EXHIBIT A

BROADBAND COMPETITION: RECENT DEVELOPMENTS
MARCH 2004

This paper provides an overview of recent competitive developments in the provision of broadband services. These developments show that cable companies continue to dominate the provision of mass-market broadband service, while at the same time competition also is increasing from a number of other technologies. As a recent study finds, this is true not only for residential customers, but also for small-business customers for whom cable has become the most used broadband technology and who also rely heavily on alternative technologies such as fixed wireless and satellite. Moreover, competing carriers also dominate the provision of broadband services to large business customers, which likewise enjoy increasing access to alternative technologies. Thus, for all segments of the broadband market, telephone companies are being squeezed in the middle between dominant incumbent providers on the one hand, and rapidly growing alternative technologies on the other hand. The recent developments detailed here accordingly provide further confirmation of Verizon's overarching position in the Commission's various broadband proceedings – that the continued imposition of Title II regulation uniquely on telco-provided broadband services is not only unnecessary but also affirmatively harmful.

A. Cable Operators Dominate the Broadband Mass Market

Recent data show that cable continues to dominate the broadband mass market. According to the Commission's latest *High-Speed Services Report*, as of June 2003, cable controlled more than *two-thirds* of all high-speed lines provided to residential and small-business customers,[1] which is the segment of the broadband market that cable operators target.[2] As of that same date, cable also controlled more than *83 percent* of the most rapidly growing segment of mass-market broadband lines – those capable of over 200 kbps in both directions.[3] In both cases, cable has increased its lead in the most recent six-month period for which the Commission reports data.[4]

Although the Commission's data are current only as of June 2003, more recent data show that cable has continued to extend its lead in the second half of 2003 as well. In that period,

---

[1] Ind. Anal. & Tech. Div., Wireline Competition Bureau, FCC, *High-Speed Services for Internet Access: Status as of June 30, 2003* at Tables 3 & 4 (Dec. 2003) ("*High-Speed Services Report*").

[2] *Compare id*. at Table 3 (Cable provides 13,660,541 high-speed lines to residential and small-business customers) *with id*. at Table 1 (Cable provides a total of 13,684,225 high-speed lines).

[3] *See id*. at Table 4. Residential and small-business high-speed lines capable of over 200 kbps in both directions represented 85 percent of all residential and small-business high-speed lines added between June 2002 and June 2003, and 78 percent of all high-speed lines added during that same period. *See id*. at Tables 1, 3 & 4. Verizon introduced a symmetrical xDSL service capable of over 200 kbps in both directions in July 2003. *See* Letter from Richard Ellis, Verizon, to Marlene Dortch, FCC, Transmittal No. 343 (July 22, 2003).

[4] *See High-Speed Services Report* at Table 3 (Cable share of all residential and small-business high-speed lines grew from 65 to 66 percent from December 2002 to June 2003); *id*. at Table 4 (Cable share of residential and small-business high-speed lines with over 200 kbps in both directions grew from 79 to 83 percent from December 2002 to June 2003).

cable added just over 2 million new subscribers, compared to only 1.6 million added by DSL. *See* Table 1.

Table 1. Cable Modem and DSL Subscriber Growth – 2H2003

DSL			Cable		
	Net Adds 2H2003	**Total Subs. YE2003**		**Net Adds 2H2003**	**Total Subs. YE2003**
Verizon	388,000	2,300,000	Comcast	895,900	5,283,900
SBC	742,000	3,500,000	Time Warner	396,000	3,356,000
BellSouth	237,000	1,460,000	Cox	313,402	1,988,527
Qwest	101,000	637,000	Charter	216,900	1,565,600
Sprint	81,000	304,000	Cablevision	136,185	1,057,020
Other*	83,000	249,018	Other*	96,600	510,000
Total	**1,633,000**	**8,450,018**	**Total**	**2,053,987**	**13,761,047**

*Other DSL providers are ALLTEL, Citizens Communications, Cincinnati Bell, CenturyTel, Commonwealth Telephone. Citizens Communications and Cincinnati Bell have not yet reported fourth quarter results. Other cable modem providers are Mediacom and Insight Communications.

Sources: See Appendix.

Cable also continues to lead DSL in terms of availability and penetration. For example, four major cable companies (Comcast, Time Warner, Cox, and Cablevision) now make cable modem service available to between 95 and 100 percent of their homes passed,[5] and between 25 and 36 percent of these companies' video subscribers now take cable modem service.[6] The Bell companies, by contrast, currently make DSL available to about 75-80 percent of their homes passed,[7] and only between 7 and 15 percent of their residential voice subscribers take DSL.[8]

Some parties have attempted to downplay cable's dominant position in the broadband market by claiming that cable modem service often is not available in the same markets as DSL. This is simply not true. JP Morgan has estimated that, as of December 2003, three-quarters of all U.S. households were able to choose between cable modem and DSL or could receive cable modem but not DSL, whereas only 5 percent of households were able to receive DSL but not

[5] *See, e.g.*, J. Halpern, *et al.*, Bernstein Research Call, *Broadband Update: DSL Share Reaches 40% of Net Adds in 4Q . . . Overall Growth Remains Robust* at 7 & Exh. 6 (Mar. 10, 2004) ("*Bernstein 4Q03 Broadband Update*") (reporting cable modem availability at 98.5% for Time Warner, 97.7% for Cox, 100% for Cablevision, and 87% for Comcast, which is adding almost 3.5 million homes passed in 2004).

[6] A. Bourkoff & J. Hodulik, UBS, *High-Speed Data Update for 4Q03* at 8, Chart 6 (Mar. 11, 2004) ("*UBS 4Q03 High-Speed Data Update*").

[7] *See Bernstein 4Q03 Broadband Update* at 7, Exh. 7 (reporting DSL availability at 75% for SBC, 80% for Verizon, 74% for BellSouth, and 45% for Qwest).

[8] *UBS 4Q03 High-Speed Data Update* at 8, Chart 5.

cable modem.[9] And, as noted above, cable has continued to expand the availability of high-speed services to the small percentage of homes that don't currently receive it.

A number of parties have also argued that cable is not available to the small-business segment of the mass market. This, too, is false. As Verizon recently demonstrated in a separate *ex parte*, broadband competition is thriving for small-business customers just as it is for residential customers.[10] And here, too, recent developments confirm that such competition has continued to grow rapidly.

Verizon previously demonstrated that cable companies have moved rapidly to provide cable modem services to small-business customers. Five of the six largest cable system operators (which, collectively, represent over 90 percent of consumer cable modem subscribers) already offer broadband services specifically tailored to small businesses.[11] As Verizon explained, these cable operators have acknowledged that they can readily reach most small-business customers with their existing infrastructure, and that it makes sense to serve them.[12] Indeed, these cable operators already have been very successful in attracting small-business subscribers.[13]

Several recent studies – including a March 2004 study commissioned by the Small Business Administration and a December 2003 study by In-Stat/MDR – confirm that small businesses are increasingly turning to cable modem service for their broadband needs.[14] Indeed, both studies find that that cable modem service is now the *most used* broadband technology by

---

[9] J. Bazinet, *et al*., JP Morgan, *Broadband 2003* at Figure 9 (Dec. 5, 2002). *See also* Kevin J. Martin, Commissioner, FCC, *FCC: Looking Forward*, presentation before the NARUC Telecommunications Committee at 11 (July 28, 2003) (citing JP Morgan).

[10] *See* Letter from Dee May, Verizon, to Marlene H. Dortch, FCC, WC Docket Nos. 01-337, 02-33, 98-10, 98-20 at 10-17 (Nov. 13, 2003) ("*Verizon November 13, 2003 Ex Parte*"); *see also* Letter from Edward Shakin, Verizon, to Marlene H. Dortch, FCC, WC Docket Nos. 01-338, 96-98, 98-147, 02-33, 01-337 (Jan. 15, 2003).

[11] *See* M. Lauricella, *et al*., Yankee Group, *Cable MSOs: Ready to Take Off in the Small and Medium Business Market* at 4 (Mar. 2002).

[12] *See, e.g.*, A. Figler, *Turning Businesses into Customers*, Cable World (Dec. 9, 2002) (Ken Fitzpatrick, senior vice president of commercial services for Time Warner Cable: "We've got an infrastructure there that is just ripe for commercial services. . . . We pass 1.2 million businesses."); Jason Livingood, Director of Comcast Commercial Internet Services, *Overview of Cable Modem Offerings for Businesses in Maryland* (Aug. 15, 2002) (Comcast targets "SMBs with 1-100 employees," "Non-profit orgs, schools, government," and "SMBs and Enterprises with telecommuters.").

[13] *See, e.g., A Snapshot of the Cox Business Strategy*, Interview with Coby Sillers, Vice President and General Manager for Cox Business Services, Xchange Mag. (June 1, 2003) ("Cox Business Services now serves more than 65,000 business customers, and the company's business efforts have grown in the past three years from less than 1 percent of Cox's overall revenue to just more than 5 percent of Cox's consolidated revenue."); J. Barthold, *Small Business, Big Money, No Guarantees*, Telephony Online (Aug. 12, 2002) (Kevin Curran, senior vice president of marketing and sales for Cablevision Lightpath: Cablevision "can't keep up with demand" for Cablevision's Business Class Optimum Online service for small businesses).

[14] S. Pociask, Telenomic Research, LLC, *A Survey of Small Businesses' Telecommunications Use and* Spending (Mar. 2004) ("*Small Business Administration Study*"); K. Burney, In-Stat/MDR, *The Data Nation: Wireline Data Services Spending and Broadband Usage in the US Business Market; Part Three: Small Businesses (5 to 99 Employees)* (Dec. 2003) ("*In-Stat/MDR Small Business Study*").

small businesses. The Small Business Administration study separately analyzes small businesses with 0-4 employees, those with 5-9 employees, and those with revenues less than $200,000, and finds that for all three segments penetration was higher for cable modem service than for DSL, and that for small businesses with 5-9 employees, monthly expenditures are higher for cable modem service than for DSL.[15] The In-Stat/MDR study analyzes home offices as well as businesses with 5 to 99 employees and finds that, as of year-end 2003, there were 2.1 million small businesses using cable modems compared to 1.4 million small businesses using DSL.[16] In making these comparisons, both studies combined the two main forms of DSL – asymmetric DSL ("ADSL") and symmetric DSL ("SDSL") – in their analysis.

In a separate study, In-Stat/MDR compared the use of cable modem solely to the use of ADSL among small businesses. It found that nearly twice as many small businesses now use cable modem service as use ADSL: 48.5 percent of Small Office/Home Office ("SOHO") businesses and 43.7 percent of small businesses use cable, versus 17.8 percent of SOHO businesses and 23.1 percent of small businesses using ADSL.[17] The fact that cable's lead over ADSL is even greater than its lead over DSL generally indicates that many small-business customers that use DSL are using SDSL service. In the provision of SDSL services, however, the Bell companies lag even further behind. For example, Verizon did not even introduce an SDSL product until July 2003.[18]

Although some parties have claimed that the Bell companies were slow to deploy SDSL services to small businesses for fear of "cannibalizing" their T-1 revenues, the data do not support this. The Small Business Administration study finds that the penetration of T-1 services among small businesses is only 4 percent, compared to 26 percent for cable modem services.[19] In-Stat/MDR likewise reports low penetration rates of T-1 service among the small-business customers it studied.[20]

The most recent competitive offerings and promotions from DSL and cable operators also belie the argument that head-to-head competition is lacking in any geographic market or segment of the mass market. In the past few months, each of the Bell companies has cut their national DSL prices considerably. *See* Tables 2 & 4. A study by Current Analysis "shows that nationwide average consumer DSL service prices plunged to their lowest levels ever . . .

---

[15] *See Small Business Administration Study* at 44, 47 (Fig. 32), 48 (Fig. 33), 50 (Fig. 35).

[16] *See In-Stat/MDR Small Business Study*. Even when home offices are excluded from these totals, cable still has 40 percent of combined cable/DSL small-business subscribers. *See id.*

[17] K. Burney & C. Nelson, In-Stat/MDR, *Cash Cows Say 'Bye-Bye': The Future of Private Line Services in US Businesses (5+ Employees)* at 19 (Dec. 2003) ("*In-Stat/MDR December 2003 Study*").

[18] *See* Letter from Richard Ellis, Verizon, to Marlene Dortch, FCC, Transmittal No. 343 (July 22, 2003).

[19] *See Small Business Administration Study* at 44 (Fig. 30); *see also id.* at 47 (Fig. 32), 48 (Fig. 33), 50 (Fig. 35).

[20] *See* K. Burney & C. Nelson, In-Stat/MDR, *The Business Hot Wire!: Data Access in the Commercial and Residential Environments of US Businesses; Part One: Cable Modem Services* at 20, Table 11 (Nov. 2003) (8.5% of SOHO businesses and 25.6% of small businesses use Full T-1 in their main office; 5.9% and 17.3%, respectively, use Fractional T-1; and 48.5% and 43.7%, respectively, use cable modem).

dropping below average cable modem service prices for the first time in broadband's history."[21] Cable operators have responded with promotional and targeted price reductions, and, more broadly, by increasing data speeds that effectively offer consumers more bandwidth at a lower price than those operators' pervious offerings. *See* Table 4.[22] And because these price wars began *after* the *Triennial Review Order*, they also vindicate the Commission's recent decision to phase out line sharing.[23]

Tables 2 and 3 show current broadband offerings over DSL and cable to residential and small-business customers, respectively. The tables reflect the standard prices for high-speed Internet access service – that is, Internet access bundled together with broadband transport. In Table 2, the bottom of the price range reflects prices when the lowest-speed broadband service is purchased together with at least one other service – voice service (local and long distance) in the case of DSL, and video or voice service in the case of cable.[24] The higher prices in the range are for broadband service purchased without one of those other services, or for higher-speed service. In Table 3, the bottom of the price range reflects prices under a one-year contract for the lowest-speed broadband service (with dynamic IP addresses, where available); the higher prices in the range are for higher speeds under a one-year contract.[25] The prices do not factor in the promotional discounts that, as demonstrated in Table 4, both DSL and cable modem providers are now routinely offering their customers.

---

[21] Current Analysis Press Release, *Current Analysis Finds Average DSL Prices Have Dropped Below Those of Cable Modem Service for the First Time Ever* (Sept. 15, 2003) (noting results of Current Analysis Broadband MarketTrack quarterly study).

[22] *See also* G. Campbell, *et al*., Merrill Lynch, *3Q03 Broadband Update: The Latest on Broadband Data and VoIP Services in North America* at 2 (Nov. 3, 2003) (cable operators "are increasingly moving 'off the rate card,' with market-specific pricing and increased use of promotional and bundled-price discounts specific to certain markets") ("*Merrill Lynch 3Q03 Broadband Update*").

[23] *See Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers*, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, 18 FCC Rcd 16978, ¶ 263 (2003) ("*Triennial Review Order*"). Of course, competitive providers of DSL service have traditionally accounted for a only a small fraction of the broadband market, particularly for mass-market customers. *See, e.g*., *High-Speed Services Report* at Table 5.

[24] *Merrill Lynch 3Q03 Broadband Update* at Table 4.

[25] The one exception to this is for Covad. The low-end for Covad reflects pricing under a two-year contract; the high-end reflects pricing under a one-year contract; and both exclude a one-time rebate of $150-$584. AT&T also offers a one-time rebate which is not reflected here.

Table 2. Current Residential Offerings by DSL and Cable Modem Providers								
Technology	**DSL**				**Cable Modem**			
Provider	**Verizon**	**SBC**	**BellSouth**	**Qwest**	**Comcast**	**Cablevision**	**Cox**	**Time Warner**
Downstream Bandwidth	1.5 Mbps	384 kbps-3 Mbps	256 kbps-1.5 Mbps	256 kbps-1.5 Mbps	3 Mbps	3.5 Mbps	3 Mbps	2 Mbps
Upstream Bandwidth	128 kbps	128-384 kbps	128-256 kbps	256-896 kbps	256 kbps	1 Mbps	256 kbps	384 kbps
Monthly Price	$29.95-$34.95	$29.95-$44.99	$29.95-$49.95	$15.00-$49.99	$42.95-$57.95	$44.95-$49.95	$29.95-$49.95	$44.95-$59.95
Sources: See Appendix.								

Table 3. Current Small Business Offerings by DSL and Cable Modem Providers							
Technology	**Cable**			**DSL**			
Provider	**Road Runner Business Class**	**Comcast Business Comm. Comcast Workplace**	**Cablevision Business Class Optimum Online**	**Verizon SDSL**	**SBC Symmetric 384 – S Package**	**Covad TeleSpeed Business DSL**	**AT&T Business Class DSL**
Downstream Bandwidth	1-4 Mbps	4-5 Mbps	10 Mbps	384-768 kbps	384 kbps	144 kbps-1.5 Mbps	144 kbps-1.5 Mbps
Upstream Bandwidth	256 kbps-2 Mbps	384-512 kbps	1 Mbps	384-768 kbps	384 kbps	144 kbps-1.5 Mbps	144 kbps-1.5 Mbps
Monthly Price	$79.95-$399.95	$145-$200	$79.95-$109.95	$79.95-$159.95	$89.99-$119.95	$125.95-$289.95	$149.95-$399.95
Sources: See Appendix.							

Table 4. Recent Changes in Cable/DSL Competitive Offerings and Promotions		
DSL		
Verizon	May 2003	Lowered monthly rate by 30% to $34.95 ($29.95 when bundled with phone service); increased download speed to 1.5 Mbps from 768 kbps
	3Q 2003	Added a free first month promotion to its $29.95 offer when DSL is purchased as part of a bundle
SBC	Feb. 2003	Lowered monthly rate to $34.95 with a one-year contract
	1H 2003	Lowered monthly rate with bundled service to $24.95 in San Diego and Orange County, Cal.; Kansas City, Mo., and Wichita, Kan., with one-year commitment
	June 2003	Lowered $34.95 monthly rate to $29.95 for new customers
	Sept. 2003	Lowered prices by 10% to $26.95 across its region to customers who sign-up online or purchase DSL within a bundle with a one-year commitment
	Feb. 2004	Replaced a $99.95 high-end offering with 3.0 Mbps/384 kbps service for $44.99
BellSouth	2Q 2003	Offered introductory rate of $19.95 for first three months
	July 2003	Implemented tiering and selective discounts, including $5/month reduction in its more competitive DSL markets
	3Q 2003	Began offering free first and third months of service
	3Q 2003	Reduced monthly rates to $29.95 and $39.95, when DSL is purchased with unlimited local and long-distance calling
Qwest	2003	Reduced monthly rate by 30 percent to $34.99 when purchased as part of a bundle
	3Q 2003	Reduced monthly modem rental fees from $5 to $2; monthly rate with bundled service is now $29.95
CABLE		
Comcast	Sept. 2003	Launched aggressive promotional trial, offering $19.95 for one year to a select group of DSL customers in California, Illinois, and Maryland
	3Q 2003	Offered $19.99 per month (effective for 3 or 6 months) for video customers, or $33.99 per month for non-video customers, in most markets.
	Oct. 2003	Announced increased download speed to 3 Mbps from 1.5 Mbps
Time Warner	Oct. 2003	Increase download speed to 3 Mbps from 2 Mbps
	Dec. 2003	Lowered monthly rate in Kansas City, Mo. from $44.95 to $26.95 for one year
	4Q 2003	Currently testing faster upload speeds (512 kbps)
Charter	Sept. 2003	Increased download speeds to 2.0 Mbps at no extra charge
Cablevision	Aug. 2003	Began limited promotion of $29.95 for the first six months
Cox	3Q 2003	Reduced monthly modem rental rate from $15 to $10
	4Q 2003	Rolling out a reduced-priced data product in 7 markets – Northern Va., Kan., New Orleans, Humboldt and Santa Barbara, Cal., Phoenix, and Ga.
	4Q 2003	Plans to add a higher-speed service as part of its tiering strategy
Adelphia	Oct. 2003	Increased download speed to 3 Mbps; doubled upload speed to 256 kbps
RCN	Oct. 2003	Increased top download speed to 5 Mbps; doubled download speed of lower-priced tier to 3 Mbps
Mediacom	Jan. 2004	Announced it will double download and upload speeds to 3 Mbps and 256 kbps, respectively, at no extra charge
Sources: See Appendix.		

Finally, the fact that cable and DSL providers are engaging in aggressive comparative advertising further proves that they are competing head-to-head for the same customers in the same markets. For example, Time Warner boasts that its "High Speed Online . . . leaves DSL in the dust."[26] Comcast claims "download speeds up to 2x faster than 1.5 Mbps DSL."[27] Cablevision claims its service "is more than twice as fast as the lowest-priced DSL."[28] BellSouth points out that DSL "provides a dedicated connection to your home to the [] DSL network. Cable modem service shares a connection with other cable modem subscribers."[29] A recent SBC print ad encourages customers to "stop throwing money away on cable and sign up for SBC Yahoo DSL." A recent Verizon television ad boasts service "that's 13 bucks less than Comcast," and, unlike Comcast includes a pop-up blocker, antivirus software, and modem. Within several weeks of airing this spot, Comcast aired a copycat advertisement – using the same set, format, and body double.[30] According to MINTEL's Comperemedia, telephone companies have also boosted their direct-mail marketing efforts "primarily due to cable companies' more aggressive marketing of packages with cable modem and cable TV services and most recently, phone service."[31]

B. Cable Is Positioned To Extend Its Broadband Dominance with IP Telephony

Cable operators are poised to extend their lead in broadband with the advent of IP telephony services. This new technology enables the cable platform to be used for the so-called "triple play" bundle of services – voice, video, and data. The main requirement for providing the voice service is the underlying cable modem service itself, which is now available to 85 percent of U.S. households and expected to rise to 90 percent by the end of 2004.[32] With only a modest incremental investment, the voice service may be added, either by the cable operator itself, or by any one of the rapidly growing number of independent voice-over-broadband providers, such as Vonage and AT&T. *See* Table 5.[33] The ability to use cable modem connections for voice is widely expected to increase penetration of cable broadband service.

---

[26] Time Warner Cable, *Products & Services: High Speed Online from Time Warner Cable*, http://www.timewarnercable.com/dispatcher/products;jsessionid=0000LZJGUTC4AGS3LJ0T3J34NUY:-1?category=10056&expand=Y&rootCategory=10050&src=0homeHS0.

[27] Comcast, *Features*, http://www.comcast.com/Benefits/CHSIDetails/Slot3PageOne.asp.

[28] Optimum Online, *What Is It?*, http://www.optimumonline.com.

[29] BellSouth, *Common Questions*, http://www.fastaccess.com/content/consumer/common_questions.jsp.

[30] Transcript of Verizon Online DSL advertisement aired on Feb. 4, 2004 at 5:58 AM on WNBC in New York, NY. The Comcast ad was subsequently pulled off in the air, in response to copyright and other challenges made by Verizon.

[31] *MINTEL's Comperemedia: Telecom Companies Push Bundled Services Packages*, Business Wire (Mar. 9, 2004).

[32] *See* J. Halpern, *et al*., Bernstein Research Call, *Broadband Update: DSL Share Reaches 40% of Net Adds in 4Q . . . Overall Growth Remains Robust* at Exhs. 1 & 6 (Mar. 10, 2004) (cable broadband available to 92.3 percent of total cable homes passed; 110.0 million U.S. households in 2003); NCTA, *Industry Overview: Statistics and Resources*, http://www.ncta.com/Docs/PageContent.cfm?pageID=86 (102.9 million occupied homes passed by cable as of Dec. 2003).

[33] The cable industry has already indicated that it would not restrict the ability of these independent providers to provide voice services over cable networks. *See* D. Jackson, *NCTA: Cable Won't Get in Vonage's*

Cable operators themselves already offer telephony services to more than 15 percent of U.S. households, with that total expected to rise to more than 35 percent by the end of 2004.[34] In just the past few months, every major cable operator has either begun commercial deployment of IP telephony services, or has announced aggressive plans to do so in the immediate future. *See* Table 5.[35] Many smaller cable operators have done so as well.[36] As analysts have found, the ability of cable operators to add IP telephony services will enable them to offer higher-value service bundles, and therefore help them attract new customers and reduce the churn of existing customers.[37]

Cable operators already are reporting great success with these offerings. For example, Time Warner achieved "nearly 10 percent primary line share" of the Portland market within the first six months.[38] Cablevision has been adding subscribers at a rate of more than 1,800 per

---

Way, TelephonyOnline (Dec. 19, 2003) ("Vonage will not be stopped by the cable industry from providing its phone service, even though it competes directly with many cable operators in this emerging market, according to Robert Sachs, president and CEO of the National Cable & Telecommunications Association. This policy is a reflection of the 'network neutrality' philosophy adopted by the cable industry that allows broadband users to access any Web site and use any DOCSIS-approved equipment, Sachs said. . . . For a cable company to strip out voice bits of a Vonage transmission would represent a departure from this philosophy, and the industry has 'no intention' to do that, he said.").

[34] *See, e.g.*, J. Halpern, *et al*., Bernstein Research Call, *U.S. Telecom & Cable: Faster Roll-out of Cable Telephony Means More Risk to RBOCs; Faster Growth for Cable* at Exh. 1 (Dec. 17, 2003) (estimating 18 percent of U.S. households as of year-end 2003) ("*Bernstein Cable Telephony Report*"); M. Richtel, *Time Warner to Use Cable Lines to Add Phone to Internet Service*, N.Y. Times (Dec. 9, 2003) (Time Warner Cable CEO Glenn Britt: "Our plan, by the end of next year, is to be in most, if not all, of our markets."); Time Warner Cable, *About Us: In a Nutshell*, http://www.timewarnercable.com/dispatcher/aboutUs;jsessionid=00000AMBAZHMY UAXZOJND5CQWMY:-1?category=10075&rootCategory=10075 (Time Warner passes 18 million homes); G. Campbell, *et al*., Merrill Lynch, *Everything over IP* at 17 (Mar. 12, 2004) (Charter will deploy VoIP to 1 million homes by year-end 2004). The December 2003 Bernstein estimate does not include 3.2 million of the 4.4 million homes passed by Cablevision. *See* Cablevision Systems News Release, *Cablevision Systems Corporation Reports Fourth Quarter and Full Year 2003 Results* (Mar. 2, 2004), http://www.cablevision.com/index.jhtml?id=2004_03_02.

[35] *See Bernstein Cable Telephony Report* ("Nearly every major cable MSO has indicated over the past month that it will offer cable telephony service to every or nearly every household in its footprint by 2005, with Time Warner Cable and Cablevision targeting year-end 2004"); *Merrill Lynch 3Q03 Broadband Update* at 9 ("In the third quarter, all of the major cable operators continued to push ahead with their VoIP plans and deployments.").

[36] BrightHouse Networks plans to deploy IP telephony commercially in 2004. Insight and Mediacom also have trials planned for 2004. *See* M. Stump, *MSOs, AT&T Set Table for VoIP Rollouts*, Multichannel News (Dec. 15, 2003). Adelphia will conduct IP telephony trials in 2004, and plans a commercial launch for 2005. *See Bernstein Cable Telephony Report* at 5.

[37] *See, e.g.*, J. Arnold, Frost & Sullivan, *North America IP Cable Telephony Market; Is Cable Able?*, Market Insight Report #6917-61 at 7 (Jan. 2004) ("Voice completes the 'Triple Play,'" "strengthens the MSO's value proposition," and that "[b]undling of services works – offering two services reduces churn from a single service, and offering three reduces churn even further."); *Merrill Lynch 3Q03 Broadband Update* at 9 ("The ability to undercut telco voice pricing (and, potentially to deliver new value-added telephony services) using VoIP should position the cablecos well to win triple-play customers."); *id*. at 1 (IP telephony "could reinforce cable's lead in [high-speed data] and open the door to new market opportunities – for example, the small business sector."); V. Vittore, *Cablevision Gets Cocky*, TelephonyOnline.com (Dec. 12, 2003) (quoting James Dolan, President and CEO, Cablevision: "In my mind, cable is going to win this competition and there is no competition. There is no platform that compares to this.").

[38] *Bernstein Cable Telephony Report* at 5.

week (and 2,500 per week for the most recent month).[39] Cox reports a "[p]enetration ramp" in Roanoke comparable to its circuit-switched markets, where Cox now averages 19 percent penetration with some markets as high as 55 percent.[40] A significant percentage of these new cable IP telephony customers have obtained the service for use as a primary line, particularly where cable operators have been marketing it as such.[41]

In light of these developments, analysts now expect "all the major MSOs to offer cable telephony to nearly 100% of their in-franchise homes over the next two to three years."[42] Even the smaller cable operators are expected to have cable telephony available to approximately two-thirds of their subscribers within this time.[43] Analysts have accordingly raised their estimates of cable telephony subscribers, and now believe that cable will control "as much as 7% of current RBOC residential lines" by the end of 2004,[44] and more than 15 percent of all primary residential

[39] Cablevision News Release, *Cablevision Systems Corporation Reports Fourth Quarter and Full Year 2003 Results* (Mar. 2, 2004). Cablevision signed up 24,000 voice over broadband customers in the first full quarter of providing service. *See* Tom Rutledge, President, Cable and Communications, Cablevision, Cablevision presentation at the Bear Stearns Media & Entertainment Conference at 41 (Mar. 9, 2004). *See also* V. Vittore, *Cablevision Gets Cocky*, TelephonyOnline.com (Dec. 12, 2003) (James Dolan, President and CEO, Cablevision: "In my mind, cable is going to win this competition and there is no competition. There is no platform that compares to this.").

[40] Cox reports "early success" with its December 2003 launch of IP telephone service in Roanoke, with the "[p]enetration ramp trending like previous-circuit switched launches." Jim Robbins, President & CEO & Chris Bowick, SVP Engineering & CTO, Cox Communications, *Cox Communications: Distribution at its Best*, Bear Stearns 17th Annual Media, Entertainment & Information Conference at 19 (Mar. 9, 2004). Cox reports that penetration for its circuit-switched telephony service now averages 19 percent, with some markets as high as 55 percent. *Id.* at 13; M. Richtel, *Time Warner To Use Cable Lines To Add Phone to Internet Service*, N.Y. Times (Dec. 9, 2003) ("In Omaha, 45 percent of Cox's cable customers now subscribe to its telephone service, and in Orange County, Calif., that figure is 55 percent."); C. Moffett, *et al.*, Bernstein Research Call, *Cable and Telecom: Bernstein Study Finds Consumers Ready and Willing To Switch to Cable Telephony* at 1 (Dec. 9, 2003) (in Cox's most mature circuit switched markets share is now approaching 35% of homes passed) ("*Bernstein Cable Telephony Consumer Study*"); *Bernstein Cable Telephony Report* at 2-3 ("Of the providers already offering telephony service – either over a circuit switched network or IP-based – the penetration rates have been impressive and above forecast.").

[41] *See Bernstein Cable Telephony Consumer Study* at 4 ("Eighty to ninety percent of Time Warner's customers in Portland are opting to keep their existing number," which indicates they are using cable IP telephony as their primary line); *Bernstein Cable Telephony Report* at 5 ("Time Warner has reached nearly 10 percent primary line share within six months."); *Bernstein Cable Telephony Consumer Study* at 4 (Cablevision is currently marketing its service as a second line for regulatory reasons); *Merrill Lynch 3Q03 Broadband Update* at 15 (at least 37 percent of Cablevision's subscribers have disconnected all other landline service).

[42] *Bernstein Cable Telephony Report* at 1; *id.* at 4 ("We now believe that by 2006, roughly 82% of total US households will be cable telephony marketable, up from a prior forecast of approximately 70%); *see also* J. Hodulik & A. Bourkoff, UBS, *High-Speed Data Update for 3Q03* at 12 (Dec. 1, 2003) ("By the end of 2005/2006" the four major "cable operators will have rolled out a cable telephony service across substantially all of their respective footprints, representing total homes of approximately 70 million.").

[43] *Bernstein Cable Telephony Report* at 4-5.

[44] F. Governali, *et al.*, Goldman Sachs, *Telecom Services: Qualifying the VoIP Threat, an Eye-Opening Exercise* at 1 (Dec. 23, 2003) ("*Goldman Sachs VoIP Report*").

lines within the next 4 years.[45] Cable IP telephony is now viewed as "the largest risk to Bell fundamentals over the next 5 years."[46]

These projections are fully consistent with the experience to date in the provision of circuit-switched cable telephony. Cable operators currently offer circuit-switched cable telephony to approximately 15 percent of U.S. homes,[47] and approximately 16 percent of those households subscribe.[48] In the more mature markets, cable operators have typically achieved penetration rates of as much as 30-35 percent, and in some markets as much as 45-55 percent.[49] Cable operators report that they have been able to earn attractive margins providing circuit-switched telephony – as much as 45 percent.[50]

As all cable operators now agree, the economics of providing cable IP telephony are even more attractive the provision of circuit-switched cable telephony. The incremental costs of deploying IP telephony have dropped drastically, and, according to cable executives, now are as low as $123 per subscriber.[51] According to Time Warner Cable's Chairman and CEO, "VoIP is over 50% cheaper than traditional circuit switched architecture."[52] Cablevision states that its

---

[45] *Bernstein Cable Telephony Report* at 1 ("[W]e are raising our estimate of cable telephony subscribers from 10.4M by 2008 (off a 2003 base of 2.3 M) to 17.4 M. Our new outlook suggests that the cable MSOs will control 15.5% of the consumer primary access lines in the US by 2008, up from our previous estimate of 9.3%); *Goldman Sachs VoIP Report* at 1 ("We've been expecting the Bells to lose 20% to 30% consumer market voice share, as a result of the aggressive introduction of voice services by the cable industry over the next 5 to 7 years.").

[46] J. Hodulik, *et al*., UBS, *Cable Telephony Competition: Who Gets It?* at 1 (Aug. 7, 2003).

[47] *See* Comcast News Release, *Comcast Full Year and Fourth Quarter Results Meet or Exceed All Operating and Financial Targets Setting Stage for Continued Growth in 2004* at Financial Tables (Feb. 11, 2004); Cox Communications News Release, *Cox Communications Announces Fourth Quarter and Full-Year Financial Results for 2003* at Financial Results: Summary of Operating Statistics (Feb. 12, 2004); Cablevision Systems News Release, *Cablevision Systems Corporation Reports Fourth Quarter and Full Year 2003 Results* (Mar. 2, 2004); Supplemental Information & Quarterly Operating Statistics *attached to* Insight Press Release, *Insight Announces Fourth Quarter and Year-End 2003 Results* (Feb. 25, 2004); Knology Press Release, *Knology Reports Strong Revenue and EBITDA in Third Quarter 2003* (Nov. 18, 2003) (3Q03 data); RCN Press Release, *RCN Announces Third Quarter 2003 Results* (Nov. 11, 2003) (3Q03 data).

[48] M. Paxton, In-StatMDR, *Cable Telephony Service: The Third Leg of Cable's "Triple Play" Bundle*, Report No. IN030711MB at Table 4 (Nov. 2003).

[49] *See, e.g*., M. Richtel, *Time Warner To Use Cable Lines To Add Phone to Internet Service*, N.Y. Times (Dec. 9, 2003); *Bernstein Cable Telephony Consumer Study* at 1. *See also Bernstein Cable Telephony Report* at 2-3 ("Of the providers already offering telephony service – either over a circuit switched network or IP-based – the penetration rates have been impressive and above forecast.").

[50] *See* J. Shim, *et al*., Credit Lyonnais Securities, *The U.S. Cable Industry – Act I* at 181 & Exh. 57 (Nov. 20, 2002) ("Cox was already generating EBITDA margins as high as 40%-45% in Omaha and 30%-35% in Orange County as of mid-2001."); *Q4 2003 Cox Communications Inc. Earnings Conference Call*, Fair Disclosure Wire (Feb. 12, 2004) (Cox COO Pat Esser: "In the fourth quarter [of 2003], telephone margins were in the low 40s. Up from about 39% in the fourth quarter of 2002.").

[51] *See, e.g*., James Dolan, President and CEO, Cablevision, presentation at the Bear Stearns Media & Entertainment Conference at 46 (Mar. 9, 2004) (stating that "total incremental capital costs" of deploying IP telephony is $123 per subscriber, including $66 for a truck roll).

[52] Glenn Britt, Chairman & CEO, Time Warner Cable, Presentation to UBS Media Week Conference (Dec. 11, 2003); *see also* Jon Arnold, VoP Equipment Program Leader, Frost & Sullivan, *North America IP Cable Telephony Market; Is Cable Alone?*, Market Insight Report #6917-61 (Jan. 2004) ("VoIP is cheaper and more

"payback period" for its total incremental capital costs is only "10 months," and that it will earn estimated margins of "40%-45%."[53] VoIP providers may keep their up-front costs low by partnering with competitive carriers for interconnection to the public switched telephone network and for long-haul transport. Time Warner recently announced such an agreement with MCI and Sprint.[54]

Finally, the advent of IP telephony also helps increase cable modem penetration even where the cable operator itself is not the voice provider. As noted above, cable IP telephony can be provided by carriers other than the cable companies themselves anywhere cable modem service is available. AT&T recently announced that, in 2004, it will deploy IP telephony service to residential and business consumers in the top 100 MSAs.[55] AT&T expects to have at least one million customers by 2005.[56] Vonage and a number of other VoIP providers already offer service nationwide. *See* Table 5. As AT&T's CEO David Dorman has noted, voice is the "killer application for broadband . . . and will be the biggest driver of broadband adoption in the next couple of years."[57] And evidence to date shows that cable is attracting the vast majority of customers that use their broadband connection for voice. For example, Vonage reports that 70 percent of its subscribers use cable, compared to only 30 percent that use DSL.[58]

---

scalable than circuit, and offers new revenue opportunities").

[53] *See*, *e.g.*, James Dolan, President and CEO, Cablevision, presentation at the Bear Stearns Media & Entertainment Conference at 47 (Mar. 9, 2004).

[54] *See* Time Warner Press Release, *Time Warner Cable Partners with MCI and Sprint for Nationwide Rollout of Digital Phone* (Dec. 8, 2003) (MCI and Sprint will assist Time Warner Cable with "provisioning. . . , termination of IP voice traffic to the public switched telephone network, delivery of enhanced 9-1-1 service, local number portability and carrying long distance traffic.").

[55] Cathy Martine, SVP Internet Telephony & Consumer Product Management, AT&T, *Voice over IP* at 27 (Feb. 25, 2004).

[56] *Id.*

[57] *Creation of Regulatory Distinctions in VoIP said to Concern AT&T*, Comm. Daily (Feb. 12, 2004).

[58] T. Hearn, *Cable Companies Accustomed to Large Capital Outlays Are in for a Pleasant Surprise*, MultiChannel News (Feb. 16, 2004), http://www.vonage.com/corporate/press_news.php?PR=2004_02_16_0 (citing Vonage CFO John Rego).

Table 5. IP Telephony Providers		
	Mass-Market Service Area	**IP Deployment Status**
Major Cable Operators		
Cablevision	4.4 million homes passed	Commercial service throughout service area 29,000 VoIP subscribers; adding 1,800 customers per week
Time Warner	18 million homes passed	Commercial service in Portland, ME with 12,000 subscribers; also in Raleigh, NC Will deploy "in most, if not all, of our markets" by end of 2004; agreement with MCI and Sprint to facilitate plan
Cox	10 million homes passed	Commercial service in Roanoke, VA "Keen interest in rolling out VoIP to all our homes passed"; "could launch in other mid-sized and smaller markets anytime in 2004"
Charter	11.9 million homes passed	Commercial launch planned for 2004 to 1 million homes in WI, MO, and New England
Comcast	39 million homes passed	Expanding trial in suburban Philadelphia; commercial launches in four markets in 2004 (Philadelphia; Indianapolis; Springfield, MA; and Hartford, CT)
Other Competitive Providers		
AT&T	35 states (UNE-P)	Commercial service available in TX & NJ since March 2004; will enter "Top 100 MSAs by the end of 2004."
Vonage	Nationwide	Local numbers available in more than 1,900 active rate centers in 115 markets
VoiceGlo	Nationwide	Local numbers available in more than 85 area codes in 22 states
VoicePulse	Nationwide	Local numbers available in more than 55 area codes in 15 states & DC
8x8 (Packet8)	Nationwide	Local numbers available in more than 1,900 rate centers in 44 states & DC
NuVio	Nationwide	Local numbers available in 24 states
Phonom	5 states	Commercial service in VA, MD, DE, eastern PA, and southern NJ
Cbeyond	GA, TX, CO	Commercial service in Atlanta, Dallas-Ft. Worth, Denver, Houston

C. There Is Significant Mass-Market Broadband Competition from Other Sources

The Commission has already recognized that, in addition to cable and DSL, there are numerous additional platforms and technologies already competing in or poised to enter the broadband mass market, including power lines, fixed wireless, 3G mobile wireless, and satellite.[59] Indeed, many of these technologies are already being used to provide service offerings that are competitive with DSL and cable modem services, both for residential and

[59] *See, e.g., Inquiry Concerning the Deployment of Advanced Telecommunications Capability*, Third Report, 17 FCC Rcd 2844, ¶¶ 79-88 (2002); *Triennial Review Order* ¶ 263 ("[T]he Commission also has acknowledged the important broadband potential of other platforms and technologies, such as third generation wireless, satellite, and power lines.") (citing *Third Section 706 Report 2002*, 17 FCC Rcd 2844, ¶¶ 79-88 (2002)); R. Mark, *Broadband over Power Lines: FCC Plugs In*, Internetnews.com (Apr. 23, 2003), http://dc.internet.com/news/article.php/2195621 (Chairman Powell: "[t]he development of multiple broadband-capable platforms – be it power lines, Wi-Fi, satellite, laser or licensed wireless – will transform the competitive broadband landscape.").

small-business customers. *See* Table 6 & 7. Under the Commission's own well-settled precedent, it must take all of these alternatives into account in its analysis of broadband competition,[60] particularly given that that the broadband market is still "in the earliest stages" and is evolving rapidly.[61]

Table 6. Typical Residential Offerings by Alternative Broadband Providers

Technology	**BPL**	**Satellite**		**Fixed Wireless**
Provider	**Prospect Street Broadband**	**DIRECWAY**	**StarBand**	**NTELOS Portable Broadband**
Downstream Bandwidth	200-300 kbps	500 kbps	200-500 kbps	1.5 Mbps
Upstream Bandwidth	200-300 kbps	50 kbps	40-60 kbps	550 kbps
Monthly Price	$26.95	$59.99-$99.99	$39.99-$99.99	$49.95-$69.95
Availability	Manassas, VA	Continental U.S.	Nationwide	VA Cities

Sources: See Appendix.

[60] The Commission has held that a proper market analysis must "examine not just the markets as they exist today," but must also take account of "future market conditions," including "technological and market changes, and the nature, complexity, and speed of change of, as well as trends within, the communications industry." *Applications of NYNEX Corp., Transferor, and Bell Atlantic Corp., Transferee, for Consent To Transfer Control of NYNEX Corp. and Its Subsidiaries*, Memorandum Opinion and Order, 12 FCC Rcd 19985, ¶¶ 3, 7, 41 (1997) ("*Bell Atlantic/NYNEX Merger Order*"); *Applications of Teleport Communications Group Inc., Transferor, and AT&T Corp., Transferee, For Consent To Transfer of Control of Corporations Holding Point-to-Point Microwave Licenses and Authorizations To Provide International Facilities-Based and Resold Communications Services*, Memorandum Opinion and Order, 13 FCC Rcd 15236, ¶ 19 n.65 (1998); *Applications for Consent to the Transfer of Control of Licenses from Comcast Corp., Transferor, and AT&T Corp. to AT&T Comcast Corp., Transferee*, Memorandum Opinion and Order, 17 FCC Rcd 23246, ¶ 27 (2002); *see also Triennial Review Order* ¶ 263 ("The fact that broadband service is actually available through another network platform and may potentially be available through additional platforms helps alleviate any concern that competition in the broadband market may be heavily dependent upon unbundled access."); *FCC v. RCA Communications, Inc.*, 346 U.S. 86, 96-97 (1953); *FCC v. WNCN Listeners Guild*, 450 U.S. 582, 594-95 (1981).

[61] *Bell Atlantic/NYNEX Merger Order* ¶¶ 40-41; *see also Inquiry Concerning the Deployment of Advanced Telecommunications Capability*, Third Report, 17 FCC Rcd 2844, ¶¶ 79-88 (2002) ("*Third Advanced Services Report*") ("preconditions for monopoly appear absent" in the broadband market).

Table 7. Typical Small-Business Offerings by Alternative Broadband Providers			
Technology	**Satellite**		**Fixed Wireless**
Provider	**DIRECWAY**	**StarBand Small Office**	**NTELOS Portable Broadband**
Downstream Bandwidth	200 kbps-1.5 Mbps	150 kbps-1 Mbps	1.5 Mbps
Upstream Bandwidth	n/a	40-100 kbps	550 kbps
Monthly Price	$75.99-$189.99	$119.99-$169.99	$49.95-$69.95
Sources: See Appendix.			

1. Fixed Wireless

Recent evidence confirms that fixed wireless continues to be a viable broadband alternative for many customers, and is likely to grow significantly in the future. The Commission has estimated that residential fixed wireless Internet access is available in counties that contain approximately 62 million people, or 22 percent of the U.S. population.[62] The national trade association for fixed wireless providers has recently stated that "approximately 1,500-1,800 [Wireless Internet Service Providers] already are providing service to approximately 600,000 subscribers in the U.S., with subscribership expected to double by the end of 2003 and reach nearly 2,000,000 by the end of 2004."[63] As the Chairman of that association has noted, "[w]ireless ISPs have rolled out broadband service in virtually every state of the union – and in hundreds of rural and metropolitan markets. . . . Wireless has boldly become the nation's third pipe for last-mile access."[64]

In just the past few months, there has been a number of new deployments of fixed wireless broadband service. In January 2004, NTELOS "announced initial commercial deployment of 'Portable Broadband, high speed-Internet access to go" in Charlottesville, Stuarts Draft, and Waynesboro, Va. "for business and residential users."[65] In December 2003, SR

[62] *Implementation of Section 6002(b) of the Omnibus Budget Reconciliation Act of 1993*, Eighth Report, 18 FCC Rcd 14783, A-4 at n.709 (2003).

[63] Comments of the License-Exempt Alliance at 3, *Revision of Parts 2 and 15 of the Commission's Rules to Permit Unlicensed National Information Infrastructure (U-NII) Devices in the 5 GHz Band*, ET Docket No. 03-122 (FCC filed Sept. 3, 2003) ("*LEA Comments*") (citing Alvairon, Inc., *The License-Exempt Wireless Broadband Market* at 8 (Apr. 2003)). The Commission's own *High-Speed Services Report* counts only 309,006 high-speed lines provided through "satellite or fixed wireless" as of June 2003, but this is likely due to the fact that the many fixed wireless lines are provided in rural areas by small providers. As the Commission notes, "we do not know how comprehensively small providers, many of which serve rural areas with relatively small populations, are represented in the data summarized here." *High-Speed Services Report* at 2.

[64] *WISPs Buck Investment Trends*, ISP-Planet (Nov. 12, 2002), http://www.isp-planet.com/research/2002/vc_trends_021112.html.

[65] NTELOS Press Release (Jan. 6, 2004), http://www.wcai.com/pdf/2004/mds_ntelosJan6.pdf. Portable Broadband will be available to approximately 50,000 households in these three cities. *Id.* NTELOS plans to expand the system later this year "to Lynchburg, VA, as well as fill out coverage in Charlottesville, and Waynesboro." *Id.* The service offers "download speeds up to 1.5 Mbps, and upload speeds up to 550 Kbps" with prices starting at $49.95 per month. Consumers can use the service to receive high-speed connection both from their homes, but also

Telecom announced that its fixed wireless access product was selected by Southwest Texas Telephone Company "to deliver voice and broadband data services to previously difficult to serve areas in the state."[66] WindChannel Communications announced in December 2003 its roll-out of fixed wireless broadband in downtown Durham, N.C.[67] In November 2003, Adams NetWorks deployed fixed-wireless non-line-of-sight broadband services to four communities in Illinois and Missouri, and has plans to expand its networks into an additional twelve communities in 2004.[68] AirTap Communications has "identified six key U.S. markets in which to deploy their second generation fixed wireless network" to large business customers, with "plans to roll out" this new technology "in Q3 of 2003."[69] In November 2003, Plateau Telecommunications and NextNet announced plans to "deliver [Non-Line-of-Sight] broadband wireless services to underserved business and residential subscribers across a 28,000 sq. mile New Mexico footprint."[70] In January 2004, NextNet reported a successful trial with America Connect in Granville County, S.C.[71]

A number of recent fixed wireless roll-outs and trials – including by NTELOS, AirTap, Plateau, and America Connect – have been targeted at business customers as well as residential ones.[72] According to In-Stat/MDR, more small businesses are now using fixed wireless (22 percent of SOHO businesses and 23 percent of small businesses) than ADSL (18 percent and 23

---

from "anywhere within the coverage area" using the "added flexibility of un-tethered non-line-of-sight access" that is "truly plug-and-play, requiring no external antenna." *Id.*

[66] SR Telecom News Release, *SR Telecom's Stride2400 Selected for Voice and Internet Project in U.S.* (Dec. 11, 2003) (Its last-mile access technology is used both for voice services as well as broadband and "provides excellent performance over long spans (11 miles) . . . resulting in reduced infrastructure deployment costs.").

[67] *WindChannel Expands; Brings Fixed Wireless Broadband Access to the EPA and Others in Durham and the Research Triangle Park*, Business Wire (Dec. 22, 2003).

[68] WaveRider Communications, Inc. News Release, *Adams NetWorks, Inc. Expands Its NetVelocity Service With WaveRider's Last Mile Solution* (Nov. 24, 2003). The WaveRider system boast speeds of up to 2.0 Mbps in a two-mile range in non-line-of-sight conditions with indoor antennas. With outdoor antennas, WaveRider's products delivers speeds of 2.0 Mbps at a range of up to five miles in non-line-of-sight conditions, and up to 25 miles with a line-of-sight connection. *See id.*

[69] AirTap, *About Us*, http://www.airtapwireless.com/about.html.

[70] NextNet Wireless News Release, *NextNet and Plateau Telecommunications Ink Deal for America's Largest NLOS Plug-and-Play Broadband Wireless Deployment* (Nov. 13, 2003).

[71] NextNet Wireless News Release, *America Connect and NextNet Announce Successful Launch of Non-Line-of-Sight Broadband Wireless Trial at 2.3 GHz* (Jan. 21, 2004).

[72] *See, e.g.*, NTELOS Press Release (Jan. 6, 2004) (announcing "initial commercial deployment of 'Portable Broadband,' high speed-Internet access to go" "for business and residential users."); AirTap, *About Us*, http://www.airtapwireless.com/about.html (AirTap has "identified six key U.S. markets in which to deploy their second generation fixed wireless network" to business customers); NextNet Wireless News Release, *NextNet and Plateau Telecommunications Ink Deal for America's Largest NLOS Plug-and-Play Broadband Wireless Deployment* (Nov. 13, 2003) (announcing plans to "deliver [Non-Line-of-Sight] broadband wireless services to underserved business and residential subscribers across a 28,000 sq. mile New Mexico footprint."); NextNet Wireless News Release, *America Connect and NextNet Announce Successful Launch of Non-Line-of-Sight Broadband Wireless Trial at 2.3 GHz* (Jan. 21, 2004) (reporting the success of a fixed wireless trial in Granville County, N.C. NextNet and America Connect are working "toward the goal of creating new opportunities for business and residential populations in the Southeast.") (quoting NextNet president and CEO Guy Kelnhofer).

percent, respectively).[73] In-Stat/MDR also expects 35 percent of small businesses and 39 percent of SOHO businesses plan to begin using fixed wireless within the next 12 months.[74]

As these deployments make clear, there has been a recent surge of investment in fixed wireless. Fixed wireless providers are now "attracting significant amounts of financing from venture capital private capital investments."[75] There has likewise been significant investment by equipment suppliers.[76] For example, Intel and Nokia have begun aggressively promoting the technology.[77] Established telecom firms like Nextel also have recently invested in fixed wireless.[78] Analysts expect fixed wireless equipment sales to growth to $1-$1.5 billion over the

[73] *In-Stat/MDR December 2003 Study* at 19, Table 10.

[74] *Id*.

[75] *WISPs Buck Investment Trends*, ISP-Planet (Nov. 12, 2003), http://www.isp-planet.com/research/2002/vc_trends_021112.html; K. Beckman, *WorldCom MMDS Assets Go to BellSouth*, RCR Wireless News (May 19, 2003) ("Several fixed-wireless vendors have received investments during the past several months."); C. Nolter, *BellSouth Bids for WorldCom Unit*, Daily Deal (May 13, 2003) ("Since December, IPWireless, Aperto Networks and Soma Networks have received infusions from venture capital firms, [Yankee Group's Linda] Schroth wrote."); C.D. Marsan, *AirBand Attracts Venture Capital Largesse*, Network World ISP News Report Newsletter (Sept. 24, 2003) (AirBand, a WISP using fixed wireless technology to deliver broadband services in the Southwest, raised $10.5 million from a group of venture capital firms in the first half of 2003).

[76] *See, e.g., Motorola Canopy(TM) Wireless Broadband Portfolio Expands with New 2.4GHz Product*, PR Newswire (Dec. 15, 2003); *Athena Semiconductors Closes Series B $10 Million Funding Round Led by Samsung*, Business Wire (Dec. 17, 2003); *Trango Broadband M900S 900MHz System Gains FCC Approval; Low Cost, Non-Line-of Sight Wireless Broadband Solution is Ready for Market*, Business Wire (Jan. 7, 2004); *Airspan Announces New Range of 802.16 OFDM Products*, Business Wire (Oct. 31, 2003).

[77] *See, e.g.*, M. Angell, *Techs Again Tout Fixed Wireless*, Investor's Business Daily at A06 (May 7, 2003) ("Now a group of tech companies, including Intel Corp. and Nokia Corp., wants to revive fixed wireless technology."); *Intel, Nokia, Proxim, Others Launch WiMax*, TMCnet.com News (Apr. 11, 2003) ("Intel, Nokia, Proxim, and a host of other companies yesterday launched WiMax, a non-profit group formed to certify and promote the developing wireless broadband standard 802.16."); M. Hachman, *Intel To Ship WiMAX Products in 2004*, EWeek (Sept. 18, 2003) ("Intel Corp. will produce integrated products that meet the 802.16 WiMAX specification by mid-2004."); R. Kay, *WiMax*, Computerworld (Dec. 1, 2003) ("Intel has now promised WiMax versions of its Centrino chip set for 2004, whereas Nokia says it will have battery and other technical issues solved in time to launch a WiMax cell phone in 2005.").

[78] Nextel recently purchased MMDS spectrum from WorldCom and Nucentrix, and has already moved well into trials of WiMAX technology. Nextel cited two potential applications for WiMAX: as an enterprise solution for offering integrated Wi-Fi, cellular and WiMAX systems; and as a parallel data network, which would allow Nextel to reach remote areas. *See* C. Nolter, *Nextel Wins Nucentrix Spectrum*, Daily Deal (Nov. 7, 2003); G. Williams, *Nextel Communications Acquires Wireless Assets*, World Markets Analysis (Nov. 10, 2003); *Nextel May Be First Major WiMAX Operator*, Blueprint Wi-Fi (Nov. 26, 2003), http://www.rethinkresearch.biz/free_page_view.asp?crypt=%B3%9C%C2%97%8C%84%86%AF%BC%C2%88%97kvn%91; *see also* V. Lipset, *Operators Wary of WiMax, Study Says*, Wi-Fi Planet (Nov. 19, 2003), http://www.wi-fiplanet.com/news/article.php/3111361.

next few years.[79] Not surprisingly, the stocks of both fixed wireless providers and equipment suppliers have risen steadily over the past year.[80]

This renaissance in fixed wireless is due to the fact that its underlying technology and economics have improved considerably. One major development is the adoption of an industry-wide standard for fixed wireless broadband – IEEE 802.16a (commonly known as WiMax)– that is designed to provide "a wireless alternative to cable, DSL and T1/E1 for last mile broadband access," and that can "also be used as complimentary technology to connect 802.11 [*i.e.*, Wi-Fi] hot spots to the Internet."[81] The new standard enables fixed wireless to be used for high-speed data transmission over much greater distances than previous standards – "up to 30 miles, with a typical cell radius of 4-6 miles."[82] It also "allows users to get broadband connectivity without needing direct line of sight with the base station," a major limitation of previous generations of fixed-wireless technology.[83] The adoption of a common standard and the fact that the technology is maturing also has caused the costs of deploying fixed wireless to drop.[84] As one

---

[79] R. Kay, *WiMax*, Computerworld at 34 (Dec. 1, 2003) ("Visant Strategies Inc., a market research firm in Kings Park, N.Y., predicts that WiMax product sales will reach $1 billion by 2008. According to Oyster Bay, N.Y.-based ABI Research, the market for long-range wireless products based on 802.16 and the forthcoming 802.20 standard will reach $1.5 billion by 2008.").

[80] For example, the stocks of fixed wireless equipment providers Alvarion (ALVR), California Amplifier (CAMP), Proxim (PROX), Endwave (ENWV), and Stratex Networks (STXN) rose 492 percent, 163 percent, 104 percent, 718 percent, and 65 percent, respectively, between January 2, 2003 and December 31, 2003. *See* Yahoo! Finance, *Historical Prices* and *Company Profile*, http://finance.yahoo.com (closing prices).

[81] *See* WIMAX Forum, *WIMAX Overview* at 1, *available at* http://www.wimaxforum.org (" *WIMAX Overview*"). The standard was approved by the IEEE and released January 29, 2003. WIMAX Forum, *WIMAX FAQs* at 1, *available at* http://www.wimaxforum.org (" *WIMAX FAQs*"). Initial vendor tests are scheduled for the third quarter of 2004, *WIMAX Overview* at 2, and certified equipment is expected in the market by the second half of 2004, *WIMAX FAQs* at 2.

[82] *LEA Comments* at 4; D. Pescovitz, *10 Technologies To Watch in 2004*, CNN.com (Dec. 25, 2003), http://www.cnn.com/2003/TECH/ptech/12/23/bus2.feat.tech.towatch ("802.16: WiMax enables wireless networks to extend as far as 30 miles and transfer data, voice, and video at faster speeds than cable or DSL. It's perfect for ISPs that want to expand into sparsely populated areas, where the cost of bringing in DSL or cable wiring is too high.").

[83] *WIMAX Overview* at 2; *Strategy Analytics: Fixed Wireless Broadband Heads Home*, M2 Presswire (Nov. 19, 2003) ("'Advances in the underlying technology have relaxed the line-of-sight constraints that used to make residential installations an expensive and uncertain proposition,' says Tom Elliott, Vice President of Consulting with Strategy Analytics."); *see also id. (*A single base station "provides total data rates of up to 280 Mbps . . . which is enough bandwidth to simultaneously support hundreds of businesses with T1/E1-type connectivity and thousands of homes with DSL-type connectivity."); Intel Corp., White Paper, *IEEE 802.16 and WiMAX – Broadband Access for Everyone* at 3 (2003) ("a single 'sector' of an 802.16(a) base station . . . provides sufficient bandwidth to simultaneously support more than 60 businesses with T1 connectivity.").

[84] M. Angell, *Techs Again Tout Fixed Wireless*, Investor's Business Daily at A06 (May 7, 2003) ("'With a standard in place, that makes for a better selection of chips and should bring down the price of the technology,' said Margaret LaBrecque, president of the newly established WiMax Forum. LaBrecque also serves as marketing manager for Intel's broadband wireless group."); D. Molta, *[News Without the Noise] – 802.16a: Sedan or Mack Truck?* Network Computing (Aug. 7, 2003) ("As IEEE standardizes on a metropolitan wireless MAC interface and WiMax pushes the OFDM physical-layer interface, it's predictable that the cost of base-station equipment and subscriber modems will come down."); *Fixed Wireless as Residential Access Sees Renewed Life*, Electronic News (Nov. 24, 2003) ("Reduced equipment costs, improved performance, and an aggressive set of vendors and wireless ISPs are making fixed wireless a serious broadband contender in rural towns and urban fringes.") (quoting Tom Elliott, VP, Strategy Analytics).

industry observer notes, "[f]irms like Winstar and Teligent 'used nonstandard gear,' . . . 'Once it becomes standardized, that brings down the cost.'"[85] The new standard also enables operators to build scale more easily.[86] It is now estimated that these advances could make "last-mile WiMAX connections cheaper than cable and DSL solutions."[87]

2. Broadband over Power Lines

According to Chairman Powell, "Broadband over Power Line [BPL] has the potential to provide consumers with a ubiquitous third broadband pipe to the home."[88] Recent evidence confirms the near-term promise of this emerging broadband alternative. At least two commercial BPL rollouts are currently underway – one in Manassas, Va., the other in Cincinnati, Ohio.[89] Other commercial BPL rollouts are planned or will be considered in the coming months.[90] BPL trials have been conducted in at least eight states by some of the nation's largest utility providers.[91] The Power Line Communications Association estimates that "broadband over

---

[85] M. Angell, *Techs Again Tout Fixed Wireless*, Investor's Business Daily at A06 (May 7, 2003) (quoting Roger Marks, Chair, 802.16 Working Group); *see also* M. Hogan, *To the WiMAX: A New Protocol Spices Up the 802.X Alphabet Soup*, Entrepreneur (Dec. 1, 2003) ("WiMAX equipment could cost less than a quarter of current technology, with prices starting under $ 2,000.") (citing Intel marketing manager Margaret LaBrecque).

[86] *WiMAX Overview* at 3 ("Easy addition of new sectors supported with flexible channels maximizes cell capacity, allowing operators to scale the network as the customer base grows.").

[87] M. Hogan, *To the WiMAX: A New Protocol Spices Up the 802.X Alphabet Soup*, Entrepreneur (Dec. 1, 2003) (citing Intel marketing manager Margaret LaBrecque); *see also* M. Stone & D. Chang, *Great Expectations for WiMAX*, Wireless Data News (Dec. 17, 2003) ("It's true that WiMAX infrastructure likely will be less expensive than existing infrastructure, and the lower entry costs will encourage new market entrants.").

[88] *Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems*, Notice of Inquiry, 18 FCC Rcd 8498, Separate Statement of Chairman Michael K. Powell (2003); *see also Broadband*, National Journal's Technology Daily (Dec. 16, 2003).

[89] *See* Comm. Daily (Jan. 14, 2004) ("Three Manassas, Va., neighborhoods are expected to go online next week as the city becomes the nation's first to provide [BPL]. Prospect St. Broadband's 'Zplug' service is to be available citywide by spring."); D. Kumar, *Utilities Revise Broadband-over-Power-Line Rollout Schedules*, Comm. Daily (Dec. 9, 2003) ("[O]nce the [network build-out] is completed in mid-2004, [the city] expects to provide service to all 15,000 electric customers."); S. Kreiger, *Innovative Web Access To Shock Manassas*, Potomacnews.com (Oct. 18, 2003); City of Manassas, http://www.manassascity.org (updated Jan. 9, 2004); *Cinergy and Current Communications To Offer Broadband Services over Power Lines*, Business Wire (Mar. 2, 2004) (announcing that companies "are beginning to offer broadband over power line (BPL) services in the greater Cincinnati, Ohio area"); D. Kumar, *Utilities Revise Broadband-over-Power-Line Rollout Schedules*, Comm. Daily (Dec. 9, 2003) ("Under current plans, Cinergy will pass 30,000-40,000 homes in Ohio in the first year and 250,000 in 3 years.").

[90] *See, e.g.*, *Muni in Upstate New York Views BPL Project as Plan with Little Risk, Plenty of Potential*, Electric Utility Week (Dec. 1, 2003) ("DVI intends to . . . begin sales to Penn Yan's 3,000 customers, which include 355 commercial customers, in January, said Marc Burling, CEO of DVI."); D. Kumar, *Utilities Revise Broadband-over-Power-Line Rollout Schedules*, Comm. Daily (Dec. 9, 2003) ("[IdaComm] CEO Chris Britton said the technical trials would take another 2-3 months to complete, after which a market trial, which was larger in scope, was planned: 'So we will make a decision on going commercial probably in the summer of 2004.'"); *Cinergy and Current Communications To Offer Broadband Services over Power Lines*, Business Wire (Mar. 2, 2004) (BPL "expansion is planned for Northern Kentucky and Indiana").

[91] D.T. Dang, *Utilities Test Potentially Revolutionary High-Speed Data Transmission System*, Baltimore Sun (May 11, 2003) ("such as Ohio's American Electric Power, New York's Consolidated Edison and Pennsylvania Power and Light"); Amperion, Inc. Press Release, *Amperion, Inc. Announces Powerline Communications Testing*

power line will reach between 750,000 and 1 million customers by the end of 2004."[92] Independent industry analysts estimate that "BPL will encompass six million power lines by 2006, promising revenues of $3.5 billion."[93]

The economics of deploying BPL are now very favorable, and technological hurdles have been overcome. The core infrastructure – power lines that extend to virtually every home and business in the nation – is already in place. Beyond that, "the cost for additional equipment ranges from about $50 to $250 per home passed, depending on housing density," which is "substantially less than the cost of introducing cable modem or DSL service in new areas."[94] Installation is inexpensive and quick. "A utility worker can connect a piece of communications equipment to a medium-voltage line in about 10 minutes."[95] And, "[i]n most cases, there is no need to send a truck or utility worker to each home to set up equipment. A consumer needs only to plug in a $70 power line modem, typically used for home networking."[96] Technological hurdles "also have now been economically cleared."[97] For example, transmitting a signal

---

Agreement with PPL Electric Utilities (Sep. 23, 2002); Amperion, Inc. Press Release, *Amperion Announces High-Speed Powerline Trial with Progress Energy* (May 1, 2003); Current Technologies, LLC Press Release, *Cinergy and Current Technologies Conduct 100-Home Test Market of the Current Technologies Powerline Communications in Ohio* (June 24, 2002); Current Technologies, LLC Press Release, *FCC Chairman Powell Visits Current Technologies Broadband over Power Line Network in Potomac, Maryland* (April 9, 2003); *Comments of Ameren Energy Communications, Inc. at 2,* Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems, ET Docket No. 03-104 (FCC filed July 7, 2003); IDACOMM Press Release, *Amperion and IDACOMM Launch Broadband Over Powerline (BPL) Pilot in Boise, Idaho* (Jan. 6, 2004); *See* Comments of Main.net Communications, Ltd. at 3, *Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems*, ET Docket No. 03-104 (FCC filed July 7, 2003); Comments of Hawaiian Electric Company, Inc. at 1, *Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems*, ET Docket No. 03-104 (FCC filed July 2, 2003); Wall Street Transcript Corp., Investext Rpt No. 8707372, CEO Interview: Joan Freilich – Consolidated Edison Inc. – Company Report at *4 (May 2, 2003); *Muni in Upstate New York Views BPL Project As Plan with Little Risk, Plenty of Potential*, Electric Utility Week (Dec. 1, 2003). *See also Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems*, Notice of Inquiry, 18 FCC Rcd 8498, Separate Statement of Chairman Michael K. Powell (2003) ("Power line networks are being tested today in a dozen states around the country and are a testament to the incredible innovations taking place in broadband network technologies.").

[92] W. Rodgers, *Power To Interfere?*, Tampa Tribune, MoneySense at 10 (Jan. 5, 2004). In February 2004, EarthLink invested $500,000 in BPL provider Ambient; EarthLink had teamed with Ambient in its BPL pilot with Con Edison. *See* Comm. Daily (Feb. 23, 2004).

[93] *At CompTel Fall 2003: What's The Next Big Thing*, Comm. Today (Oct. 13, 2003) (citing Gartner Group research).

[94] C. Berg, *PPL Tests Broadband Internet Service*, Morning Call at A1 (Apr. 27, 2003); *see also* P. Davidson, *High-speed Net Coming to a Plug Near You?*, USA Today (Apr. 14, 2003) ("Costs recently have fallen to $50 to $160 per home passed, suppliers say. 'The breakthrough is that cheaper silicon has made this possible on a large scale,' says Amperion CEO Philip Hunt. This is much cheaper than what cable and phone giants had to spend beefing up their networks with fiber or copper, as well as adding broadband gear. At first, they spent $750 to $1,000 per home passed, though costs lately have fallen to $200 to $400, Jupiter's Joe Laszlo says.").

[95] *Tampa, Fla.-Area Electric Utility May Offer New Outlet for Broadband*, Tampa Tribune (Oct. 6, 2003); *id*. ("BPL is cheap to install.").

[96] D.T. Dang, *Utilities Test Potentially Revolutionary High-Speed Data Transmission System*, Baltimore Sun (May 11, 2003).

[97] Comments of Current Technologies, LLC. at 4, *Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems*, ET Docket No. 03-104 (FCC filed July 7, 2003); *see also* J. Mears,

through power transformers, "one of the biggest obstacles to making power line communications work,"[98] can now circumvented by no fewer than three different methods.[99]

BPL can be used to provide high-speed access at speeds comparable to or faster than DSL and cable, and at comparable prices.[100] Cinergy recently noted that its "[h]igh-speed Internet access in the trials achieve[d] speeds over 2 megabits/second."[101] Companies plan to sell BPL service at rates comparable to or less than those of other access services.[102] For example, Prospect Street Broadband, the company with which the City of Manassas has partnered in the nation's first commercial BPL rollout, offers residential high-speed Internet access for only $26.95 per month.[103]

Broadband over Power Lines Closer to Reality, Network World (June 2, 2003) ("Today, companies . . . have developed technology to move bits across medium- and low-voltage lines.").

[98] C. Berg, *PPL Tests Broadband Internet Service*, Morning Call at A1 (Apr. 27, 2003); *see also* P. Davidson, *High-speed Net Coming to a Plug Near You?*, USA Today (Apr. 14, 2003) ("The biggest roadblock, however, is the transformer that converts medium-voltage current (10,000 to 69,000 volts) to the low voltages (220/110) that enter your home. It can swallow data signals whole.").

[99] *See* P. Davidson, *High-speed Net Coming to a Plug Near You?*, USA Today (Apr. 14, 2003) ("Ambient and Current Technologies bypass the transformer with a special wire that carries the data, while only electric current passes through the transformer. Main.Net relies on packet-chopping technology to slip the data intact through the trash-can-sized transformer. And Amperion's Wi-Fi antennas wirelessly link the Internet signal to the customer before it gets to the transformer."); *see also* C. Berg, *PPL Tests Broadband Internet Service*, Morning Call at A1 (Apr. 27, 2003).

[100] *See* D. Kumar, *Utilities Revise Broadband-over-Power-Line Rollout Schedules*, Comm. Daily (Dec. 9, 2003) ("symmetrical speeds of 1.5 Mbps to 2 Mbps"); C. Berg, *PPL Tests Broadband Internet Service*, Morning Call at A1 (Apr. 27, 2003) ("[Main.net President Joe] Marsilii said Main.net's system can achieve speeds up to 1.8 megabits per second – faster than DSL and about as fast as the best cable modems. And, he said, the next generation of technology will be five times faster than that.").

[101] Comments of Cinergy Corp. at 1-2, *Inquiry Regarding Carrier Current Systems, including Broadband over Power Line Systems*, ET Docket No. 03-104 (FCC filed July 7, 2003).

[102] *See, e.g., Muni in Upstate New York Views BPL Project as Plan with Little Risk, Plenty of Potential*, Electric Utility Week (Dec. 1, 2003) ("[DVI] plans to offer basic Internet service to residents for $29.95/month, with business customers paying $89.95/month at speeds that are comparable to digital subscriber line and cable Internet service"); S. Strangmeier, *Consumers to Surf Power Lines*, Natural Gas Week (Dec. 5, 2003) ("BPL proponents claim it costs less than major cable and telephone services at about $29.95/month."); C. Berg, *PPL Tests Broadband Internet Service*, Morning Call at A1 (Apr. 27, 2003) ("[P]ower line communications will be significantly cheaper than its competitors."); A. Szoke, *Electric Utilities Try to Plug in to High-Speed Internet in Peoria, Ill., Area*, Journal Star (Apr. 22, 2003) ("Some utilities have said they may be able to offer [BPL] at a cost of $30 to $40 a month for residential users compared to the $40 to $50 average monthly charge for broadband.").

[103] *See* Prospect Street Broadband, *Products and Services*, http://www.prospectstreet.com/psb/Products/ResidentialServices.htm; D. Kumar, *Utilities Revise Broadband-over-Power-Line Rollout Schedules*, Comm. Daily (Dec. 9, 2003).

3. Satellite

Satellite is another broadband alternative that has begun a resurgence. As one industry observer has recently noted, "satellite broadband will be on the upswing again in 2004."[104]

One of the two main broadband satellite providers – Hughes Network Systems – reported 177,000 customers for its DIRECWAY service as of third quarter 2003.[105] The recently approved merger between General Motors/Hughes and News Corp.[106] will allow News Corp. to "work aggressively to ensure that broadband services are available to as many American consumers as possible. . . . News Corp. believes it is critical that consumers have a vibrant set of broadband choices that compete with cable's video and broadband services on capability, quality, and price."[107] In October 2003, MCI began reselling Hughes's DIRECWAY service to "small-to-medium businesses and enterprises."[108] MCI notes that "with today's broadband satellite technology . . . you can connect remote employees and offices wirelessly while experiencing the same advantages that many terrestrial options offers, such as speed, security and reasonable costs."[109]

The other main satellite provider – StarBand – emerged from bankruptcy in November 2003 with most of its customer base intact.[110] The company has recently introduced new hardware and service offerings targeted at mass-market customers that offer lower prices and higher speeds that were previously available.[111] "A stripped-down version of its residential

---

[104] R. Brown, *et al., Smooth Sailing or the Perfect Storm?*, CED (Jan. 1, 2004); *see also ISCE Panelists See Big Satellite Broadband Growth*, Satellite Week (Aug. 25, 2003) ("Michael Agnostelli, SES Americom vp-business strategy, said that for the first time DBS TV services cost less…than cable TV. 'There's no reason satellite broadband can't cost less than [DSL or cable modem],' he said: 'The technology is well positioned to hit the cost point and performance point that consumers are looking for.'").

[105] Hughes Electronics Corp., Form 10-Q (SEC filed Nov. 7, 2003) (residential and small office/home-office customers in North America).

[106] *General Motors Corp. and Hughes Electronics Corp., Transferors, and The News Corp. Ltd., Transferee*, Memorandum Opinion and Order, MB Docket No. 03-124, FCC 03-330 (rel. Jan. 14, 2004).

[107] Consolidated Application for Authority to Transfer Control at 31, *Application of General Motors Corp. and Hughes Electronics Corp., Transferors, and The News Corp. Ltd., Transferee*, MB Docket No. 03-124 (FCC filed May 15, 2003).

[108] MCI, *Enterprise, Internet Broadband Satellite*, http://global.mci.com/us/enterprise/internet/broadbandsat/.

[109] *Id.*

[110] *Starband to Emerge from Bankruptcy Protection by Month's End*, Satellite Week (Nov. 24, 2003) ("Starband is expected to emerge from bankruptcy protection late this month with a revamped sales staff. . . . Starband has 38,000 subscribers, having lost 2,000 since filing for bankruptcy protection in U.S. Dist. Court, Wilmington, Del., in May 2002.").

[111] *See, e.g., StarBand Unveils Faster Modem*, Satellite News (Aug. 4, 2003) ("StarBand . . . has introduced a modem designed to provide peak download speeds of up to one megabit per second (Mbps) and upload speeds of 100 kilobits per second (Kbps)."); *Starband to Emerge from Bankruptcy Protection by Month's End*, Satellite Week (Nov. 24, 2003) ([Starband] recently introduced model 480 Pro satellite modem that's designed for small-business market . . . will be priced at $899 with a one-year contract carrying a $149 monthly fee; $599 with 2- and 3-year pacts that have $149 and $139 monthly charges. On the consumer side, Starband will continue with the model 360 satellite modem and price ranging from a starter kit at $699 with a one-year contract and a $39 monthly fee that

service now sells for about $40 a month, with more comprehensive service going for $50 to $70 per month."[112]

Finally, WildBlue Communications plans to introduce broadband satellite service in the Ka-band during 2004.[113] The National Rural Telecommunications Cooperative (NRTC) has agreed to a distribution partnership with WildBlue, and members of NRTC will offer WildBlue's service across the country.[114] According to NRTC President and COO Bob Phillips, "[NRTC is] confident that WildBlue is the best solution to deliver affordable high-speed satellite Internet access to rural America," and that "virtually every home and small business in the continental United States will finally have access to the most advanced telecommunications services available."[115]

4. 3G Mobile Wireless

In recent months, third-generation ("3G") wireless services have taken another step closer to becoming a full-fledged competitor in the broadband market. In September 2003, Verizon Wireless launched a 3G wireless network in Washington, DC and San Diego.[116] Verizon's 3G service using EvDO technology provides Internet access at speeds of 300-500 kbps, with bursts up to 2 Mbps.[117] As one analyst notes, the download speeds of EvDO networks are "comparable to those of DSL and cable modems."[118] In January 2004, Verizon announced that it will spend over $1 billion deploying its EvDO network over the next two years, allowing it to reach many major metropolitan areas across the country.[119] This puts pressure on other wireless providers to follow suit.

---

provides download speeds up to 250 kbps to $199-$699 standard plans that are based on 2- and 3-year contracts. The 2- and 3-year agreements charge $99 a month for the first year, then drop to $59 and $49, respectively.).

[112] G. Witte, *StarBand Prepares to Exit Bankruptcy*, Washington Post (Nov. 13, 2003).

[113] WildBlue Communications Press Release, *NRTC to Offer WildBlue Satellite Broadband Services* (Aug. 25, 2003) ("WildBlue will deliver affordable two-way wireless broadband services via satellite, direct to homes and small offices, throughout the continental United States in 2004. WildBlue is expected to be the first to launch the Ka-band spot beam satellite technology designed to lower the cost of providing consumers high-speed Internet access via satellite. The WildBlue system also will leverage proven terrestrial cable modem technology, resulting in lower customer equipment and installation costs; a critical requirement in satellite-based consumer services."); R. Brown, *et al*., *Smooth Sailing or Perfect Storm?*, CED (Jan. 1, 2004).

[114] WildBlue Communications Press Release, *NRTC to Offer WildBlue Satellite Broadband Services* (Aug. 25, 2003).

[115] *Id.*

[116] Verizon Wireless Press Release, *Wireless Broadband Data Service Introduced in Major Metro Areas* (Sept. 29, 2003).

[117] Verizon Wireless Press Release, *Verizon Wireless Announces Roll Out of National 3G Network* (Jan. 8, 2004).

[118] B. Richards, *et al*., CIBC World Markets, Investext Rpt. No. 7305232, Sierra Wireless Inc. – Company Report at *2 (Mar. 6, 2003).

[119] Verizon Wireless Press Release, *Verizon Wireless Announces Roll Out of National 3G Network* (Jan. 8, 2004); V. Mamelak, Netaxis Bleichroeder, *Verizon* at 3 (Dec. 1, 2003).

AT&T Wireless has announced plans to deploy next-generation W-CDMA technology capable of providing download speeds of 384 kbps in four cities by the end of 2004.[120] Sprint has begun conducting trials of EvDO.[121] Nextel is conducting a trial of Flarion's next-generation wireless platform, which provides bandwidth of between 1-3 Mbps.[122]

D. There Is Extensive Broadband Competition for Large Business Customers

Recent evidence also confirms that there is extensive competition for broadband services provided to large business customers. As Verizon has previously explained, this segment of the broadband market differs from other segments both because it is more mature, with competitors having first entered the market two decades ago, and because it is national in scope.[123] As the Commission has found, it is comprised of customers that typically demand end-to-end services provided across LATAs, states, and often countries.[124]

A January 2004 report by Schwab Soundview Capital Markets provides further confirmation of this, and shows that it is AT&T and the other large interexchange carriers – not the ILECs – that dominate this segment of the market. As the report notes, "ATM and frame relay services constitute the majority of telecom spending by businesses and nearly 85% of revenue opportunity within ATM and frame relay services is in long distance service offerings."[125] This analyst notes that, as of January 2004, AT&T, MCI, and Sprint together controlled 79 percent of the Frame Relay market and 60 percent of the ATM market.[126] And because the Frame Relay market is much larger than the ATM market, these companies' share of the combined market for broadband services provided to large businesses is approximately 75 percent.[127] AT&T's Chairman recently boasted that his company is the nation's "largest private line/frame relay/ATM provider."[128]

---

[120] AT&T Wireless Press Release, *AT&T Wireless Outlines Actions It Will Take to Meet 2003 Goals* (Jan. 28, 2003) (announcing plans to rollout W-CDMA in four cities (Dallas, San Diego, San Francisco, and Seattle) by year end 2004); G. Lynch, *Dropping EDGE Could Regain Edge for AT&T*, America's Network (Feb. 1, 2001).

[121] *See, e.g.*, K. Fitchard, *Rollout Kicks Off 3G's Amazing Race*, Telephony (Oct. 6, 2003) (Sprint ran a trial of EvDO in Boise, Idaho); S. Marek, *U.S. Spotlight Shines on EV-DO*, Wireless Week (Apr. 15, 2003), http://www.wirelessweek.com/article/CA292170 (Sprint PCS affiliate Ubiquitel has been testing its own EvDO network).

[122] C. Larsen, *et al*., Prudential Equity Group, LLC, *Wireless Services: CTIA Trade Show Take-Aways* at 3 (Mar. 24, 2004).

[123] *Verizon November 13, 2003 Ex Parte* at 17.

[124] *See, e.g., Triennial Review Order* ¶ 302 ("Enterprise market customers . . . prefer a single provider capable of meeting all their needs at each of their business locations which may be in multiple locations in different parts of the city, state or country.").

[125] M. Bowen, *et al*., Schwab Soundview Capital Markets, *AT&T Corp*. at 2 (Jan. 21, 2004).

[126] *See id*. at 3.

[127] IDC estimated total frame-relay revenues of $7.44 billion for 2003, while total ATM revenues were estimated at $1.98 billion. *See* R. Kaplan, IDC, *U.S. Frame Relay Services Forecast, 2002-2007* at Table 2 (Mar. 2003); R. Kaplan, IDC, *U.S. ATM Services Forecast, 2002-2007* at Table 2 (Mar. 2003).

[128] David Dorman, Chairman and CEO, AT&T, *Presentation for Credit Suisse First Boston Media and Telecom Week* at 6 (Dec. 11, 2003) ("*Dorman Presentation*").

Although some parties have argued that the IXCs often provide Frame Relay and ATM services using facilities obtained from ILECs, the fact that these carriers have nonetheless come to dominate the retail market is definitive proof that they are able to compete effectively. For example, as the D.C. Circuit recently found in analogous circumstances, the fact that IXCs may be using special access services as an input in the broadband data services they provide to end-user customers has not changed the fact that the retail market for broadband services provided to large businesses is "rapidly expanding and prosperous," with competition "not only . . . surviv[ing] but . . . flourish[ing]."[129] In any event, these parties greatly exaggerate the limitations on the availability of competitive facilities. Time Warner Telecom has recently stated that "[w]hile [RBOCs] have lot of fiber deployed, I don't know that they have more buildings connected than we do in all cases. In certain markets they may; in others they may not.[130] In December 2003, AT&T noted that its network now "touches virtually all Fortune 1,000 companies."[131]

Moreover, the availability and use of alternative last-mile broadband facilities for large businesses is rapidly increasing, just as it is for other segment of the broadband market. A recent study by In-Stat/MDR found that 41 percent of "enterprises" (businesses with 5,000 or more employees) were using cable modem service, 40 percent were using fixed wireless, and 21 percent were using satellite, in place of or in addition to other alternatives such as high-speed ILEC lines.[132] With respect to the "middle market" (businesses with between 500 and 5,000employees), 32 percent were using cable modem, 29 percent fixed wireless, and 9 percent were using satellite.[133] In addition, the study finds that 40 percent of enterprise businesses and 38 percent of middle-market businesses plan to use cable modem in the 12 months, and that 54 percent and 44 percent, respectively, plan to use fixed wireless within that time.[134]

These findings are consistent with the fact that both cable operators have increasingly been going after large businesses. Cox Business Services "provides a range of advanced communications services, including high-speed Internet access . . . for companies of all sizes."[135] Cox's Business Services division estimated that it has already garnered 10-13 percent of the market (based on revenue) in areas where its services are currently available.[136] Comcast boasts that it provides best in class fiber-based Metropolitan Area Network (MAN) services by utilizing thousands of miles of existing fiber infrastructure."[137] As the Yankee Group notes, "[t]he focus

---

[129] *United States Telecom Assn. v. FCC*, No. 00-1012, Slip. Op. at 30-31 (D.C. Cir. Mar. 2, 2004).

[130] E. Gubbins, *A Conversation with Time Warner Telecom's Mike Rouleau*, Telephony Online (Oct. 29, 2003), http://telephonyonline.com/ar/telecom_conversation_time_warner/index.htm (quoting Mike Rouleau, Time Warner Telecom senior vice president of business development).

[131] *Dorman Presentation* at 6.

[132] *In-Stat/MDR December 2003 Study* at 19, Table 9.

[133] *Id.*

[134] *Id.* at 19, Table 10.

[135] Cox Communications, Form 10-K (SEC filed Mar. 31, 2003).

[136] Cox Communications, presentation before the UBS Media Week Conference (Dec. 2003), http://phx.corporate-ir.net/phoenix.zhtml?c=76341&p=irol-presentations.

[137] Comcast Commercial Services, *Data Services*, http://www.comcast-

of Comcast Business Communications…is fiber-to-the-building and passive optical networking (PON)."[138] Time Warner Cable is "delivering cost effective, high capacity access solutions to several Fortune 500 customers."[139] Charter is moving "'up-market' to compete in Enterprise RFP environment;"[140] it reports that 9 percent of its business subscribers are medium or large businesses.[141]

ccs.com/frames.asp?section=products_and_services&page=data_description.

[138] M. Lauricella, *et al*., The Yankee Group, *Cable MSOs: Ready to Take Off in the Small and Medium Business Market* at 7 (Mar. 2002).

[139] Road Runner Business Class, *High Speed Internet*, http://www.twcbroadband.com/products/hsd.php (Jan. 13, 2004).

[140] T. Cullen, senior vice president, Advanced Services, Charter Communications, presentation before the Smith Barney Citigroup Entertainment, Media & Telecommunications Conference, at 23 (Jan. 7, 2004).

[141] Charter Communications, presentation before the UBS Media Week Conference, at 19 (Dec. 11, 2003) (reporting that 91% of business customers are small businesses).

Appendix. Sources for Tables

Table 1. Cable Modem and DSL Subscriber Growth – 2H2003

3Q2003 Net Additions (for all carriers). J. Hodulik & A. Bourkoff, UBS, *High-Speed Data Update for 3Q03* at Table 3 (Dec. 1, 2003).

Verizon. Verizon Press Release, *Verizon Reports Solid Overall Fourth-Quarter and Year-End Results, Based on Strong Fundamentals* (Jan. 29, 2004).

SBC. SBC, *4Q03 Investor Briefing*, http://www.sbc.com/Investor/Financial/Earning_Info/docs/4Q_03_IB_FINAL.pdf.

BellSouth. BellSouth Press Release, *BellSouth Reports Fourth Quarter Earnings* (Jan. 22, 2004).

Qwest. Qwest Press Release, *Qwest Communications Reports Fourth Quarter 2003 Net Loss Per Diluted Share of $0.17; Full Year Earnings Per Diluted Share of $0.93* (Feb. 19, 2004).

Sprint. Sprint FON Group, *Fourth Quarter and Full Year 2003 Investor Update*, http://www.sprint.com/sprint/ir/fn/qe/fon4q03.pdf.

DSL Other. ALLTEL Press Release, *ALLTEL Reports Solid Fourth-Quarter, 2003 Results* (Jan. 23, 2004); CenturyTel Press Release, *CenturyTel Announces Fourth Quarter 2003 Earnings* (Jan. 29, 2004); CTE Press Release, *CTE Reports 2003 Fourth Quarter Results* (Feb. 10, 2004).

Comcast. Comcast, *Financial Tables, attached to* Comcast Press Release, *Comcast Full Year and Fourth Quarter Results Meet or Exceed All Operating and Financial Targets Setting Stage for Continued Growth in 2004* (Feb. 11, 2004).

Time Warner. Time Warner, *2003 Trending Schedules* (Jan. 28, 2004), http://www.timewarner.com/investors/trending_schedules/xls/01_28_04.pdf.

Cox. Cox Communications, *4Q03 Financials, attached to* Cox Press Release, *Cox Communications Announces Fourth Quarter and Full-Year Financial Results for 2003* (Feb. 12, 2004).

Charter. Charter Press Release, *Charter Reports Fourth Quarter and Year 2003 Financial and Operating Results* (Feb. 19, 2004).

Cablevision. Cablevision Press Release, *Cablevision Systems Corporation Reports Fourth Quarter and Full Year 2003 Results* (Mar. 2, 2004).

Cable Other. Mediacom Press Release, *Mediacom Communications Reports Results for Fourth Quarter and Full Year 2003* (Feb. 24, 2004); Insight Communications Press Release, *Insight Announces Fourth Quarter and Year-End 2003 Results* (Feb. 26, 2004).

Table 2. Current Residential Offerings by DSL and Cable Modem Providers

G. Campbell, *et al*., Merrill Lynch, *Everything Over IP* at Table 2 (Mar. 12, 2004). The high-end price for SBC reflects a one-year term agreement.

Table 3. Current Small-Business Offerings by DSL and Cable Modem Providers

Road Runner. Road Runner, *Products & Services: Access*, http://rrbiz.com/products/acc.asp; Road Runner Business Class, *Pricing & Services*, http://www.roadrunnerbiz.com/packages.shtml (pricing for 1.5-2 Mbps downstream/384 kbps-1.5 Mbps upstream packages).

Comcast Business Communications. Comcast Business Communications, *Comcast Workplace*, http://work.comcast.net/workplace.asp#pricing.

Cablevision. Lightpath, *Internet: BusinessClass Optimum Online*, http://www.lightpath.net/solutions/internet/business/bcinfo.html; Lightpath, *Internet: BusinessClass Optimum Online*, http://www.lightpath.net/solutions/internet/business/pricepage.html. Cablevision also offers business-class service to not-for-profit customers for $59.95, when purchased as part of a bundle. *Id.*

Verizon. Verizon, *Internet Access – DSL: Prices and Packages*, http://biz.verizon.net/pands/dsl/packages/Default.asp.

SBC. SBC, *SBC Yahoo! DSL Special Offers*, http://www02.sbc.com/DSL_new/content/1,,21,00.html?pl_code=MSBC245C8952P192222B0S0.

Covad. Covad, *TeleSpeed Business DSL*, http://www.covad.com/products/access/telespeed/pricing.shtml.

AT&T. AT&T Business, *Small & Medium Business: DSL Internet Service*, http://businessesales.att.com/products_services/dslinternet_available.jhtml?_requestid=76704.

Table 4. Recent Changes in Cable/DSL Competitive Offerings and Promotions

Verizon. G. Campbell, *et al*., Merrill Lynch, *3Q03 Broadband Update: The Latest on Broadband Data and VoIP Services in North America* at Table 4 (Nov. 3, 2003) ("*Merrill Lynch 3Q03 Broadband Update*"); J. Hodulik & A. Bourkoff, UBS, *High-Speed Data Update for 3Q03* at 9 (Dec. 1, 2003) ("*UBS 3Q03 High-Speed Data Update*"); A. Breznick, *Major MSOs Scramble To Boost Cable Modem Download Speeds*, Comm. Daily at 6 (Dec. 15, 2003); S. Emling, *Battle for Broadband Is on as Phone Industry Cuts Prices*, Cox News Service (May 21, 2003).

SBC. *Merrill Lynch 3Q03 Broadband Update* at 13 & Table 4; R. Krause, *SBC's Broadband Push Getting Results*, Investor's Business Daily at A06 (Apr. 22, 2003); T. Giles, *BellSouth, SBC Cut Web Charge*, Kansas City Star at C2 (Oct. 11, 2003); SBC Press Release, *SBC Internet Services Unveils Sizzling General Market Price of $29.95 per Month for SBC Yahoo! DSL* (June 6, 2003); D. Barden, *et al*., Banc of America Securities, *SBC Communications Inc.* (Feb. 2, 2004).

BellSouth. S. Emling, *Battle for Broadband Is on as Phone Industry Cuts Prices*, Cox News Service (May 21, 2003); *Merrill Lynch 3Q03 Broadband Update* at 13 & Table 4; *UBS 3Q03 High-Speed Data Update* at 9; BellSouth Press Release, *New BellSouth FastAccess DSL Lite Gives Customers Greater Broadband Choice and Expands BellSouth Internet Portfolio* (July 8, 2003).

Qwest. T. Giles, *BellSouth, SBC Cut Web Charge*, Kansas City Star at C2 (Oct. 11, 2003); *UBS 3Q03 High-Speed Data Update* at 9.

Comcast. *UBS 3Q03 High-Speed Data Update* at 9; *Merrill Lynch 3Q03 Broadband Update* at Table 4; Comcast News Release, *Comcast To Double Downstream Speeds for Comcast High-Speed Internet Customers* (Oct. 2, 2003).

Time Warner. A. Breznick, *Major MSOs Scramble To Boost Cable Modem Download Speeds*, Comm. Daily at 6 (Dec. 15, 2003); J. Hu, *Road Runner Takes Cue from DSL*, CNET News.com (Jan. 5, 2004).

Charter. A. Breznick, *Major MSOs Scramble To Boost Cable Modem Download Speeds*, Comm. Daily at 6 (Dec. 15, 2003); Charter Comm. Press Release, *Charter Communications Reports Third Quarter 2003 Results* (Nov. 3, 2003).

Cablevision. *Merrill Lynch 3Q03 Broadband Update* at 14 & Table 4.

Cox. *UBS 3Q03 High-Speed Data Update* at 10; A. Breznick, *Major MSOs Scramble To Boost Cable Modem Download Speeds*, Comm. Daily at 7 (Dec. 15, 2003); *Merrill Lynch 3Q03 Broadband Update* at 15.

Adelphia. A. Breznick, *Major MSOs Scramble To Boost Cable Modem Download Speeds*, Comm. Daily at 7 (Dec. 15, 2003).

RCN. A. Breznick, *Major MSOs Scramble To Boost Cable Modem Download Speeds*, Comm. Daily at 7 (Dec. 15, 2003).

Mediacom. Mediacom Press Release, *Mediacom Communications To Double Speeds for Mediacom Online High Speed Internet Customers* (Jan. 5, 2004).

Table 5. IP Telephony Providers

Cablevision. Cablevision News Release, *Cablevision Completes Network Rebuild* (Dec. 3, 2003); Cablevision Press Release, *Cablevision Announces First Widescale Digital Voice-Over-Cable Deployment* (Nov. 11, 2003); Cablevision News Release, *Cablevision Systems Corporation Reports Fourth Quarter and Full Year 2003 Results* (Mar. 2, 2004).

Time Warner. Time Warner Cable, *About Us: In a Nutshell*, http://www.timewarnercable.com/dispatcher/aboutUs;jsessionid=00000AMBAZHMYUAXZOJND5CQWMY:-1?category=10075&rootCategory=10075; M. Richtel, *Time Warner To Use Cable Lines To Add Phone to Internet Service*, N.Y. Times (Dec. 9, 2003); *Q4 2003 Time Warner Inc. Earnings Conference Call – Final*, FD (Fair Disclosure) Wire, Transcript 012804ao.798 (Jan. 28, 2004); G. Campbell, *et al*., Merrill Lynch, *Everything over IP* at 16 (Mar. 12, 2004).

Cox. *Financial Results, attached to* Cox News Release, *Cox Communications Announces Fourth Quarter and Full-Year Financial Results for 2003* (Feb. 12, 2004); Cox *Communications Delivers Cox Digital Telephone to 12th Market; Roanoke, Va. Marks Cox's First Market Launch of VoIP Technology*, Business Wire (Dec. 15, 2003); P. Bernier, *Cablecos Set Sights on VoIP*, Xchange Mag. (Feb. 1, 2004) (quoting Cox director of product development Dianna Mogelgaard); A. Breznick, *Cable Operators See VoIP as Next Big Service*, Cable Datacom News (Jan. 1, 2004), http://cabledatacomnews.com/jano04/jan04-2.html.

Charter. Charter Communications, *Overview*, http://www.corporate-ir.net/ireye/ir_site.zhtml?ticker=CHTR&script=2100; G. Campbell, *et al*., Merrill Lynch, *Everything over IP* at 17, 52 (Mar. 12, 2004).

Comcast. Comcast, *Factsheet*, http://www.cmcsk.com/phoenix.zhtml?c=147565&p=irol-factsheet; NCTA, *2003 Year-End Industry Overview* at 9 (Dec. 2003); Comcast, presentation at the UBS 31st Annual Media Week Conference (Dec. 11, 2003), http://media.corporate-ir.net/media_files/irol/11/118591/presentations/cmcsk_121103c/sld016.htm; J. Reif Cohen, *et al*., Merrill Lynch, *Cable Television: The Latest on Broadband Data and VoIP Services in North America* at 15 (Nov. 3, 2003).

AT&T. AT&T News Release, *Dorman Outlines Aggressive, Continuing Transformation of AT&T as the "World's Networking Company"* (Feb. 25, 2004); B. Charny, *AT&T Begins Selling Net Phone Service*, CNET News.com (Mar. 11, 2004), http://news.com.com/2100-7352_3-5172626.html?tag=nefd_top; Cathy Martine, SVP Internet Telephony & Consumer Product Management, AT&T, *Voice over IP* at 27 (Feb. 25, 2004).

Vonage. Vonage, *About Vonage*, http://www.vonage.com/corporate/aboutus_fastfacts.php.

VoiceGlo. VoiceGlo, *Area Codes*, http://www.voiceglo.com/area_codes.

VoicePulse. VoicePulse, *Available Phone Numbers*, http://www.voicepulse.com/plans/availability.aspx.

8x8 (Packet8). 8x8 Press Release, *8x8 Adds Packet VoIP Telephone Numbers in New Hampshire and Rhode Island* (Jan. 20, 2004); Packet8, *Area Codes and Rate Centers*, http://www.packet8.net/about/areacodes.asp.

NuVio. NuVio, *Service Area*, https://www.nuvio.com/servicearea.php.

Phonom. Phonom Press Release, *Phonom Is First-to-Market with Complete Residential Digital IP Telephony to Virginia, Maryland, S. New Jersey, Delaware and Philadelphia* (Jan. 12, 2004).

Cbeyond. Cbeyond Press Release, *Cbeyond Communications Enters Houston Market; Voip Provider Specializes in Small Business Needs* (Feb. 9, 2004).

Table 6. Typical Residential Offerings by Alternative Broadband Providers

Prospect Street Broadband. Telephone conversation with PSB BPL customer service representative, (888) 624-6752 (Jan. 21, 2004); Prospect Street Broadband, *Products and Services*, http://www.prospectstreet.com/psb/Products/

DIRECWAY. Telephone conversation with DIRECWAY customer service representative, (866) 556-9655 (Jan. 21, 2004); DIRECWAY, *How To Buy DIRECWAY*, http://iwantdway.com/htb_two.html.

StarBand. Telephone conversation with StarBand customer service representative, (800) 478-2722 (Jan. 21, 2004); StarBand, *StarBand Residential*, http://www.starband.com/residential/index.asp; StarBand, *StarBand Residential Pricing*, http://www.starband.com/residential/pricing.asp.

NTELOS. NTELOS, *Portable Broadband*, http://www.ntelos.net/residential/portbro1.html.

Table 7. Typical Small-Business Offerings by Alternative Broadband Providers

DIRECWAY. DIRECWAY, *WAY Flexible*, http://www.be.direcway.com/service.html.

StarBand. StarBand, *StarBand Small Office*, http://www.starband.com/smalloffice/more.asp; StarBand, *StarBand Small Office*, http://www.starband.com/smalloffice/index.asp.

NTELOS. NTELOS, *Portable Broadband*, http://www.ntelos.net/business/portbro2.html (range reflects a two-year contract versus month-to-month service).