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November 16, 2004

BY ELECTRONIC FILING

Marlene H. Dortch, Secretary
Federal Communications Commission
445 Twelfth Street, S.W.
Washington, D.C. 20554

Re: Written *Ex Parte* Presentation
*Unbundled Access to Network Elements; Review of the Section 251 Unbundling
Obligations of Incumbent Local Exchange Carriers,*
WC Docket No. 04-313, CC Docket No. 01-338

Dear Ms. Dortch:

In their reply comments to the Commission's Notice of Proposed Rulemaking in the above-captioned proceeding, the Bell Operating Companies ("BOCs") claim that the Commission can depend on the availability of Voice over Internet Protocol ("VoIP") applications to produce robust residential competition, and therefore no longer need require that incumbent local exchange carriers ("LECs") provide unbundled access to switching. The BOCs simply are wrong to claim that VoIP has eliminated impairment with respect to mass market switching, as explained in the attached white paper, entitled "The Promise of VoIP: Let Them Eat Cake from the Only Two Bakeries in Town," by Dr. Michael Pelcovits and Dr. Ken Baseman of the economic consulting firm Microeconomic Consulting and Research Associates, Inc. ("MiCRA").

As Drs. Pelcovits and Baseman show, the presence of VoIP services does not eliminate impairment for the mass market in the absence of unbundled local switching. Specifically, Drs. Pelcovits and Baseman explain that:

- VoIP is not a very powerful competitive threat to the incumbent LECs for the more than 75% of customers that do not now subscribe to broadband Internet service.
- Even customers that already subscribe to broadband service will at best only have two underlying providers of those services – the incumbent LEC and the cable company.

- The market power of this broadband duopoly cannot be dissipated by the existence of independent VoIP providers.

Pursuant to section 1.1206 of the Commission's rules, 47 C.F.R. § 1.1206, this letter is being provided to you for inclusion in the public record of the above-referenced proceeding.

Sincerely,



Curtis L. Groves

Attachment

cc: Scott Bergmann
Jeffrey Carlisle
Daniel Gonzalez
Marcus Maher
Jessica Rosenworcel
Tim Stelzig

Matthew Brill
Gail Cohen
Russ Hanser
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Carol Simpson
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Michelle Carey
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Christopher Libertelli
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**The Promise of VoIP:
Let Them Eat Cake from the Only Two Bakeries in Town**

Michael Pelcovits and Ken Baseman, MiCRA

November 2004

Table of Contents

I.	Introduction.....	1
II.	Definition of Impairment	4
III.	Technical Challenges Faced by a VoIP Subscriber	4
IV.	Let Them Eat Cake	8
	A. Many Customers Do Not Have Internet Access at Home	9
	B. Customers with Dial-up Internet Will Not Shift to BB + VoIP In Response to a SNIP	11
	C. Marginal Customers Do Not Constrain Monopoly Pricing	15
V.	Competition for Bundled Services Provided Over the Broadband Platform is Limited by the Duopoly Over Broadband	17
VI.	Impact on Consumers of Broadband Duopoly.....	20
	A. The Price Impact of a Duopoly.....	21
	B. Multiple Providers of VoIP Cannot Constrain the Underlying Market Power of the Broadband Duopoly.....	24
	C. Continued Availability of UNE-P Helps to Constrain the Duopoly.....	27
VII.	Conclusion	28

I. Introduction

A funny thing happened on the way back from the *USTA II* forum. The ILECs created an entirely new – and entirely speculative – vision of the future to support their case against unbundled switching.

In the past, the ILECs portrayed a vision of competition in which there were few barriers to entry preventing the CLECs from connecting UNE loops to hundreds of new circuit switches and ending CLECs' reliance on what the ILECs derisively called "subsidized" UNE switching. Now, the ILECs have completely shifted gears and claim that the debate over their loop provisioning processes is "academic,"¹ because competition from other modes, especially VoIP, has obviated the CLECs' need for UNE switching to serve the mass market.

There is a lesson to be learned from the ILECs' advocacy. CLECs cannot rely on the ILECs' self-serving promises of future performance and speculation about the evolution of new technologies. A CLEC that had tried to build a mass market business using UNE loops and self-supplied switching, based on the ILECs' representations that no barriers to entry existed, would have made a tremendous and costly error. MCI's mass market UNE-L entry plans, for example, were based on the hopeful assumption that the economic and operational barriers to mass market UNE-L entry would be resolved.² The ILECs have not removed those entry barriers, and they have no incentive to remove

¹ Verizon Comments at 110 (Oct. 4, 2004). (Unless otherwise indicated, all comments cited herein were filed in WC Docket No. 04-313.)

² MCI Comments at 32 ("MCI's analysis assumed improvements in the ILEC loop provisioning process and TELRIC-based hot cut non-recurring charges of \$10 beginning in January 2006.").

them. CLECs that relied on the ILECs' assurances that there were no barriers to entry would find themselves like the Peanuts comic strip character Charlie Brown who runs to kick the football, only to have it snatched away at the last moment by the devious Lucy van Pelt. Because those barriers remain, it is not surprising that the ILECs now claim that CLECs are not impaired even without UNEs, because of the presence of intermodal competition.³

This paper will explain why intermodal competition does not eliminate impairment in the mass market. We will focus on the ILECs' claims that VoIP has almost single-handedly eliminated the market power of the ILECs in the voice telephony market. Although the ILECs' comments and declarations also argue that wireless competition eliminates impairment, we find there is little to add to this debate, because the wireless market has not changed markedly – except to become more concentrated in the hands of the ILEC affiliates – since the Commission found that CMRS fails to compete directly with traditional incumbent LEC local exchange service because of service quality, data rate, and ubiquity limitations.⁴

This paper will analyze the role of VoIP in the voice market in four steps. One, we restate the definition of impairment, which was offered by one of the authors in a

³ See, e.g., SBC Comments at 27-28 (“...there is substantial intermodal competition in the local exchange market. That competition should preclude much, if not all, unbundling of narrowband facilities.”)

⁴ *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, as modified by Errata, 18 FCC Rcd 19020, ¶¶ 230, 445 (2003) (“*Triennial Review Order*”); see also *Applications of AT&T Wireless Services, Inc. and Cingular Wireless Corporation For Consent to Transfer Control of Licenses and Authorizations*, WT Docket No. 04-70, Memorandum Opinion and Order ¶ 242 (rel. Oct. 26, 2004) (FCC 04-255) (substitution between wireless and wireline services is currently limited).

declaration previously filed in this proceeding. Two, we discuss the importance of the technical impediments faced by the VoIP providers. Three, we explain why VoIP does not constrain the ILECs' market power for customers that currently do not subscribe to broadband service. Finally, we explain why the absence of access to unbundled switching reduces the amount of competition with respect to telecommunications services provided to customers that subscribe to broadband service. Our analysis of the role of VoIP in the market reaches the following conclusions:

- The competitive effect from VoIP will be very different across different market segments, and the Commission would be mistaken if it were to treat the entire market as a homogeneous entity, subject to competition across-the-board from new entrants.
- VoIP is not a very powerful competitive threat to the ILECs for the 75% of customers that do not now subscribe to broadband Internet service. Without the availability of UNE-P, the CLECs will be unable to compete effectively to offer voice telephony to most customers.
- Even customers that already subscribe to broadband service will at best only have two underlying providers of these services – the ILEC and the cable company. This duopoly will have significant market power over their customers.
- The market power of the broadband duopoly cannot be dissipated by the existence of so-called independent VoIP providers. Therefore, the many VoIP providers in a market should not be counted separately as additional competitors with respect to demonstrating whether impairment exists in the mass market.

II. Definition of Impairment

As explained in the declaration of Dr. Pelcovits filed earlier in this Docket, it is possible to clarify the impairment standard to address several concerns raised by the *USTA II* Court.⁵ Dr. Pelcovits proposed adopting as a criterion that *impairment exists unless sufficient entry has occurred or is likely to occur to result in workably competitive downstream markets*. Workability is defined as “reasonably satisfactory ... marketplace performance.”⁶ The focus on *marketplace performance*, which is measured in terms of overall social welfare, rather than the well-being of particular competitors, is fully consistent with the pro-competitive goals of the Act.

An impairment standard that assesses performance in the downstream markets provides a framework for analyzing the significance of intermodal competition. Intermodal competition should “count” toward a finding of no impairment only to the extent that the competitor helps create workable competition in downstream markets. To the extent that consumers consider intermodal competitors as effective substitutes for the wireline-based ILEC or CLEC services, then competition in downstream markets is more likely to be workable.

III. Technical Challenges Faced by a VoIP Subscriber

The ILECs state that many parties “now uniformly agree that VoIP provides comparable quality and functionality to conventional circuit-switched service.”⁷

However, they do not provide any credible analysis or study that compares the technical

⁵ Declaration of Michael Pelcovits, MCI Comments (Oct. 4, 2004).

⁶ Joe S. Bain, *Industrial Organization*, at 15 (John Wiley & Sons, 1959).

⁷ “UNE Fact Report” at II-20, filed by BellSouth, SBC, Qwest and Verizon (Oct. 4, 2004).

quality of VoIP and conventional voice services or estimates the willingness of subscribers to accept any deficiencies of VoIP relative to conventional voice telephone service. Rather, the “Fact Report” relies on selected quotes or citations to analysts’ reports or statements by carriers in the business of providing VoIP.

In this report, we provide evidence that the technical challenges associated with mass market VoIP are significant.

One of the sources cited by the UNE Fact Report for the proposition that “VoIP routed over private networks fully matches the sound quality of conventional circuit-switched voice,”⁸ is an article from *Consumer Reports* magazine. This article provides a good starting point for understanding the technical challenges faced by a VoIP subscriber. Although the article judged that “voices sounded almost as good as on a regular home phone,” it pointed out some significant deficiencies of the VoIP service used by the expert panel, including:

- “You’ll lose phone service during power outages or Internet access interruptions unless you keep your regular phone service and a corded phone as a backup.
- Service quality may not match the phone company’s, given the problems we had.
- Your Vonage number won’t be available from directory assistance.”⁹

There are a host of other technical problems associated with mass market VoIP. To demonstrate some of these, we have attached the list of “troubleshooting” topics included in the 32-page installation guide provided to AT&T’s new CallVantage

⁸ UNE Fact Report, II-23, n.107.

⁹ *Consumer Reports*, “Phone Calls Without the Phone Company” (July 2003).

customers (see Attachment 1).¹⁰ Some examples of the problems listed in the guide, and their resolution are shown in Table 1 below:

Table 1: Technical Problems Experienced by VoIP Customers

PROBLEM	RESOLUTION
I cannot use my existing phone jacks throughout the house for my AT&T CallVantage Service.	You cannot use your existing phone jacks with AT&T CallVantage Service. If you want to use AT&T CallVantage Service in other rooms, you can use a cordless phone.
I can't get this to work with my home security system.	Home security or alarm systems are not supported by this service.
I am having voice quality problems with my phone.	Check your cable/DSL speed... If your speed does not meet the minimum requirements of 90Kbps uplink and downlink at this time, you may want to try again later. You can also try disconnecting the phone and using a different corded or cordless phone.

As indicated by this troubleshooting guide, a VoIP customer may face challenges connecting VoIP service to the existing inside wiring and CPE. The reason is that the customer's existing wiring and equipment must be connected directly to the single port on the VoIP telephone adapter. Typical installation instructions provided to the customer portray a single telephone instrument connected to the VoIP telephone adapter. The customer is then instructed to use a cordless phone, with multiple handsets to use the VoIP service in multiple rooms. For example, on the AT&T CallVantage Call Manager home page the instructions on how to expand the system are: "expand your service throughout your home with cordless phones." Clicking on this instruction will direct the customer to a site which sells multi-handset cordless phones. This means the customer

¹⁰ The entire guide is available online at <http://www.usa.att.com/callvantage/faqs/user_guide.jsp>.

must substitute a new multi-handset cordless phone system for the typical single-handset cordless phone now in use. The reason is that there is only one jack on the VoIP telephone adapter into which the wireless base station can be plugged.

VoIP service can be extended to other jacks in the house by connecting the VoIP telephone adapter to the network interface device and correctly wiring the phone jacks. Most consumers will not have the technical expertise to do this and would have to hire a technician if they wanted to activate all of their jacks for VoIP. AT&T CallVantage customers can obtain this service from AT&T at a cost of \$135.

Some of the cable companies offer VoIP service geared to the “average” subscriber. For example, Cox Cable sends a technician to install the service, wire the phone jacks, and test all phone lines jacks and outgoing and incoming call ability. Further, as mentioned in the UNE Fact Report, Cox provides a backup battery to power the system in the event of a power failure.¹¹ But all of this comes at a price. Rather than paying the \$24.95 a month charged by Vonage, or the \$29.95 a month charged by AT&T, a Cox customer is charged \$49.95 for VoIP service.¹² The large increment in price charged by Cox is evidence of the disadvantage faced by the independent VoIP providers, such as Vonage, that do not deploy a work force to supply technical assistance at customers’ premises.

The ILECs’ contention that VoIP is now the centerpiece of a competitive voice market rests on a rocky foundation. Namely, the ILECs must expect or assume that a large number of customers will be willing to use the lower-priced VoIP, in spite of its technical drawbacks. We believe that it is unwise to base public policy on an assumption

¹¹ See <<http://www.cox.com/roanoke/telephone/faqs.asp>>.

¹² See <<http://www.cox.com/roanoke/telephone/pricing.asp>>.

about consumer behavior that cannot be tested this soon in the evolution of the market. It is simply too difficult to predict how many mass market customers (even those with broadband Internet connections) will be willing to adopt VoIP products.

IV. Let Them Eat Cake

The ILECs recognize that their hypothesis that VoIP is at the center of wireline voice competition must contend with the fact that only customers with broadband can use VoIP. This is a very acute and serious problem for the ILECs' case, because as they admit, no more than 25% of U.S. households subscribe to broadband.¹³ The ILECs address this issue with the following arguments:

- Nearly 90 percent of U.S. households can now obtain a broadband connection from a provider other than the ILEC.¹⁴
- For customers that “have not yet subscribed to broadband service, the combination of broadband service and VoIP is competitive with what customers pay for a bundle of local, long distance, and dial-up Internet access.”¹⁵

¹³ Declaration of Michael K. Hassett and Vincent J. Woodbury, submitted on behalf of Verizon, at 13 (Oct. 4, 2004) (“Hassett/Woodbury Declaration”). In fact, the percentage of households subscribing to broadband is probably closer to 21%. *See* MCI Comments at 99. For purposes of this paper, we use the 25% figure put forth by Verizon, but the Commission should recognize that estimate is likely to overstate actual subscription rates.

¹⁴ UNE Fact Report at II-2.

¹⁵ Reply Declaration of Robert W. Crandall and Hal J. Singer, submitted on behalf of Verizon, at 3 (Oct. 18, 2004) (“Crandall/Singer Reply Declaration”).

- Because competition “occurs at the margin – a ‘minority’ of households might be sufficient to constrain ILEC prices.”¹⁶

There are several problems with this ILEC syllogism. First, it completely ignores the households that do not have Internet connections of any sort – dial-up or broadband. This is a significant share of households, especially those with lower income. (Table 2 below shows the number of households with: narrowband, broadband, and no Internet access.) Second, the comparisons made between package prices of narrowband with voice and broadband with VoIP are wrong, and thus overstate the ability of VoIP to constrain the ILECs’ prices. Third, the ILEC experts fail to apply properly the economic principle about competition “at the margin” to the situation at hand.

Table 2: Distribution of Households by Type of Access to the Internet¹⁷

Access Type	Number of HH	% of Total
None	46M	41%
Dial-Up Only	38M	34%
Broadband	28M	25%
Total	112M	100%

A. Many Customers Do Not Have Internet Access at Home

VoIP is not a substitute means of providing voice service for the 41% of U.S. households that do not have Internet access. These customers would need to pay the entire cost of a broadband Internet connection and pay for the VoIP service in order to obtain a substitute for their existing voice telephone service. According to the ILECs’ analysis the total cost of these two services would be between \$62 and \$90 per month,

¹⁶ *Id.* at 3-4.

¹⁷ Hassett/Woodbury Declaration ¶¶ 38, 46.

which is about double the cost of voice telephone service.¹⁸ And, not surprisingly, even the ILECs have not been able to come up with a calculation that demonstrates that these households will buy the VoIP plus broadband package should the ILECs be free to exercise market power over local telephone service.

There are a number of important matters to realize about these households that do not have Internet services. First, their number has remained nearly constant over the last several years, indicating that the bread eaters have no desire to eat cake at current prices.¹⁹ Second, there is a disproportionately high percentage of lower-income households without any Internet service, and also those households with service are much more likely to use dial-up than broadband. This is shown in the diagram below, reproduced from a recent paper of the Consumer Federation of American, which explores the policy and social implications of these penetration statistics.²⁰

In addition to any social issues or equity considerations raised by CFA, we believe that the evidence provided in the report has important implications for the choices that consumers are likely to face for voice telephone service if UNE-P is no longer available. There appears to be a substantial number of households in the United States that do not subscribe to Internet service (on either a dial-up or broadband basis). The vast majority of these households do not have computers,²¹ and are unlikely to consider VoIP

¹⁸ UNE Fact Report, at II-19.

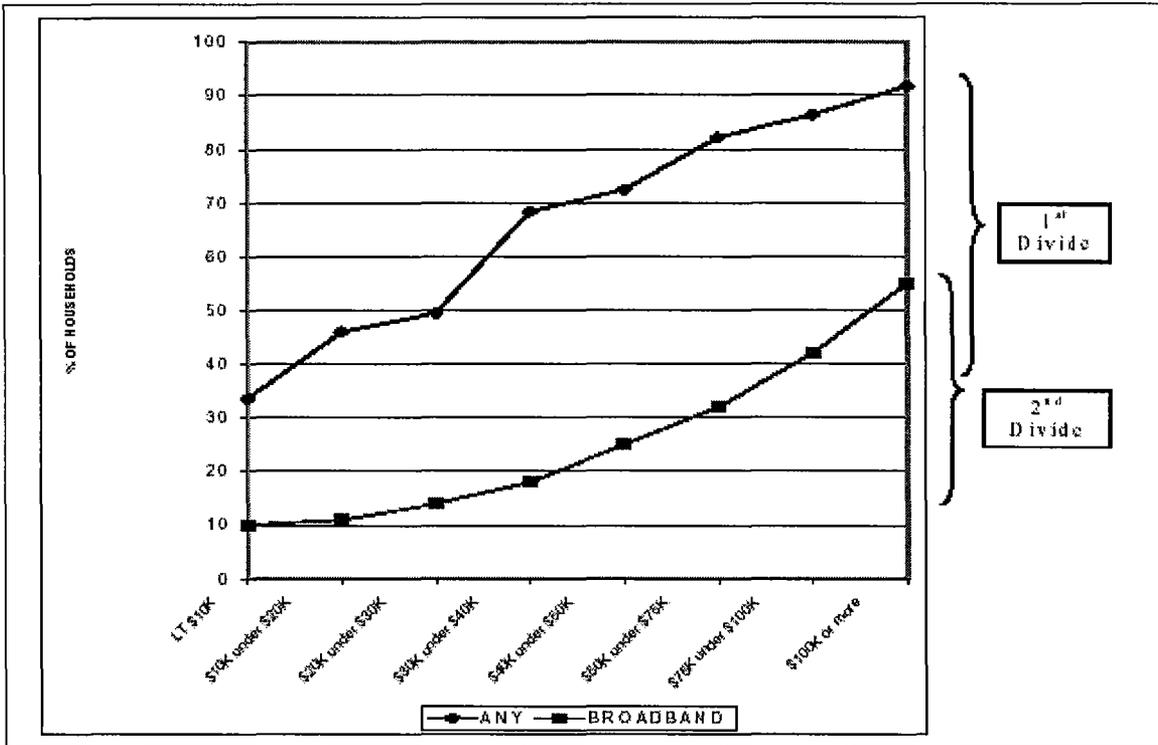
¹⁹ Consumer Federation of America & Consumers Union, *Expanding the Digital Divide & Falling Behind on Broadband*, at 14 (Oct. 2004) (“*Expanding the Digital Divide*”).

²⁰ *Id.* at 16.

²¹ As of September 2001, 56.5% of households had a personal computer and 88.1% of those houses had Internet access. See U.S. Department of Commerce, NTIA, *A Nation Online*, at 3 (Feb. 2002).

as a substitute for conventional voice telephone service, even if its price decreases substantially.

PENETRATION OF INTERNET AT HOME BY HOUSEHOLD²²



B. Customers with Dial-up Internet Will Not Shift to BB + VoIP In Response to a SNIP

More U.S. households connect to the Internet over dial-up than over broadband. Since the VoIP service touted by the ILECs requires a broadband connection, it is not at all apparent how, as the ILECs claim, VoIP is at the “center of competitive activity” for these households.²³ Recognizing this weakness in their arguments, the ILECs are

²² *Expanding the Digital Divide*, at 16.

²³ See UNE Fact Report at I-5 (“Voice-over-IP services now clearly define the center of wireline voice competition”).

compelled to claim that VoIP is a good substitute for ordinary voice service for many households now without broadband, because the cost of VoIP plus broadband service is comparable to what the customer is now paying for voice service plus dial-up Internet service. According to Drs. Crandall and Singer, this means that the two services are in the same product market, because there are enough customers who would switch from voice telephony to VoIP in response to a small, but non-transitory, increase in price, so as to make the price increase unprofitable. This is referred to as the *Merger Guidelines*' SNIP (Small but Non-Transitory Increase in Price) test for market definition.²⁴

We agree that the *Merger Guidelines*, properly applied, provide a good benchmark for testing whether the ILECs retain market power in the voice market and the CLECs are impaired without access to the UNEs.²⁵ We disagree, however, that average or typical households would find VoIP plus broadband to be a close substitute for voice plus dial-up. The calculations used by the ILECs to support their position are flawed and, at best, would apply to a small proportion of customers.

The ILECs' price comparison is summarized in Table 3, which is reproduced from the UNE Fact Report.

²⁴ Crandall/Singer Reply Declaration at 2-3, citing to the U.S. Department of Justice and Federal Trade Commission, *Horizontal Merger Guidelines*.

²⁵ Crandall/Singer Reply Declaration, n.3, cite Hassett and Woodbury for the proposition that bundled service plus VoIP is price competitive with a bundle of local, long distance and dial-up service. Hassett and Woodbury make this claim based on their assessment of the prices facing "typical" customers in New York City.

TABLE 3

UNE FACT REPORT PRICE COMPARISON					
	Circuit-Switched		VoIP		
Service	BOC	Cable	Cable	Vonage	Other
Voice*	\$50 - \$60	\$50	\$35 - \$40	\$25	\$20 - \$35
Internet Access	\$10 - \$22		\$42	\$42 - \$50	
Taxes/Fees/Surcharges*	\$5.50 - \$13+		\$0 - \$5	\$2 - \$4	\$0 - \$5
Total	\$65 - \$95	\$65 - \$85	\$77 - \$87	\$69 - \$79	\$62 - \$90
<i>Source:</i> UNE Fact Report, at II-19.					
*Assumes unlimited local, local toll, and long distance calling.					

The featured comparison is between a broadband plus VoIP bundle that sells for between \$62 and \$90 per month and a “comparable” narrowband voice bundles priced between \$65 and \$95 per month.

In fact, however, the average household, according to the most recent data available from the FCC (which is cited by the UNE Fact Report), spends \$47 per month for local and long distance service. As the Fact Report correctly mentions, this total includes contributions to the SLC, the Federal Universal Service Fee, and taxes.²⁶ Moreover, as the Fact Report neglects to mention, this total includes international long distance calling.

A correct comparison between VoIP plus broadband and voice plus dial-up for the typical or average customer, therefore, should use this FCC revenue data and also correct for other mistakes in the computation found in the Fact Report. We present this comparison in Table 4 below, which makes the following corrections to the table from the UNE Fact Report shown above:

²⁶ UNE Fact Report, at II-18 & n.83, citing to FCC Reference Book (July 2004).

- The price for circuit-switched voice service is changed to reflect expenditures by the average customer.
- Taxes/Fees/Surcharges are eliminated from the circuit-switched offering, because they are already included in the estimate for voice service reported by the FCC.
- International calling charges, which are included in the expenditures on voice telephone service for ordinary voice services, are added to the VoIP service.
- The upper end of the range of VoIP service is raised to \$50 per month to reflect the cost to the customer of back-up battery and inside wire costs. This is based on the price charged by Cox Communications for the full-featured cable telephony VoIP service.
- The cost of renting a cable modem is included.
- The cost of cable broadband service is shown as a range from \$40 to \$58 to reflect actual charges of the four largest cable companies.²⁷

Table 4: Cost Comparison for Service Bundles (*CORRECTED*)

	Circuit-switched	Cable	Vonage
Voice	\$47	\$35 - \$50	\$25
International voice ²⁸	included	\$2	\$2
Internet Access	\$10 - \$22	\$42 - \$50	\$42 - \$50
Cable modem rental ²⁹	\$0	\$3	\$3
Taxes, Fees/Surcharges	included	\$0 - \$5	\$0 - \$5
TOTAL	\$57 - \$69	\$82 - \$110	\$72 - \$85
Midpoint	\$63	\$96	\$78.50

²⁷ Merrill Lynch, "Everything over IP," at 13 (June 8, 2004) ("*Everything Over IP*").

²⁸ We assume ten minutes a month of international calling at 20 cents per minute.

²⁹ This is the amount charged by Comcast; charges by other cable companies vary from \$10/month to zero.

This analysis demonstrates that the VoIP-plus-broadband bundle is approximately \$25 more expensive than the voice-plus-dial-up bundle for customers using a cable VoIP service and \$15 more expensive for customers using a third-party VoIP provider. Further, the cable companies are much more likely to appeal to the typical residential subscriber than the third-party systems, because of the ease of installation and the potential for superior voice quality.³⁰ With a \$25 price difference between the old and new service bundles, it is much too soon to declare that competition has arrived. Although for some customers the availability of the new bundle will be sufficiently attractive, there is likely to be a large number of customers (including both “average” customers and those customers with below-average expenditures) that will not switch to VoIP in response to a small, but significant, increase in the price for voice service.

C. Marginal Customers Do Not Constrain Monopoly Pricing

Crandall and Singer argue that “proponents of mandatory unbundling forget that competition for customers (and economic decision-making in general) occurs at the margin [and therefore] a ‘minority’ of households might be sufficient to constrain ILEC prices.”³¹ They appear to be arguing that it doesn’t matter whether the “average” customer using dial-up would switch to the VoIP-plus-broadband bundle, or even whether the households without computers or an Internet connection of any sort would switch to VoIP – the marginal customer should do the trick and discipline the ILECs’ prices for all of their voice customers and services.

³⁰ According to some analysts, there is a growing consensus that cable telephony operators will “marginalize” the third-party VoIP providers by using packet prioritization to give their own telephone traffic priority. *Everything Over IP*, at 19.

³¹ Crandall/Singer Reply Declaration at 3-4.

There are two main fallacies in the Crandall-Singer hypothesis. First, a monopolist sets its price to maximize profits, and will not be disciplined by those customers that do not buy its product at this price. Even though the monopolist could lower price and attract more customers – thereby causing the “marginal” customers to buy its product – the loss in revenue from the non-marginal customers will more than offset the gain in revenue from the marginal customer. This is the reason that monopolists can cause harm. Put differently, under a correct *Merger Guidelines*’ analysis, it matters immensely how big a group of marginal customers would shift purchase decision in response to a SNIP. If the group of marginal consumers is small, their presence will not protect other consumers from the exercise of market power. The most charitable interpretation we can put on Crandall and Singer’s little discourse on the relevance of the marginal consumer is they may think they have shown that many households must be on or close to the margin, even though few have switched to VoIP so far, because they (incorrectly) believe they have shown that the “typical” customer is close to the switching point. However, as we showed above, Crandall and Singer relied on price comparisons that were riddled with major errors.

Second, as the *Merger Guidelines* recognize, but Crandall and Singer do not, a firm with market power may be able to “have its cake and eat it too,” by engaging in price discrimination and lowering prices only for the “marginal” customers, while forcing the non-marginal customers to pay the higher price. For example, the ILECs already offer all-you-can-eat voice packages to customers with greater appetites, while keeping their “rack” rates at high levels. As competition becomes more widespread in some parts of the market, the ILECs will have even powerful incentives to construct price schemes

that wall off the customers with the fewest alternatives. In the language of the *Merger Guidelines*, where (as here) price discrimination is feasible, markets must be defined separately for the customer groups that are subject to discrimination.³²

V. Competition for Bundled Services Provided Over the Broadband Platform is Limited by the Duopoly Over Broadband

The ILEC version of telecommunications markets portrays vigorous competition between broadband providers of service to the home. In addition to their own DSL offerings and the cable companies, the ILECs project substantial competition from competing technologies, including: satellite broadband, power companies, fixed wireless, and mobile wireless. According to the ILECs, there is no added benefit from the presence of UNE-P-based competitors for voice service, because of the competitive nature of the broadband market. This view of the market, however, is based on a very ambitious and unproven projection of competition from alternative technologies, as well as an exaggeration of the extent of competition in a highly concentrated market. This section will address the ILECs' projections about new technologies. The following section will address the impact on the market of allowing two firms to control prices and entry conditions in the broadband market.

There are at least five potential sources of broadband competition, other than the cable and telephone company incumbents: (1) Satellite Broadband; (2) Fixed Wireless; (3) Broadband over Power Line ("BPL"); (4) non-ILEC DSL providers; and (5) Mobile Wireless. Competition from the first two sources is limited, and the prospect that they will bring significant competitive pressure to bear in the near future is very limited. The

³² *Horizontal Merger Guidelines*, Section 1.12, "Product Market Definition in the Presence of Price Discrimination."

third potential source, BPL, is in its infancy. Competition from the fourth and fifth sources is likely to be more widespread, but because of constraints on the capabilities of these technologies they will be unable to constrain the market power of the ILEC/cable duopoly.

Even the ILECs recognize the limited role likely to be played by satellite and fixed wireless carriers in the residential market. The ILECs' own estimate of current and projected subscribers shows both technologies with a very small share of the market, and an expectation of very limited growth over the next several years. Here, in Table 5, we reproduce a portion of a table from the UNE Fact Report showing these ILEC-sponsored estimates of market share of satellite and fixed wireless.³³ Although the ILECs claim that these providers are powerful potential competitors to their own broadband service, the evidence supporting this claim is very weak. Fixed wireless generally costs more and provides less bandwidth than DSL and cable.³⁴ Satellite suffers from quality and cost problems, which will severely handicap it in the race to obtain market share. Indeed, DirecTV, which the ILECs claim is one of the major "potential" competitors, has recently abandoned its Internet-via-satellite efforts and taken a \$1.6 billion charge to earnings of its long-pending Spaceway project.³⁵ Broadband over Power Line is available commercially on an extremely limited basis.³⁶

³³ UNE Fact Report, Table 9, at I-12.

³⁴ Declaration of Joshi, Moyer, Richman, and Zulevic, on behalf of Covad, CC Docket No. 01-338 (Apr. 5, 2002); Declaration of Stephen Siwek and SuSun, on behalf of Covad, CC Docket No. 01-338 (Nov. 20, 2002).

³⁵ *The Wall Street Journal*, at B5 (Oct. 25, 2004).

³⁶ *See, e.g.*, Covad Comments at 28 (Oct. 4, 2004).

Table 5: Alternative Technology Market Penetration
(as reported and projected by the ILECs)

	YE 2004 (est.)	2006	2008
Residential Satellite Broadband Subscribers	0.3 million	0.8 million	1.4 million
Residential Fixed Wireless Subscribers	2 million	3 million	3 million

Mobile wireless and independent DSL providers have greater potential to offer service on a widespread basis. According to the ILECs, there will be 29 million subscribers at the end of 2004, and 75 million subscribers in 2008, to 2G, 2.5G, and 3G services.³⁷ However, mobile wireless is unlikely to be either an economic or technically satisfactory means of providing VoIP, let alone to compete for other uses of broadband, such as entertainment. Mobile bandwidth is expensive relative to the bandwidth available from fixed wireline technologies. Further, voice service uses a lot of mobile bandwidth to accommodate voice conversations, due to the high “activity rate” needed. In addition, VoIP service using mobile broadband would be subject to high packet loss rate in many buildings. This loss rate is not a problem for data, because lost packets can be retransmitted and reinserted in the proper place in the data stream. But the high packet loss rate will degrade seriously the quality of voice service (with a series of pops, clicks and broken transmissions), since conversations occur in real time and the data reinsertion fix that works well for data will not work for VoIP-based voice service. Mobile wireless is not a feasible broadband alternative for entertainment because it does not offer adequate bandwidth.

³⁷ UNE Fact Report, Table 9, at I-12.

Independent DSL providers (often referred to as “DLECs”) are present in the market, but similarly unable to compete against the ILEC for many customers and usages. One reason is that the DLECs are not collocated in a majority of the central offices in the U.S. Another reason is that the DLECs cannot provide service to customers located more than a certain distance (18,000 feet or less, depending on the speed offered) from the central office. As the ILECs have upgraded their own networks to enable broadband service to the customer distant from the central offices, they have denied the DLECs access to these upgraded loops. This has turned the DLECs into “second-class citizens” with more limited capabilities and network coverage than the ILECs.

VI. Impact on Consumers of Broadband Duopoly

The ILECs and the cable companies are increasingly becoming the “only games in town” for consumers that demand all three of the major components of today’s telecommunications bundle. The cable companies now offer entertainment and broadband access, and are deploying telephone service in many service areas. The ILECs offer voice service and broadband access, and are deploying fiber optic facilities in order to provide entertainment services. The market will soon reach the point, as shown in Table 6, where other providers, either on their own or together, cannot offer a bundle comparable to the ILECs or cable companies. The main reason is that no other firm will be able to offer voice service on cost and quality terms that are comparable to the cable companies or the ILECs.

Table 6: Ability of Service Providers to Meet Consumer Demand

	Voice	Internet	Entertainment
ILEC	Yes	Yes	Will be provided with deployment of fiber to the home
Cable	Yes	Yes	Yes
DLECs/CLECs	On a limited basis with UNE-L voice service or VoIP	Yes	No
Satellite	No	Limited	Yes
Wireless	Yes (but not comparable to wireline)	Higher cost and with many limitations	No

This will result in higher prices to consumers of voice products and broadband service, as well as any bundle that contains these two services. This certainly falls very short of achieving a workably competitive outcome, or even anything approaching this outcome. Also, it is contrary to established Commission policy to allow the ILEC/cable duopoly to harm consumers, particularly where an option already exists (*i.e.*, UNE-P) that can alleviate the duopoly problem and increase the potential for entry by other broadband providers over the longer run.

A. The Price Impact of a Duopoly

Economists, antitrust policymakers, and FCC regulators have all recognized that a market limited to two suppliers is not enough to ensure a workably competitive outcome.³⁸ In particular, entry of the RBOCs into long distance service was supported

³⁸ In its decision rejecting a proposed merger of DirecTV and The DISH Network, the Commission fairly summarized the state of current economic and antitrust thinking rejecting any notion that two competitors are enough to generate adequate competition. “[The proposed merger] would result in a reduction in the number of competitors from three to two or from two to one.... *Such a drastic reduction in the number of competitors and concomitant increase in concentration create a strong presumption of significant anticompetitive effects.*” See *Application of EchoStar Communications Corp., General*

(partially) on the grounds that three nationwide suppliers plus a collection of regional facilities-based long distance competitors were not enough to ensure competition, and an additional competitor could materially increase competition. In that debate, the ILECs (which now argue that two are more than enough for competition) argued that three competitors were grossly insufficient for competition, and a fourth competitor could reduce prices to consumers by anywhere from 13% to 50%!³⁹ By the same logic, the price impact of adding a third firm to a two-firm market would have an even greater impact on prices.⁴⁰

The FCC and antitrust authorities have previously dealt with the issue of whether two entertainment “pipes” to the home would be competitive. The proposed merger of DirecTV and The DISH Network was rejected, even though after the merger two “pipes” (one cable and one satellite) would have still been available to most consumers. The Commission concluded that, although two competitors would remain after the merger in

Motors Corp., and Hughes Electronics Corp. (Transferors) and EchoStar Communications Corp. (Transferee), Hearing Designation Order, 17 FCC Rcd 20559, ¶ 99 (2002) (“EchoStar Hearing Order”) (emphasis added).

³⁹ Declaration of Paul W. MacAvoy in Support of Bell Atlantic’s Petition to Provide In-Region, InterLATA Telecommunications Services in the State of New York, at 34-43.

⁴⁰ The RBOCs’ experts used the “Cournot” model to generate their price predictions. They argued that the Cournot model was the most appropriate and widely used oligopoly model. We are not saying Cournot is necessarily the proper way to model the specific two-firm case for broadband markets, but are simply drawing an analogy from a similar telecommunications market where the RBOCs have previously stated a position on how to analyze oligopoly pricing behavior. Today, the ILECs’ economists have completely abandoned the Cournot analysis (which assumes an absence of price competition) that the ILECs championed in the long distance debates, and have adopted (implicitly) a model of intense, two-firm price competition between themselves and the cable companies. Economists generally believe that intense price competition cannot be expected in a two-player market. See Dennis Carlton and Jeffrey Perloff, *Modern Industrial Organization*, at 265 (2nd ed., HarperCollins 1994) (“...experimental evidence indicates that the Cournot equilibrium is often (but not always) observed, *especially in duopoly games.*”) (emphasis added).

many areas, “the proposed merger would significantly increase concentration in an already concentrated market, and thus the merger should be presumed to create or enhance market power or facilitate its exercise.”⁴¹ The Department of Justice was similarly dismissive of the notion that two competitors are enough to create a competitive outcome. “For tens of millions of households in the United States, this merger would create a duopoly.... For the roughly 95% of U.S. television households that currently have three or fewer options for MVPD service, this merger would lead to higher prices and lower service quality....”⁴² The prospect of only two broadband pipes to the home carrying a large bundle of services (that include voice, data, and entertainment) should be even more troublesome to the FCC and the antitrust agencies, because of the likely price structure that the duopoly will create.

The cable companies and the ILECs are increasingly turning to bundled service prices that establish a very low incremental price for components added to the customer’s first or second service. For example, cable companies charge much lower prices for broadband to customers that subscribe to their entertainment services. This price structure accomplishes two business purposes. First, it squeezes the profit margins for single service competitors that have to compete against the low incremental price within the bundle for their service. Second, the bundled services have a lower price elasticity of demand than do the individual components. The consumer must find a way to replace all elements of the bundle at the same time to switch suppliers. This results in more “stickiness” to consumer decisions, and less churn (customer turnover) for suppliers. If

⁴¹ EchoStar Hearing Order ¶ 280.

⁴² See *United States et. al. v. EchoStar Communications Corp., Hughes Electronics Corp., General Motors Corp., and DirecTV Enterprises Inc.*, Case Number 1:02CV02138, Complaint at 6 (D.D.C. filed Oct. 31, 2002).

much of the residential market converts to bundled purchases, the ILECs and cable companies will be able to charge higher prices and earn high profit margins because they will be selling to consumers with lower demand elasticities. The primary potential constraint on such pricing lies in the creation of a third bundle. A secondary constraint comes from bundles of two services (*e.g.*, voice and entertainment, or voice and high-speed Internet access). A later section explains the beneficial role of UNE-P in strengthening both these constraints on the ILEC/cable duopoly.

B. Multiple Providers of VoIP Cannot Constrain the Underlying Market Power of the Broadband Duopoly

The ILECs argue that VoIP is a near-perfect substitute for conventional telephone service, and therefore the retail market for voice telephone service will be competitive. The implication of this argument is that there is no impairment with respect to unbundled switching and they should be freed from their obligation under the Telecommunications Act to offer unbundled access.

Not only is this argument empty with respect to customers that do not subscribe to broadband service, but it also confuses the issue of competition for the underlying facility with the issue of competition for a particular service that is carried on the facility. If, as we just demonstrated, competition for the facility is very weak, then this will result in excessive prices to the retail customer for the services that ride the broadband pipe. The reason is that the facility providers can set prices for any bundle that rides the pipe that capture much of the value to the customer of using it. And although the incremental price for any component of the bundle may be very low, this does not mean the consumer is getting a “good deal.” Rather, the consumer may be paying for that low-priced

component through a high price for the use of the pipe itself or for the bundles that include this particular component.

To make the point as concrete as possible, suppose, as some ILECs suggest,⁴³ that VoIP will become a “killer app” for residential broadband services. Suppose that most households with broadband connections presently spend \$45 per month on ordinary telephone services. Further, assume that the underlying true cost of VoIP is \$25 per month. Because VoIP itself should be very competitive, as claimed by the ILECs’ experts, the highly-competitive VoIP providers will drive the retail price of stand-alone VoIP service to its underlying cost – \$25 per month. This will create \$20 of benefits, equal to the difference between the present cost of voice service (\$45) and the cost of VoIP (\$25). The question is: Who will obtain this benefit?

As just mentioned, the benefit will not accrue to the VoIP providers, because they are forced by competition among themselves to sell VoIP at its underlying cost. Rather the benefit will be divided between the broadband providers and the consumer, depending largely on the market power of the broadband providers. If the broadband market were fully competitive, then consumers would gain the entire \$20.⁴⁴ If the broadband providers are able to set prices at monopoly levels, then consumers will gain none of the \$20.⁴⁵ Rather, the broadband providers will raise the price of unbundled

⁴³ See, e.g., UNE Fact Report at II-4; Qwest Comments at 37 (Oct. 4, 2004).

⁴⁴ For consumers to get most or all of the \$20, the competitive supply curve must also be highly price-elastic, but this is a reasonable assumption.

⁴⁵ In unregulated contexts, even a monopolist shares the benefits of cost-reducing technological change with its customers. The amount of pass-through will depend on the elasticity of demand. However, the ILECs’ retail rates are still subject to various forms of price cap regulation (because regulators know that the market for local telephone is not competitive – if retail regulation were lifted, rates would go up!). Under such regulation,

broadband service, or raise the price of bundles that include voice service. With only two broadband firms in the market, consumers will not get the full benefit from VoIP, unless the duopolists compete as aggressively on price as they would if they faced eight or ten competitors – a scenario that is implausible.

There are many fledgling independent VoIP providers now providing service. It is entirely possible that these firms will be squeezed out of the market by the ILECs and the cable companies. As a recent Merrill Lynch report pointed out, the cable companies may engage in packet prioritization that gives their own VoIP services a significant quality advantage over their competitors.⁴⁶ Also, as we just explained, the ILECs may set a very low incremental price for VoIP services when they are added to a bundle of data and entertainment services. This would drive out the independent VoIP providers, and lead to further consolidation of the industry. At best, even if they survive, the independent VoIP providers would only limit the degree of price discrimination in the market, but not threaten the duopoly's core market power.

Once again, we can draw an analogy to the long distance market, which the RBOCs labeled as a tight oligopoly. In that market, as the RBOCs were quick to point out, the resellers could not constrain the upstream facilities-based providers from charging too much for their “pipes.” Although the resellers were able to flourish for many years and limit the ability of the facilities-owners to practice price discrimination,

a monopolist does not have economic incentives to pass through cost reductions to consumers. Rather, it will keep the full amount of the cost reduction as increased profit.

⁴⁶ See *Everything Over IP*, at 3 (“There is a growing consensus that virtual VoIP services will be marginalized by cable operators through the use of packet prioritization, which will give cable telephony traffic priority over other services”).

they were not viewed by most parties and the FCC as providing a significant enough constraint to compel a workably competitive result in the market.

C. Continued Availability of UNE-P Helps to Constrain the Duopoly

If the necessary UNEs remain available to the CLECs, however, competition and pricing performance will improve in several related markets. The fundamental reason is that when CLECs purchase UNEs on a regulated cost basis, they exhibit the characteristics of being independent cost-based competitors in the local telephone market. This allows firms to provide consumers with stand-alone voice service at economic cost, or to bundle voice service along with entertainment services provided over one of the direct broadcast satellite (DBS) providers. This will benefit consumers directly and also create some pressure on the ILEC/cable duopoly to price their three-component bundles closer to cost.

This pressure is created by the fact that the price for the three-product bundle is constrained by the willingness of customers to pay for a two-product bundle that excludes broadband service. Today, only 25% of households purchase high-speed Internet service. Thus, today, high-speed Internet service is the least critical element of the bundle for consumers. The price they are willing to pay for the full bundle is limited by the value they place on high-speed Internet and the available price for a bundle of voice and entertainment services. UNE-P increases the number of independent bundles of voice and entertainment from two to three, because UNE-P adds a third competitor for the voice product, thereby allowing a CLEC/satellite bundle.

Some might argue that state commission regulation of local retail telephone rates provides a sufficient constraint on the duopoly's pricing freedom, and therefore UNE-P is unnecessary. There are two things wrong with this argument. First, the necessity for

local rate regulation is itself an admission that the market is not workably competitive, and therefore impairment exists. Second, regulation of retail local rates may not constrain the prices of other voice services, such as long distance and vertical services, over which the ILEC/cable duopoly will exercise market power. Absent a more comprehensive regulation of the prices of the panoply of voice services, it is necessary to require that the key inputs into these services, *i.e.*, the unbundled network elements, continue to be made available to the CLECs.

VII. Conclusion

VoIP is an exciting and potentially very important technological development. It enables customers to use their broadband Internet connections to make and receive voice calls and provides many enhanced calling and call management features to mass market customers. It is too soon to say, however, whether enough mass market customers will accept VoIP as an alternative to their POTS service, such that the ILECs will lose much of their market power over voice services. The uncertainties surrounding consumer acceptance of VoIP will be resolved over the next few years.

Even if most consumers would be willing to accept VoIP as an alternative, there are only two major broadband platforms that can deliver VoIP service to the mass market. This market structure will not generate a competitive outcome, and indeed the cable/ILEC duopoly will have a powerful incentive to limit the ability of stand-alone providers of VoIP, or other voice services, to compete against them for a part of the bundle that they are offering to customers. Absent a major technological breakthrough that would make additional broadband pipes into effective competitors, the Commission should continue to treat the

ILECs' competitors as impaired with respect to the network elements required to compete in the mass market.

Attachment 1

APPENDIX C TROUBLESHOOTING

Troubleshooting topic	Page
I just finished installation and cannot get a dial tone on my phone.	21
I had a dial tone before, but do not receive a dial tone now.	
I can surf the Internet but have a blinking red status light and do not have dial tone.	21
I get a Page Not Found error when attempting to browse the Web with my computer.	21
I need help getting my computer to “obtain IP address automatically.”	22
I need help cloning my MAC address.	22
I am connected via a home router and my real time/gaming applications are not working correctly.	23
I have DSL and I cannot access my TA setup Web page.	23
I have DSL and am getting the message “can’t connect to the Internet” even though I can see the Internet.	23

Troubleshooting topic	Page
I keep getting “activation fail” during the TA Activation process.	24
I forgot my PPPoE username and password. Where can I find it?	24
I may have a static IP address but I’m not sure.	24
I have DSL and keep getting “authentication fail” for connecting status.	24
I may have an integrated modem/home router. How can I find out?	25
I have an integrated modem/home router. I don’t know which section to use in this guide.	25
I have a USB DSL modem.	25
I have a satellite broadband Internet connection.	25
I have a private IP address.	25
I can’t get this to work with my company’s VPN.	25

Troubleshooting topic	Page
My data service is lost every once in a while, but I still have a dial tone.	25
I am using a home router and have to reboot everything to get the data to work again.	
My TA Status and WAN lights sometimes blink green or amber for no apparent reason. Should I be concerned?	26
I am having voice quality problems with my phone.	26
I cannot use this line in any other room.	26
I cannot hook multiple phones to the TA.	26
I cannot use my existing phone jacks throughout the house for my AT&T CallVantage Service.	26
I can’t get this to work with my home security system.	26

PROBLEM

RESOLUTION

I just finished installation and cannot get a dial tone on my phone.

I had a dial tone before, but do not receive a dial tone now.

1. Verify that the switch on the back of the TA is set to VoIP.
2. Make sure you follow the instructions step by step.
3. Check that you do not have a router between the TA and cable/DSL modem.
4. Make sure your phone is plugged into the jack of the TA (Line 1) and your phone is appropriately charged and in working order. One way to make sure is to try connecting your phone into any working telephone jack and see if you get a dial tone.
5. Check your connection between your TA and cable or DSL modem. The connectors on the Ethernet cable look like a regular phone connector, but wider. Make sure that these connectors "click" into place when they are plugged in.
6. See if your cable/DSL Internet service is operational. You should be able to access the Web with browsing software.
7. Power all devices down and unplug your cable/DSL modem and home router. Leave them off for at least 15 minutes. Power up your cable/DSL modem and wait until all appropriate indicator lights are lit. Plug your TA into a power outlet. Power up your router (if you have one). Turn on your computer(s).
8. If you still cannot get a dial tone, try a hard reset of your TA to restore it to its factory default settings. Power all devices down and unplug your cable/DSL modem and home router. Follow the power-up sequence above, but when powering up the TA, HOLD down the reset button at the back, then HOLD the reset button down for about 10 seconds.
9. If you still do not get a dial tone, contact technical support.

PROBLEM

RESOLUTION

I can surf the Internet but have a blinking red status light and do not have dial tone.

1. Your TA may be connected to the Ethernet port of your router and not directly to your cable/DSL modem. Confirm that your cabling is correct according to Step 3.
2. You may have a private IP address. If so, see "I have a private IP address" on page 25.
3. You can also try a hard reset of your TA to restore it to its factory settings. See resolution step #8 under "I just finished installation and cannot get a dial tone" to the left on this page. If the problem persists, call Technical Support

I get a Page Not Found error when attempting to browse the Web with my computer.

1. Re-read the instructions and make sure you followed them step by step. Make sure the Ethernet cables are "clicked" into place.
2. Power all devices down and unplug your cable/DSL modem and home router. Leave them off at least 15 minutes. Power up your cable/DSL modem and wait until all indicator lights are lit. Plug your TA into a power outlet. Power up your router (if you have one). Turn on your computer(s).
3. If you still can't browse, your computer may not be set to "Obtain IP address automatically". See "I need help getting my computer to obtain IP address automatically", below.
4. Some cable users need to clone their MAC address to be fully functional with their operator's network. See "I need help cloning my MAC address", below.

APPENDIX C TROUBLESHOOTING, CONTINUED

PROBLEM	RESOLUTION	PROBLEM	RESOLUTION
<p>I need help getting my computer to "obtain IP address automatically."</p>	<p>If you have a single computer connected to your cable/DSL modem, try the following (if you have a router, you must set this on your router, not your computer):</p> <p><i>For Windows 95, 98, or ME</i></p> <ol style="list-style-type: none"> 1. Go to "Start", select "Settings", then "Control Panel." Double Click "Network" 2. Highlight "TCP/IP" and click the "Properties" button. 3. Make sure "Obtain an IP address automatically" is selected. 4. Click OK several times to return to the desktop, and if your computer asks you to, restart your computer. <p><i>For Windows 2000</i></p> <ol style="list-style-type: none"> 1. Go to "Start", select "Settings", then "Network and Dial Up Connections." 2. Double click the "Local Area Connection" icon and click the "General" tab. 3. Highlight "Internet Protocol (TCP/IP)" and click the "Properties" button. 4. Make sure "Obtain an IP address automatically" is selected. 5. Click OK several times to return to the desktop, and if your computer asks you to, restart your computer. 	<p>(Continued)</p>	<p><i>For Windows XP</i></p> <ol style="list-style-type: none"> 1. Go to "Start", select "Control Panel." Double click "Network Connections" 2. Highlight the "Local Area Connection" icon and click "Change settings of this connection." 3. On the "General" tab, highlight "Internet Protocol (TCP/IP)" and click the "Properties" button. 4. Make sure "Obtain an IP address automatically" is selected. 5. Click OK several times to return to the desktop, and if your computer asks you to, restart your computer.
		<p>I need help cloning my MAC address.</p>	<p>Connect to the TA via 192.168.15.1 through a Web browser. Click "Configure WAN IP." If your cable Internet service requires a Host name enter it in the following area. Clone the MAC address on the computer that is registered on the cable provider's network.</p> <p>NOTE If MAC cloning is required, please use the original computer that was registered onto the cable network. If you don't have access to that computer, please call your cable provider to register your new computer's MAC address on their network.</p>

PROBLEM	RESOLUTION	PROBLEM	RESOLUTION
<p>I have DSL and I cannot access my TA setup Web page.</p>	<ol style="list-style-type: none"> 1. First check to ensure you have an up to date browser. You will need IE 5.5 or higher on Windows, IE 5.X on Mac OS 9 or OS X, or Apple Safari 1.0 or higher on Mac OS X. 2. Power all devices down. Leave them off for at least 15 minutes. Power up your cable/DSL modem and wait until all appropriate indicator lights are lit. Power up your TA by plugging it into a power outlet. Power up your router (if you have one). Turn on your computer(s). 3. If you still cannot access the TA setup Web page you may need to perform a hard reset of your TA to restore it to its factory settings. To do this, power all devices down and unplug your cable/DSL modem and home router. Follow the power-up sequence above, but when powering up the TA, HOLD down the reset button on the back of the TA WHILE you power up the box, then HOLD the reset button down for about 10 seconds. 	<p>I am connected via a home router and my real time/gaming applications are not working correctly.</p>	<p>Your home router acts as a NAT (Network Address Translation) device. After installing the TA, there are now two NAT devices connected to each other. All Internet traffic is now going through double NAT. This is not a problem for most applications, but some, especially real time gaming applications, will not work correctly.</p> <p>To eliminate double NAT, use the home router as a switch by connecting the TA's Ethernet port to the home router's LAN (Ethernet) port, instead of the WAN port. This way NAT functions are bypassed in the home router and Internet traffic is only passing through single NAT (that of the TA). A crossover cable may have to be used between the TA and router.</p>
<p>I have DSL and am getting the message "can't connect to the Internet" even though I can see the Internet.</p>	<p>This is likely because your DSL provider installed communications software on your computer that is no longer used to connect to the Internet.</p> <p>Contact your DSL provider for assistance in deinstalling or re-configuring this software, and to see if you need to update your browser settings.</p>		

APPENDIX C TROUBLESHOOTING, CONTINUED

PROBLEM	RESOLUTION	PROBLEM	RESOLUTION
I keep getting "activation fail" during the TA Activation process.	Make sure that prior to beginning the TA Activation process you have disconnected from any secure client such as a VPN client and that you are connecting to the Internet through your cable/DSL Internet provider.	I have DSL and keep getting "authentication fail" for connecting status.	<ol style="list-style-type: none"> 1. Make sure your cabling is correctly set up according to this guide. 2. Power all devices down and unplug your cable/DSL modem and home router. Leave them off for at least 15 minutes. Power up your cable/DSL modem and wait until all appropriate indicator lights are lit. Power up your TA by plugging it into a power outlet. Power up your router (if you have one). Turn on your computer(s). 3. Check to see that your PPPoE username and password are correct (you may need to contact your DSL provider for this information.) 4. Check to see whether you have an integrated modem/home router (if you do, see "I have an integrated modem/home router" below)."
I forgot my PPPoE username and password. Where can I find it?	This information should have been provided by your DSL service provider. If you cannot find the information, please contact your DSL service provider to obtain this information.		
I may have a static IP address but I'm not sure.	<p>Chances are you have dynamic IP addressing.</p> <p> If you have a home router, you can check whether or not your router is set up for static or dynamic IP using your router configuration Web page (see your home router's documentation).</p> <p> If you don't have a router, you should find your TCP/IP properties (in the Network Settings area of your computer – see your computer's online help or page 22 of this guide if you do not know where this is). If "obtain IP address automatically" is checked, you have dynamic IP; if "specify an IP address" is checked, you have static IP. To be sure, you can also check with your cable/DSL service provider.</p>		

PROBLEM	RESOLUTION	PROBLEM	RESOLUTION
I may have an integrated modem/home router. How can I find out?	If you have a single device that plugs directly into your cable/DSL jack and that you can connect multiple computers into (allowing each to access the Internet), you have an integrated modem router.	I can't get this to work with my company's VPN.	AT&T CallVantage SM Service supports most VPN clients. Check the settings on your VPN Client to verify that "keepalive" messages are disabled. Also, select "allow VPN to pass through NAT", if this option is available. You may have to disable (uncheck) "negotiate UDP encapsulation with VPN tunnel server", if this option is available. You may also have to contact your network administrator to understand what other settings may need to be modified for your setup.
I have an integrated modem/home router. I don't know which section to use in this guide.	While integrated modem/home routers are not explicitly supported, you can typically get the service to work if you put the integrated modem/router in bridge mode. Check with your cable/DSL provider to see if it supports putting integrated modem/routers in bridge mode, and if so, how to put your device into bridge mode.	My data service is lost every once in a while, but I still have a dial tone.	If you are using a home router, make sure your device has the most up-to-date software available from the manufacturer. Software updates are readily available from the manufacturer's Web site. Check their site for your model, and compare the most recent version they are offering against the version your device is running. If they are not the same, follow the upgrade instructions on the Web site or in your router's manual.
I have a USB DSL modem.	DSL modems with only a USB interface are not supported.	I am using a home router and have to reboot everything to get the data to work again.	
I have a satellite broadband Internet connection.	Satellite broadband connections are not supported.		
I have a private IP address.	While private IP addresses are not explicitly supported, you can typically get the device to work if you put your router into what is known as bridge mode. Check with your router's owner's manual to see if it supports bridge mode and how to do so.		

APPENDIX C TROUBLESHOOTING, CONTINUED

PROBLEM	RESOLUTION	PROBLEM	RESOLUTION
My TA Status and WAN lights sometimes blink green or amber for no apparent reason. Should I be concerned?	<p>You should not be concerned; this is normal. This indicates your TA is automatically receiving firmware upgrades from our network.</p> <p>You can place a call while this is happening but you MUST NOT unplug your TA while these lights are blinking or you may damage your TA. If you are on a call when a firmware update occurs your call will not be affected.</p>	I cannot use my existing phone jacks throughout the house for my AT&T CallVantage Service.	You cannot use your existing phone jacks with AT&T CallVantage Service. If you want to use AT&T CallVantage Service in other rooms, you can use a cordless phone.
I am having voice quality problems with my phone.	<p>Check your cable/DSL speed at: http://www.broadbandreports.com/stest. Your cable/DSL provider's connection speed can vary; if your speed does not meet the minimum requirements of 90Kbps uplink and downlink at this time, you may want to try again later. You can also try disconnecting the phone and using a different corded or cordless phone.</p>	I can't get this to work with my home security system.	Home security or alarm systems are not supported by this service.
I cannot use this line in any other room.	You can connect a cordless phone base station into "Line 1" on the TA in order to use the phone throughout your home.		
I cannot hook multiple phones to the TA.	AT&T CallVantage Service supports a single line. You can connect a cordless phone base station into "Line 1" on the TA in order to use the phone in any other room. You can also use a cordless phone with two or more handsets.		