated, both provided by the Kansas Corporation Commission (copies available from Legislative Research or the Corporation Commission).

The meeting adjourned at 10:55 a.m.

The next meeting is Wednesday, January 22, 2003 at 9:00 a.m.

# HOUSE UTILITIES COMMITTEE GUEST LIST

DATE: January 21, 2003

NAME	REPRESENTING
John Federico	KCTA
Debbie Schmidt	WorldNet LLC
Judy Shaw	Worldnet LLC
Rand Springs	Curb
MIKE LURA	CURB
Tom Behren	KCC
Wade Haggood	Sprint
Guy Mc Donald	KCC - Staff
Janet Berberian	KCC - Staff
Randy Tomlin	SBC Kansas
Eddie Rodriguez	"
Tim Pickering	"
Ron GARTES	EXPERIAN
Ave Spiess	KITA - ks. Telecommunications Indust <sup>Assoc</sup>
Tom Gleason	Independent Telecom Group
Jim Frankover	SW BT
Jusan Mahoney	SBC KS
George Barbee	RTMC
Jim Sullinger	KC STAR
Mike Murray	Sprint

# HOUSE UTILITIES COMMITTEE GUEST LIST

DATE: January 21, 2003

NAME	REPRESENTING
Daphne Cannon	Pixius Communications
Mark Johnson	Bonex Communications W/Vox Comm.
Debbie Snow	CWA - SBC
Ernest C. Pogge	AARP
Shuly Allen	SITA
John D. Pinegar	State Independent Telephone Assn.

# Joint Committee on Economic Development

## BROADBAND DEPLOYMENT

### CONCLUSIONS AND RECOMMENDATIONS

The Committee concludes that broadband is of vital importance to economic development and that the 2003 Session of the Legislature should continue to examine ways to encourage consumer driven investment in broadband throughout the state.

The Committee also concludes that further study and legislative action in the area of broadband deployment may be necessary in the future. To this end, the Committee has identified issues which are central to the broadband deployment debate: the economic benefits of broadband, the demand for broadband access, and the supply of broadband services.

**Proposed Legislation:** None

### BACKGROUND

The Joint Committee on Economic Development is permitted to select its own topics of study in addition to those which may be assigned to the Committee by the Legislative Coordinating Council. The topic of Broadband Deployment was selected by the Committee, and the focus of the study was placed specifically on the impact of broadband deployment on economic development.

**Definition of Broadband.** While traditional dial-up data access provides speeds of less than 56 kilobits per second (kbps), the Federal Communications Commission (FCC) defines broadband technology as that technology providing for speeds of at least 200 kbps in at least one direction. The term "Broadband" can be further broken down into "advanced services" and "high-speed access services." Section 706(b) of the Federal Telecommunica-

tions Act of 1996, describes advanced services 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." According to the FCC, the distinction between advanced service and high-speed service is that in order to be considered advanced service, there must be services and facilities with an upstream (customer-to-provider) and downstream (provider-to-customer) transmission speed of more than 200 kbps, while high-speed service would be at the same speed but the transmission capability would only need to be in one direction.

Broadband services can be provided over wireline facilities such as digital subscriber line (DSL), wireless third Generation (3G) facilities, cable facilities, and satellite facilities.

HOUSE UTILITIES

**The KAN-ED Network.** The KAN-ED Network, which was created by the Legislature in 2001, is a broadband technology-based network to which schools (including public and private Kansas postsecondary institutions and public and private K-12 schools), libraries, and hospitals may connect for broadband Internet access and intranet access for distance learning. Access to the network must be provided to not less than 75 percent of all participating schools, libraries, and hospitals by July 1, 2004. The Kansas Board of Regents has responsibility for governance of the network and for contracting for the creation, operation, and maintenance of the network. The implementation of KAN-ED has proceeded steadily since its inception in 2001, with a KAN-ED director and operations manager being named and invitations to join the KAN-ED Consortium have been sent to schools, libraries, and hospitals in the state.

**Status of Broadband Deployment in Kansas.** Kansas has an Internet usage rate which is slightly higher than the national average. According to the U.S. Department of Commerce, in 2001 between 55 percent and 61 percent of Kansans used the Internet, while 54 percent of the nation as a whole used the Internet. However, in December 2001, 44 percent of Kansas zip codes did not have a provider of high-speed access lines. Census data reported in December 2000, indicate that approximately 5 percent of Kansans subscribe to broadband services.

According to the FCC, there were a total of 17 broadband providers in Kansas in December 2001. This total includes all providers with at least 250 lines in service at speeds meeting the definition of broadband service. These providers had 125,963 high-speed access lines in

December 2001, of which 23,564 used Asymmetric Digital Subscriber Line (ADSL) technology, 94,047 used coaxial cable technology and 8,532 used other technologies. (The Kansas Corporation Commission (KCC) has identified nearly 20,000 DSL lines in addition to those identified by the FCC).

## COMMITTEE ACTIVITIES

The Committee held a hearing on the topic at the September meeting. At this time, various conferees provided testimony.

A representative of the KCC, provided information on broadband deployment and its effect on economic development. Her testimony included basic background information regarding broadband service and narrating the differences between advanced and high-speed service. She reviewed federal legislation and state and federal regulatory proceedings that may have an effect/impact on deployment of Broadband. She spoke about the Rural Utility Service Programs and summarized with a status report regarding broadband deployment in Kansas. She shared with the Committee the belief that high-speed access will make distance learning and telemedicine programs more effective as well as provide access to new entertainment opportunities and additional services.

A representative of the United States Department of Commerce presented testimony entitled "Broadband: The Sky's The Limit and It's Not Falling (Yet)." He described the deployment of broadband and its potential on the national, state, and local levels, emphasizing that the issue is not one of supply but instead one of demand for broadband services. He focused on the following themes.

- High speed Internet access holds extraordinary promise for our economy and our society.
- While current generations of broadband are deploying robustly, much work remains to deploy a sufficiently robust network and to encourage its widespread usage.
- There are steps government and private participants can take to promote broadband deployment and encourage its usage. For state and local governments, he recommended prioritizing bandwidth when considering issues such as rights-of-way, taxes and application fees, tower siting, zoning, building and construction codes, building access, franchise agreements, historic preservation, and environmental protections. He also suggested that leaders consider ways to aggregate demand to incent carrier deployment.

A representative of the American Internet Service Provider (ISP) Association, gave a presentation entitled, "A Positive Competitive Broadband Agenda for the Nation." In her presentation, she provided the history of the American ISP Association and spoke about the challenges associated with supply/demand sides of broadband deployment, results from a recent survey of 1,000 U.S. voters, data on percent of U.S. households with broadband availability, consumer rate verses take rate, drivers of broadband demand, five promising areas for immediate impact, effect of increased prices as competition falters, changing patterns of consumers, broadband vision, and a national broadband agenda.

A representative of the Southern Kansas Telephone Company, and the Kansas Rural Independent Telephone companies, spoke about the importance of broadband deployment for Kansas. He reviewed the impact of the 1996 Kansas Telecommunications Act, and the 1996 Federal Telecommunications Act on independent telecommunication companies. Under the mandate of that act his companies have deployed broadband capable facilities over the last ten years. He suggested that they would need ongoing reasonable support to meet the mandate of comparable services at comparable rates.

A representative of the Kansas Chamber of Commerce and Industry (KCCI), presented testimony regarding the business community's interest in broadband deployment. He told the Committee that KCCI believes high-speed Internet technology is critical as an economic developer to attract new industry and retain existing business. He submitted that the core policy question is what climate will cause Kansas to benefit from the constant evolution of communication technology.

A representative of Southwestern Bell Communications (SBC) gave a presentation on the topic of broadband technology and its importance to economic development in Kansas. The presentation covered four key points:

- Broadband technology is vital to the economic development of Kansas;
- Expanding broadband deployment in Kansas can revive the state's telecommunications industry and technology;
- More broadband access will help

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Kansas retain and attract business; and

- SBC has made significant investments in Kansas in the past.

He told the Committee that SBC is willing to continue to make a significant investment to extend broadband access across Kansas at no cost to the state. However, SBC asked that their investment be protected by fair broadband regulation. He stated that if a company invests in the technology, that company should not be punished by having to turn the network over to competitors. He recommended that the Legislature consider adopting regulatory reform, with the goal being to apply the same state regulation to all high speed Internet service providers, and allow the broadband market to regulate itself through competition. When asked about SBC's future technology plans in Kansas, he stated that unless there are regulatory reforms, SBC does not plan to expand services and facilities beyond its current commitments.

A representative of AT&T testified in support of a proactive and competitively neutral broadband policy. He briefly reviewed the history of the 1996 Telecom Regulatory Act, stating that its purpose was to establish local competition in the marketplace. He gave a historical prospective of when AT&T was forced to share its network with competitors to insure that ubiquitous service would be available for all competitors. He noted that the 1996 Act provides three ways by which a new competitor can get into the marketplace; build their own network, re-sell incumbent services, or purchase unbundled network elements. The Act provides pricing for unbundled network elements and is set by the Commission

and included in that price is a rate of return. He stated that the issue carries so many subtle ramifications that it is incumbent on the Legislature to listen to all the testimony before moving forward with legislation.

A representative of Sprint Communications gave a presentation on the costs and benefits of broadband deployment. He noted that currently market forces determine broadband deployment in a majority of markets, although he questioned whether the speed of deployment would be sufficient in this model. He reviewed data on usage in urban and rural areas stating that there have been significant increases in the past two years. He gave an overview of the reasons for supply inconsistency, including prioritization on the part of providers; limited capital budgets, including costs of network upgrades; inability to generate "critical mass" to justify expenditure on equipment; and physical and technological constraints. He suggested the following actions for policymakers:

- Pursue policies that work with the market mechanism, not against it or in place of it;
- Work with suppliers to create incentives making provision cost effective;
- Use demand-aggregation to provide the incentive for deployment; and
- Use specific, targeted policy tools to encourage supply where demand exists and currently is unmet.

A representative of Everest Connections urged the Legislature not to enact legislation that advances the

interest of one company to the detriment of other companies, stating that legislation is not likely to result in the availability of advanced services to customers who reside at distances well outside the city limits.

A representative of Pixius Communications, gave a presentation on the economic benefits and challenges of broadband. He told the Committee that the high-speed, broadband networks of the 21<sup>st</sup> century are essential to attracting and retaining businesses, providing state-of-the-art healthcare, and offering children the benefits of distance learning and the Internet. He recommended that a cooperative effort between the Kansas Legislature and the KCC is required to encourage bandwidth providers to provide services to ISPs at a wholesale level, grant restricted CLEC status to ISPs, provide tax relief from telecommunications taxes, and grant investment tax credits.

## CONCLUSIONS AND RECOMMENDATIONS

The Committee concludes that broadband is of vital importance to economic development and that the 2003 Session of the Legislature should continue to examine ways to encourage consumer driven investment in broadband throughout the state.

The Committee also concludes that further study, inquiry, and legislative action in the area of broadband deployment may be necessary in the future. To this end, the Committee has identified the following issues which are central to the broadband deployment debate: the economic benefits of broadband, the demand for broadband access, and the supply of broadband services.

**Economic Benefits of Broadband Deployment.** Although the Committee received a general sense of the importance of broadband services to economic development, further information as to the specific benefits of broadband deployment would provide the opportunity for future legislatures to weigh the urgency for legislative action regarding broadband deployment in Kansas.

**Demand for Broadband Access.** The demand for broadband access plays a key role in broadband deployment. Both the business community and government can take actions to stimulate the demand for broadband. Some issues relative to the demand for broadband include:

- Quality of content available using broadband technology.
- Perception of return on investment for broadband investments.
- Understanding how to implement broadband business solutions.
- Use of broadband in the government sector, such as in the areas of education and health care, to stimulate demand for broadband. This could include maximizing the potential of KAN-ED.
- Aggregating demand for broadband through community collaboration to attract investments in broadband infrastructure.
- Importance of price in creating a demand for broadband. When price goes down, the "take-rate" for broadband goes up.



**Supply of Broadband Services.** The Committee's discussion of the supply side of broadband services focused, in large part, on the issue of government regulation. Specifically, the issue centered around the possibility that, under the 1996 Telecommunications Act, SBC, as the incumbent telephone provider, will be required to open up their broadband network for the use of competitors as it has been required to open up its traditional telephone network. Because broadband services as we know them today were not available in 1996 at the time of the landmark telecommunications legislation, there is some question as to whether intramodal competition is needed in addition to intermodal competition for broadband carriers. In other words, it is unclear whether it is sufficient under the law that broadband competition exists among the various technologies or if the law will be interpreted to require competition in the provision of broadband services using telephone technology.

The question of intramodal competition currently is being decided by the KCC and FCC and their decisions will ultimately impact any legislation that is proposed in this area.

The Legislature, after consultation with

the KCC, could adopt legislation clarifying that broadband networks of the incumbent telephone provider would not be opened up to competitors. However, there would be implications for voice competition that would need to be addressed. The voice network and the broadband network are intertwined and may someday be the same facility and thus any language limiting regulatory authority would have to be carefully crafted.

Other issues that arise in the area of the supply of broadband services are as follows:

- The possibility of subsidizing broadband deployment using moneys from the Kansas Universal Service Fund.
- The possibility of offering tax incentives for broadband use or deployment.
- Minimizing governmental barriers and impediments to broadband deployment.
- The rate of reimbursement for use of lines belonging to the incumbent provider.

# Telecommunications

## An Overview

A Presentation to the House Utilities Committee  
January 21, 2003

Tom Gleason  
Gleason & Doty, Chartered

*HOUSE UTILITIES*

DATE: 1-21-03

ATTACHMENT 2

Mr. Chairman and Members of the House Utilities Committee:

My name is Tom Gleason. I am an attorney with the firm of Gleason & Doty, Chartered of Ottawa and Lawrence. I have the honor to serve as regulatory and legislative counsel for the Independent Telecommunications Group, an informal association of twelve companies providing local service to Kansas families, individuals and businesses in rural areas and smaller communities.

I appear before you today at the invitation of the Chairman in conjunction with a presentation by the staff of the Kansas Corporation Commission, the agency that regulates the provision of telecommunications services within our state. Our purpose is not to address a particular bill or proposal, nor to persuade you of anything; instead we will try to give you a better understanding of Kansas telecommunications, and the development of the legal and regulatory environment in which specific policy decisions may be made.

I. A Brief History: Building and Broadening the Network

For some time after Mr. Watson received the first unsolicited telephone call in Alexander Graham Bell's laboratory, there was disagreement about how broad the need and demand for telephone service would become. Gradually, both in Kansas and nationwide, local networks arose and interconnected with each other, providing service to an ever-increasing number of communities and citizens. Numerous providers, some nationwide in scope and others serving only a single community, brought instantaneous voice communications to millions.

Where demand was sufficient and costs were moderate, building a local network was an attractive business proposition. The Bell system, under the ownership of AT&T, covered much of the country and most of the urban population through its regional Bell operating companies. Other multistate companies each served numerous areas. Meanwhile many small towns gained service in spite of higher costs, through the efforts of small locally owned companies or through establishment of co-operatives owned by their customers. AT&T's long distance facilities became the principal connection among these many separate companies and local exchanges.

A major development in telecommunications policy was the adoption of the federal Communications Act of 1934. An enduring focus and effect of this law was the identification of universal service as the primary goal of telecommunications policy. The universal service principle means simply this: reliable, convenient telecommunications service should be made available and affordable to everyone. In this way everyone connected to the network can call, and be called by, the greatest possible number of others. This maximizes the value of the network to every member the public.

Governmental supervision of telecommunications, at least until the latter part of the twentieth century, focused on assuring uniform and reliable service while supervising rates that could be charged by service providers, each of which held exclusive rights to offer local service in defined territories. In rural areas, where low population density led to higher costs

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per customer, a variety of support mechanisms allowed companies to keep their rates affordable. These mechanisms included: internal support by companies serving both urban and rural exchanges; toll rate support, in which higher long distance costs helped fund local network costs; and financing opportunities such as Rural Electrification Administration loans that provided low-cost financing for the expansion of utility services beyond population centers. Few would dispute that universal service has been an overwhelming policy success; by the nineteen-nineties well over ninety percent of households nationwide had telephone service. Support for this level of service also comes from federal universal support mechanisms relying principally on customer charges.

## II. Competition: an Additional Objective under Federal and State Statutes

In the 1980's a change in the direction of national communications policy was undertaken. Instead of continuing toll service under a regulated monopoly model, it was decided that competition in long distance service would be in the public interest. AT&T was required to permit competing interexchange carriers to carry their customers' calls over its facilities until they could build (as they soon did) their own competing facilities. Further support for increased competition included the separation of the Bell system into regional operating companies existing apart from the nationwide AT&T toll network. In the meantime, long distance carriers were required to continue their support for affordable local networks through access charges paid for origination and termination of calls between exchanges. These access charges were recovered from customers in the carriers' toll rates – the more toll calls a customer placed, the more support that customer provided for local facilities necessary to place and receive the toll calls.

The federal Telecommunications Act of 1996 was an extensive amendment to the 1934 act. In an attempt to address many competing concerns, the act established competition in local service as a policy objective while seeking to preserve the universal service objective. Regulators were required to authorize competition for local service in larger companies' service areas and were permitted to do likewise where smaller companies were the local service suppliers. State regulators were given authority to require larger companies to make their facilities, or components of their facilities, available to competitors for resale to local customers. As had been the case with long distance competition, it was assumed that this action would be a step toward competitors' investment in their own facilities and networks. Competition was also said to require that support mechanisms for affordable local rates become explicit, i.e., standing alone and clearly identified, rather than continuing as indirect support included in access charges and toll rates. Reductions in access charges have resulted in lower toll calling rates; at the same time, local service rates have increased on average 23% since 1996.

At the same time the 1996 federal act was coming into being, Kansas took the initiative to address the changing world of telecommunications. The Kansas Telecommunications Act, adopted that same year, set the terms for entry of local service competitors while expressing definite public policy goals and service requirements. Different forms of regulation of providers were authorized and defined, and authority was given to the KCC to end regulation of sufficiently competitive services. The Kansas Act addressed maintenance of existing

service quality and defined the basic service to be required of providers; it also established terms for the development of additional and advanced services, both through statement of general objectives and adoption of specific future service requirements. The Kansas Universal Service Fund (KUSF) was established to continue support for local service, at the same time as support in access and toll rates was reduced.

Under the Kansas Act local service providers have chosen between two basic types of regulation: traditional rate of return, and price cap. Rural companies have elected continuation of the former, while the state's two larger local service providers have chosen the latter. Under rate of return regulation, the KCC is empowered to determine the level of a carrier's reasonable costs and investments necessary to provide required services, and an allowable percentage of return on investment. The Commission then gives the company a reasonable opportunity to earn enough revenues to meet its approved costs, investments and level of return. Under price cap regulation the Commission sets maximum reasonable charges a company may impose on its customers for regulated services; if the company then is able to achieve savings in providing the services, it increases its return on its investment.

Both federal and state policies recognize that there are public interests in communications that require continuing government direction. Those interests, including public safety and the reliability of essential services, are the reason for regulatory mandates and for support mechanisms. As a general rule, it is government's objective that such requirements and support should not give any provider an unwarranted advantage or disadvantage in the competitive arena. Both levels of government set competitive neutrality as an overriding requirement, so that competition will not be distorted by government action in the public interest. Generally, competitive neutrality requires that no class of provider or specific technology should be given an undue advantage or disadvantage in the competitive arena.

### III. Beyond Dial Tone and into Cyberspace: Comparable Availability of Advanced Services

It's clear that the 1996 federal and state Telecommunications Acts recognized the increasing role of networks for data transmission and the need for a broader "pipeline" for advanced uses. The Kansas act talks of multimedia transmission, broadband service and digital transmission technologies, but it's not clear the extent to which the 1996 legislature foresaw the expansion of the internet to include its present and future applications. The Kan-Ed network was foreshadowed by the Act's requirement for interconnection of schools, hospitals and government agencies, but it's less settled whether many individual customers were expected to demand data and multimedia services substantially exceeding the capacity of the ordinary local service network.

Today's advanced services are likely to become tomorrow's universal expectations. Just as demand for voice communications exceeded most original expectations, few will be surprised if we soon see broadband capabilities offered and used everywhere. Distance learning, telemedicine and e-commerce may lead to higher broadband usage in rural areas, where preservation of education and health services located in each community has become difficult or impossible. Business retention, expansion and recruitment are likely to create

further demand for new communications capabilities. More telecommuters and tele-shoppers will want and expect something much faster than the marginal data speeds now available in many rural areas.

There are practical issues that affect delivery of advanced services to a broader segment of Kansans. One of these is a limitation on transmission speeds over greater distances. Telecom people speak of the "18-kilofoot" limit: this refers to the problem of carrying data at reasonable speeds over telephone lines exceeding about three miles in length. Without additional investment in facilities, it is difficult or impossible to transmit at speeds over 19,200 bits per second. That may sound like quite a few bits, but virtually all of today's computers and modems are capable of speeds at least three times that rate. The FCC's definition of advanced services assumes rates of at least 200 kbps, or more than ten times the possible rate over ordinary long lines. Some digital subscriber line (DSL) and cable modem technologies, already common in many population centers, offer much higher data speeds.

A second impediment to wider availability of high-speed service is that of cost. As private companies, telecommunications providers obviously won't invest in new capabilities if there's no reasonable prospect of recovering that investment. Just as the first voice services were slower coming to rural areas, it will be harder to get advanced services to customers in sparsely populated parts of our state. Even as newer technologies like wireless or satellite broadband emerge, the costs of providing service will be higher where there are fewer potential customers to share the costs of required facilities.

Federal and state expressions of public policy on this issue are clear: in spite of the higher costs of service in rural areas, all customers should have the same communications opportunities. The 1996 federal act calls for comparable services in urban and rural areas at comparable rates; the Kansas act states that all Kansans are to be afforded the opportunity to benefit from advanced services. The FCC has undertaken a national proceeding to decide how comparable service can be supported in areas where the marketplace alone won't do the job; meanwhile, the Kansas Telecommunications Act authorizes KUSF support for eligible companies' investment in facilities required to provide mandated services, including "ISDN or its technological equivalent."

The principles of universal service, competition, competitive neutrality and comparable availability of service at comparable rates are all at work throughout telecommunications policy. Ideally, public policy will be evaluated in light of all these objectives.

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## *Kansas Corporation Commission*

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*Kathleen Sebelius, Governor   John Wine, Chair   Cynthia L. Claus, Commissioner   Brian J. Moline, Commissioner*

Briefing By  
Guy McDonald, Senior Telecommunications Analyst  
Kansas Corporation Commission

Before the House Utilities Committee  
An Overview of Broadband Deployment in Kansas  
January 21, 2003

Chairman Holmes and Members of the Committee:

Thank you for the opportunity to appear before you today on behalf of the Kansas Corporation Commission to assist with gathering information regarding broadband services, in Kansas. My name is Guy McDonald. I am one of seven analysts in the Telecommunications section of the Commission's staff.

While the Commission does not have regulatory authority over the retail offering of broadband services and no jurisdiction over some providers of broadband services, the Commission does have access to information that may be of use to the committee.

Attached to my presentation, you will find several pieces of information. First, a brief description of what is commonly meant by "broadband service". Next, you will find an illustration of a common broadband network architecture, a status report on broadband deployment and a brief listing of RUS programs that offer funding for deployment of broadband services in rural areas.

I will step through this information with you and stand for any questions.

*HOUSE UTILITIES*

DATE: **1-21-03**

1500 SW Arrowhead Road, Topeka, Kansas 66604-4027 785.271.3100 ATTACHMENT **3**

## What is Broadband?

The term “broadband” is sometimes used interchangeably with the terms “advanced services” and “high-speed access services”. In general, all these terms refer to services that allow consumers to gain fast access to a wide range of information and services. Section 706(b) of the Federal Telecommunications Act of 1996, describes advanced services 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.” The FCC has made a distinction between services classified as advanced services and those classified as high-speed service.

Advanced service describes services with an upstream (customer-to-provider) and downstream (provider-to-customer) transmission speed of more than 200 kbps.<sup>1</sup>

High-speed service describes service and facilities with over 200 kbps capability in at least one direction.<sup>2</sup>

By comparison, voice bandwidth is generally allocated 64 kbps.

These services provide considerably faster delivery of information than the traditional dial-up service used by most residential and small business customers. Dial-up service is generally limited to speeds of not more than 56 kbps. The FCC periodically reevaluates its definitions of advanced telecommunications and will continue to examine this definition as consumer demand and technology develops. Most commonly, these services are used to access the Internet.

Broadband services can be provided over wireline facilities such as digital subscriber line (DSL), fixed (and soon mobile) wireless facilities, cable facilities, and satellite facilities.

Some examples of broadband services provided over wireline facilities are:

Asymmetric Digital Subscriber Line (ADSL) can be used to provide consumers with multiple data transmission rates. The upstream and downstream transmission rates vary, with downstream transmission rates being faster.

Symmetric Digital Subscriber Line (SDSL) provides moderately high-speed transmission rates. The upstream and downstream transmission rates are identical. Multiple data transmission rates can be made available.

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<sup>1</sup> CC Docket Number 98-146, “Third Report”, February 6, 2002, paragraph 9, page 7.

<sup>2</sup> CC Docket Number 98-146, “Third Report”, February 6, 2002, paragraph 9, page 7.



Fixed wireless systems (a/k/a 802.11 systems) can generally provide:

Bi-directional speeds in the range of 1.54 mbps.

Mobile or 3G wireless systems have been allocated the following speeds:

- 144 kilobits/second or higher in high mobility (vehicular) traffic
- 384 kilobits/second for pedestrian traffic
- 2 megabits/second or higher for indoor traffic<sup>3</sup>

Cable Modem Service:

Cable modem service speeds are a function of system load. The typical end-user speeds will range from several hundred Kbps to megabit speeds, depending on simultaneous usage by other subscribers. While the modem itself is generally capable of 10mbps, several subscribers compete for common bandwidth into their respective neighborhoods, thus impacting the actual speeds experienced by any user at any point in time.

Satellite Service:

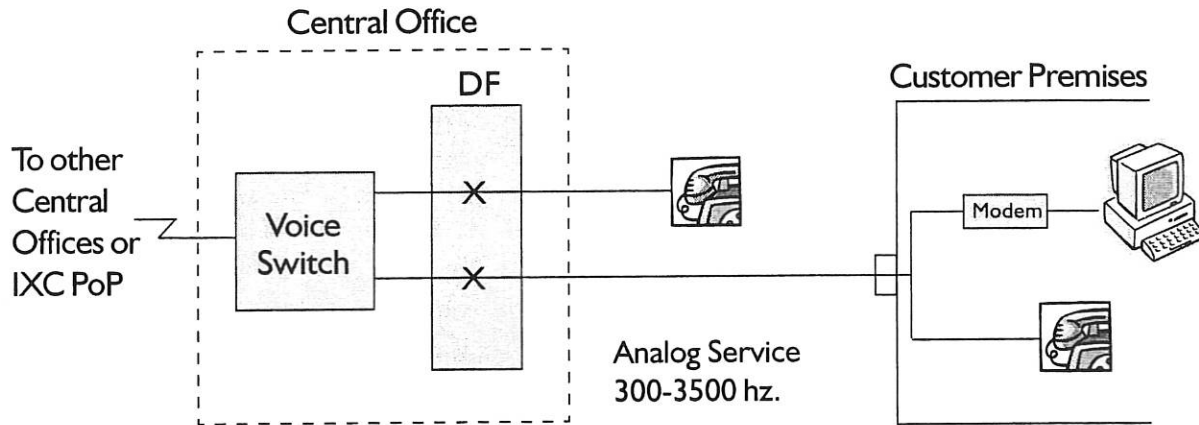
The download and upload speed for satellite internet access depends on several factors including: the satellite internet provider, the level of subscription on their network, your line of sight to the orbiting satellite, the service package purchased and in some cases, the weather. Typically, a user can expect to receive about 500 kbps download and approximately 80 kbps upload. While this is slower than many cable and DSL connections, it is about 10 times faster than a normal modem.<sup>4</sup>

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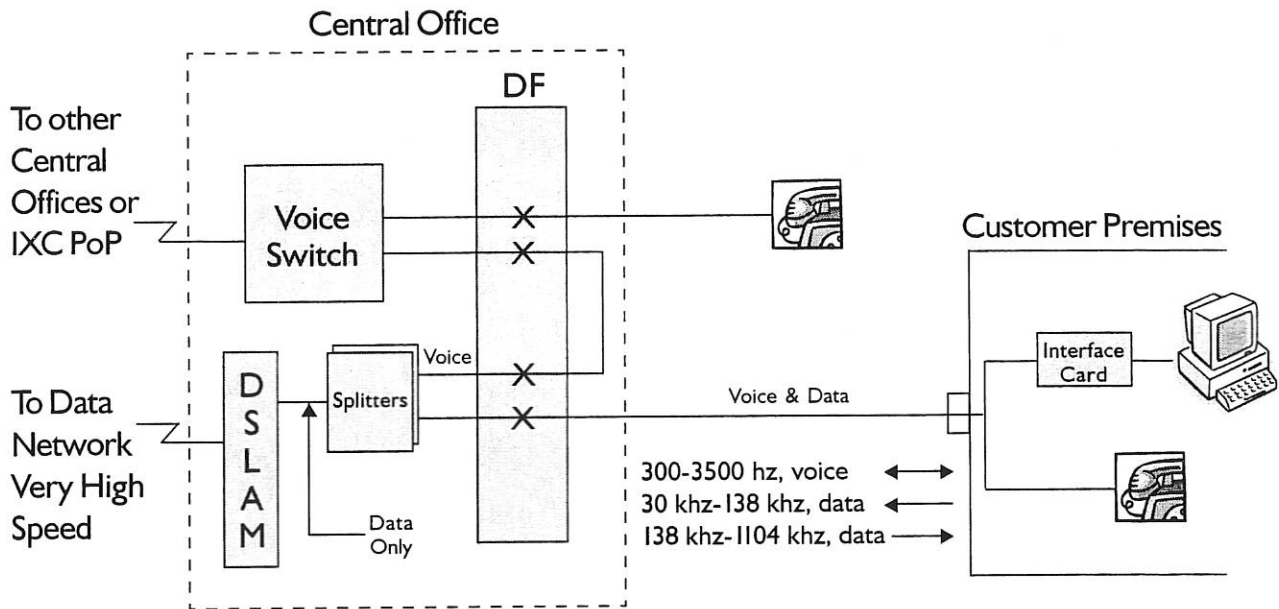
<sup>3</sup> <http://ftp.fcc.gov/3G/>, visited September 10, 2002.

<sup>4</sup> [http://www.satellite-internet-access.net/about\\_satellite.htm](http://www.satellite-internet-access.net/about_satellite.htm), visited September 10, 2002.

# Plan Old Telephone Service (PoTs)



# PoTs & Broadband (ADSL)\*



## Legend:

DF = Distributing Frame. The DF is a large central office devices where telephony equipment and subscriber lines are interconnected.

X = Cross Connect. Cross Connects are pieces of wire used to connect various components needed to provide telephony service.

DSLAM = Digital Subscriber Line Access Multiplexer (DSLAM).

\* There are several varieties of Broadband Services. Asymmetric Digital Subscriber Line (ADSL) is the most common and shown here.

## **Key Points:**

- The PSTN was originally engineered and operated to provide a voice grade (300-3,500Hz) service.
- PC computers are able to use the PSTN by using a modem to interface with the network. Modems take a PC's digital data signal and converts it to an analog signal between 300 and 3,500Hz and performs the reverse process with incoming analog signals.

## **Broadband service:**

- Supports the simultaneous use of the telephone (voice) and PC (data).
- ADSL makes use of the available higher frequencies to connect an end user to the data network.
- Supports up to 8Mbps from the network to the end user and up to 640Kbps from the end user to the network.
- Service availability is distance sensitive. Data service is generally available up to 15,000 feet from the central office and is not generally available to subscribers served by a pair gain system.

## Status Report on Broadband Deployment

Increasingly, discussion of access to the Internet has focused on the speed with which data can be accessed. Traditional dial-up access provides speeds of less than 56 kbps. The FCC has defined broadband technology as that technology providing for speeds of at least 200 kbps in at least one direction. Many new broadband technologies are able to provide speeds well in excess of 200 kbps. Broadband services will make distance learning and telemedicine applications more widely available and effective, provide access to new entertainment opportunities and many additional services. Thus, deployment of broadband has become a topic of national interest and concern.

Table 1, below, summarizes data gathered by the FCC regarding the number of broadband providers in Kansas.

**Table 1 - Number of Broadband Providers in Kansas  
By Type of Provider**

Type of Provider	June 2000	December 2000	June 2001	December 2001	June 2002
ADSL	*	4	*	5	6
Coaxial Cable	*	5	6	7	10
Other	6	9	10	12	12
Total (Unduplicated)	7	11	14	17	21

\* Data withheld by the FCC to maintain confidentiality

Other includes wireline technologies other than ADSL, optical fiber to the subscriber's premises, satellite, and fixed wireless systems.

Source: Industry Analysis Division of the Common Carrier Bureau, FCC, "High-Speed Services for Internet Access," Reports filed October 2000, August 2001, February 2002, July 2002, December 2002.

It should be noted that a provider was required to report information to the FCC only if it had at least 250 high-speed lines (or wireless channels) in service in a state and was providing service capable of speeds of over 200 kbps in at least one direction. Thus, the FCC report may understate the number of broadband service providers. This may be especially true if there are small providers serving mainly rural areas of a state and providers offering slower speeds but speeds which may be acceptable for consumers.

Thus, it is likely that the number of carriers is under-reported for Kansas. For comparison, we provide data from other SBC states since SBC-KS has the largest territory (in terms of access lines) in Kansas. As of June 30, 2002, Arkansas has a total of 10 providers of high-speed lines while Missouri has 22 providers, Oklahoma has 18 providers and Texas has 36 providers. However, when comparing data between states, keep in mind that the demographics of the states vary considerably and those differences contribute, in part, to the reported differences.

The number of high-speed lines subscribed to in Kansas has been steadily increasing since 1999. Table 2 shows the number of high-speed access lines reported to the FCC for Kansas and the percent increase in the number of lines each year. Again, because the FCC only required data from providers with 250 access lines providing customers with high-speed access of over 200 kbps in at least one direction, it is likely that the number of access lines for Kansas is understated. The table also reports the number of high-speed access lines in other SBC states and the percent increase attained in those states. Missouri and Texas have several market areas that are much larger than those that can be found in Kansas; thus, it is reasonable that both states would have a greater number of broadband access lines than reported for Kansas.

**Table 2 - Number of High-Speed Access Lines**  
(over 200 kbps in at least one direction)

State	December 1999	June 2000	December 2000	June 2001	December 2001	June 2002
Kansas	26,179	42,679	68,743	101,734	125,963	149,733
% Change		63%	61%	48%	24%	19%
Arkansas	8,155	15,139	28,968	40,803	66,537	84,235
% Change		86%	91%	41%	63%	27%
Missouri	23,347	46,903	100,403	123,915	181,794	224,282
% Change		101%	114%	23%	47%	23%
Oklahoma	96,730	163,703	95,138	92,947	114,931	151,213
% Change	*	*	*	*	24%	32%
Texas	152,518	276,087	522,538	646,839	840,665	1,050,511
% Change		81%	89%	24%	30%	25%

\*The % Change is not meaningful due to inconsistencies in the reported data.

Source: Industry Analysis Division of the Common Carrier Bureau, FCC, "High-Speed Services for Internet Access," December 2002 Report, Table 7.

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The FCC also reports the number of broadband access lines for each state by the type of technology used to provide the service. Table 3 reports the number of access lines provided in Kansas by coaxial cable, ADSL and “other” technologies. The “other” technologies include wireline technologies other than ADSL, optical fiber to the subscriber’s premises, satellite, and fixed wireless systems. As is true for the nation, providers utilizing coaxial cable have garnered the most access lines in Kansas.

**Table 3 – Number of Kansas High-Speed Access Lines by Technology**

<b>Technology</b>	<b>June 2000</b>	<b>Dec 2000</b>	<b>June 2001</b>	<b>Dec 2001</b>	<b>June 2002</b>
ADSL	*	14,281	*	23,564	28,713
Coaxial Cable	*	48,541	74,337	94,047	111,615
Other	5,171	5,921	*	8,532	9,405

\* Data withheld by the FCC to maintain confidentiality

Other includes wireline technologies other than ADSL, optical fiber to the subscriber’s premises, satellite, and fixed wireless systems.

Source: Industry Analysis Division of the Common Carrier Bureau, FCC, “High-Speed Services for Internet Access,” Reports filed October 2000, August 2001, February 2002, July 2002, December 2002.

The FCC reports that facilities-based providers of ADSL service, as of June 2002, were predominately incumbent local exchange carriers.

Residential and small business customers are the primary subscribers to broadband services. The FCC reports data for each state for two categories of customers: (1) residential and small business and, (2) other. The “other” category includes medium and large businesses as well as institutional and government customers. Table 4 reports the number of high-speed access lines in Kansas by type of customer. By June 2002, residential and small business customers subscribed to approximately 96% of the broadband access lines in Kansas. For the nation as a whole, residential and small business customers subscribe to approximately 86% of the broadband lines.

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**Table 4 – Number of Kansas High-Speed Access Lines by Customer Type**

Type of Customer	June 2000	Dec 2000	June 2001	Dec 2001	June 2002
Residential and Small Business	Not Available	64,095	96,393	120,375	143,271
Other	Not Available	4,648	5,341	5,588	6,462

Other includes medium and large businesses, institutional, and government customers.

Source: Industry Analysis Division of the Common Carrier Bureau, FCC, "High-Speed Services for Internet Access," Reports filed October 2000, August 2001, February 2002, July 2002, December 2002.

The FCC provides data regarding the portion of zip codes within a state that have one, two, three, four, five, six, seven, eight, nine, ten or more, and no providers of high-speed access lines. As is indicated in Table 5, Kansas has a greater percentage of zip codes with no provider of high-speed access lines than the nation as a whole.

**Table 5 – Percent of Zip Codes with No Provider of High-Speed Access Lines**

	June 2000	Dec 2000	June 2001	Dec 2001	June 2002
Kansas	50%	41%	35%	44%	38%
Nationwide	30%	25%	22%	21%	16%

Source: Industry Analysis Division of the Common Carrier Bureau, FCC, "High-Speed Services for Internet Access," Reports filed October 2000, August 2001, February 2002, July 2002, December 2002.

Table 6 shows additional FCC data for Kansas and other SBC surrounding states, as of June 2002. Again, because the FCC only requires a provider to report data if it has more than 250 access lines in a state, the data for Kansas may understate the number of providers in Kansas zip codes. For comparison, data for Arkansas, Missouri, Oklahoma, Texas, and the nation as a whole are also provided.

**Table 6 – Percent of Zip Codes with High-Speed Access Providers**

State	No Provider	One	Three	Five	Seven	Ten or more
Kansas	38%	22%	6%	5%	3%	0%
Arkansas	30%	27%	11%	2%	1%	0%
Missouri	24%	24%	13%	4%	2%	0%
Oklahoma	21%	28%	9%	5%	5%	0%
Texas	13%	15%	11%	7%	4%	15%
Nationwide	16%	18%	13%	7%	3%	6%

Source: Industry Analysis Division of the Common Carrier Bureau, FCC, "High-Speed Services for Internet Access," December 2002 Report, Table 10.

Also found in the FCC's recent report on high-speed services is nationwide data regarding the subscribership to broadband by groups of zip codes organized by population density and by income. As one might expect, the more densely populated an area and the greater the income level, the more zip codes with at least one subscriber.

On December 17, 2002, the FCC released its fourth report on the availability of advanced services capabilities and whether deployment of such services is being made in a reasonable and timely manner. In the report, the FCC concludes that advanced service capability is being deployed in a reasonable and timely manner for the nation as a whole. The FCC also concluded that investment in infrastructure for most advanced services remained strong. Only three nations had a higher broadband subscribership rate than the United States (3.24%) – Korea (13.91%), Canada (6.22%) and Sweden (4.52%).<sup>1</sup> Some researchers estimate that broadband services have a subscribership of approximately 10% for the nation. (This subscribership rate may include services of slower speeds than reviewed by the FCC and capture the subscribership of carriers providing to fewer customers than required for FCC reporting). Researchers indicate that at a subscribership rate of 10% for the nation, the only consumer electronics device adopted more quickly in recent decades was the black-and-white television.

<sup>1</sup> CC Docket Number 98-146, "Third Report," February 6, 2002, p.6.

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The Kansas Corporation Commission can provide limited information, independent from that gathered by the FCC, regarding the deployment of broadband services in Kansas. The Commission does not have regulatory authority over the retail offering of many forms of broadband service; thus, information is provided primarily on a voluntary basis.

Incumbent local exchange carriers report enhanced services information on Schedule 23 of their Annual Report filed with the Commission. Table 7 summarizes the availability of DSL service to customers through their incumbent local exchange carriers. Additional enhanced services information from Schedule 23 is summarized in the Attachment to this paper. As can see from the attached summary, 26 of the 40 incumbent local exchange carriers are now capable of providing DSL to some portion of their customers. This is an increase in availability from that reported in the 2000 Annual Report when 14 of the 40 incumbent carriers reported being able to provide DSL to some portion of their customers. Preliminary information indicates a significant increase will be reported for 2002.

SBC reports that ISDN is available throughout their service territory. In addition, SBC-Kansas has been progressing toward deployment of broadband services, as required by a Stipulation and Agreement reached in Docket Number 98-SWBT-677-GIT. By August 1, 2003, SBC must deploy DSL near ubiquitously<sup>2</sup> in 24 wire centers serving the following cities: Hays, Hutchinson, Kansas City, Lawrence, Manhattan, Salina, Topeka and Wichita. While SBC is able to provide DSL service in these communities if the customer is within 14,000 to 15,000 feet of the central office, the company is still deploying facilities that are necessary to provide service ubiquitously. SBC has

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<sup>2</sup> In this context, the phrase "near ubiquitously" means that DSL will be available beyond the usual distance limitation of 14,000 to 15,000 feet from the central office. SBC agreed to deploy additional facilities that would permit DSL service to be provided to more customers in the communities listed above.

**Table 7 - Reported Availability of DSL by Kansas Incumbent Local Exchange Carriers**

<b>Available to % of Customers</b>	<b>Number of KS Incumbent Local Exchange Carriers</b>
100%	7
81% - 99%	3
61% - 80%	5
41% - 60%	2
21% - 40%	3
1% - 20%	4
0%	14
No Data Reported	2

deployed Optical Concentration Devices, which are necessary in order for SBC to offer DSL service ubiquitously, in 13 of the 24 wire centers and has deployed 424 remote terminals which are also necessary for ubiquitous deployment. As of August 2002, SBC was not able to provide near ubiquitous service in any of the 24 wire centers. Also, by August 1, 2003, SBC must deploy DSL facilities where technically feasible<sup>3</sup> in 16 wire centers serving the following cities: Arkansas City, Bonner Springs, Coffeyville, Dodge City, El Dorado, Emporia, Garden City, Great Bend, Independence, Leavenworth, Liberal, McPherson, Newton, Ottawa, Parsons and Pittsburg. SBC has deployed all of the facilities necessary to provide DSL, where technically feasible, to these communities. SBC estimates that it will have invested approximately \$175 million in facilities when it completes its deployment obligation.

As of June 2002, SBC reports that it has 24,484 DSL lines in service with a subscribership rate that ranges from 1.32% to 7.97% depending upon the wire center in question.

<sup>3</sup> In this context, the phrase "technically feasible" means that DSL will be available to customers within the distance limitation of 14,000 to 15,000 feet from the central office.

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ISDN is available to all customers in Sprint/United territory. While Sprint/United had not deployed DSL services as of December 31, 2001, the company reports that it has now begun deployment to meet requirements of a Stipulation and Agreement reached in Docket Number 99-UTDT-455-GIT. According to the Stipulation and Agreement, Sprint/United must deploy ADSL to Bucyrus, Edgerton, Spring Hill and Gardner by October 1, 2002. Sprint also indicates that it will deploy facilities, subject to availability, in Junction City, Fort Riley, Lyndon and Osage City. Sprint/United reports a forecasted subscribership rate of 5% for these areas. The company indicates that it currently has 148 DSL subscribers in Kansas as of June 2002.

ISDN is not available in all independent rural telephone company territories. But in those territories where it is available, it is predominately available to all customers. The independent rural companies have made great strides in deployment of broadband. Much of this deployment has been stimulated by the low interest loans available to rural companies. The RUS has low interest loans available to rural carriers specifically for deployment of broadband facilities. RTSC Communications, Inc., d/b/a Nex-Tech, a subsidiary of Rural Telephone Service Company, was one of the first companies in the nation to receive such a loan. In fact, this loan allowed Nex-Tech to place fiber-to-the-home in Norton and Alma, Kansas.

The independent rural companies, as a group, previously indicated that as of 2001, approximately 55% of their customers have DSL service available to them. They also indicate that 2,057 DSL lines are in service with the rate of subscribership varying from 1% to 25% depending upon the company in question. With the planned 2002 additions, the availability of DSL service in independent rural telephone company territory was expected to increase to approximately 61% by the end of 2002.

Broadband services are also offered by competitive local exchange carriers and cable providers. While the Commission does not have jurisdiction over cable modem services, the Mid-America Cable Association kindly responded to Staff's request for information.

The Association reports that as of December 31, 2001, there are 94,047 subscribers to cable modem service. Cable systems pass approximately 873,821 Kansas homes. This would mean that approximately 11% of the customers to whom the service is available actually subscribe to cable modem services. Their November 2002 report shows cable modem (Advance Service) being available in 213 Kansas communities. Staff has also identified 12 competitive local exchange carriers who provide broadband services. As of June 2002, these carriers have approximately 15,460 broadband customers.

SBC, Sprint/United and the independent rural carriers all state that they face competition from various types of technology for the provisioning of broadband services. SBC states that it faces competition from cable modem service in some exchanges and, in the Kansas City area, from fixed wireless service. SBC also believes that satellite service is available nearly statewide. Sprint/United indicated that it faces competition from cable modem service in some exchanges. Information from the independent rural companies regarding the type of competition they face for the provisioning of broadband is not yet available.

**Table 8 – Summary of KCC Data, as of December 31, 2001**

<b>Provider</b>	<b>Number of Lines</b>
SBC	24,484
Sprint	148
Independent Companies	2,057
Cable Companies	94,047
Wireline Competitive Providers	15,460
<b>Total Broadband Lines</b>	<b>136,196</b>

Table 8, above, summarizes the data gathered by staff. It appears that broadband is being deployed in Kansas. Cable modem lines out number DSL lines in Kansas. This is consistent with the finding of the FCC for the nation as a whole. There are 94,047 cable modem lines in service and approximately 42,149 DSL lines operating in the State. Staff has identified nearly 13,587 fewer DSL lines in the state than reported by the FCC;

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however, the data received by Staff is from 2001 statistics, 2002 data is not yet available. Staff is aware that there is a growing number of Internet Service Providers (ISPs) in Kansas using a mixture of technologies (wireless and xDSL) to provide broadband services to their customers, however, we do not have comprehensive information on their activities. According to the 2000 Census, there are 1,037,891 households in Kansas. Wireline and cable providers have reported 136,196 subscribers to broadband service in Kansas. Thus, 13% of Kansas households currently subscribe to a broadband service.

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**Data Services**  
**2001 Annual Report**  
(from Schedule 23)

Company Name	Provide ISDN	Available To % of Customers	Provide xDSL	Available To % of Customers	Capable of Providing Broadband to Schools and Libraries	Available to % of Exchanges
SWBT	Yes	100%	Yes	56%*	Yes	No Response
Sprint/United	Yes	100%	No		Yes	86%
Bluestem	Yes	100%	No	0%	Yes	100%
Blue Valley	No		Yes	100%	Yes	100%
Cass County	No		Yes		No	
Columbus	No		No		Yes	100%
Council Grove	Yes	100%	Yes	85%	Yes	100%
Craw-Kan	Yes	100%	Yes	< 1%	Yes	100%
Cunningham	No		No		No Response	
Elkhart	No		Yes	10%	Yes	100%
Golden Belt	No		Yes	95%	Yes	100%
Gorham	No		Yes	7%	Yes	No Response
H & B Communications	No		Yes	100%	No	
Haviland	No		No		Yes	No Response
Home	No		No		Yes	20%
JBN	No		Yes	27%	Yes	47%
KanOkla	Yes	100%	Yes	75%	Yes	100%
LaHarpe	No		No		No	
Madison	No		Yes	65%	Yes	100%
MoKan	No		No		Yes	100%
Moundridge	No		Yes	No Response	Yes	No Response
Mutual	No		No		No	
Peoples	No		No		No	
Pioneer	Yes	100%	Yes	100%	Yes	100%
Rainbow	No		Yes	20%	No	
Rural	Yes	100%	Yes	100%	Yes	100%
S & A	No		No		Yes	100%
S & T	Yes	1%	Yes	70%	Yes	100%
South Central	Yes	No Response	No		Yes	No Response
South Central of Kiowa	No		No		Yes	No Response
Southern Kansas	No		Yes	74%	Yes	100%
Sunflower	Yes	100%	Yes	30%	Yes	100%
Totah	No	100%	No	100%	Yes	100%
Tri County	Yes	100%	Yes	42%	Yes	100%
Twin Valley	No		Yes	100%	Yes	100%
United Association	Yes	75%	Yes	75%	Yes	100%
Wamego	Yes	100%	Yes	100%	No Response	
Wheat State	No		Yes	84%	Yes	50%
Wilson	No		Yes	0%	Yes	100%
Zenda	No		Yes	No Response	Yes	100%

\* SWBT information provided in a letter to the Commission

## Rural Utility Service Programs<sup>1</sup>

### **Dial-up Internet Access Grant Program**

This program provides up to \$400,000 for communities with no local dial-up access. It is a competitive application process.

### **Broadband Pilot Grant Program**

This program will make \$20 million in grants available to applicants who agree to provide certain community organizations with broadband service as well as making it available to residential and business customers. The applicant must agree to provide community-oriented connectivity. That is access to broadband service must be provided to community schools, libraries, education centers, health care providers, law enforcement agencies and public safety organizations. The applicant must provide a fund match of at least 15% of the grant request.

### **2002 Farm Bill**

The 2002 Farm Bill provides for a Broadband Loan Program that will provide hundreds of millions of dollars in loans. Priority will be given to loan applications to serve an area that does not currently have residential broadband service available. The loans are available to competitive carriers and are made on a technology neutral basis. State and local governments can borrow from the program only if within 90 days after publication of the regulations no other party provides or has committed to providing broadband service. Locally, Pixius Communications, LLC, was awarded a \$6.76 million loan from this program to provide broadband access in 36 southeast Kansas counties. Pixius utilizes a wireless technology that should make broadband available to approximately 90% of each county.<sup>2</sup>

### **Broadband Pilot Loan Program**

All funds available through this program have been committed. Locally, a subsidiary of Rural Telephone Service Company, Inc. was one of the first entities to be awarded a loan through this program.

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<sup>1</sup> See RUS home page [http://www.usda.gov/rus/telecom/initiatives/index\\_initiatives.htm](http://www.usda.gov/rus/telecom/initiatives/index_initiatives.htm)

<sup>2</sup> Information regarding Pixius Communications, LLC, was gathered from an article in the Wichita Eagle published in July 2002.