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AT&T supports the Commission's effort to develop policies that encourage the expansion of telework opportunities for American workers and companies and, as discussed below, AT&T offers a variety of innovative solutions to facilitate teleworking today. Organizations benefit from teleworking by reducing their carbon footprint, increasing job retention, improving the organization's attractiveness to prospective employees, and improving access to non-traditional workers, such as workers living in lower income areas and workers whose location or physical condition makes commuting a challenge. Workers benefit from telework by eliminating distance and commuting as barriers to employment, improving job satisfaction, decreasing stress, and accessing employment opportunities that were previously foreclosed by disabilities, dependent care issues, or other personal or family obstacles.⁴

Encouraging the adoption of teleworking is also vitally important to prepare our nation to respond to unexpected events that prevent workers from reaching their traditional office environment, such as natural disasters, outbreaks of disease, or terrorist incidents. The occurrence of one or more of these conditions would force workers and students to stay home due to closed businesses and schools.⁵ If those workers and students are capable of teleworking on a regular basis, they can leverage the decentralized work settings to continue to perform their job and school functions if an emergency occurs. Effectively implemented, teleworking would allow the national economy to continue functioning in the face of an emergency, until the urgency of that emergency has passed.

⁴ For example, telework can provide job opportunities for single parents with childcare responsibilities, caregivers for an elderly or infirm friend or relative, and persons with disabilities who have difficulty commuting to work or engaging in a normal nine-to-five work day at an office environment.

⁵ Department of Homeland Security, *Pandemic Influenza Impact on Communications Networks Study*, at 4-1 (Dec. 2007) (unclassified version), available at <http://www.aba.com/NR/rdonlyres/668AC437-7CEF-4B55-92F7-79BC1AB870B4/50864/PandemicCommsImpactStudyDecember20072.pdf> (“*DHS Pandemic Study*”).

There is no doubt that access to broadband is a crucial element to any campaign to encourage teleworking. The availability of broadband service provides the opportunity for teleworking to benefit nearly every industry. The NBP should encourage private-sector investment in expanding and upgrading broadband service so that progress continues towards the twin ultimate goals of 100 percent broadband coverage and 100 percent broadband adoption, which will translate into enhanced opportunities to engage in teleworking and create job-producing economic growth.

However, as AT&T has previously explained in this docket, simply increasing the supply of broadband is not a magic bullet for teleworking or any of the other societal goals identified in the Recovery Act.⁶ Indeed, despite the substantial increase in broadband availability in the United States in the last few years, the workplace has not experienced a corresponding increase in teleworking. Broadband Internet access service is available to at least 92 percent of United States households⁷ and is subscribed to by approximately 55 percent of households.⁸ Yet, in 2008, only 11 percent of workers in the United States engaged in teleworking at least one day a month.⁹

⁶ See Comments of AT&T, In the Matter of a National Broadband Plan for Our Future, GN Docket No. 09-51, p. v (filed June 8, 2009).

⁷ Jon M. Peha, The Brookings Institution, *Bringing Broadband to Unserved Communities*, at 11-12 (July 2008), available at http://www.brookings.edu/~media/Files/rc/papers/2008/07_broadband_peha/07_broadband_peha.pdf (“Bringing Broadband”).

⁸ John B. Horrigan, Pew Internet & American Life Project, *Home Broadband Adoption 2008*, at i, 3 (July 2008), available at <http://www.pewinternet.org/Reports/2008/Home-Broadband-2008.aspx>; see also U.S. Census Bureau, *2007 Internet and Computer Use Supplement to the Current Population Survey*, at tbl. 1 (June 2009), <http://www.census.gov/population/socdemo/computer/2007/tab01.xls> (finding that approximately 51 percent of U.S. households subscribe to broadband).

⁹ Worldatwork, *Telework Trendlines 2009: A Survey Brief* by WorldatWork, p. 4 (Feb. 2009), available at www.worldatwork.org/waw/adimLink?id=31115&nonav=yes (“Telework Trendlines”).

While broadband is a necessary component to an effective telework experience, it is the combination of mobility, security and smart network management that will drive telework growth in the long-term. Powerful smartphones, such as the Apple iPhone and the multitude of applications available to it, high fidelity video conferencing services like Telepresence¹⁰ and new, unified voice, video, and web collaboration services such as AT&T Connect,¹¹ offer the cutting edge technologies and services that employers and employees seek. In fact, as evidenced with smartphones and existing use of telework on home broadband connections, the line between “business” and “consumer” is blurring as sophisticated products and services that businesses use are migrating to mainstream consumer use.

The Commission must identify and address other issues that impact the utilization of teleworking and recommend policies and programs for inclusion in the NBP that incent employers and employees to engage in teleworking. Other issues that affect the adoption of teleworking include: (a) the employee’s access to equipment to connect to company resources, (b) the employer’s commitment to maintaining a robust virtual private network (“VPN”) through which the employee can access those company resources, (c) the security that is implemented to deter malware, spyware, and other harmful attacks to IT systems, intellectual property, and customer information,¹² and (d) reliable and robust network management tools available to providers to manage and prioritize network traffic, especially congestion that would inevitably

¹⁰ See AT&T Telepresence website at <http://www.business.att.com/enterprise/Service/unified-communications-enterprise/conferencing-services-enterprise/telepresence-enterprise/>.

¹¹ See AT&T Connect website at <http://www.business.att.com/enterprise/Service/unified-communications-enterprise/conferencing-services-enterprise/web-conferencing-enterprise/state=Texas/>.

¹² Organizations can deploy secure teleworking programs through the use of innovative Internet and computer security solutions that reduce the risk of cyber attack, such as firewalls, encryption, anti-virus and anti-spam software, automated software updates, and backup solutions.

occur in any large scale use of teleworking in an emergency. As telework applications become more demanding their will be increasing requirements for service providers to provide additional options for managed services over lines that might otherwise be considered a consumer connection.

To stimulate the adoption of teleworking, the federal government should consider providing tax and other incentives to support business efforts to disassociate job function from job location and to allow teleworkers to offset at least a portion of the cost of broadband service or equipment used for teleworking, end the policy of taxing broadband service stipends as income, and offer tax credits for non-federal employers and employees who engage in teleworking. These focused incentives would act as a downpayment on the benefits that the United States economy, employees, and employers will derive for years to come from the increase in telework.

Federal government agencies should accelerate the effort to mainstream telework by continuing to lead the way in utilization of teleworking for government employees and contractors.¹³ NBP Public Notice #3 describes the successes of the Government Accounting Office and the Patent and Trademark Office in implementing teleworking. Further, based upon a October 2008 survey, 42 percent of federal workers telework at least part time and 82 percent of federal workers spend work time out of the office every month.¹⁴ Yet, that same study found that only 16 percent of federal employees give their agency an “A” grade for mobile support.¹⁵

¹³ PL 106-346, Sec. 359 already mandates that the federal agencies offer telework opportunities to the federal workforce.

¹⁴ Out of Office: Federal Mobile Workforce Trends, Telework Exchange, p.6 (Oct. 15, 2008), *available at* www.teleworkexchange.com/fedmobility.slides-asp?slide=1.

¹⁵ *Id.* at p. 5.

Federal agencies can lead the way by providing federal employees with the means to engage in teleworking, including through the provision of smartphones. The smartphone is a powerful tool for increasing productivity and allows employees to stay connected in an increasingly mobile workforce.¹⁶ Yet, it has been estimated that 66% of federal workers with some mobility as part of their job do not have smartphones, and that providing them with smartphones would increase productivity to the tune of \$37 million per day.¹⁷ This is the proverbial “low hanging fruit” from which the federal government could derive substantial benefit in the near-term.

AT&T, for its part, is setting an example in the private sector for utilization of teleworking. Approximately 134,000 AT&T employees have secured remote access capabilities to AT&T’s VPN. Further, AT&T has made its industry-leading Telepresence Solution¹⁸ accessible by companies with existing videoconferencing systems, and is doubling the number of Cisco TelePresence rooms deployed at AT&T locations globally from 25 to 50 for its internal use. Since launching Telepresence within its own operation, AT&T has experienced a significant improvement in collaboration across business units, increased employee productivity, and savings of nearly 10 percent in travel costs. AT&T estimates that its use of Cisco

¹⁶ Id. at p. 10.

¹⁷ Id. at p. 11-13.

¹⁸ AT&T Telepresence Solution is a fully-managed solution enabled by Cisco TelePresence™.

TelePresence will reduce CO2 emissions by approximately 31,000 tons over the next six years¹⁹—equivalent to the annual emissions generated by over 5,600 passenger vehicles.²⁰

II. DISCUSSION

1. Broadband and Telework.

a. How does broadband increase the effectiveness of telework currently (i.e., what can employees do now with broadband that they could not do with a phone or a fax machine)? Has this been quantified? What empirical data and studies are available?

Comments: Simply put, teleworking via broadband is more effective than teleworking via a standard dial-up connection because the greater speeds and bandwidth of a broadband connection allow the person who is working remotely to communicate faster and deliver large quantities of data relatively quickly. In particular, a broadband connection allows the remote device to support a substantial number of applications that a dial-up connection (including a phone or fax machine) cannot provide effectively, such as the following:

- E-mail via broadband allows users to transmit voluminous amounts of information (e.g., spreadsheets or other large attachments) that would take much longer over a dial-up connection.

- SD video conferencing, and HD videoconferencing (e.g., Telepresence) allow users to collaborate visually and with audio in real time. Webconferencing and virtual web

¹⁹ See AT&T Citizenship and Sustainability Report 2008 at <http://att.centralcast.net/CSRBrochure09/Default.aspx>. See also AT&T Reduces Environmental Impact and Delivers Savings of More than US\$100,000 by Hosting Regional Customer Meeting Via Telepresence, AT&T Press Release (June 1, 2009) at <http://www.att.com/gen/press-room?pid=4800&cdivn=news&newsarticleid=26843>.

²⁰ All greenhouse gas equivalency comparisons in these Comments are calculated with the Environmental Protection Agency's greenhouse gas equivalencies calculator, available at <http://www.epa.gov/RDEE/energy-resources/calculator.html>.

events are an extension of these applications that allow a user to present information to a group for team and large group activities.

- Document/application sharing and editing, whiteboarding, and screen sharing allow teams to work together in real time on documents, charts, records, or other applications.
- Calendar sharing and project sharing allows teams to coordinate their activities and schedules.
- Presence applications, unified communications, location and directory services, and groups and buddy lists allow workers to locate other team members quickly.
- Instant messaging, chat functions, and SMS allow for private instant conversations, such as during a voice conference, to facilitate coordination of a team strategy.
- RSS-enabled blogs and wikis and Twitter-style micro-blogs provide instant notification tools to communicate information to large groups and tie teams together.
- Data intensive applications accessible through an employer VPN, such as customer relationship management programs, human resource databases, and expense reporting tools, allow teleworking employees to access key company information.

In addition, studies have demonstrated that teleworkers using a broadband connection are more likely than those using a dial-up connection to implement firewalls, VPNs, anti-virus software that is regularly updated, and log-on authentication protocols.²¹ Thus, as compared to dial-up, broadband teleworking is both faster and more secure.

²¹ Exploring Telework as a Business Continuity Strategy: A Guide to Getting Started, ITAC p. 39 (2005), available at www.workingfromanywhere.org/news/ITAC_Explore_Telework.pdf (“Exploring Telework”).

b. How can employers use telework to increase output during events such as natural disasters, outbreaks of disease, or other contingencies that limit employees' ability to be physically at a particular location?

Comments: Business continuity planning is the process by which an organization develops processes and procedures that allow it to continue operating with minimal disruption during and following an unexpected event that prevents workers from accessing their traditional office environment. The best technology in the world will be ineffective if the preparatory work has not gone into planning, practicing and refining how work can continue in the face of a variety of extraordinary events. Historically, organizations that developed disaster plans focused on disaster-recovery technologies – such as data replication, mirroring, information backup, continuous data protection, alternate work sites – for keeping operations running and IT infrastructure accessible.

However, unexpected events in this decade (Sept. 11, 2001, Anthrax, Hurricane Katrina, H1N1) have demonstrated the need for a more thorough continuity plan that extends beyond traditional disaster planning—to teleworking. For example, a business continuity plan that requires employees to relocate to an alternate work site would not be effective in the case of an emergency where employees cannot physically travel to the alternate site or should not attend the workplace, such as during a disease outbreak where workers should be isolated. In the disease outbreak scenario, teleworking can minimize contagion by separating workers, while allowing them to stay connected and perform their job functions. It also is flexible enough to accommodate many different work-life scenarios, whether as part of normal business operations or in an unexpected emergency.

Today, a telework program should be a crucial component to any business continuity plan, as it educates employees on where and how they can continue to perform their work duties despite the occurrence of an unexpected emergency. The flexibility of teleworking provides resilience to an

employer's operations. Via teleworking, workers can access key information to perform crucial job functions and facilitate ongoing operations of an organization when workers are dispersed. One or more workers with the best skills and experience for a particular project can be enlisted to work on the project, regardless of geography and time zones and with a minimal need for extra travel. During and in the aftermath of an emergency, teleworking may be the only way that an organization can provide its workers with the tools needed to continue to perform their jobs—work that may be critical to keeping the economy running or our nation safe.

Telework can improve productivity for virtually any job function whose performance is not dependent upon the employee's presence at a particular physical location. Even if an employer does not opt to use teleworking on a large scale or regular basis, by structuring work and equipping and training personal to use telework technologies, many of which are compatible with and can enhance a traditional office environment, the employer will be better prepared if the work functions must quickly transition to an alternative site. Other employers may elect to implement telework as a business as usual process, but derive the benefit of less service disruption during an emergency. For example, organizations with call center operations may elect to route calls to representatives working remotely from their home or to specialists in different areas of the country. Although business continuity may not be the impetus for such a telework arrangement, this distributed, network-based approach is flexible enough to be utilized in an emergency.²²

²² See Carol Wilson, *Contact Centers Shifting to Smaller, Network-based Model*, TelephonyOnline (Sept. 17, 2009), available at www.telephonyonline.com/business_services/news/contact-centers-smaller-0917/.

In 2000, Congress recognized the benefits of teleworking and passed Public Law 106-346, Sec. 359, which requires that federal agencies develop policies to encourage and facilitate teleworking and to meet certain telework benchmarks:

Each executive agency shall establish a policy under which eligible employees of the agency may participate in telecommuting to the maximum extent possible without diminished employee performance. Not later than 6 months after the date of the enactment of this Act, the Director of the Office of Personnel Management shall provide that the requirements of this section are applied to 25 percent of the Federal workforce, and to an additional 25 percent of such workforce each year thereafter.²³

The conference report associated with the law clarified that Congress contemplated teleworking policies that were well planned and fully implemented:

Each agency participating in the program shall develop criteria to be used in implementing such a policy and ensure that managerial, logistical, organizational, or other barriers to full implementation and successful functioning of the policy are removed. Each agency should also provide for adequate administrative, human resources, technical, and logistical support for carrying out the policy.²⁴

Congress recognized what every organization must understand—that effective teleworking requires planning and support.

Employers must proactively plan and support their telework programs to be able to react to an unexpected event and keep their operations running smoothly. While the inclusion of telework in a business contingency plan is an important part of any planning effort, it is only the beginning. A telework program is effective in an emergency only if the program has been implemented, operational, and actively used before the emergency occurs. This means that employees that are expected to telework during an emergency should have a sufficient level of telework capability before an emergency occurs to minimize the stress and disruptions associated with the transition from office to home. Employers can facilitate this level of functionality and

²³ 106 P.L. 346; 114 Stat. 1356, Sec. 359 (Oct. 23, 2000).

²⁴ 146 Cong. Rec. H. 8977 (Oct. 5, 2000)

preparation by formally establishing telework arrangements, upgrading VPNs to handle the greater workloads that are to be expected during an emergency, ensuring connectivity for employees, providing employees with telework equipment and training commensurate with the employee's work needs, and providing frequent enough opportunities to telework so systems can be tested and functionality confirmed.

Recent experience shows that the need for preparedness is not unfounded. This past May, a number of large organizations were unprepared when the Mexican government mandated business closures due to the outbreak of the H1N1 virus. Many organizations turned to AT&T to help scale a remote access VPN to allow their workforce in Mexico City and other affected areas of Mexico to use local broadband service to connect to the organization's corporate resources. While the needs of the customers were eventually met, advanced preparation better assures a quicker, satisfactory outcome.

Not only can an organization's telework policy, planning and support help sustain much of its day to day operations during an emergency, but a telework program can also assist the organization in serving the community in the aftermath of those emergencies. Following an emergency, many organizations, such as large retailers, beverage makers, insurance companies, telecommunications carriers, and others, undertake tremendous efforts to mobilize into the affected geographic areas to establish remote assistance centers that serve the public and their employees. Using their telework programs, these organizations can often establish a sufficient operation to service the public and help to restore the area to normal as quickly as possible.

Employers can effectively plan and support their telework programs by undertaking the following actions:

- Ensure that employees have access to and are trained to use remote access equipment, such as smartphones or computers.

- Ensure that employees have access to and are trained to use an internet connection via a home broadband connection, WI-FI, wireless connectivity, and if no broadband alternatives exist, via dial-up service.²⁵
- Ensure that employees can securely connect to company resources via a VPN or other secure link over their broadband connection.
- Ensure that the employer's VPN or other secure link can scale quickly and efficiently to accommodate a large portion of their work force becoming teleworkers in a short period of time.

The use of remote access services to engage in teleworking includes the need to care for large masses of employees working from "non-traditional" locations, but also must, necessarily care for the needs of employers in restoring business to normal order. This drives a need for a well thought out business contingency plan that includes telework and an employer commitment to making the telework program sufficiently implemented and developed to be operational in short order if an emergency occurs.

c. What technologies, processes, regulations, and capabilities need to be in place to allow government, businesses, and employees to quickly shift to telework effectively and economically in case of natural disasters, outbreaks of disease, or other contingencies?

Comments: *Technologies/Capabilities.* During the 2000s, the world has witnessed the proliferation of high-speed connectivity and the explosion of flexible devices, such as

²⁵ Employers often outsource this function to providers like AT&T, which via its Global Network Client, can provide a "phone book" of more than 125,000 wi-fi and wired ethernet locations and identify 100 countries where an internet connection can be established.

smartphones, laptops, and netbooks, to the extent that such devices are no longer relegated to high-end business use, but have penetrated small businesses and the mainstream public. Consequently, for the first time in history, the technology exists to effectively and economically engage in teleworking. As referenced more fully below, to ensure that innovation occurs in a manner that allows telework to evolve to its full potential, the federal government should adopt policies that spur innovation and investment, such as by offering tax incentives to organizations and workers that engage in teleworking and allowing carriers to utilize network management tools to ensure that the networks can handle the increased traffic loads from mass teleworking if an emergency occurs.

Processes. Government, business organizations and employees currently have the ability to implement telework programs to facilitate effective and economical teleworking. As referenced in response to Question 1.b., in order to harness that ability and effectively and economically shift to teleworking in an emergency requires substantial preparation, training, and on-going support. Employers need to prepare in advance by designing job responsibilities to minimize the requirement that work occur in a particular location. Employers must also implement a business contingency plan that includes a comprehensive telework program, including adopting telework arrangements, scaling VPNs to handle greater capacity, ensuring that employees have broadband connectivity, and providing telework capable equipment to employees. Employees, for their part, must be open to utilizing new technologies and engage in teleworking frequently enough to feel comfortable using it in any environment they could face in the event of an emergency. Last, but not least, plans must not be relegated to the book shelf. The processes must be periodically tested to assure effectiveness and to assure employee readiness to act.

Regulations. Businesses need certainty to undertake the investments (both in terms of time and money) required to take full advantage of telework opportunities. If organizations

adopt widespread teleworking, the occurrence of an unexpected event that keeps a significant portion of the workforce at home (or at least, unable to work from their normal office environment), such as a natural disaster or a disease outbreak, would radically alter network traffic patterns. Such an event would greatly increase the number of workers and students forced to stay home due to closed businesses and schools.²⁶ These displaced workers and students would rely on the Internet for connectivity to their places of work and school. Until the unexpected event subsides, connectivity would be essential to keeping the national economy functioning.

Daytime network traffic would shift from commercial to residential areas, and lead to substantially heavier-than-normal peak usage in those areas. The network congestion that would likely result from such a dramatic shift in usage patterns would impair the online experience of all users, and could particularly degrade latency-sensitive applications like streaming video or VoIP, as well as VPNs, which depend on reliable, uninterrupted connectivity. The Department of Homeland Security estimates that a pandemic that leads to a worker absentee rate of over 40 percent would render connectivity so impaired as to be unusable for telecommuting.²⁷ These same problems could cause alarming failures in the systems that support first responders, health-care providers, and other public-sector entities whose missions are vital to addressing any pandemic and maintaining a stable government.

To address such potential radical, but unprecipitable, shifts in network usage during pandemics or similar nationwide emergencies, network operators must have robust network management tools at their disposal. By effectively managing congestion, operators can minimize

²⁶ *DHS Pandemic Study*, at 4-1.

²⁷ *Id.* at iii.

the inevitable network disruptions that would otherwise impair critical communications and exacerbate the economic impact of the crisis. To do so, providers must have the flexibility to invest in and utilize “smarter” networks that can differentiate between various types of traffic to ensure that the most vital communications get through. For example, few would dispute that, during such an emergency, a doctor’s home Internet connection to the hospital where she works should receive priority over her neighbor’s web surfing session when network congestion arises—even if that means the neighbor waits a bit longer for web pages to load.²⁸

Regulatory restrictions on a broadband providers’ ability to build and run smart networks that can cost-effectively accommodate the rapidly shifting traffic volumes likely to arise in a pandemic or other similarly large disaster scenario would undermine both telework and emergency preparedness. Just as it is economically impractical to build 50-lane highways to accommodate the traffic outflows likely to occur in the mass evacuation of a major city affected by a disaster, it is similarly impractical to build networks with sufficient spare capacity to handle the massive shift in traffic volumes on the Internet (from business to residential networks) that would likely occur in a major disaster. Thus, rather than contemplating prescriptive net neutrality rules that will disincent investments in smarter networks today, policymakers should encourage broadband providers to deploy the advanced network management technologies necessary to support telework and other critical communications so that the Nation is adequately prepared to respond to a pandemic or other major disaster in the future.

Other Incentives. In addition to the steps discussed above, the federal government could provide the following further incentives for telework:

²⁸ The Department of Homeland Security agrees and recommends the building of sophisticated “Next Generation Network Priority Services” into broadband networks. *DHS Pandemic Study* at ii.

- Provide tax and other incentives for businesses to restructure jobs to remove the linkage between location and work activities;
- Create tax incentives for businesses that compensate teleworkers for their monthly high-speed broadband services or equipment used for teleworking;
- Eliminate tax disincentives for workers to engage in teleworking, such as taxes on compensation received from employers for broadband services; and/or
- Offer tax credits for non-federal employers and employees who engage in teleworking.

d. Going forward, how could broadband change telework?

Comments: Broadband is an enabler. It enables persons engaged in telework to accomplish their objectives remotely in a manner that they would not otherwise be able to accomplish. However, as mentioned in response to Question 1.a, the existence of broadband alone does not create innovation. Broadband is already available to at least 92 percent of U.S. households today.²⁹ In order for broadband to significantly change telework, broadband adoption must be accompanied by the widespread acceptance of teleworking in the private sector and the effective preparation and implementation of business contingency plans and flexible work policies to drive the investment that spurs innovation. This investment can also be spurred by the government acting as a market participant (i.e., by aggressively procuring teleworking equipment and services for its own use) as well as through tax and regulatory incentives.

For example, Telepresence, which offers a life-size "in-person" meeting experience through large screen displays and high-fidelity video and audio, requires substantial bandwidth

²⁹ *Bringing Broadband*, at 11-12.

and is anticipated to grow substantially if telework is widely adopted. Among other things, Telepresence would allow a manager to meet with employees, suppliers, or partners, in multiple locations around the world, while retaining a high level of security over a secure VPN connection. As discussed above, reduced travel costs and greenhouse emissions together with greatly increased productivity make Telepresence an attractive solution for a wide variety of business and government users. These users, in turn, will demand greater broadband connectivity to enable Telepresence in more locations, thus creating a virtuous cycle that will encourage greater broadband deployment.

Telemedicine is another telework application requiring broadband that is poised for potential growth.³⁰ Basically, telemedicine is the ability to use telecommunications to allow a doctor to provide and a patient to receive interactive healthcare remotely. Using telemedicine, patients can visit with physicians live over video for immediate care. Telemedicine also allows patient data to be stored and sent to physicians for diagnosis and follow-up treatment at a later date. Demographic trends suggest that telemedicine is set to expand substantially:

The population of developed countries, including the U.S., is aging through a combination of the Baby Boomer population surge and the extended life expectancies. And this is not a near-term only phenomenon – by the year 2030, the U.S. Census Bureau expects the number of people over age 65 to double to 72.55 million people from 35.7 million in 1995. With that aging population comes more chronic illness such as heart disease and Type 2 diabetes.

At the same time, the U.S. is facing a potential shortage of doctors, expected to reach 159,000 primary care physicians by the year 2025, according to The Association of

³⁰ The Commission has recently addressed telemedicine in two different proceedings. *See* Investigation of the Spectrum Requirements for Advanced Medical Technologies, Amendment of Parts 2 and 95 of the Commission's Rules to Establish the Medical Device Radio Communications Service at 401-402 and 405-406 MHz, DexCom, Inc. Request for Waiver of the Frequency Monitoring Requirements of the Medical Implant Communications Service Rules, Biotronik, Inc. Request for Waiver of the Frequency Monitoring Requirements for the Medical Implant Communications Service Rules," *Report and Order*, ET Docket No. 06-135, RM-11271, FCC 09-23, (rel. March 20, 2009); Amendment of the Commission's Rules to Provide Spectrum for the Operation of Medical Body Area Networks, *Notice of Proposed Rulemaking*, ET Docket No. 08-59 (rel. June 29, 2009).

American Medical Colleges. And nowhere is that shortage more acutely felt than in rural areas, where the lack of primary care physicians and specialists has reached crisis proportions, according to the National Association of Community Health Centers.³¹

With the right government policies in place, these demographics are poised to drive more broadband bandwidth, all to the benefit of doctors and patients.

Distance learning is also an application that can be used in teleworking to create a remote educational experience between a teacher and student. Rather than attending a classroom or laboratory, teachers communicate with students through real-time communications, such as an online course. Distance learning is becoming increasingly accepted around the globe. The increased speeds and higher bandwidth of broadband allows a near real-life experience for students and teachers alike, and will expose students to people and places that they might not otherwise experience.

As telework applications become more widely adopted, the demands on the broadband network will increase, both in terms of bandwidth and performance predictability. To ensure that these technologies develop to their potential, the Commission should follow a policy that minimizes rules that would hamper the broadband provider's ability to manage the traffic in the manner that is needed to ensure performance is not adversely affected and innovation is not stifled.

e. What applications do teleworkers most frequently use? How do the applications used change across different industries and user types?

Comments: AT&T does not monitor the types of applications its customers use for teleworking purposes and cannot state with certainty the applications that teleworkers use

³¹ Carol Wilson, *Health Care Industry a Challenge, Opportunity for Telecom*, TelephoneOnline (Aug. 24, 2009), available at www.telephonyonline.com/business_services/news/telecom-challenges-health-care-0824/index.html.

most frequently. However, based upon its own experience with teleworking, AT&T expects that the following applications are the most widely accepted:

- e-mail (e.g. MS Outlook/Exchange);
- instant messaging (e.g. AT&T's Q Team-Link Messenger);
- voice telephony (landline phone or VoIP);
- remote access security protocols and security software such as firewall, anti-virus, anti-spyware, user authentication/identification, encryption, and intrusion prevention;
- voice, video and web collaboration software and tools (e.g., AT&T Connect, discussed above);
- file sharing applications (e.g., Microsoft SharePoint).

f. What broadband characteristics are essential for teleworkers to be able to use those applications and succeed in telework (e.g., low latency, consistent data rates, mobility, reliability, etc.)?

Comments: The nature of the work and the supporting applications needed to accomplish that work will dictate the broadband bandwidth and end-to-end performance required by a particular employee and employer engaged in telework. For example, mobility is crucial to an executive who travels extensively and needs to access e-mail and important documents in a remote location, whereas mobility is not a determinative factor for a call center employee who takes calls from behind his home computer during standard work hours. Similarly, latency may be acceptable for a teleworking employee utilizing predominantly e-mail and calendaring applications, but would be problematic for an employee who needs VoIP and videoconferencing applications.

Generally, reliability tends to be valued as the most important attribute of broadband for teleworkers. After all, teleworking is truly functional only if a worker's connection to company resources consistently functions at a high performance level. For example, an employee who works exclusively from home would be effectively prevented from engaging in any teleworking activity by an inoperative internet connection. By contrast, a ubiquitous and reliable broadband connection would allow the employee to perform job functions with minimal disruption.

In large part, the more reliable user experience offered by broadband is due to its "always-on" nature, as contrasted to the on/off nature of dial-up. Anyone who has attempted to conduct a significant amount of online work via a dial-up connection can attest to the log-in delays (or busy signals), frequent cut-offs, and race to authenticate before being timed out. In short, telework via dial-up is like diving without an oxygen tank. You get "gasps" of network interactivity, with much wasted effort and productivity. In contrast, the broadband VPN experience is like a diver with an unlimited oxygen tank, able to work and breathe effortlessly for long periods of time. Although applications with low bandwidth requirements, like e-mail or unified messaging, are possible with a dial-up connection, they do not benefit from the always-on effect that broadband provides and consumers have come to expect.

Mobility also has become an increasingly important characteristic of broadband service in the last few years. Workers who need or want to remain connected to clients, customers and coworkers have turned to mobile devices, such as smartphones, laptop computers, and more recently netbook computers, as job aids. Increasingly, those workers consist of younger members of the workforce who have never lived in a world without mobile phones, or have used a mobile phone since they were in elementary school. Those workers expect mobile coverage

everywhere they live and work, and wireless providers have committed to meeting those demands.

The widespread adoption of smartphones by mainstream consumers in the last two years has educated those consumers on the use of broadband applications over mobile devices. As demonstrated by the popularity of smartphones such as the Apple iPhone, RIM Blackberry devices, the Palm Pre, and Android phones, consumers have become accustomed to broadband applications on mobile devices. As those consumers increasingly engage in teleworking, they will demand a teleworking experience that is mobile in nature.

g. How will these characteristics evolve? What is the impact of improved hardware and software and increased capabilities for compression and signal processing?

Comments: As technology advances, improvements in compression techniques, signal processing and other efficiency-enhancing capabilities will likely enable broadband providers to use available bandwidth more effectively. At the same time, however, the demand for more bandwidth to support video conferencing and other real-time teleworking applications are likely to continue at an even greater pace. Thus, broadband providers will need maximum flexibility to deploy *smart* networks that can cost-effectively provide the performance capabilities required by individual users and applications. For those reasons, the regulatory landscape should not unreasonably restrain the ability of broadband providers to respond to evolving conditions in the marketplace and changing customer demands, whether those conditions and demands occur in a single emergency event or gradually develop over time. Customers will demand a choice of service options and it is essential that broadband providers be able to provide those options.

i. What do the data suggest about the benefits or harms of current telework programs?

Comments: According to the U.S. Addendum to the “SMART 2020” report released in November 2008 by members of the Global e-Sustainability Initiative, including AT&T and The Climate Group, only 3.9% of the U.S. workforce works more than one day per week outside of the office.³² The report cites that the missed opportunity of more workers not having flexible telework arrangements has a high cost on productivity, employee engagement, and the environment.³³

The International Telework Association & Council (“ITAC”) has cited the following benefits of teleworking programs, among others:

- Reduced facilities costs for employers with fewer employees that need office space and for employers that allow remote employees to share office space;
- Improved productivity for employees who avoid workplace distractions;
- Reduced energy costs as employees utilize less gasoline and employers heat and cool smaller office environments;
- Reduced absenteeism as workers are able to continue working in the event of a minor illness or traffic/weather issues;
- Improved recruiting and worker satisfaction and decreased turnover; and

³² United States Report Addendum, Smart 2020: Enabling the Low Carbon Economy in the Information Age, Global Sustainability Initiative, p. 38 (2008), available at www.theclimategroup.org/assets/resources/publications/smart2020unitedstatesreportaddendum.pdf (“US Addendum”).

³³ US Addendum, p. 38.

- The ability to remain operational during emergencies and more quickly recover in the aftermath of the emergency.³⁴

For a comprehensive discussion of the benefits of telework, see the white paper published by the United States General Services Administration and Telework Exchange in September 2009.³⁵

j. What do the data suggest about the benefits or harms of telework programs if these programs were more widely used?

Comments: There are many sources of data that discuss both the impacts of increasing telework programs as well as the general adoption of increased broadband. For example, the U.S. Addendum to the “SMART 2020” states that greater utilization and adoption of travel substitution, such as virtual meetings and flexible work arrangements, could reduce CO2 emissions and yield billions in gross savings in the United States in 2020. Businesses could reduce CO2 emissions by an estimated 70-130 MMT in the United States in 2020, representing 5-9% of air and road CO2 emissions, by allowing employees to choose their optimal work location and meet virtually instead of in-person.³⁶ Moreover, the increase utilization of travel substitution and adoption could yield \$20-\$40 billion in gross savings in the United States in 2020 through lower fuel consumption.³⁷ The U.S. Addendum to the SMART 2020 report further explains that the innovation of Information and Communication products/services has resulted in

³⁴ Exploring Telework, pp. 6-8.

³⁵ United States General Services Administration, *The Benefits of Telework* (Sept. 2009), available at www.teleworkexchange.com/pdfs/the-benefits-of-telework.pdf.

³⁶ US Addendum, p. 40.

³⁷ *Id.*

a rise in “information workers” that has created a labor force that can work from anywhere at anytime and that organizations will be able tap into that workforce.³⁸

As a further example, according to the American Consumer Institute (“ACI”), if video conferencing substituted for 10 percent of business air travel, it would reduce CO2 emissions in the United States by 36.3 million tons annually³⁹, the equivalent of the annual electric demand of more than 5.0 million homes.⁴⁰ In reference to the general increase in broadband adoption, ACI, Connected Nation, and the World Wildlife Fund suggest that a 7 percent increase in broadband adoption could result in annual savings of \$6.4 billion in mileage from foregone driving and 3.2 billion fewer pounds of CO2 in the United States.⁴¹ This level of reductions would be the equivalent of removing more than 290,000 passenger cars from the road.⁴² Widespread adoption of broadband could reduce CO2 emissions by more than 1 billion metric tons,⁴³ equivalent to the annual CO₂ emissions of approximately 215 coal fired power plants.⁴⁴

³⁸ US Addendum, p. 38.

³⁹ Joseph Fuhr, Stephen Pociask, *Broadband Services: Economic and Environmental Benefits*, American Consumer Institute (October 31, 2007), available at www.theamericanconsumer.org/2007/10/31/broadband-services-economic-and-environmental-benefits/ (“ACI Report”)

⁴⁰ See supra, n. 20.

⁴¹ Connected Nation, *The Economic Impact of Stimulating Broadband Nationally*, p. 20 (February 2008), available at http://connectednation.org/_documents/connected_nation_eis_study_full_report_02212008.pdf.

⁴² Greenhouse gas equivalency factors generated with the Environmental Protection Agency’s greenhouse gas equivalencies calculator, available at <http://www.epa.gov/RDEE/energy-resources/calculator.html>.

⁴³ ACI Report.

⁴⁴ See supra, n. 20.

3. Programs.

b. What percentage of employees use telework programs on a regular basis? What demographics of employees typically take advantage of telework programs?

Comments: See comments in response to Question 1.i. See also Worldatwork, Telework Trendlines 2009: A Survey Brief by WorldatWork, p. 4 (Feb. 2009), *available at* www.worldatwork.org/waw/adimLink?id=31115&nonav=yes.

c. What barriers, other than lack of broadband, exist that impede the development of successful telework programs?

Comments: According to the U.S. Addendum to the “SMART 2020” report, a number of challenges could hinder the broader adoption of flexible work, including:

Adverse government regulations- In some states, such as New York, out of state telecommuters are taxed if they work remotely for in-state employers.

Unfavorable work culture- the general sense that managers believe that employees are less productive when working remotely without direct supervision. Managers are unwilling to manage employees by objectives and results- instead of level of activity.

Employee sense of isolation- Flex work may cause some employees to feel isolated from the employer.⁴⁵

Unfavorable tax treatment of stipends provided to employees to purchase telework, in that the stipend is declared as income, could also act as a disincentive for workers to accept the stipend,

⁴⁵ US Addendum, p. 43.

and thus, be less likely to acquire the broadband connection and equipment needed to engage in effective telework.

Respectfully submitted,

AT&T INC.

A handwritten signature in cursive script, appearing to read "Robert Vitanza".

Robert Vitanza
Gary L. Phillips
Paul K. Mancini

AT&T Services, Inc.
1120 20th Street, N.W.
Suite 1000
Washington, D.C. 20036
(202) 457-3076 – phone
(202) 457-3073 – facsimile

Its Attorneys

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