Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
Inquiry Concerning the Deployment of	)	
Advanced Telecommunications	)	
Capability to All Americans in a Reasonable	)	GN Docket No. 07-45
And Timely Fashion, and Possible Steps	)	
to Accelerate Such Deployment	)	
Pursuant to Section 706 of the	)	
Telecommunications Act of 1996	)	

COMMENTS OF CONSUMERS UNION,
CONSUMER FEDERATION OF AMERICA AND FREE PRESS

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SUMMARY

This Notice of Inquiry seeks input that will enable the Commission to determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion. This inquiry is mandated under Section 706 of the 1996 Telecommunications Act, which provides a very specific and measurable definition of "advanced telecommunications capability" 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."

We offer evidence to support the conclusion that the deployment of *advanced telecommunications capability* is not being deployed to *all* Americans in a reasonable and timely fashion. In these comments we detail how the Commission has ignored the statutory language of the Act (and ultimately the intent of Congress) in the past four Section 706 Reports by focusing on the deployment of *non-dial-up* Internet services, and not *advanced telecommunications* services as intended by The Act.

Furthermore, even ignoring the specific bar set by Section 706 with regards to the functionality of "advanced telecommunications" we believe that the deployment of *non-dial-up* Internet capability is not proceeding in a reasonable and timely manner to *all* Americans. In these comments we demonstrate how large segments of the U.S. market remain unserved, and will likely continue to remain unserved without proper intervention by the Commission. We also demonstrate how in areas that are served by non-dial-up Internet service providers, that the lack of adequate competition on price, speed and value has led to slower than expected uptake of these services.

We urge the Commission to recognize the failures of the U.S. broadband market. Once it does it can move towards the development and implementation of a comprehensive broadband policy that will achieve the goals outlined in the 1996 Act.

No broadband policy can be constructed without a thorough recognition of the problems in the current broadband market. It is important that the Commission set aside the myths and excuses offered to explain away our broadband troubles. The reality is that the U.S. broadband market has significant failures in the three metrics that matter most: availability, speed, and value (cost per unit of speed). Despite years of touting the goal of universal broadband availability, there are still roughly 10% of American households that lack a terrestrial broadband provider. And in the areas that are served, we do not have a competitive market that is pushing speeds up and prices down at a rate sufficient to raise our stature relative to the rest of the world.

The first step that must be taken by the Commission is a complete overhaul of the data collected from broadband providers. The current information does not allow the Commission to fulfill its obligations under Section 706. Furthermore, the current data is so inadequate that it creates a muddied understanding of the true nature of our problems and our progress.

Better data is a start. But the Commission should move forward with the implementation of a variety of policy initiatives to bring competition to the broadband marketplace. These include ensuring spectrum auctions produce real competitors not vertical integration; opening the TV white spaces for unlicensed use; guaranteeing the interconnection of networks on nondiscriminatory terms; transitioning USF programs to

broadband; and safeguarding the Internet's free market for goods, services and speech through network neutrality rules.

We rely on the market forces of a duopoly to produce robust cross-platform competition at our peril. When the chief supporters of the status quo, wait-and-see approach to the arrival of a third competitor to DSL and cable are the incumbents themselves, we should understand that they do not expect it will happen. Further, we can see that most of the global leaders in broadband performance have embraced so-called "open access" network rules, policies that bring competition both *between* and *within* technology platforms. This combination of "intermodal" and "intramodal" competition is the key to regaining our once-lofty stature as the world's technology leader. We must not sacrifice the long-term economic and social interests of the country for the short-term interests of a duopoly marketplace that has long shielded itself from free market competition. This is a paradigm shifting moment for American telecommunications. It is imperative that the Commission acts accordingly.

TABLE OF CONTENTS

I. Introduction.....6

A. Interest and Expertise of Commenters.....6

B. Task Before the Commission.....7

II. Discussion.....9

A. The Practical Significance of Section 706.....9

B. Even if The Language of Section 706 is Loosely Interpreted, The Record Shows that Non-Dial-Up Internet Connections Are Not Being Deployed to All Americans in a Reasonable and Timely Manner.....17

i. The Commission's Data is Inadequate, Yet Still Shows Large Gaps in Broadband Coverage.....18

ii. Non-Commission Data Shows a Persisting Digital Divide.....21

iii. Limited Data on Deployment Shows Large Gaps.....24

iv. 3G Mobile Wireless Connections are Not Broadband Substitutes.....29

C. Europe and East Asia Continue to Outperform The U.S. Broadband Market in Speed, Price, Value, Availability and Adoption. Their Success is Rooted in Good Policy Decisions, and Not Due to Geography.....37

D. Policies that Will Foster The Universal Deployment and Adoption of the Advanced Telecommunications Capability Congress Envisioned in Section 706.....46

i. Gathering Better Data.....49

ii. Enacting Multi-Modal Competition Policy.....51

a. Policies for the Physical Layer.....52

b. Policies for the Applications Layer.....54

III. Conclusion.....55

IV. Appendix A - Mobile Broadband Offerings of Major U.S. Carriers.....58

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**COMMENTS OF CONSUMERS UNION,
CONSUMER FEDERATION OF AMERICA AND FREE PRESS**

Consumers Union, Consumer Federation of America and Free Press (collectively, "CU et al."), respectfully submit these Joint Comments in response to the Notice of Inquiry, FCC 07-21 ("Notice" or "NOI"), released April 16, 2007 by the Federal Communications Commission ("FCC" or Commission").

I. INTRODUCTION

A. Interest and Expertise of Commenters

Consumers Union, the publisher of Consumer Reports®, is an independent, nonprofit testing and information organization serving only consumers. CU does advocacy work from four offices in New York, Washington, San Francisco, and Austin. CU's public policy staff addresses a broad range of telecommunications, media and other policy issues affecting consumers at the regional, national and international level. CU staff members frequently testify before Federal and state legislative and regulatory bodies and participate in rulemaking activities at the Commission and elsewhere.

The Consumer Federation of America is an advocacy, research, education and service organization established in 1968. CFA has as its members some 300 nonprofit organizations from throughout the nation with a combined membership exceeding 50 million people. As an advocacy group, CFA works to advance pro-consumer policy on a variety of issues before Congress, the White House, federal and state regulatory agencies, state legislatures, and the courts.

Free Press is a national nonpartisan organization working to increase informed public participation in crucial media policy debates, and to generate policies that will produce a more competitive and public interest-oriented media system with a strong nonprofit and non-commercial sector.

B. The Task Before the Commission

This Notice of Inquiry seeks input into the Commission's fifth inquiry concerning the availability of advanced telecommunications capability to all Americans, as mandated by the Telecommunications Act of 1996 ("The Act").[1] The task before the Commission is clearly articulated in The Act: to "determine whether advanced telecommunications capability is being deployed to all Americans in a reasonable and timely fashion."[2] The Act also provides a very specific and measurable definition of "advanced telecommunications capability". The Act states, "[t]he term 'advanced telecommunications capability' is defined, without regard to any transmission media or technology, as high-speed, switched, broadband telecommunications capability that

[1] 47 U.S.C. § 157. See § 706(b) of the Telecommunications Act of 1996, 104 P.L. 104; 110 Stat. 56; 1996 Enacted S. 652; February 8, 1996. Section 706(b) details the mandate for periodic inquiry (the current (fifth) inquiry is mandated by the clause "regularly thereafter", referring to the first inquiry, which was published by the Commission in 1999).

[2] *Ibid.*

enables users to originate and receive high-quality voice, data, graphics, and video telecommunications using any technology."[3]

We respectfully disagree with the conclusion of the Commission in the previous four Section 706 Reports, which all stated that the deployment of *advanced telecommunications capability* was being deployed to *all* Americans in a reasonable and timely fashion.[4] In these comments we detail how the Commission has ignored the statutory language of the Act (and ultimately the intent of Congress) in the past four Section 706 Reports by focusing on the deployment of *non-dial-up* Internet services, and not *advanced telecommunications* services as intended by The Act.[5] We believe that under a proper analysis of deployment based upon the actual language of Section 706, the

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[3] See § 706(c) of the 1996 Act.

[4] *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-146, Report, 14 FCC Rcd 2398 (1999); *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-146, Second Report, 15 FCC Rcd 20913 (2000); *Inquiry Concerning the Deployment of Advanced Telecommunications Capability to All Americans in a Reasonable and Timely Fashion and Possible Steps to Accelerate Such Deployment Pursuant to Section 706 of the Telecommunications Act of 1996*, CC Docket No. 98-146, Report, 17 FCC Rcd 2844 (2002); *Availability of Advanced Telecommunications Capability in the United States*, GN Docket No. 04-54, Fourth Report to Congress, 19 FCC Rcd 20540 (2004).

[5] We use the term "non-dial-up Internet access" to mean any "always-on" means of connecting to the Internet that does not involve the use of a "dial-up" modem (a form of connection that involves the use of a telephone line and a modem, in which the user creates a link with an ISP via a "handshake", and which has a maximum symmetrical connection speed of 56 kbps); or does not involve the use of BRI ISDN technology (Basic Rate Interface Integrated Services Digital Network), which is also conducted over traditional copper telephone networks, with 2 64 kbps channels, capable of carrying voice or data packets over the public switched telephone network (PSTN). In general, non-dial-up technologies include traditional wireline (T1, T3, DS-1, DS-3, OC-X), digital subscriber line (asymmetric, or symmetric), cable modem, fiber-to-the-home, third generation wireless (3G), Wifi, WiMax, Satellite (in some cases), and broadband over powerline (BPL).

proper conclusion is that the deployment of advanced telecommunications capability to all Americans is neither reasonable nor timely.

Furthermore, even ignoring the specific bar set by Section 706 with regards to the functionality of "advanced telecommunications", we believe that the deployment of *non-dial-up* Internet capability is not proceeding in a reasonable and timely manner to *all* Americans. In these comments we demonstrate how large segments of the U.S. market remain unserved, and will likely continue to remain unserved without proper intervention by the Commission. We also demonstrate how in areas that are served by non-dial-up Internet service providers, that the lack of adequate competition on price, speed and value has led to slower than expected uptake of these services.

We believe that if the Commission evaluates the information contained in these comments and in its own Form 477 semi-annual reports with the definitional language of Section 706 in mind, that there is no conclusion but that of an unreasonable and untimely deployment of advanced telecommunications capability to all Americans. We feel that there are a number of regulatory tools at the Commissions disposal to begin to turn this situation around, including policy lessons that can be gleamed from the broadband successes of Europe and East Asia.

II. DISCUSSION

A. The Practical Significance of Section 706

The promise of the Internet to affect social and economic change is based upon its fundamental nature as a *two-way* communications medium. In the years and months leading up to the enactment of the 1996 Telecommunications Act, Congress clearly articulated its intent to use the legislation as a means of fostering universal deployment

and adoption of a *communications* technology, and not another one-way, one-to-many broadcast medium.

For example, the accompanying Committee language to S.1822 (a predecessor bill to the 1996 Act) clearly states the importance of developing ***two-way*** broadband service, and the belief that carriers would likely, without appropriate FCC action, continue to deploy high-speed services that did not live up to the standard of "true" broadband[6]:

> Section 901 grants the necessary authority to the FCC to achieve in a timely fashion the national policy goal of making available, so far as possible to all the people of the United States***, high-capacity two-way communications*** networks capable of enabling users to ***originate*** and receive ***affordable*** and accessible ***high-quality, voice, data, graphics, video***, and other types of telecommunications services... This goal will not be achieved if carriers only deploy more of the same service that subscribers already receive today... The Committee is concerned that such capability will not be deployed in a timely fashion. According to Dr. Robert Cohen, a Senior Fellow at the Economic Strategy Institute, ***less than 1 percent of the subscribers*** who will receive the broadband service under the proposals pending before the FCC ***will be served by systems that are capable of both sending and receiving information in all its forms.*** Most of the systems are only capable of delivering more two-way phone and data service and more one-way cable service. One goal of S. 1822 is to provide new, advanced services to Americans. ***This section authorizes the FCC to initiate an inquiry to determine if the current trend in deployment of systems incapable of sending and receiving information in all its forms (e.g. images, graphics, and video) continues.*** Such an inquiry should determine if users will gain "reasonable and timely" access to switched broadband telecommunications network capabilities. If the FCC finds that reasonable and timely access will not be achieved, it shall initiate a rulemaking... [emphasis added]

Thus we see a clear emphasis on *two-way true next generation broadband* in the debates leading up to the final legislation that contained the Section 706 mandate. The

[6] Communications Act of 1994, S. 1822, Senate Report 103-367, 103d Congress, 2nd Session (1994).

accompanying report on the Senate bill that became The Act (S.652) also contains a similar emphasis on two-way next generation technology[7]:

> The goal is to accelerate deployment of an ***advanced capability*** that will enable subscribers in all parts of the United States to ***send and receive*** information in all its forms voice, data, graphics, and ***video*** over a high-speed switched, interactive, broadband, transmission capability... Section 304 of the bill is intended to ensure that ***one of the primary objectives of the bill to accelerate deployment of advanced telecommunications capability is achieved***. Section 4 of the bill states clearly that this bill is intended to establish a national policy framework designed to accelerate rapidly the private sector deployment of advanced telecommunications. More specifically***, the bill's goal is "to promote*** and encourage advanced telecommunications ***networks, capable of enabling users to originate and receive affordable, high-quality*** voice, data, image, graphics, and ***video telecommunications services***."

The Congressional emphasis on video and on two-way telecommunications is a key aspect of Section 706 of The Act. Clearly Congress intended for the FCC to focus *both* on download speeds (for users to receive high-quality video and data) and upload speeds (for users to originate high-quality video and data). Indeed, Congress likely intended to foster deployment of technologies that were much higher bandwidth versions of the technologies that were commonly used at the time of the crafting of the legislation -- dial-up and Integrated Services Digital Networks (ISDN) -- both which are *symmetrical* bandwidth technologies.

But in the years since the Act's passage, the Commission has largely abandoned its duty to focus on the upload aspect of advanced telecommunications deployment. The FCC only gathers information on connections that have upload speeds less or greater than 200 kbps, barely above what is possible with dial-up and ISDN connections. The Commission does not gather the appropriate data that would enable it to assess if services

[7] Telecommunications Competition and Deregulation Act of 1995, S. 652, Senate Report 104-23, 104th Congress, 1st Session (1995).

that are capable of originating high-quality voice, data, graphics, and video are being deployed to all Americans in a reasonable and timely fashion.

Depending upon the compression standard, a user would need approximately 2 to 4 Mbps of upload speed to originate a standard-definition quality television signal, and 30-40 Mbps of upload speed to originate a professional high-definition quality television signal over the Internet (see Figure 1).

Figure 1: Speeds Required for Video Transfer[8]

Data Speed Required (Mbps)	Application	Compression Standard
0.384	Low Quality Video Conference	MPEG-4
1.5	Video in a Window (You Tube)	MPEG-1
1 to 2	VHS Quality Full Screen	MPEG-2
2 to 3	Broadcast NTSC	MPEG-2
4 to 6	Broadcast PAL	MPEG-2
8 to 10	Professional PAL	MPEG-2
12 to 20	Broadcast HDTV	MPEG-2
28 to 40	DVB Satellite Multiplex	MPEG-2 Transport
32 to 40	Professional HDTV	MPEG-2
34 to 50	Contribution TV	MPEG-2-I
140	Contribution HDTV	MPEG-2-I
168	Raw NTSC	Uncompressed
216	Raw PAL	Uncompressed
270	Raw Contribution PAL	Uncompressed
1000 to 1500	Raw HDTV	Uncompressed

But an examination of the offerings of the leading providers of non-dial-up Internet service reveals that very few, if any U.S. consumers are able to purchase an advanced service product that allows them to originate high-quality video. Nearly all the products offered by the leading companies who provide the DSL and cable platforms

[8] See http://erg.abdn.ac.uk/research/future-net/digital-video/mpeg2.html

(which have a combined share of 96% of the residential market[9]) have upload speeds below 1 Mbps (see Figure 2). The so-called "third-pipe" satellite and 3G mobile wireless products offer upload speed that are in some cases incapable of originating even low-quality VOIP data. At these levels of upload speed, users have no hope of originating high-quality video.

Figure 2: Offerings of Leading U.S. Internet Providers[10]

Service Type	Provider	Monthly Fee	Maximum Download Speed (Mbps)	Maximum Upload Speed (Mbps)	Must Bundle or Bundle for Rate?
Cable Modem	Comcast[1]	$42.95	6	0.768	Yes
	TimeWarner	$44.95	5	0.384	Yes
	Cox[2]	$41.95	7	0.512	Yes
	Charter	$42.99	3	0.256	Yes
	Cablevision	$44.95	10	1	Yes
DSL	AT&T[3]	$49.95	3	0.512	Yes
	Verizon	$37.99	3	0.768	Yes
	Qwest	$31.95	1.5	0.896	Yes
3G Wireless	Verizon[4]	$79.99	0.4 to 1.4	0.05 to 0.5	No
	AT&T[5]	$79.99	0.4 to 0.7	0.05 to 0.07	No
	Sprint[6]	$79.99	0.4 to 1.4	0.05 to 0.5	No
Fiber	Verizon	$199.95	30	5	No
Satellite	HughesNet[7]	$59.99	0.7	0.128	No
	WildBlue[8]	$49.95	0.5	0.128	No

[1] $59.95 without video bundle

[2] Services at this price vary by location

[3] Standard rate; must be voice customer; contract terms depend on location

[4] One-year contract; $175 early termination fee; usage restrictions; $25-$35 activation fee; faster (Rev-A) service availbility is limited

[5] One-year contract; $175 early termination fee; usage restrictions; $36 activation fee

[6] One-year contract; $200 early termination fee; usage restrictions; $36 activation fee; faster (Rev-A) service availbility is limited

[7] Require a minimum 2 year service agreement; $299.98 for equipment and standard installation; usage resrictions; $300 service termination fee

[8] $299 equipment fee; $179.95 installation fee; minimum service term is 12 months with early termination fee

The only major U.S. provider that is deploying advanced services with upload speeds that even come close to approaching the intent of Section 706 is Verizon with its

[9] "High-Speed Services for Internet Access as of June 30, 2006," Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission.

[10] The information in this figure was gathered from each companies published offerings as of May 15 2007.

FIOS fiber optic service. However, the 30Mbps download/5Mbps upload service is the very top tier FIOS offering, and is only available in a few limited areas. Moreover, the $200 price tag is clearly outside of the realm of "affordable" -- a term used many times in the legislative activities that produced the 1996 Act.

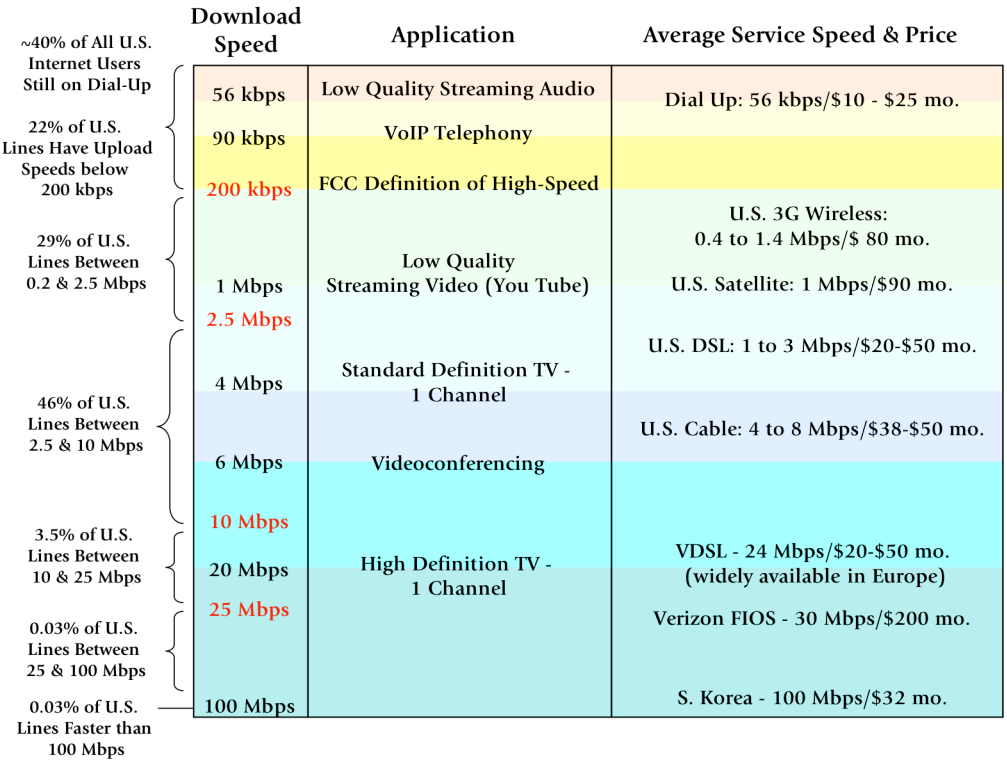
Furthermore, almost every major high-speed Internet provider restricts end-users from hosting their own websites by using their home connection as a server. This is articulated in the acceptable use policies that must be agreed to when subscribing to the service, and is achieved in practice by the use of Dynamic Internet Protocol Addresses.[11] Thus, even if carriers offered the speeds needed for users to originate high-quality video content, doing so would likely be forbidden under standard terms of use.

Congress articulated a clear vision of a two-way symmetrical broadband marketplace. But even setting aside for the moment the upload capabilities of U.S. broadband connections, it is clear from the Commission's own data that very few consumers are able to purchase a broadband connection that allows them to *receive* high-quality video data. Typical DSL offerings have download speeds that range from 768 kbps to 3 Mbps, with a few carriers now rolling out 6 Mbps service. Cable, the leading platform in the U.S., continues to outperform DSL in speed, but the typical cable offering is 6 Mbps, with a few limited areas seeing 10-15 Mbps service.

[11] In order to host a website server using their home Internet connection, a user would need a static Internet Protocol Address, something that if offered by carriers is far more expensive than their Dynamic IP services, and use of the static IP as a server would possibly still violate the acceptable use policy (AUP). For example, Comcast's AUP states, "[t]he Service is for personal and non-commercial use only and you agree not to use the Service for operation as an Internet service provider or for any business enterprise or purpose... you may only access and use the Service with a dynamic Internet Protocol ("IP") address that adheres to the dynamic host configuration protocol ("DHCP"). You may not configure the Service or any related equipment to access or use a static IP address or use any protocol other than DHCP unless you are subject to a Service plan that expressly permits otherwise."

According to the most recent FCC data, more than half of all U.S. high-speed lines (residential and business) are slower than 2.5 Mbps. At this speed, using the standard video compression format (MPEG-2), none of these users could receive a standard-definition quality video service, which requires about 3 Mbps of bandwidth. Only 3.5% of all U.S. high-speed connections are between 10 and 25 Mbps, and thus capable of receiving a broadcast HDTV quality signal. In total less than 0.01% of U.S. lines can receive professional quality HDTV data, which requires speeds between 30 and 40Mbps using the MPEG-2 compression standard (see Figure 3).

Figure 3: Speeds of U.S. High-Speed Lines[12]



Thus it is clear, if the Commission adopts an analytical framework based on the *actual* language of Section 706, it has no choice but to conclude that advanced

[12] "High-Speed Services for Internet Access as of June 30, 2006," Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission; *Ibid.* at 8; Free Press Research.

telecommunications services are not being deployed to all Americans in a reasonable and timely fashion. Congress envisioned The Act as a way of facilitating the deployment of a *communications* technology, where every American could become a broadcaster by simply subscribing to a competitive and affordable advanced service offering. But the Commission's implementation of Section 706 and its definition of "advanced services" as at least 200 kbps symmetrical falls far short of meeting its statutory obligation to monitor deployment of broadband technology.

The Commission's abandonment of the focus on upload speeds has fostered an industry that deploys extremely asymmetrical connections. FCC data reveals that the proportion of slow connections is on the rise.[13] In December 2005, 15% of broadband lines had upload speeds slower than 200kbps. By June 2006 this had increased to 22% of lines. The proportion of DSL lines that had upload speeds slower than 200kbps increased over the 12/06-6/06 time period from 18.4% to 18.9%

This trend likely will continue, leaving home users without the ability to originate high-quality high-bandwidth content, regardless of future advances in compression technology. Indeed, the popularity of web sites like YouTube is a direct industry development that stems from the lack of acceptable upload speeds in home broadband connections. YouTube allows a user to upload (albeit slowly) self-produced video content that can then be viewed by others. YouTube then converts the video to a low-quality flash format, and streams the content over the Internet using servers hosted by Limelight Networks - which costs YouTube well over $1 million per month.[14] End users can then view the grainy videos on YouTube in tiny windows that make recognition of

[13] *Ibid.*

[14] Frommer, Dan. "Your Tube, Whose Dime?", *Forbes*. April 27, 2006.

fine details virtually impossible. But in a world like Congress actually envisioned, there would be no need for gatekeepers like YouTube and Limelight Networks. Users with high-capacity symmetrical home connections could originate their own video products without the need for third-party commercial firms.

The Commission should rethink its approach to fulfilling its obligations under Section 706 and revise the definition of "advanced services" from 200 kbps symmetrical to a more realistic definition that reflects both the intent of Congress and the technical realities of the marketplace. At the very minimum this definition should initially be set at 3 Mbps symmetrical, which reflects the bandwidth needed for standard TV quality transmission. If HDTV were chosen as the benchmark, the commission would need to update the definition of advanced service capability to encompass only the lines capably of 12-40 Mbps symmetrical transmission.

B. Even if The Language of Section 706 is Loosely Interpreted, The Record Shows that Non-Dial-Up Internet Connections Are Not Being Deployed to All Americans in a Reasonable and Timely Manner

If we abandon the clear intent stated in Section 706, and assume that the Commission's 200 kbps symmetrical definition of "advanced services" is adequate, the available evidence still suggests that these non-dial-up Internet connections are not being deployed to *all* Americans in a reasonable and timely manner. Indeed, there are millions of American households that have no ability to purchase such connections, and will not likely be able to without some sort of market intervention. For millions more, the connections available are slow, expensive, of low value, and too restrictive to encourage near-universal consumer adoption like that which occurred in the multi-channel video distribution platforms (cable and satellite television).

i. The Commission's Data is Inadequate, Yet Still Shows Large Gaps in Broadband Coverage

The Commission's ability to monitor the marketplace for the reasonable and timely universal deployment of advanced services is only as good as the data it collects. And it is in this effort that the Commission has failed.

To fulfill the monitoring requirements of the Act, the Commission implemented the Form 477 reporting requirements.[15] Initially, all providers of high-speed and advanced services with at least 250 customers in a given state were required to report twice a year about their broadband deployment activities. This information included the total number of subscribers in a state and type of technology to which they subscribed, as well as a listing of each 5-digit ZIP code where a provider had at least one subscriber residing. Providers were required to report connections based on the Commission's perplexing definitions of "high-speed" (200 kbps asymmetrical) and "advanced service" (200 kbps symmetrical) Internet connections.

Four years after these reporting requirements were implemented, the FCC released an updated Order on Form 477.[16] All companies are now required to report regardless of how many subscribers they serve. Also, companies now must report some limited information on the speeds and types of the connections to which their customers subscribe. These are welcome changes, as they do provide the FCC and Congress with a more detailed understanding of the U.S. broadband market.

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[15] See "Local Competition and Broadband Reporting", *Report and Order*, CC Docket No. 99-301, 15 FCC Rcd 7717, (2000).

[16] See "Local Telephone Competition and Broadband Reporting", *Report and Order*, WC Docket No. 04-141, 19 FCC Rcd 22340 (2004).

However, the only information that Form 477 provides on *local* broadband activity is the absolutely meaningless metric of ZIP code coverage. The FCC reports the number of providers in a given ZIP code that report serving at least one subscriber in that ZIP code. Given the large geographic size of ZIP codes, especially in rural areas, this metric provides no realistic measure of actual broadband deployment and adoption at the local level.

The 1996 Act clearly requires the FCC to determine the pace and extent of the deployment of broadband to *all* Americans. Yet the Commission itself admits that its ZIP code methodology is not meant to be a measure of broadband deployment.[17] In the 2004 proceeding to revise Form 477 reporting requirements, the FCC was urged to make changes that would provide a better understanding of the true nature of broadband deployment. For instance, the FCC could ask providers to report the actual number of subscribers in a given ZIP code, which would allow for a more granular level of household penetration calculations (currently, state-level household penetration is the most granular level the Form 477 data enables calculation of). The Commission could have decided to use Form 477 to ask providers to list ZIP codes where their service is available at the more specific "ZIP plus 4" geographic level, which approximates city blocks. Likewise, the FCC could have required the reporting of pricing data. The Commission declined to implement any of these improvements. Thus the mandate of the 1996 Act goes unfulfilled, and policymakers are left in the dark about the true nature of broadband deployment in America.

[17] See "Local Competition and Broadband Reporting", *Report and Order*, CC Docket No. 99-301, 15 FCC Rcd 7717, (2000).

In its May 2006 report on broadband deployment, the GAO chided the FCC on its use of the meaningless ZIP code metric.[18] The GAO stated that "the use of subscriber indicators at the ZIP code level to imply availability, or deployment, may overstate terrestrially based deployment." The GAO added: "Based on our analysis it appears that these [ZIP code] data may not provide a highly accurate depiction of deployment of broadband infrastructures for residential service in some areas." **The GAO concluded that "the number of providers reported in the ZIP code *overstates the level of competition to individual households.*"**

For example, according to the FCC's data, 95 percent of Kentucky households live in ZIP codes where broadband service has been reported. However, the results from ConnectKentucky's massive statewide assessment showed that only 77 percent of Kentucky households live in areas where broadband service is available.[19] The GAO also compared FCC ZIP code data to survey data they obtained from Knowledge Networks. According the FCC's ZIP code data, the median number of providers offering broadband in the average ZIP code area is eight. However, after the GAO corrected for the shortcomings in the FCC's data, it found that the median number of providers fell to just two, and that 9 percent of respondents had no service available whatsoever.

The inadequacy of the FCC's data is no small matter. ***The FCC's methodology overstates the true level of broadband deployment and adoption***, and offers no

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[18] "Broadband Deployment is Extensive throughout the United Sates, but it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas", United States Government Accountability Office, Report to Congressional Committees, GAO-06-426, May 2006.

[19] "Technology Adoption and Barriers by Metropolitan and Non-Metropolitan Areas: Results and Analysis from the ConnectKentucky Technology Assessment Study", ConnectKentucky, 2005.

information at all on the price to performance ratio of broadband connections. So what is the true state of broadband in America?

ii. Non-Commission Data Shows a Persisting Digital Divide

To answer the above question, one must use other non-FCC survey data to construct a more accurate assessment of the fulfillment of the Section 706 mandate for universal broadband deployment. The Pew Internet and American Life Project conducts periodic surveys that provide a snapshot of the broadband marketplace. In their most recent report[20] (May 2006 based on 2005 survey data), Pew showed that urban adults were 1.76 times more likely to report a home broadband connection than their rural counter parts, increasing from 1.72 the previous year. Pew data also shows that adults living in homes with annual household incomes below $30,000 are more than three times less likely to report having a broadband connection as those with annual household incomes above $75,000.

Other sources confirm these findings. A 2006 GAO study revealed that approximately one out of 10 households with incomes below $30,000 reported having broadband access, while broadband connections were in six out of every 10 households with incomes above $100,000. This study also showed that urban households had broadband connections at nearly twice the rate of rural households.[21] USDA data reveals that U.S. farms are half as likely to have broadband as the average American household.[22]

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[20] In 2005 18 percent of rural adults reported a home broadband connection, compared to 31 percent of urban adults. In 2006 25 percent of rural adults reported a home broadband connection compared to 44 percent of urban adults. See John B. Horrigan, "Home Broadband Adoption 2006", Pew Internet & American Life Project, May 28 2006.

[21] "Broadband Deployment is Extensive throughout the United Sates, but it is Difficult to Assess the Extent of Deployment Gaps in Rural Areas", United States

A recent survey by the Yankee Research group asked non-broadband users why they did not subscribe. Nearly half of the respondents indicated that broadband was just "too expensive," with nearly 10 percent reporting that broadband service was unavailable where they lived.[23] The latter result is consistent with the May 2006 GAO report, which showed that nearly 10 percent of adults live in areas where broadband service is unavailable.

The data make it quite clear that the key barriers to broadband adoption by low-income and rural consumers are price and availability. This is not surprising, as high prices and limited deployment is the exact expected outcome in a duopoly market.

ConnectKentucky, a public-private alliance in that state, has undertaken the largest and most comprehensive broadband availability and use assessment effort to date. The work demonstrates that in Kentucky, one of the lowest-ranking states in terms of broadband penetration, availability and price are the key barriers to adoption by non-broadband Internet users. Of all Kentucky dial-up users, 23 percent report that no high-speed service is available, and 26 percent report that broadband is too expensive. In non-metropolitan Kentucky counties, 30 percent of dial-up users report no broadband service is available, while just 18 percent of dial-up users in metropolitan Kentucky counties

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Government Accountability Office, Report to Congressional Committees, GAO-06-426, May 2006.

[22] "Farm Computer Usage and Ownership", National Agricultural Statistics Service, Agricultural Statistics Board, U.S. Department of Agriculture, July 29 2005.

[23] Yankee Group, February 2006, as published 2/17/2006 on emarketer.com. See http://www.emarketer.com/eStatDatabase/ArticlePreview.aspx?1003833

reported no service is available. In metropolitan Kentucky counties, nearly one out of every three dialup users reported that broadband is too expensive.[24]

Response to questions about patterns and habits of all Kentucky Internet users clearly demonstrates that non-metropolitan subscribers use the Internet in almost identical ways as their metropolitan counterparts, with significantly more non-metropolitan users reporting using the Internet for instant messaging and taking online classes. The results from this survey seem to confirm that it is price and availability that is standing in the way of broadband adoption by rural users. If given the opportunity, rural users will use their broadband connection in ways that are identical to their urban counterparts.

Results from a recent survey of low-income families in California confirm that this segment of society uses information and communications technologies at a high rate but have not adopted broadband service due to its high price. Cell phone usage is prominent in these low-income households, with 88 percent of homes reporting cell phone adoption. More than 70 percent of low-income California families have a computer in their homes, and 76 percent of these homes (or 54 percent of all low-income California families) are connected to the Internet.[25] Contrast this with the GAO study, which found that 66 percent of all households nationwide have a home computer and that 59 percent of all households nationwide are connected to the Internet.

Of the families in the California survey who reported no home Internet access, 50 percent said that the monthly cost of Internet service was a barrier to adoption. When

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[24] Technology Adoption and Barriers by Metropolitan and Non-Metropolitan Areas: Results and Analysis from the ConnectKentucky Technology Assessment Study", ConnectKentucky, 2005.

[25] Results of Greenlinings "Low Income Twenty-first Century Technology Study" as filed with the California Public Utilities Commission, May 24 2006.

low-income respondents who reported no home Internet access were asked if they would subscribe to broadband at a price level of $15 per month, a whopping 83 percent said that they would. The results from this survey indicate that the price of broadband service, and not necessarily the lack of a home computer, is the key barrier to broadband adoption by low-income households.

Bringing higher quality and more affordable broadband products to underserved low-income and rural markets is a policy goal that flows directly from the language contained in the 1996 Telecommunications Act. The Act also declares that "consumers in all regions of the nation, including low-income consumers and those in rural, insular, and high cost areas, should have access to telecommunications and information services, including interexchange services and advanced telecommunications and information services that are reasonably comparable to those services provided in urban areas and that are available at rates that are reasonably comparable to rates charged for similar services in urban areas." But the Commissions data gathering doesn't enable it to determine if rural and low-income consumers in all regions of the nation have access to advanced services, and it doesn't even attempt to gather any information about the prices of these services.

iii. Limited Data on Deployment Shows Large Gaps

As the various data above indicates, urban users have home broadband connections at nearly twice the level of rural users, a gap that has held quite steady over the years. We know that at least 10 percent of Americans nationwide report having no broadband service available where they live, and that in certain less-populated areas a quarter of households have no broadband service.

Even the FCC's own ZIP code data, which overstates the level of deployment, shows that 12 percent of ZIP codes have no users reporting cable modem and/or DSL service, and that nearly 40 percent of ZIP codes have one or less cable modem and/or DSL providers. This same data shows that nine out of every 10 ZIP codes have one or less providers of cable modem service, and six out of every ten ZIP codes have one or less providers of DSL service.[26]

Nationwide, the FCC reports that DSL service is not offered on 21 percent of incumbent telephone companies' lines, and that cable companies do not offer modem service on 7 percent of their lines. In some states, these numbers are very high. In South Dakota, 42 percent of the cable lines are not modem-capable, while over 40 percent of New Hampshire's Incumbent telephone lines are not equipped with DSL.

Because of the granularity of Form 477 data, conclusions based on this data about the differences in proliferation of advanced services can only be made at the state level. This is somewhat problematic because the variation in local deployment at such a large aggregate will be somewhat misleading and understated. However, even at the state level we see large gaps between the household penetrations of the top versus bottom states. Likewise, we see large gaps in the availability of cable and DSL between the best and worst performing states (see Figure 4 and Figure 5).

Together these data paint a very troubling picture. America appears to be a land of broadband haves and have-nots, where large and significant numbers of citizens in rural states unable to purchase the same high-speed Internet services that are more common in other states. The data on the availability of cable modem and DSL suggests a very slow

[26] "High-Speed Services for Internet Access as of June 30, 2006," Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission;

increase in the provision of service at the nationwide level. **But quite disconcertingly, from December 2005 to June 2006, 20 states saw a decrease in the availability of cable modem service and 5 states saw a decrease in the availability of DSL service** (see figure 5).

And none of this data tells the Commission anything about how low-income citizens are left behind in the information economy, a fact born out by the numerous national surveys. And it does not speak at all to the issue of a racial/ethnic digital divide. Recent data from Pew (2006) indicates that **while 43% of white American adults have a broadband connection in the home, only 29% of Latino and 31% of African American adults report access**.[27]

[27] "Latinos Online: Hispanics with lower levels of education and English proficiency remain largely disconnected from the Internet", March 14, 2007, Pew Internet & American Life Project and the Pew Hispanic Center; Also, *Ibid.* at 20.

Figure 4: State-Level Household Broadband Penetration[28]

State	Percent of Homes Subscribing to Broadband (2006)	Rank
Connecticut	55.4	1
New Jersey	55.4	2
Hawaii	53.3	3
California	53.0	4
Massachusetts	52.4	5
Maryland	48.8	6
New Hampshire	48.7	7
Rhode Island	47.6	8
New York	47.1	9
DC	45.9	10
Nevada	45.0	11
Washington	44.2	12
Oregon	42.6	13
Virginia	42.2	14
Florida	41.7	15
Kansas	41.6	16
Colorado	40.9	17
Illinois	40.2	18
Georgia	39.2	19
Nebraska	39.1	20
Arizona	38.9	21
Texas	38.7	22
Delaware	38.5	23
Alaska	38.2	24
Minnesota	37.4	25
Utah	37.0	26
Pennsylvania	36.7	27
Ohio	36.1	28
Wisconsin	35.2	29
Indiana	33.9	30
Missouri	33.6	31
Maine	33.4	32
Vermont	32.4	33
Oklahoma	32.3	34
Louisiana	32.1	35
Michigan	31.7	36
Wyoming	30.9	37
Tennessee	30.3	38
Iowa	30.3	39
South Carolina	29.2	40
North Carolina	28.8	41
Montana	28.4	42
Idaho	28.2	43
Kentucky	28.0	44
West Virginia	26.2	45
New Mexico	26.1	46
Arkansas	25.6	47
Alabama	25.4	48
South Dakota	19.4	49
North Dakota	18.6	50
Mississippi	17.9	51
Nationwide	40.0	

State	Percent of Homes Subscribing to Broadband in 2002	Percent of Homes Subscribing to Broadband in 2006	Percentage Point Change 2002 to 2006	Improvement Rank
Connecticut	15.9	55.4	39.5	1
New Jersey	17.2	55.4	38.2	2
Maryland	11.8	48.8	37.0	3
California	17.6	53.0	35.5	4
New Hampshire	13.5	48.7	35.2	5
DC	11.5	45.9	34.4	6
Massachusetts	18.7	52.4	33.8	7
Rhode Island	14.6	47.6	32.9	8
Virginia	10.0	42.2	32.2	9
Nevada	13.2	45.0	31.9	10
New York	15.7	47.1	31.4	11
Illinois	9.1	40.2	31.1	12
Oregon	11.6	42.6	31.0	13
Washington	14.2	44.2	29.9	14
Colorado	11.3	40.9	29.6	15
Kansas	12.3	41.6	29.3	16
Delaware	9.2	38.5	29.3	17
Florida	12.6	41.7	29.2	18
Indiana	4.9	33.9	29.0	19
Pennsylvania	8.0	36.7	28.7	20
Texas	11.0	38.7	27.6	21
Georgia	12.2	39.2	27.0	22
Nebraska	12.2	39.1	26.9	23
Utah	10.3	37.0	26.7	24
Wyoming	4.3	30.9	26.6	25
Arizona	12.4	38.9	26.5	26
Ohio	10.4	36.1	25.7	27
Minnesota	11.8	37.4	25.6	28
Missouri	8.2	33.6	25.4	29
Wisconsin	9.8	35.2	25.4	30
Maine	8.5	33.4	24.9	31
Montana	3.7	28.4	24.7	32
Kentucky	3.6	28.0	24.4	33
Vermont	8.9	32.4	23.5	34
Oklahoma	9.1	32.3	23.3	35
Iowa	7.8	30.3	22.5	36
Louisiana	10.1	32.1	22.0	37
Alaska	16.2	38.2	22.0	38
Idaho	6.8	28.2	21.4	39
New Mexico	4.9	26.1	21.1	40
South Carolina	8.5	29.2	20.7	41
Michigan	11.3	31.7	20.4	42
Tennessee	10.3	30.3	20.1	43
West Virginia	6.3	26.2	19.9	44
Arkansas	6.7	25.6	18.9	45
Alabama	7.6	25.4	17.9	46
North Carolina	10.9	28.8	17.8	47
South Dakota	3.4	19.4	16.0	48
North Dakota	4.4	18.6	14.1	49
Mississippi	4.2	17.9	13.7	50
Hawaii	N/A	53.3	N/A	N/A
Nationwide	11.7	40.0	28.3	

[28] All data based on number of residential lines in each state reported in FCC Form 477 as of June 30 2006. Percentages assume one line per household, based on U.S. Census household estimates.

Figure 5: State-Level Broadband Availability[29]

Cable Modem Availability Where Cable Systems Offer Cable TV Service (% of end user premises)				Percent Rural Pop	xDSL Availability Where ILECs Offer Local Telephone Service (% of residential end user premises)				Percent Rural Pop	Percent of Telephone Lines that are RBOC
State	Jun-05	Dec-05	Jun-06		State	Jun-05	Dec-05	Jun-06		
New Jersey	96.8%	96.8%	99.9%	5.6%	New Jersey	86.8%	88.0%	88.0%	5.6%	75.7%
Massachusetts	98.3%	98.9%	98.9%	8.6%	Florida	84.6%	85.6%	88.0%	10.7%	65.0%
New York	98.3%	97.3%	98.8%	12.5%	Louisiana	85.3%	85.2%	87.4%	27.4%	74.3%
Maryland	94.1%	97.3%	97.6%	13.9%	Georgia	77.0%	83.7%	87.3%	28.4%	65.6%
California	96.6%	97.7%	97.2%	5.6%	North Dakota	81.3%	83.7%	86.2%	44.1%	33.3%
Illinois	96.9%	98.4%	97.2%	12.2%	Nebraska	52.0%	70.7%	86.1%	30.2%	29.4%
Wisconsin	96.5%	N/A	96.3%	31.7%	California	84.1%	84.8%	85.9%	5.6%	80.8%
Missouri	88.9%	89.4%	96.0%	30.6%	Nevada	81.2%	84.0%	85.3%	8.5%	25.7%
Florida	93.7%	97.1%	95.9%	10.7%	Kentucky	59.8%	74.3%	84.5%	44.2%	42.1%
Virginia	94.6%	95.9%	95.9%	27.0%	Iowa	77.3%	80.5%	83.1%	38.9%	51.8%
Colorado	87.3%	95.9%	95.8%	15.5%	North Carolina	74.9%	78.8%	82.7%	39.8%	44.8%
Tennessee	94.9%	97.0%	95.2%	36.4%	Pennsylvania	74.3%	76.2%	82.5%	22.9%	62.2%
Texas	86.6%	88.1%	95.1%	17.5%	Utah	77.7%	80.1%	82.1%	11.8%	68.6%
Ohio	97.7%	96.4%	94.8%	22.6%	Colorado	74.3%	80.2%	82.0%	15.5%	76.6%
North Carolina	95.4%	96.1%	94.8%	39.8%	Minnesota	75.9%	78.5%	81.1%	29.1%	50.1%
Indiana	92.9%	96.1%	94.0%	29.2%	Ohio	73.0%	78.7%	81.0%	22.6%	56.6%
Washington	92.4%	93.0%	93.6%	18.0%	Oregon	77.1%	79.2%	80.7%	21.3%	71.2%
Pennsylvania	89.5%	92.5%	93.5%	22.9%	Tennessee	79.8%	80.2%	80.7%	36.4%	63.0%
Michigan	98.0%	98.3%	91.7%	25.3%	Washington	74.8%	78.4%	80.1%	18.0%	75.0%
Arizona	85.0%	95.3%	91.4%	11.8%	Kansas	77.5%	78.6%	79.5%	28.6%	58.4%
Nebraska	90.8%	91.4%	91.4%	30.2%	South Carolina	73.3%	75.6%	78.2%	39.5%	57.9%
Alabama	91.1%	95.3%	90.9%	44.6%	New York	80.9%	80.1%	78.1%	12.5%	59.2%
Minnesota	88.6%	95.5%	90.8%	29.1%	Alabama	75.7%	76.5%	78.1%	44.6%	63.0%
Kentucky	86.7%	88.5%	90.6%	44.2%	Illinois	76.6%	76.8%	77.9%	12.2%	75.2%
Oregon	89.7%	89.7%	89.7%	21.3%	Alaska	72.0%	75.4%	77.9%	34.4%	0.0%
Maine	82.9%	85.8%	89.1%	59.8%	Wyoming	70.1%	73.7%	77.3%	34.9%	68.3%
Georgia	88.3%	92.3%	89.1%	28.4%	Wisconsin	75.1%	76.6%	76.1%	31.7%	54.4%
Iowa	85.0%	91.9%	88.5%	38.9%	Montana	70.5%	70.8%	76.1%	45.9%	55.8%
West Virginia	82.2%	82.4%	88.2%	53.9%	South Dakota	72.9%	72.6%	76.0%	48.1%	34.9%
Oklahoma	80.1%	84.5%	87.6%	34.7%	Idaho	68.1%	69.7%	75.6%	33.6%	81.1%
Louisiana	93.6%	55.6%	87.1%	27.4%	Texas	71.5%	74.2%	75.4%	17.5%	69.4%
Kansas	86.8%	87.4%	86.1%	28.6%	Maryland	75.6%	77.1%	75.1%	13.9%	80.8%
South Carolina	79.3%	82.7%	84.2%	39.5%	Oklahoma	72.4%	73.1%	75.0%	34.7%	61.8%
Connecticut	83.0%	83.4%	83.7%	12.3%	New Mexico	71.8%	75.5%	75.0%	25.0%	78.0%
Montana	21.0%	87.1%	83.3%	45.9%	Indiana	70.7%	72.7%	74.2%	29.2%	74.4%
Idaho	77.6%	82.8%	83.3%	33.6%	Mississippi	72.6%	73.0%	73.5%	51.2%	80.5%
New Hampshire	95.6%	81.6%	82.8%	40.7%	Missouri	68.3%	68.6%	71.9%	30.6%	59.8%
New Mexico	71.6%	74.8%	79.5%	25.0%	West Virginia	56.9%	61.2%	68.3%	53.9%	70.9%
North Dakota	79.2%	89.1%	79.4%	44.1%	Maine	69.9%	67.2%	67.0%	59.8%	62.3%
Mississippi	76.9%	91.9%	78.9%	51.2%	Arizona	61.2%	64.5%	66.9%	11.8%	63.4%
Arkansas	64.6%	67.1%	77.3%	47.5%	Michigan	64.8%	65.1%	66.4%	25.3%	73.3%
South Dakota	62.1%	N/A	58.5%	48.1%	Virginia	66.0%	66.9%	65.6%	27.0%	66.7%
Alaska	N/A	N/A	N/A	34.4%	Arkansas	57.2%	62.9%	65.6%	47.5%	56.5%
DC	N/A	N/A	N/A	0.0%	Vermont	64.4%	61.3%	59.9%	61.8%	71.1%
Delaware	N/A	N/A	N/A	19.9%	New Hampshire	65.0%	62.6%	59.4%	40.7%	67.8%
Hawaii	N/A	N/A	N/A	8.5%	Connecticut	N/A	N/A	N/A	12.3%	84.3%
Nevada	N/A	N/A	N/A	8.5%	DC	N/A	N/A	N/A	0.0%	82.7%
Rhode Island	N/A	N/A	N/A	9.1%	Delaware	N/A	N/A	N/A	19.9%	80.0%
Utah	N/A	N/A	N/A	11.8%	Hawaii	N/A	N/A	N/A	8.5%	0.0%
Vermont	N/A	N/A	N/A	61.8%	Massachusetts	N/A	N/A	N/A	8.6%	73.8%
Wyoming	N/A	N/A	N/A	34.9%	Rhode Island	N/A	N/A	N/A	9.1%	54.7%
Nationwide	91.1%	92.6%	93.1%	21.1%	Nationwide	75.9%	77.7%	79.3%	21.1%	66.7%

[29] Data as reported in FCC Form 477 as of June 30 2006. Percent rural population obtained from the U.S. Census Bureau.

iv. 3G Mobile Wireless Connections are Not Broadband Substitutes

To the extent that the Commission's broadband policy has been guided by any logic, it is the argument that intermodal or cross-platform competition will be the savior of the U.S. broadband market. While much of the rest of the world has opened up vigorous competition *within* platforms, we have staked our broadband future on competition *between* platforms. So far, it has not worked out—the U.S. broadband market has long been a rigid duopoly that shows few signs of weakening.

The lack of price competition between DSL and cable modem is apparent in the marketplace. Cable operators have made no attempt to match DSL on price. Comcast CEO Brian Roberts poured cold water on the idea that he is concerned about introductory price cuts in DSL. "We continue to believe and continue to charge for our services a rate that we think is a great value because the product is so much better. When Hyundai cuts their prices, BMW isn't exactly upset about it."[30] Though they have picked off consumers who want higher speeds, they primarily rely on bundled services to hold customers. The DSL operators have aimed their marketing strategy at transitioning dial-up customers with introductory rates to low-end DSL. However, this practice is ebbing. Recent industry analysis shows that introductory DSL prices are rising; so are prices for bundled services. According to a recent press report, Banc of America analyst David W. Barden noted that "a duopoly is emerging where cable and phone companies can avoid provoking price cuts in their core services. Carriers, for instance, can discount DSL

[30] See: http://www.dslreports.com/shownews/65917

service while keeping prices up on phone service, and cable firms can drop prices for phone service but maintain higher pay-TV rates."[31]

The broadband problem in the U.S. flows from a simple policy mistake – a decision to rely upon a duopoly of telephone and cable companies to decide where and when to deploy this vital infrastructure with no overarching social responsibilities whatsoever. They have slow rolled deployment, kept prices far above those in other nations, and emphasized bundles of services targeted to upper income Americans built around "franchise" services. The result is restricted availability and a network that is intended to maximize short run profits, not the long run national interests of social welfare.

Though some might maintain that duopoly competition is sufficient, it is the expectation of a third pipe competitor that has propped up the logic of relying on intermodal competition to reach our policy goals. The steady promise is that of a viable wireless competitor right around the corner. This hypothetical wireless competitor will supposedly throw open the gates of competition, unleash market forces, and the genius of the invisible hand will drive down prices, increase innovation, and turn the U.S. back onto the path toward regaining global leadership in broadband technology. Some commentators claim that the wireless competitor has already arrived in the form of 3G mobile cellular broadband. For example, Steve Largent, the President and CEO of CTIA made this comment before the Senate Commerce Committee in May of 2006: "As we enter our third decade, the wireless industry is poised to enter a wireless renaissance, bringing advanced services like wireless Internet, to more than 200 million mobile

[31] See: James S. Granelli, "Prices going up for phones, Net," 1 Feb 2007, *Baltimore Sun*, http://www.baltimoresun.com/business/bal-bz.pricing01feb01,0,1370518.story?coll=bal-business-headlines

Americans."[32] Recent data from the FCC seem to support this point of view. 60% of the increase in broadband connections over the past 6 months is due to mobile cellular wireless connections.[33]

But these promising statistics are only promising because they are misleading. The FCC counts a broadband capable PDA subscriber exactly the same as a residential DSL or cable modem subscriber when counting broadband connections. The problem is that the *wireless and wireline broadband products are in completely different product markets*. They are not comparable in either performance or price; they are not substitutable services; and they are certainly not direct competitors. Though no precise data exists, it seems obvious that ***the overwhelming majority of subscribers to mobile broadband devices have not cancelled their wireline broadband service as a result***. The wireless product is a complementary product for which the consumer pays extra. Most consumers do not use mobile wireless broadband on cell phones for the same purposes as a residential broadband connection.

These new mobile broadband lines are for the most part mobile devices with a data service capable of accessing the Internet at >200kbps speeds. They are highly unlikely to be used as a primary home broadband connection. In fact, 89.5% of mobile wireless connections are business subscribers, not residential subscribers.[34]

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[32] Testimony before the US Senate Committee on Commerce, Science and Transportation, S. 2686, Communications, Consumer's Choice, and Broadband Deployment Act of 2006, May 18, 2006.

[33] "High-Speed Services for Internet Access as of June 30, 2006," Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission.

[34] *Ibid.*

In total, 17% of all broadband lines counted by the FCC are now mobile wireless. But only 3.8% of advanced service lines are mobile wireless (>200kbps in both directions), and only 2.5% of residential advanced service lines are mobile wireless.[35] What's more, the three largest mobile data carriers are AT&T, Verizon and Sprint. Two of these three carriers are also ILECs, and are the number one (AT&T) and number three (Verizon) most subscribed to broadband Internet service providers, and are the top 2 DSL providers in the United States.[36] Sprint's joint venture with cable operators also diminishes any potential role it could play as a third pipe.

It is important to note that the multi-functionality of cellular phones with broadband data components may contribute to an overstating of the true level of mobile broadband use. A provider of a DSL line only reports to the FCC the lines that are actively subscribed to (and presumably used). However, if a cellular customer's mobile device is capable of data transfers at >200 kbps, then they are counted as a broadband line, even if the customer rarely uses the device for non-voice purposes.

Furthermore, cellular broadband connections are duplicate connections -- that is, very few people subscribe to and use a mobile broadband connection as their home broadband connection. In addition, mobile wireless connections are not *practical* substitutes for cable or DSL connections. These connections are slow, have strict bandwidth caps, and other restrictions, such as users not being allowed to use the

[35] *Ibid.*
[36] Leichtman Research Group, May 2006.

connection for VoIP applications (Internet phone) and numerous other Internet-based functionalities.[37]

Appendix A gives the exact specifications of price, speed, and bandwidth limits of mobile wireless broadband products from the major carriers -- AT&T, Verizon and Sprint. These services, while valued by consumers, are not competitors to wireline broadband service. They have not brought the competition necessary to drive down prices and drive up speeds in the overall broadband market. It would be unwise to bet that they will. Vertically integrated carriers that dominate the wireline broadband market are highly unlikely to offer a wireless broadband product that can potentially cannibalize their wireline marketshare. It is far better business to offer a complementary service.

If 3G mobile broadband won't bring us competition, surely the auction of the 700 MHz band will do so, right? Will 4G finally bring us the third pipe in this "wireless renaissance"? Not likely. The DTV transition has long been touted as the moment when wireless broadband will come into its own. A senior executive at Motorola made these comments in July of 2005: "The spectrum that will be made available at 700 MHz as a result of the transition to digital television provides a unique opportunity to provide facilities-based competitive broadband services."[38] His comments are typical of the hopes many have expressed. The frequencies vacated by the broadcasters in 2009 are up for auction early next year, and this "beachfront spectrum" is thought by many to be the answer to our broadband competition woes.

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[37] See: Tim Wu, "Wireless Net Neutrality," New America Foundation, February 2007, http://www.newamerica.net/publications/policy/wireless_net_neutrality

[38] Michael D. Kennedy, Senior Vice President, Motorola, Before the United States Senate Committee on Commerce, Science, & Transportation, July 12, 2005.

To be sure, the 700 MHz auction could be the last, best chance to bring a third pipe to the market. It has been hailed as such by legislators, regulators, and industry leaders alike. Yet the favorites to win this auction (the major cellular carriers) really do not intend to deliver the third pipe. Further there are technical limitations that come with the proposed structure of the auction that would make it very difficult for any licensee to produce the desired outcome. It is quite a striking disconnect. All of the rhetoric about this auction promises the inauguration of the elusive third pipe in wireless broadband. But none of the facts of what the FCC is doing will realize those lofty goals.

Why is there such a divide between the rhetoric of 700 MHz as the promised land of the third pipe and the reality of the auction?

First, there is nothing that says the winning bidders must use the frequencies to offer wireless broadband services that are true competitors to DSL and cable. Looking at the likely winners of the auction, it is clear that a competitive market is the last thing on their minds. The incumbent carriers are thought by most odds-makers to be the most likely winners in this auction -- just as they were in the last spectrum auction for Advanced Wireless Services frequencies. These companies are the nation's leading providers of DSL service. Why would they use the 700 MHz licenses to offer a wireless broadband service that cannibalizes their own market share in DSL? The answer is they would not -- not here anymore than they have in 3G cellular broadband. They are far more likely to use this spectrum to offer new services that consumers will buy on top of their existing wireline voice service, wireline broadband service, and wireless voice service. This new service, 4G wireless, will be an enhanced mobile data service capable of delivering limited amounts of video and audio to a handheld device. This is not an

unwelcome product, of course, but it will not solve the broadband problem; it will not bring a "third pipe"; and it will not bridge the digital divide to poor and rural communities.

Second, most of the other bidders in the pool will be looking to grab spectrum to fill out the geographic coverage area of their existing cellular networks. This will also allow them to compete, to some degree, with AT&T and Verizon Wireless, the industry leaders. This is not an unwelcome development either, but by itself, it will not solve our broadband problem.

Third, none of the spectrum blocks up for auction are large enough to provide a true alternative to DSL and cable modem no matter the intentions of the bidders. The largest block up for auction is 10 MHz. That translates into about 15 mbps of capacity spread over a cell sector. Depending on the density of users in that sector, the actual throughput performance experienced by a customer will struggle to exceed 2 mbps on the download, and probably will be less.[39] That's not bad today, but down the line as DSL and cable providers eventually increase speeds to 5-10 mbps of throughput for each user, that wireless service will not be a true competitor. It will be a reasonable broadband experience for a wireless device used for limited applications, but it will not be a substitute for a residential wireline connection. To have that, we would have to allocate at least 30 MHz to the task.

Fourth, at present, none of the spectrum blocks up for auction are conditioned on "open access" rules -- though we have filed comments with the Commission asking for

[39] This estimate of bit rates (roughly 1.5 bits per hertz) in the 700 MHz band was provided by an engineer responsible for one of the entities preparing to bid for a 700 MHz license. It was confirmed independently by two other wireless engineers as a reasonable estimate given the frequency, power levels and modulation schemes available today.

this and other proposals to maximize the utility of the auction.[40] Why are these important? Essentially, this is the only way to make a spectrum allocation into a truly competitive market for connectivity to the Internet, software applications, and devices that attach to the network. Open access simply means that the licensee sells access to the network on a wholesale basis at commercial rates. Any number of ISPs that choose may come and buy bandwidth and compete for customers. Everyone shares the same transmitter and connectivity; they compete on customer service and price. These networks are neutral in two important respects. First, bandwidth on this network is available to any ISP on nondiscriminatory terms. Everyone pays the same rates for the same wholesale products to compete fairly in the market. Second, the network is neutral towards the devices and applications running on the network. Provided they do not harm the network, any innovative piece of software or hardware a company can dream up may connect to the network and sell to consumers. In turn, the broadband network provider is fully compensated for use of its network. This is the ultimate free market.

Such a system of intramodal competition in the 700 MHz band using blocks of spectrum large enough to compete with wireline products is the only chance to realize the impact of the elusive third pipe. If the Commission is interested in preventing a serious disappointment and the loss of a golden opportunity to deliver broadband competition, getting the auction process right is imperative.

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[40] Consumers Federation of America, et. al., "Ex Parte Comments of the Ad Hoc Public Interest Spectrum Coalition," PS Docket No. 06-229, WT Docket No. 06-150, 05-211, 96-86, April 5, 2007, Available at http://www.freepress.net/docs/pisc700mhzpart2.pdf

C. Europe and East Asia Continue to Outperform The U.S. Broadband Market in Speed, Price, Value, Availability and Adoption. Their Success is Rooted in Good Policy Decisions, and Not Due to Geography

According to the Organization for Economic Cooperation and Development (OECD), as of December 2006 the United States ranks 15th out of the 30-member nations in per capita broadband use, down from 12th place just 6 months ago, and down from 4th place in 2001.[41] In terms of growth in broadband penetration over the past year, the U.S. ranks 20th out of 30. The International Telecommunications Union's (ITU) 2005 broadband penetration data had the U.S. at 16th overall in the world, a figure that will likely show a drop to 20th when updated data is released.[42] ITU includes several countries in its study with high broadband performance that are not OECD members (which is why the numbers vary).

The U.S. ranks 21st in another ITU metric -- the Digital Opportunity Index -- which measures eleven different variables of technology development, including an important factor not captured in the simple broadband rankings -- the cost of connectivity relative to per capita income. Notably, the US dropped from 8th place in the Digital Opportunity Index in 2000 to 21st place by 2005. We are ranked 36th relative to other nations in the increase in the absolute value of our Digital Opportunity Index score between 2000 and 2005.[43]

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[41] Organization for Economic Cooperation and Development (OECD), "OECD Broadband Statistics to December 2006"

[42] http://www.itu.int/ITU-D/ict/statistics/at_glance/top20_broad_2005.html

[43] World Information Society Report, August 2006, http://www.itu.int/osg/spu/publications/worldinformationsociety/2006/wisr-web.pdf

International rankings have very practical significance far beyond the mere ordinal rankings. The absolute magnitudes in difference in penetration have real world economic consequences, and every single point of separation matters.

Currently about 40% of U.S. households subscribe to broadband service (see Figure 4). If the U.S.'s penetration level were as high as in Denmark or the Netherlands, this would translate into an additional 36 million total subscribers, or approximately 33 million additional residential subscribers. This would put the U.S. *household* penetration level at 67%. If the U.S.'s penetration level were as high as 9th-ranked Canada, this would translate into an additional 12.5 million total subscribers, or about 11.5 million additional residential subscribers. This would put the U.S. *household* penetration level at 50%.

These differences have real world consequences. In 2003 when residential broadband penetration was at 20%, economists estimated the annual consumer surplus from broadband to be about $10 billion per year. If broadband penetration were 50% of all U.S. homes, consumers would realize a $38 billion annual surplus. If household broadband penetration were at 95%, the consumer surplus would be $350 billion annually.[44] Because of network effects, ***the benefits of higher broadband penetration accumulate exponentially***, thus even a minor increase in our international broadband ranking has tremendous positive impact on the American economy.

Though the U.S. position in the international rankings is cause for concern, even more troubling is how we have progressed in recent years relative to other countries. From December 2001 to December 2006 the U.S. penetration in the OECD rankings

[44] Crandall et. al., "The Effect of Ubiquitous Broadband Adoption on Investment, Jobs, and the U.S. Economy," Criterion Economics, L.L.C., September 2003.

increased by 15.1 subscribers per 100 inhabitants, below the OECD average of 15.9, and 14th overall in the amount of increase among the 30 nations. The average 5-year growth rate of the countries that outperformed the U.S. since 2001 is 40% higher, and the growth rate of the top performing country, The Netherlands, is over 85% higher than that of the U.S.

From December 2005 to December 2006, the U.S. penetration in the OECD rankings increased by 3.3 subscribers per 100 inhabitants, below the OECD average of 3.4, and 20th overall in the amount of increase among the 30 nations. The average 1-year growth rate of the countries that outperformed the U.S. in the past year is nearly 60% higher, and the growth rate of the top performing country, Denmark, is 114% higher than that of the U.S. Even South Korea, a very early broadband leader that in theory should be closer to market saturation, outperformed the U.S.'s growth over the past year.

The growth trends indicate that the U.S. is likely to continue to fall behind the rest of the world in broadband penetration, which will have lasting and significant effects on the U.S. economy.

Even if we were able to match the world leaders in penetration rates, we cannot touch the speed and value (cost per unit of speed) they offer their consumers. The value of U.S. connections is alarmingly below other countries. Where U.S. consumers routinely pay about $10 per month per Mbps (Megabit per second), citizens in countries like Japan, South Korea, Sweden and France pay less that $1 per month per Mbps.[45] A 50

[45] Organization for Economic Cooperation and Development (OECD), "OECD Communications Outlook 2007," forthcoming, June 2007.

mbps connection in Japan costs $30 per month.[46] Such speeds are not even available in the US. American customers can expect to pay $20-30 per month for (at best) 3 mbps of DSL connectivity or between $40-50 per month for 4-8 mbps of cable modem connectivity (see Figure 2). A French company offers the "triple play"—50 mbps of symmetrical broadband service, unlimited telephony and cable television—for 30 euros per months.[47] Neither this level of service nor this price point is available in the US by a wide margin.

Data from another recent OECD study on youth exposure to computers and information technology reveals a troubling finding that has implications for the future of U.S. competitiveness in the global information economy.[48] Of the countries studied, the United States had the fourth-highest level of students who have never used a computer, exceeded only by Turkey, Slovakia and Mexico. This is especially problematic because the study also found that students without access to computers at home are, on average, one proficiency level below the OECD average in measures of mathematic ability. In most countries, including the United States, this gap in performance remains even after controlling for students' socio-economic backgrounds.

Apologists for the poor relative performance of the U.S. in these various international comparisons are eager to discredit these data. They offer ways to explain away the declining status of the United States as a global technology pioneer and leader. But the excuses of entrenched incumbents bear a heavy burden of proof. Too often, these

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[46] Grant Gross, "U.S. customers pay considerably more than the Japanese for bandwidth," IDG, 4 April 2007.

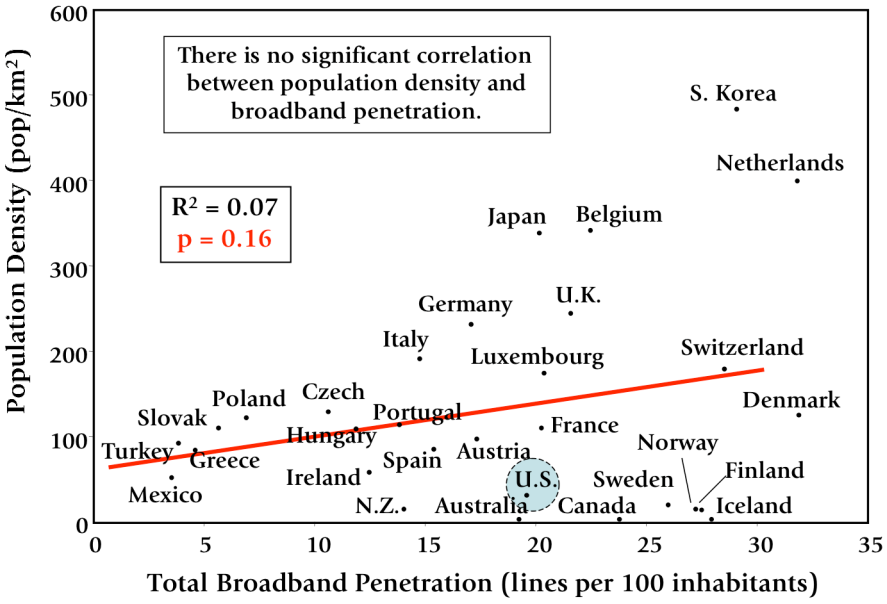
[47] "Neuf Offers 50 Mbps in Paris for 30 EUR per month," *MuniWireless*, 7 March 2007, http://www.muniwireless.com/article/articleview/5771/1/2/

[48] "Are students ready for a technology-rich world?", OECD, January 2006.

are simply diversions offered by companies that oppose the competition policies that would challenge market failures and ensure that America's digital future gets back on the right track.

By far the most touted excuse for the poor U.S. performance in international rankings is that of population density. But an honest look at the data reveals that geography does not account for America's declining broadband performance. For the 30 nations of the OECD, population density is not significantly correlated with broadband penetration. Indeed, one of the world's leading broadband nations, Iceland, has one of the lowest population densities in the world. Furthermore, 5 of the 14 countries ahead of the U.S. in the OECD broadband rankings have lower population densities than the U.S. (see Figure 6).

Figure 6: Broadband Penetration vs. Population Density (OECD)



While there may be a theoretical reason to think that population density should be correlated with broadband penetration, in real world measurements comparing performance at the national level that is not the case. The phenomenon of "economies of

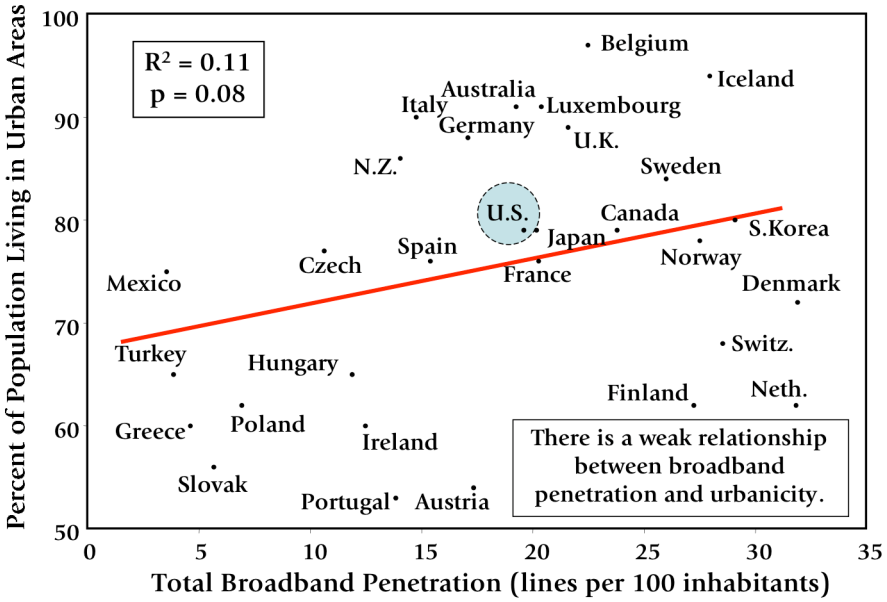
density" is indeed relevant here, as in theory it should be less costly on a per-line basis to deploy broadband to an area that is highly populated than one that is sparsely populated — all other things being equal. But population density is not the relevant metric to capture this phenomenon — as people tend to cluster in cities, regardless of the overall geographical area of a particular country. The relevant metric is "urbanicity," or the percentage of a nation's population living in urban areas or clusters.

When the relationship between urbanicity and broadband penetration is examined, there's only a very weak, statistically insignificant correlation, with urbanicity only explaining 11% of the variation in broadband penetration (see Figure 7). Countries like the Netherlands and Switzerland have lower percentages of their population living in urban areas than the United States yet have higher broadband penetration rates. Similarly, countries like New Zealand and Germany have higher percentages of urban population than the United States but lower broadband penetration levels. In total, 8 of 14 countries ahead of the U.S. in the OECD broadband rankings have lower percentages of their population living in urban areas. In short, geographic factors alone cannot explain why the United States lags behind. Factors like income, income distribution, public policy, and market competition play a far bigger role.

Another major excuse for the poor U.S. performance in the OECD penetration rakings is the assertion that the OECD's methodology does not account for special access lines (a type of broadband data platform that is typically subscribed to by large business customers). We could not verify this with OECD. But if this were indeed the case, it would not influence the U.S. ranking in the OECD tabulation. Using FCC data, and assigning a generous 1 million "missing" special access lines, this would change the

U.S.'s December 2006 OECD penetration level from 19.6 to 19.9, still behind 14th ranked Japan, which has 20.2 subscribers per 100 inhabitants.[49] Thus this possible omission by the OECD does not appear to impact the overall results.

Figure 7: Broadband Penetration vs. Percent Urban Population (OECD)



Apologists for the poor U.S. performance also assert that the amount of platform competition (i.e. competition between technologies) is lacking among other nations, and thus the U.S. is poised for some sort of "just around the corner" broadband wonderland. However, several of the nations ahead of the U.S. in the OECD ranking *do* have appreciable levels of platform diversity and they *also* have significant amounts of competition *within each platform* -- something the U.S. lacks. Countries like Denmark, The Netherlands, South Korea, Sweden, Belgium, Canada, and Japan all have significant amounts of second and third-platform broadband technologies. In fact, in 7 of the 14 countries ahead of the U.S. in the OECD rankings, the leading platform has a

[49] We say "generous" because the most recent FCC data shows just over 600,000 traditional wireline business lines, the category special access lines falls under.

marketshare of 62% or less. This is very close to the share of the cable platform in the U.S., which is 52% in the latest OECD data.

Thus we see that the excuses for the declining U.S. performance on the international broadband stage are just that -- excuses. There is simply no way to ignore the successes in countries as diverse as The Netherlands and Japan. These countries are realizing real and measurable gains in productivity and economic activity precisely because they *planned and promoted* policies that created a robust broadband marketplace. Europe and Asia have used open access policy to successfully create competition not only between broadband platforms, but also competition *within* each platform. Unfortunately the Commission has turned its back on open access, ignoring the lessons taught by the successes of Europe and East Asia.

It is worth dwelling on this point. A review of the policy literature indicates the policy prescription *most* responsible for success in the international broadband market -- open access to network infrastructure for intramodel competitors -- is precisely the policy that the US has abandoned.[50] Ironically, this policy was originally initiated in the FCC's own *Computer Inquiry* decisions of the 1970s and 1980s, which allowed Internet service providers to purchase underlying telecom inputs on a nondiscriminatory basis. Many believe this ISP "open access" policy, along with the *Carterphone* principles of the 1960s, helped pave the way for the rise and enormous success of the Internet. Later, The 1996 Act briefly opened up the local network so that competing carriers could use the local loop to provide DSL and other advanced data functionalities. Unfortunately, in both cases these pro-competitive precedents were eviscerated in subsequent legal and

[50] Amit Schejter, "From all my teachers I have grown wise, and from my students more than anyone else: What Lessons Can the US Learn from Broadband Policies in Europe?" Working Paper, 2007, Pennsylvania State University.

regulatory disputes, essentially because they were not in the short-term financial interests of incumbents. Asia and Europe adopted and embraced open access -- betting on the long-term benefits of the policy -- and they have used it to leap-frog the US in the race for global broadband supremacy.

A similar analysis comparing US and South Korean broadband policy also highlights the divergent paths on open access rules that have led to higher and lower barriers to entry (respectively) in the broadband market.[51] The study concludes:

> The sluggish progress of intermodal and intramodal market competition explains a part of the sluggish demand in the residential high speed Internet access market in the U.S., while the South Korean market was able to grow rapidly due to fierce competition in the market, mostly facilitated by the Korean government's open access rule and policy choices more favorable to new entrants rather than to the incumbents. Furthermore, near monopoly control of the residential communications infrastructure by cable operators and telephone companies manifests itself as relatively high pricing and lower quality in the U.S. The more favorable terms from which the dominant providers have benefited, and government's deregulation, may limit business opportunities for other Internet service providers.

Japan's NTT East continues to make heavy investments in fiber optics despite requirements that it must share its network with competitors. When asked to explain why, an NTT executive cited the long-term benefit to the country. "We see the future, and then we do what we feel is right," he said.[52] As a result of this vision, Japan (like many of the world's leading broadband nations) has multiple wireline competitors offering broadband in each market. In the United Kingdom, BT has agreed to a split between its retail and wholesale operations, which has both created intramodal competition over BT's local

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[51] Richard Taylor and Eun-A Park, "Barriers to Entry Analysis of Broadband Multiple Platforms, Comparing the US to South Korea," Paper presented to the Telecommunications Policy Research Conference, September 29 – October 1, 2006, Washington DC.

[52] *Ibid.* at 35.

loops and led to greater overall investment in broadband facilities. The evidence is clear: the results of broader consumer choice are lower prices, higher speeds, and greater innovation.

Professor Schejter points out that the US may be well served to learn from the European and Asian examples: "Observing international broadband adoption trends and rates, one cannot fail to notice that while Europe is plunging ahead, with some countries leaving even Asian powerhouses behind, the United States, which was the original leader in both making the first regulatory moves and adopting Internet technology, is slowly falling behind. What is it then that makes Europe different than the United States, and what can the United States learn from the European experience in order to revive broadband penetration?"[53]

D. Policies that Will Foster The Universal Deployment and Adoption of the Advanced Telecommunications Capability Congress Envisioned in Section 706

There is so little competition in American broadband markets that there is no strong incentive for network operators to build high capacity lines throughout the country. Consequently, most U.S. consumers are stuck using the same slow and expensive broadband connections while consumers in other countries enjoy connections that are far faster and cheaper than those deployed here. These real-world consequences are market failures that are themselves the direct result of policy failure.

The U.S. is a nation without an explicit national policy for promoting broadband. In response to a recent request to compare Japanese and American broadband policy, a Japanese telecom executive noted: "I don't think at the moment, the United States has

[53] *Ibid.* at 50.

any national policy. The idea is, let the market do it."[54] The key problem is that US broadband policies have not even engaged the free market, choosing instead to wait for the elusive intermodal competition to come along and challenge the stagnant duopoly of DSL and cable. It is in this void that we must reassert the commitment to a ubiquitous, affordable 21st century communications network for all Americans. The framework of public-private partnership in policy-making that characterized the technology boom of the 1990s worked because public policy guided the thrust of development. As Thomas Bleha describes it: "The private sector did the work, but the government offered a clear vision and strong leadership that created a competitive playing field for early broadband providers."[55] When we talk about public private partnerships, we do not mean situations in which the private sector profits at the expense of the public; we mean partnerships that serve the public interest, which is difficult when public policy is not clearly articulated.

The national broadband policy should be designed around aspirations to particular social and economic outcomes, not the business models of the incumbent telecommunications carriers. We need to identify our goals and work backward to find the right policies. We suggest goals that address our shortfalls in each of the three major indices of broadband performance: availability, price, and value (cost per unit of speed).

The Commission should proceed in this area guided by three major goals, each which can be achieved via a number of policy levers already at the Commission's disposal. Goal number one should focus on establishing universal availability of broadband services. Goal number two should be the delivery of competitive, affordable advanced services, and programs to stimulate adoption in under-subscribed areas. And

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[54] *Ibid.* at 46.

[55] Thomas Bleha. "Down to the Wire." *Foreign Affairs*, May/June 2005.

the third goal should be enhancing the speed, coverage, and reliability of communications networks to spawn the next generation applications that will raise the social and economic value of connectivity.

To achieve these goals, and help America regain its global leadership in broadband and maximize the social benefits of a network economy, the Commission needs to do its part to establish a framework that supports an evolving communications infrastructure that will ultimately provide 100 megabits of symmetrical connectivity to every home in America in the next decade. From the passage of the Communications Act in 1934 to the Telecommunications Act in 1996, the American telephone network evolved through rapid technological change and an immense expansion of service and services. It was an infrastructure built with private capital subject to public obligations and oversight. We must certainly adapt to the more dynamic world of today, but we are suffering because we have abandoned the key role of public policy.

To foster universal 100 Mbps connections, the U.S. market will need vigorous, multi-modal competition -- that is, competition between delivery platforms (e.g. DSL, cable, and wireless) as well as competition within delivery platforms. The U.S. cannot and should not bet its digital future on one form of competition. The Commission should ensure that the content/applications market that sits adjacent to the connectivity/access market also retains maximum competitiveness, as it always has, by precluding market power in network ownership from distorting the market for Internet content. This will maximize innovation in the content market and increase the likelihood that the next "killer application" will attract more and more Americans to subscribe to a network. Indeed, this virtuous cycle of greater demand for advanced applications leading to greater

uptake of broadband, leading again to greater demand for advanced applications, seems to be completely missing in the Commission's current policy framework. Though outside of the Commission's authority, there is a strong need and role for investment in social programs that bring the equipment and training needed to help disadvantaged communities into a place where it makes sense to connect. So-called digital inclusion programs are often overlooked in the consideration of the broadband future.

To do its part to help realize these goals, the Commission needs to establish a national broadband policy framework that is comprehensive and aggressive in pursuit of market competition and advanced network capabilities. Not all of these changes will be supported by the incumbent industries. But it is essential that the Commission recognize that the short-term financial interests of dominant firms must not be permitted to overshadow the larger national interest in charting a successful path for our digital future.

i. Gathering Better Data

The Commission should begin by addressing its data collection problems. The Commissions recent effort to begin a Notice of Proposed Rulemaking into its data collection efforts is a welcome development.[56] There is near universal agreement that in order to live up to the mandate of Section 706, the Commission needs better data. We hope that the Commission moves expeditiously on this matter. It wasn't until the *2004 Data Order* -- 8 years after the passage of The Act and four years after the initial *Data Order*, when the commission finally began to gather some information about actual

[56] *In the Matter of Development of Nationwide Broadband Data to Evaluate Reasonable and Timely Deployment of Advanced Services to All Americans, Improvement of Wireless Broadband Subscribership Data, and Development of Data on Interconnected Voice over Internet Protocol (VoIP) Subscribership*, WC Docket No. 07-38 *Notice of Proposed Rulemaking*, April 16, 2007.

advanced service *deployment*.[57] We hope the efforts to improve data collection efforts this time do not take so long.

What kind of data should the Commission gather? Knowing at a granular level -- block by block -- where broadband service is available and where it is not is an important first step. But we must go beyond that. The Commission should collect information about the price and speed of connections as well (either by census or survey). The Commission also needs to know about service agreement terms that may inhibit competition, such as early termination fees in long-term contracts and other switching costs. Without this information, the Commission cannot quickly identify the gaps in deployment, and thus cannot fulfill its mandate under Section 706 to remedy market failures that hold prices high and service quality low.

The Commission should also study the cost and feasibility of universal deployment of various broadband technologies. For many years, it has been the stated goal of the U.S. government to make broadband connections universal. Yet we do not have reliable cost estimates for realizing that goal, much less have we compared the costs of deploying different technologies to accomplish the task. This information will become very critical very soon, because Section 254 of The Act calls for the eventual inclusion of broadband within the Universal Service Fund.

Possessing data about our own broadband market will be an enormous advantage, but we should look beyond our borders. The Commission can put an end to all the

[57] The 2004 Data Order implemented the reporting of cable modem availability where cable systems offer cable TV service, and DSL availability where ILECs offer local telephone service. This data is publicly reported at the state and national level, and unlike the ZIP code methodology, is a better approximation of service deployment.

quibbling over the validity of the OECD and ITU data by conducting its own thorough and periodic international comparative analysis.

ii. Enacting Multi-Modal Competition Policy

The vision for our national broadband policy should be bold, aspirational, and comprehensive. The problems in the marketplace will not be solved by tweaking around the edges; nor will they be solved by enacting policies that are functionally subsidies of status quo, incumbent business-models. The Commission needs to change course and turn away from the conventional political wisdom of complacent incrementalism and embrace a policy inquiry into all the possible options for putting our broadband future back on track. Now is not the time to make artificial declarations that some ideas are off the table and narrowly focus on particular proposals. No one policy idea is the silver bullet. It will require many different initiatives aimed at different levels of the broadband market to accomplish the goals as set forth in Section 706. In short, it must be "multi-modal"—by which we mean that it must foster competition both *within* and *between* broadband technology markets.

A useful way to categorize policy proposals is to group them according to the network layer to which they apply. To simplify for present purposes, the broadband market can be understood as two separate arenas: 1) a physical connection to the Internet and the technologies used to transmit information over the network; and 2) the applications and content delivered via that Internet connection and the devices used to receive them. The Commission can and should target broadband policy in both layers of the network to maximize the productivity of both markets. This policy has two broad components: engendering greater competition at the physical layer, and crafting

protective safeguards for the application layer. Though each of these proposals deserves analysis and explanation, for the purposes of this testimony, we will simply list them out for discussion. This may serve as a consumer blueprint of ideas for a national broadband policy. We would encourage other stakeholders to offer the Committee similar, comprehensive proposals for consideration.

a. Policies for the Physical Layer

The physical layer is not just wires and cables. It is any means of delivering a broadband connection and the baseline rules and consumer protections governing that delivery system. By extension, policies aimed at the physical layer include any effort to expand the reach, capacity, competitiveness or efficiency of these networks to serve residential and business customers. In turn these networks support the spread of advanced Internet applications that can be accessed and used by all Americans.

The Commission has the ability to allocate licensed public spectrum in a manner that is aimed at creating a viable wireless broadband competitor. The Commission should approach policy opportunities like the auction of 700 MHz frequencies with the goal of bringing new entrants into the market that are independent of wireline incumbents.

The Commission has the authority to increase the availability of unlicensed public spectrum. The greatest success of recent broadband policies is WiFi, operating on unlicensed spectrum. The Commission should expand the availability of unlicensed spectrum into lower frequencies by opening up the unassigned television channels (also known as "white spaces") for wireless broadband. We applaud the Commission for its initial work in this area, and encourage them to make the white spaces available on an

unlicensed basis, in order to maximize the innovative potential of this vastly underused public resource.

The Commission has the power to reform and transition the federal universal service programs from dial-tone to broadband. The Commission has a duty under the Act to recognize the evolving nature of telecommunications, and act to move our valuable USF programs into the 21st century with targeted subsidies and accountability benchmarks to support broadband deployment in high-cost areas. The Joint-Board has solicited comment into this very issue, but we encourage the Commission to move swiftly on this matter.[58]

The Commission has the ability to ensure reasonable and nondiscriminatory interconnection between facilities-based providers. Since the Internet is nothing more than a global network of interconnected private and public networks, it is imperative that each interconnects with one another to maximize the efficiency and utility of the overall network.

The Commission could move to reintroduce intramodal competition into the broadband market. Though recent FCC decisions have moved away from this model of competition policy, it is imperative that it is not abolished. Intramodal competition through open access to network infrastructure has been the cornerstone of international broadband successes. The Commission should embrace open access plans in the licensing of the 700 MHz band and establish policies to bring competition back in the wireline space.

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[58] *Federal-State Joint Board on Universal Service Seeks Comment on Long Term, Comprehensive High-Cost Universal Service Reform*, WC Docket No. 05-337CC Docket No. 96-45, May 1 2007.

Finally, the Commission could require network owners to offer customers stand-alone or "naked" DSL or cable modem service. The promise of VoIP competition in the voice market has been stymied by the bundling practices of the incumbent operators. To give this alternative (and others) a viable chance, the FCC should put in place protections for this consumer benefit.

b. Polices for the Applications Layer

The applications layer, in this analysis, refers to the marketplace for content, applications, services and devices that flow over, or connect to, the Internet. This economic space at the "edge" of the network architecture has been a remarkable engine of economic growth in the last decade. In addition, this is the space where network technologies meet democratic discourse and open cultural expression. Because of the open marketplace at the edge of the network, an open sphere for public speech has developed that rivals the printing press as the most important development in modern political communication. Policies aimed at the application layer should recognize its centrality to the economic and democratic health of the nation.

The Commission should act to establish Network Neutrality as the cornerstone of broadband policy. It is the Commission's fundamental duty to protect an open market for speech and commerce on the Internet for consumers, citizens and businesses alike. To do this, the Commission should apply nondiscrimination safeguards to the broadband ramps leading onto the Internet that prohibit owners of the physical layer of the network from gate-keeping the applications layer of the network.

The Commission should apply *Carterphone* rules to the wireless broadband platform. It should recognize and remedy the contradictions in fostering an open market

for wireless broadband on a platform emerging from the closed networks of cellular telephony. The walled garden of the mobile telephony world should not be permitted to cripple the potential of mobile wireless broadband. All devices, applications and services that do not harm the network should be permitted access.

The Commission should begin research into network traffic and data management over this nation's telecommunications infrastructure. The dearth of information about what is happening on the Internet cripples our efforts to address some of the most pressing problems in the application layer: spam, cyber-security, privacy, and traffic management. Policymakers should seek to make available the tools researchers need to provide the best available answers to these problems.

III. Conclusion

The status quo is unacceptable. If we watch and wait, trusting that today's artificially-constrained marketplace will magically solve the broadband problem, we will see America slip farther behind the rest of the world and widen the digital divide—both domestically and internationally. This is the precise negative outcome the Congress wanted to avoid when it enacted Section 706.

The current trend lines are clear. We continue to have large gaps in broadband service across the nation. Virtually none of our infrastructure lives up to the standards of "advanced service" set forth in Section 706. Worse still, the networks we do have are slower, more expensive, and less competitive than the global leaders in broadband performance. Our reliance on intermodal competition has not proven successful, as we remain mired in a rigid duopoly. The optimistic predictions about mobile cellular broadband do not appear to hold any real promise of a viable "third pipe." Meanwhile,

network operators are following the demands of quarterly returns—investing in networks where costs are lowest and profits highest and leaving the rest of the market behind. Perversely, the proposals of the incumbents include dismantling the open, neutral marketplace for commercial applications and political speech to squeeze out higher revenues. The result in the value chain and in the public sphere will be a resounding net loss. This is robbing Peter to pay Paul, and the Commission should reject this approach. The Commission must reject the argument that an open Internet *and* a high capacity network are mutually exclusive goals. The Commission should recognize the reality that we must have *both* for our information marketplace to prosper.

The first step on the road to broadband recovery is understanding the problem. It is the Commission's duty under Section 706 to rectify the deplorable state of data collection in the broadband market. What the Commission does not know undercuts its ability to craft and target viable solutions. Second, we must shed the myths about our failures and the false promises that a magical resurrection of our fortunes is right around the corner. Third, we must study the successes of other nations to determine which policies are the best bets for the digital future of America. Now is not the time to take ideas off the table, it is a moment for aspirational inquiry and bold vision.

Finally, the Commission should synthesize its efforts into a comprehensive national broadband policy. This should be a broad platform of initiatives that addresses the complexity of the issue and maximizes the potential for both near and long term success. The focus of these policies should be: 1) enhancing competition between and within the technologies that deliver broadband connectivity; 2) protecting competition and speech in the content flowing over the Internet; 3) expanding opportunities to bring

new broadband providers to the market using new technologies, and 4) promoting a permanent research agenda that facilitates the collection of data in the market and on the network.

Solving the broadband problem is a serious challenge of signal importance. It is the statutory duty of the Commission under Section 706 to address this problem and ensure that every American in every region of this country has access to affordable, truly advanced symmetrical broadband services.

Respectfully submitted,

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III. Appendix A - Mobile Broadband Offerings of Major U.S. Carriers

Mobile broadband service programs are expensive, slow, not universally available, and severely restrictive. These new mobile broadband lines are for the most part mobile devices with a data service capable of accessing the Internet at under 200 kbps speeds. They are highly unlikely to be used as a primary home broadband connection. In fact, 89.5 percent of mobile wireless connections are business subscribers, not residential subscribers.[59] In total, 17 percent of all broadband lines counted by the FCC are now mobile wireless. But only 3.8 percent of advanced service lines are mobile wireless (under 200 kbps in both directions), and only 2.5 percent of residential advanced service lines are mobile wireless.[60] What's more, the three largest mobile data carriers are AT&T, Verizon and Sprint. Two of these three carriers are also ILECs and are the number one (AT&T) and number three (Verizon) most subscribed-to broadband Internet service providers, and are the top two DSL providers in the U.S.[61] Sprint's joint venture with cable operators also diminishes any potential role it could play as a third pipe.[62]

Here is a sample of available offers:[63]

Sprint

- In Rev A coverage areas (available to 100 million people)
  - Download Speed: 600-1400 kbps
  - Upload Speed: 350-500 kbps
  - Price: $59.99 per month with a 2-year contract. *Or* $79.99 per month with a one-year contract.

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[59] "High-Speed Services for Internet Access as of June 30, 2006," Industry Analysis and Technology Division, Wireline Competition Bureau, Federal Communications Commission.

[60] *Ibid.*

[61] Leichtman Research Group, May 2006.

[62] See: http://www2.sprint.com/mr/news_dtl.do?id=8961

[63] Published offerings of Sprint, Verizon and AT&T as of April 19th 2007.

        - $36 activation fee
        - $200 early termination fee.
        - Numerous taxes, surcharges and fees
- In non-Rev A coverage areas (available to 94 million additional people)
    - Download Speed: 400-700 kbps
    - Upload Speed: 50-70 kbps
    - Price: Same as above
- Service restrictions:
- "Use as a private line or frame relay service substitution, service, or like equivalent, is prohibited. Not available while roaming. Premium content not available. Shared data not available."
- "We reserve the right to limit or suspend any heavy, continuous data usage that adversely impacts our network performance or hinders access to our network. If your Services include unlimited web or data access, you also can't use your Device as a modem for computers or other equipment, unless we identify the Service or Device you have selected as specifically intended for that purpose."

Verizon

- In Rev A coverage areas (available to 135 million people)
    - Download Speed: 600-1400 kbps
    - Upload Speed: 350-500 kbps
    - Price: $59.99 per month with a 2-year contract, *and* customer must also be a Verizon voice customer. *Or* $79.99 per month with a one-year contract.
        - $25-$35 activation fee
        - $175 early termination fee.
        - Numerous taxes, surcharges and fees
- In non-Rev A coverage areas (available to 67 million additional people)
    - Download Speed: 400-700 kbps
    - Upload Speed: 50-70 kbps
    - Price: Same as above
- Service restrictions:
- "Examples of prohibited uses include, without limitation, the following: (i) continuous uploading, downloading, or streaming of audio or video programming or games; (ii) server devices or host computer applications, including, but not limited to, Web camera posts or broadcasts, automatic data feeds, automated machine to-machine connections or peer-to-peer (P2P) file-sharing; or (iii) as a substitute or backup for private lines or dedicated data connections.
- Will terminate service if you exceed 5GB per month -- or about 6 CD's worth of data (800MB each).

AT&T

- Download Speed: 400-700 kbps
- Upload Speed: 50-70 kbps
- Price: $59.99 per month with a 2-year contract *and* subscription to a voice plan that's at least $39.99 per month. *Or* $79.99 per month with a 1-year contract.
    - $36 activation fee
    - $175 early termination fee.
    - Numerous taxes, surcharges and fees
- Service restrictions:
    - "PROHIBITED USES INCLUDE, BUT ARE NOT LIMITED TO, USING SERVICES: (I) WITH SERVER DEVICES OR WITH HOST COMPUTER APPLICATIONS, INCLUDING, WITHOUT LIMITATION, WEB CAMERA POSTS OR BROADCASTS, CONTINUOUS JPEG FILE TRANSFERS, AUTOMATIC DATA FEEDS, TELEMETRY APPLICATIONS, PEER-TO-PEER (P2P) FILE SHARING, AUTOMATED FUNCTIONS OR ANY OTHER MACHINE-TO-MACHINE APPLICATIONS; (II) AS SUBSTITUTE OR BACKUP FOR PRIVATE LINES OR DEDICATED DATA CONNECTIONS; (III) FOR VOICE OVER IP"
    - **"UNLIMITED PLANS CANNOT BE USED FOR UPLOADING, DOWNLOADING OR STREAMING OF VIDEO CONTENT (E.G. MOVIES, TV), MUSIC OR GAMES**."
    - "Service is not intended to provide full-time connections, and the Service may be discontinued after a significant period of inactivity or after sessions of excessive usage. Cingular reserves the right to (i) limit throughput or amount of data transferred, deny Service and/or terminate Service, without notice"