

**I. INTRODUCTION**

**Q. PLEASE STATE YOUR NAME, ADDRESS AND OCCUPATION.**

A. My name is John F. Finnegan. My address is 1875 Lawrence St., Denver, CO 80202. I am a Senior Policy Witness in AT&T's Law and Government Affairs organization.

**Q. PLEASE PROVIDE YOUR BACKGROUND AND PROFESSIONAL EXPERIENCE AS THEY RELATE TO THE ISSUES IN THIS PROCEEDING.**

A. My education and relevant work experience are as follows. I have a B.S. in Engineering from the Rutgers College of Engineering and an M.B.A. from the University of Denver. I have worked for AT&T for over 20 years. After graduating from Rutgers, I spent the next two years with Combustion Engineering in Valley Forge, PA as a Project Engineer. In 1983, I joined AT&T as a purchased product engineer. Over the next 12 years, I spent time with AT&T in a variety of engineering, quality management, sales and marketing positions. Almost half of that time was spent leading a supplier quality management organization.

In 1995, I joined AT&T's New Markets Development Organization and was one of the first employees in AT&T's Western Region to explore the opportunities associated with providing local exchange services. In 1996, I began in my current position of Senior Policy Witness. As a Senior Policy Witness, I am responsible for developing and advocating AT&T's position on a wide range of issues.

1 During Qwest's attempt to obtain Section 271 relief, I concentrated my work  
2 efforts on collaborating with Qwest, CLECs and state regulators on understanding  
3 and evaluating Qwest's operational support system ("OSS") and developing  
4 performance measurements supporting those OSS. I was AT&T's representative  
5 in the Arizona and the Regional Oversight Committee's ("ROC") OSS tests since  
6 their inception. Since the issuance of the Triennial Review Order, I have been  
7 concentrating my efforts on the cross over point issue that is relevant to this  
8 testimony, the batch hot cut process, including participation in industry  
9 workshops addressing batch hot cuts, market definition and triggers.

10 I am a frequent panelist on ROC OSS and Triennial Review Order discussions. I  
11 have testified in proceedings in Kansas, Iowa, Minnesota, Arizona, Montana,  
12 Wyoming, Utah, Idaho, Colorado, Washington, North Dakota, South Dakota,  
13 Nebraska, Oregon, and New Mexico.

14 **Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY?**

15 A. The purpose of my testimony is to recommend an approach the Commission can  
16 use to distinguish the mass market from the enterprise market, as directed by the  
17 FCC. I also conduct a quantitative analysis that results in a recommendation in  
18 the number of lines that distinguish the mass market from the enterprise market  
19 (the cross over point).

20 **I. Summary**

21 **Q. WHAT IS THE CROSSOVER POINT THAT YOU RECOMMEND THIS**  
22 **COMMISSION ADOPT?**

23 A. I recommend that the commission adopt a cross over point of 13 lines.

1   **Q.     HOW DID YOU ARRIVE AT THIS CONCLUSION?**

2   A.     I arrived at this conclusion by determining where it made economic sense for a  
3           competitive local exchange carrier (“CLEC”) to serve a multi-line plain old  
4           telephone service (“POTS”) customer using a DS1 based service. In performing  
5           the analysis to arrive at that conclusion, I identified all of the costs that are  
6           incurred when serving a multi-line POTS customer with a DS1 based service and  
7           divided that total cost by the cost of a single UNE-P line. The result of that  
8           calculation rounded up to the next whole number is the cross over point.

9   **II.     Introduction**

10  **Q.     PLEASE IDENTIFY THE FUNDAMENTAL CROSS OVER POINT ISSUE**  
11  **THE FCC ASKED STATE COMMISSIONS TO ADDRESS.**

12  A.     The FCC tasked the state commissions with determining the point where it makes  
13           economic sense for a multi-line customer to be served via a DS1 loop, termed by  
14           the FCC as the “crossover point.”<sup>1</sup> The purpose of making this determination is  
15           to establish when a customer would be considered a “mass market” customer as  
16           distinguished from the “enterprise market.” The FCC identified the cross over  
17           issue in the section of the TRO that is concerned with defining the market.<sup>2</sup>

18  **Q.     DID THE FCC SUGGEST UNITS THAT COULD BE USED IN**  
19  **DISTINGUISHING THE MASS AND ENTERPRISE MARKETS?**

20  A.     Yes, it did. The FCC suggested that the number of DS0 lines a customer uses at a  
21           particular location would be an appropriate unit for the cross over analysis.

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<sup>1</sup> *In the Matter of Review of the Section 251 Unbundling Obligations of Incumbent Local Exchange Carriers, Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, and Deployment of Wireline Services Offering Advanced Telecommunications Capability*, CC Docket Nos. 01-338, 96-98 & 98-147, Report and Order and Order on Remand and Further Notice of Proposed Rulemaking, FCC 03-36 (rel. Aug. 21, 2003) (“*Triennial Review Order*” or “*TRO*”). ¶ 497.

<sup>2</sup> *Id.*, ¶¶ 495 – 497.

1 Specifically, the FCC stated, “as part of the economic and operational analysis  
2 discussed below, a state must determine the appropriate cut-off for multi-line DS0  
3 customers as part of its more granular review.”<sup>3</sup> The FCC asked the state  
4 commissions to identify the number of DS0 lines needed at a particular customer  
5 location before the customer crosses over from the mass market to the enterprise  
6 market.

7 **Q. WHAT ARE THE CHARACTERISTICS OF MASS MARKET**  
8 **CUSTOMERS?**

9 A. The mass market customer base is: (a) primarily interested in basic voice POTS  
10 service<sup>4</sup>; (b) widely geographically dispersed<sup>5</sup>; and (c) unaccustomed to complex  
11 or disruptive provisioning schemes.<sup>6</sup> The TRO recognizes each of these  
12 characteristics when it distinguishes mass market from enterprise customers. For  
13 purposes of the switching impairment analysis, the FCC stated “mass market  
14 customers are analog voice customers that purchase only a limited number of  
15 POTS lines, and can only be economically served via DS0 lines.”<sup>7</sup> Mass market  
16 customers are not located exclusively in concentrated geographic locations such  
17 as central business districts; rather residential and small business customers are  
18 located across all urban, suburban, and rural locations. These customers expect  
19 that using their telephone services, as well as changing service providers, should

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<sup>3</sup> *Id.* ¶ 497.

<sup>4</sup> *Id.*

<sup>5</sup> *Id.* ¶ 205.

<sup>6</sup> *Id.* n. 716.

<sup>7</sup> TRO ¶ 497. *See also* ¶ 127 (“Mass market customers consist of residential customers and very small business customers. Mass market customers typically purchase ordinary switched voice service (Plain Old Telephone Service or POTS) and a few vertical features.”)

1 not be a complicated transaction. As the FCC described it, “mass market  
2 customers demand reliable, easy-to-operate service and trouble-free installation.”<sup>8</sup>

3 **Q. HOW DOES AN ENTERPRISE CUSTOMER DIFFER FROM A MASS**  
4 **MARKET CUSTOMER?**

5 A. Enterprise customers demand a level of service and capacity – particularly for  
6 data services – quite different from the mass market customer. As the FCC put it,  
7 “DS1 enterprise customers are characterized by relatively intense, often data  
8 centric, demand for telecommunications services sufficient to justify service via  
9 high-capacity loops at the DS1 capacity and above.”<sup>9</sup>

10 Enterprise customers also require more sophisticated sales, marketing and  
11 technical support than mass market customers. For example, local exchange  
12 carriers can generally acquire POTS customers through inbound or outbound  
13 telemarketing calls, direct mail or similar simplified marketing techniques. In  
14 contrast, convincing a customer served by analog mass market loops to upgrade to  
15 “enterprise” status using digital DS1-based service in order to change service  
16 providers generally requires sales personnel to visit the customer on one or more  
17 occasions. As explained below, such an upgrade requires that changes be made to  
18 the customer’s CPE at its premises. As a result, CLECs may also need to have  
19 Systems Consultants visit with the customer. Consequently, it requires  
20 considerably more sales and marketing activity, hence expense, to acquire an  
21 enterprise customer than it does a mass market customer.

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<sup>8</sup> TRO ¶ 467.

<sup>9</sup> TRO ¶ 451.

1 In addition, after the CLEC sales personnel visits with the customer, not every  
2 customer will decide to take service with that CLEC. In that event, the sales and  
3 marketing costs are expended by the CLEC without any accompanying revenue.

4 **Q. HOW MUCH MORE COSTLY IS IT TO MARKET TO AN ENTERPRISE**  
5 **CUSTOMER THAN TO A MASS MARKET CUSTOMER?**

6 A. Industry analysts have estimated that the cost to acquire a mass market customer  
7 is \$125.<sup>10</sup> I estimate that, because of the additional activities and expertise  
8 required, the costs to acquire an enterprise customer are six times higher than the  
9 costs to acquire a mass market customer. For purposes of this analysis, I used a  
10 marketing cost differential of \$625.<sup>11</sup>

11 **Q. HOW DOES THE TRIENNIAL REVIEW ORDER DISTINGUISH THE**  
12 **MASS AND ENTERPRISE MARKETS?**

13 A. The Triennial Review Order provides that a customer served by mass market  
14 loops is to be considered part of the enterprise market when “it is economically  
15 feasible for a competitive carrier to provide voice service with its own switch  
16 using a DS1 or above loop. We determine that this includes all customers that are  
17 served by the competing carrier using a DS1 or above loop and all customers  
18 meeting the DS0 cutoff described in paragraph 497.”<sup>12</sup> In describing the cross  
19 over point, the FCC stated that it “may be the point where it makes economic  
20 sense for a multi-line customer to be served via a DS1 loop.”<sup>13</sup>

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<sup>10</sup> See Banc of America Securities, Research Brief Wireline Telecommunications, *AT&T Corporation A Case for Consumer Services*, April 30, 2003, p. 20.

<sup>11</sup> Cost to market to an enterprise customer (\$750) – Costs to market to a mass market customer (\$125) = \$625.

<sup>12</sup> TRO ¶ 421, n.1296.

<sup>13</sup> TRO ¶ 497.

1   **Q.    WHAT IS THE CROSS OVER POINT FOR MULTI-LINE DS0**  
2   **CUSTOMERS?**<sup>14</sup>

3    A.    This is the point at which ILECs are relieved of their obligation to provide  
4           unbundled local switching to an individual customer location.<sup>15</sup> The purpose of  
5           the cross over is to establish a governmentally drawn upper boundary to the mass  
6           market – in effect, substituting the Commission’s judgment of how a customer  
7           *should be* served (via a DS-1), for the customer’s judgment of how it *has chosen*  
8           to be served (multiple POTS lines).

9   **Q.    WHAT IS THE PRACTICAL IMPLICATION OF THE CROSS OVER**  
10  **POINT?**

11  A.    In all but the most limited situations, an ILEC’s unbundled local switching  
12           network element is only used as part of a platform with all of the other unbundled  
13           network elements known as UNE-P. The cross over point will decide the line  
14           level at which a CLEC can and cannot serve customers using UNE-P.

15  **Q.    DID THE FCC COME TO ANY PREVIOUS CONCLUSIONS ON**  
16  **DISTINGUISHING THE MASS FROM THE ENTERPRISE MARKET?**

17  A.    Yes, it did. The FCC previously found that if a customer had four or more lines at  
18           a single customer location in density zone 1 in one of the top 50 Metropolitan  
19           Statistical Area (“MSAs”) and the ILEC had provided non-discriminatory, cost-  
20           based access to the enhanced extended link (“EEL”), then the ILEC had no

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<sup>14</sup> *Id.*

<sup>15</sup> It should be noted that if the Commission finds no impairment with respect to unbundled local switching, a Bell Operating Company would still have to provide access to that element (TRO ¶ 653); however, it would not have to provide switching at the rates, terms and conditions mandated by section 252 of the Act (TRO ¶ 656).

1 obligation to provide unbundled local switching.<sup>16</sup> However, that conclusion did  
2 not apply in other than the top 50 MSAs or in density zones other than zone 1 in  
3 the top 50 MSAs. This finding has become known as the “three line limit” or the  
4 “switching carve-out.”

5 **Q. WHAT FACTS DID THE FCC RELY ON IN SETTING THE “THREE**  
6 **LINE LIMIT”?**

7 A. Frankly, the evidence the FCC relied upon in reaching its three line limit was  
8 minimal. It appears that the FCC based much of its finding on the presence of  
9 CLEC local switches in density zone 1 in the top 50 MSAs. Specifically, the FCC  
10 concluded, “exempting incumbent LECs from unbundling local circuit switching  
11 in certain circumstances in the top 50 MSAs is reasonable because nearly all of  
12 the top 50 MSAs contain a significant number of competitive switches.”<sup>17</sup>  
13 However, the FCC did not provide any meaningful explanation as to how that  
14 finding translated into a three line (or any specific line) limit. Indeed, in his  
15 Separate Statement, Commissioner Harold Furchtgott-Roth pointed out the  
16 absence of evidence supporting a three line limit when he stated:

17 We have before us no clear evidence that there are *material*, switching-  
18 related differences in the cost of serving customers with different numbers  
19 of lines. Certainly, there is no basis whatsoever for concluding there are  
20 *material* differences in the cost of providing switching to customers with  
21 three lines, rather than four. ....From a technological and economic  
22 perspective, there is no difference between a carrier that serves four one-  
23 line customers and a carrier that serves one four-line customer. There is  
24 consequently no reason to discriminate between the two carriers by giving

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<sup>16</sup> Before the Federal Communications Commission, In the Matter of Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, CC Docket No. 96-98, Third Report and Order and Fourth Further Notice of Proposed Rulemaking (“UNE Remand Order”), Decision FCC 99-238, Released November 5, 1999, ¶ 278.

<sup>17</sup> *Id.*, ¶ 281.



1 the first access to local circuit switching, but denying such access to the  
2 second.<sup>18</sup>  
3

4 **Q. DOES MERE EVIDENCE OF THE EXISTENCE OF COMPETITIVE**  
5 **SWITCHES SUPPORT A THREE LINE LIMIT?**

6 A. No. In considering the evidence regarding the number of competitive switches in  
7 zone 1 in the top 50 MSAs, the FCC failed to consider what type of customers  
8 were being served by the switches. What the FCC did not appreciate at the time  
9 of the UNE Remand Order – and what it does appreciate now, is that competitive  
10 switches are used to serve large business enterprise customers. Thus, as the FCC  
11 found in the TRO:

12 We find that the extent of competitive LEC circuit switch deployment  
13 varies tremendously in the enterprise and mass markets. In particular, we  
14 find that the record demonstrates significant nationwide deployment of  
15 switches by competitive providers to serve the enterprise market, but  
16 extremely limited deployment of competitive LEC circuit switches to  
17 serve the mass market.<sup>19</sup>  
18

19 **Q. SHOULD THE STATE COMMISSION SIMPLY ACCEPT THE FCC'S**  
20 **THREE LINE AS THE APPROPRIATE CROSS OVER POINT?**

21 A. Absolutely not. As discussed above, the FCC's initial line limit was not based  
22 upon a factual analysis. More importantly, the FCC has directed the state  
23 commissions to make a fact-based determination of the cross over point as part of  
24 its granular analysis, using a cost/economic based review. It follows logically that  
25 the FCC would not have delegated this review to the state commissions if it

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<sup>18</sup> Separate Statement of Commissioner Harold Furchtgott-Roth, Concurring in Part and Dissenting in Part, Re: Implementation of the Local Competition Provisions of the Telecommunications Act of 1996, Third Report and Order and Fourth Further Notice of Proposed Rulemaking, CC Docket 96-98, FCC 99-238, pp. 2-3.

<sup>19</sup> TRO, ¶ 435.

1 believed that its prior line determination was simply to be adopted by state  
2 commissions.

3 **Q. HOW SHOULD THIS COMMISSION DEVELOP THE CROSS OVER**  
4 **POINT?**

5 A. I recommend that the analysis be based on the economic and operational factors  
6 that a CLEC must face in deciding whether to serve a customer using multiple  
7 UNE-P lines or lines that are aggregated onto one or more DS1 services. This  
8 analysis compares the total costs to provision DS1 services at a customer's  
9 location to the costs of serving that same customer via UNE-P.

10 The costs to provision DS1 service at a location are characterized by substantial,  
11 upfront marketing, non-recurring and investment costs and monthly recurring  
12 costs that are generally not dependent upon the number of lines served at the  
13 customer's location. That is because it generally costs a CLEC roughly the same  
14 to serve a customer with a DS1 based service whether the customer has one line  
15 or twenty-four lines.<sup>20</sup>

16 In contrast, a CLEC's cost to order and provision UNE-P service include virtually  
17 no investment or upfront non-recurring costs. The CLEC's monthly recurring  
18 costs are directly related to the number of loops served at a location.<sup>21</sup> For  
19 example, if the ILEC's rate for UNE-P service is \$20 per line per month, then the  
20 total monthly cost to serve a customer with five lines is \$100.

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<sup>20</sup> A DS1 loop can serve up to 24 voice grade equivalents.

<sup>21</sup> A CLEC that provides a customer with service using UNE-P will certainly incur some non-recurring expenses for activities such as creating an internal order once the customer has agreed to subscribe to the CLEC's service and submitting an order to the ILEC. However, those expenses would also occur if the CLEC served the customer using a DS1 based service. To simplify the analysis, CLEC costs to order either UNE-P or DS1 loops are excluded from the analysis.

1 To arrive at the recommended cross over point, I calculate the total monthly cost  
2 to sell, install and maintain a DS1 based service at a customer's location and then  
3 I divided that result by the monthly UNE-P costs of serving that same customer.  
4 This result (rounded to the next higher whole number) yields the number of UNE-  
5 P lines at which the CLEC should be economically indifferent between using  
6 UNE-P or DS1 lines to serve that location. My analysis also generally compares  
7 and contrasts the operational issues associated with using UNE-P and DS1  
8 services.

9 **Q. HOW DOES YOUR ANALYSIS ACCOUNT FOR THE DIFFERENT UNE**  
10 **RATE ZONES IN THIS STATE?**

11 A. The costs for a DS1-capable loop and UNE-P can vary substantially by rate zone.  
12 Thus, there could conceivably be a different cross over point for each rate zone.  
13 However, for the sake of simplicity and administrative efficiency, I recommend a  
14 cross over point based upon a weighted average of the cross over points for the  
15 individual zones.<sup>22</sup> The weighting is based on the percentage of unbundled loops  
16 that are found in each zone.

17 **III. UNE-P and DS1 Network Architectures**

18 **Q. DO THE RELATIVE NETWORK ARCHITECTURES OF UNE-P AND**  
19 **DS1 SERVICE AFFECT THE COSTS USED IN THE ANALYSIS?**

20 A. Yes. To understand the analysis, one must first understand the UNE-P and DS1  
21 network architectures.

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<sup>22</sup> Since the analysis determines rate zone-specific cross over points, the Commission can alternatively use it to establish cross over points for each rate zone. The analysis can also be used to develop weighted average cross over points if the Commission defines geographic market areas that include more than one rate zone.

1   **Q.     PLEASE DESCRIBE THE NETWORK ARCHITECTURE FOR UNE-P.**

2   A.     The network architecture for UNE-P is the same, simple POTS architecture that  
3           ILECs use to provide retail service to their own end users. To obtain service, a  
4           customer with one or more telephone lines merely plugs its analog telephone sets  
5           into wall jacks. Each jack will be associated with one or two of the customer's  
6           telephone numbers.<sup>23</sup> The wall jacks are connected to the customer's inside  
7           telephone wire. The inside wire for a premises terminates at the customer's  
8           Network Interface Device ("NID"). For a residential customer, the NID is  
9           generally located on the side of the customer's house. For small business  
10          customers, the NID can be located on the side of the customer's building or inside  
11          the customer's building in some type of equipment closet. For each POTS line at  
12          a customer's location, an ILEC twisted copper loop is connected to the NID. The  
13          copper loop provides the electrical current necessary to ring the customer's  
14          telephone when an incoming call is received and to provide dial tone when the  
15          customer attempts to make a call.<sup>24</sup> Because all of the electrical current required  
16          to make and receive telephone calls is provided over the copper loop, a  
17          customer's telephone service will operate even when the customer has  
18          experienced an electrical power outage.

19          Thus, in its simplest form, with a POTS architecture, each telephone line has its  
20          own separate connection from the customer's premises to the local circuit switch

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<sup>23</sup> A telephone jack can be wired to support two different telephone lines with two different telephone numbers. This permits a customer to use both telephone lines with a single, two-line, analog telephone set.

<sup>24</sup> If the customer's copper loop is connected directly to the circuit switch, the switch will provide the ringing current and dial tone. If the customer's loop has multiplexing equipment in the loop, the multiplexing equipment provides the ringing current and dial tone.

1 serving that customer. For example, a customer with eight POTS lines will have  
2 eight separate loop connections to the local circuit switch serving those lines.

3 **Q. DOES A UNE-P ARCHITECTURE REQUIRE THE CLEC TO MAKE**  
4 **ANY INVESTMENT IN CPE OR NETWORK EQUIPMENT?**

5 A. Generally speaking, a CLEC does not have to make any network or CPE  
6 investments to serve a customer using UNE-P. A CLEC may, however, invest in  
7 its own equipment to provide voice mail service or to provide its own operator or  
8 directory assistance services. For purposes of this analysis, no CLEC investment  
9 is assumed when the CLEC serves a customer using UNE-P.

10 **Q. WHAT NON-RECURRING UNE-P COSTS ARE CONSIDERED IN THE**  
11 **ANALYSIS?**

12 A. None. Ordinarily, my analysis would assume that a customer with POTS service  
13 from the ILEC would be migrated to CLEC UNE-P service and I would include  
14 such non-recurring migration costs in this analysis. However, in Missouri the  
15 UNE-P migration recurring charge is \$1.05, per electronic LSR.<sup>25</sup> Because the  
16 costs incurred by the ILEC to migrate a customer from retail to UNE-P are  
17 relatively<sup>26</sup> low, I did not include them in the analysis. There are no other non-  
18 recurring UNE-P costs that I considered in the analysis.

19 **Q. WHAT ARE THE MONTHLY RECURRING UNE-P COSTS THAT ARE**  
20 **CONSIDERED IN THE ANALYSIS?**

21 A. For purposes of this analysis, the following Missouri UNE-P monthly recurring  
22 costs were used:

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<sup>25</sup> M2A, Appendix Pricing UNE, Schedule of Prices, 06/27/03.

<sup>26</sup> This charge, when amortized over two years as discussed on page 22, would be pennies.

Rate Zone	Monthly UNE-P Rate
1	\$16.60
2	\$22.84
3	\$25.27
4	\$21.55

1

2 The UNE-P rate is comprised of the rate zone-specific unbundled analog loop  
3 cost, the monthly recurring switch port charge, and any applicable usage sensitive  
4 costs (e.g., switching, shared transport, signaling, databases, and Daily Usage  
5 File).<sup>27</sup>

6 **Q. PLEASE DESCRIBE THE NETWORK ARCHITECTURE FOR THE DS1**  
7 **SERVICE.**

8 A. With DS1 service, instead of maintaining a separate connection (analog loop)  
9 from the customer's premises to the local circuit switch for each telephone line,  
10 special equipment at the customer's premises is used to aggregate the multiple  
11 telephone lines onto a single connection (a DS1-capable loop) from the  
12 customer's premises to the switch. As with the POTS architecture, with a DS1  
13 architecture a customer with one or more telephone lines can plug analog  
14 telephone sets into wall jacks that are connected to the customer's inside wire and  
15 that inside wire will terminate at a NID.

16 In order to aggregate multiple, analog lines onto a common DS1 loop, the signals  
17 from all of the customer's analog lines must be converted into digital signals and  
18 then multiplexed. The equipment that must be installed at a customer's premises  
19 to convert the multiple analog lines onto a single digital DS1 loop is called

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<sup>27</sup> The usage sensitive charges assumed 1,668 minutes of combined originating and terminating local and toll calling.

1 channel bank equipment. If a customer does not already have such equipment  
2 (and considering the circumstances being reviewed, there is no reason to assume  
3 that it will), then the CLEC must provide it, because the customer would not be  
4 willing to incur such costs simply because regulatory rules require that it be  
5 moved from “mass market” to “enterprise” status.

6 With digital DS1 services, unlike analog POTS service, the electric current  
7 necessary to ring the customer’s telephones and provide dial tone cannot be  
8 provided through the digital DS1 loop. Instead, they are provided by the CLEC  
9 channel bank equipment at the customer’s premises. The channel bank equipment  
10 is typically installed inside a customer’s premises, either on a wall or on the floor.  
11 Although there are varying numbers of lines that may terminate on a single card,  
12 the channel bank unit will typically have a 24-line capacity.<sup>28</sup> Examples of  
13 frequently used channel bank units are Premisys SlimLine Channel Bank and the  
14 Adtran Total Access 750 units.

15 To power the CLEC’s channel bank equipment at the customer’s premises, the  
16 equipment must be plugged into the customer’s commercial AC power. The  
17 channel bank unit typically has the ability to convert the customer supplied AC  
18 power to the DC power needed to run the customer’s CPE. And, as noted above,  
19 however, the DS1 loop architecture does not allow the electrical current needed  
20 for ringing and dial tone to be provided from the carrier’s switch. Thus, in order  
21 to provide the customer with continuous service during power interruptions, the  
22 CLEC must also provide DC battery back up. To do so, a separate power unit is

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<sup>28</sup> This 24-line limit is a natural result in that the capacity of a DS1 loop is 24 voice grade channels.

1 required to manage the battery string to assure the batteries are fully charged and  
2 can be accessed in the event of a power failure. For the purpose of this analysis,  
3 an Adtran Total Access 750 Channel Bank with 24 analog line ports, an Adtran  
4 AC/DC Power Supply and Battery Charger and an Adtran Battery Backup System  
5 (Wall mount) is employed.<sup>29</sup> The backup battery system will provide power  
6 during an interruption of commercial power for the channel bank for up to eight  
7 hours. The list price of the Adtran channel bank equipment, AC/DC power  
8 supply and battery charger and backup battery system is \$3,161. I assumed a  
9 discount of 30% off of the list price of the Adtran CPE to account for discounts  
10 that efficient CLECs would likely obtain from the supplier of the channel bank  
11 equipment. The net CPE cost that I used for the analysis was \$2,212.70.

12 In sum, regardless of the variety of names applied to the CPE provided by  
13 telecom equipment suppliers, the fundamental set of functionalities that must be  
14 provided to support DS1 service are channel banks, power management and  
15 battery backup.

16 **Q. WHAT MUST THE CLEC DO TO INSTALL THE CHANNEL BANK AND**  
17 **BATTERY BACKUP EQUIPMENT?**

18 A. To install the equipment, a CLEC must have a technician travel to the customer's  
19 premises. To connect the inside copper wires from the individual telephone lines  
20 to the channel bank equipment, the CLEC must either provide a wired connection  
21 from the NID to the channel bank equipment, or disconnect the inside wires from  
22 the NID and reconnect them to the channel bank. For the purpose of this analysis

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<sup>29</sup> Technical descriptions of the Adtran Total Access 750 and the associated AC/DC Power Supply and Battery Charger and Battery Backup System are provided in Attachment 1 to this Testimony.



1 a CLEC installation cost of \$94.89 was used. This cost assumes two hours for the  
2 installation of the equipment at a rate of \$30.93 for the first half hour and \$21.32  
3 for every hour thereafter.<sup>30</sup>

4 **Q. WOULD THE INSTALLATION BE THE ONLY TIME THAT A CLEC**  
5 **TECHNICIAN WOULD NEED TO SERVICE THE CHANNEL BANK**  
6 **AND BATTERY BACKUP EQUIPMENT?**

7 A. No. A CLEC technician would also have to visit the customer's premises to  
8 service the equipment in the event that the equipment needed repair, or in the  
9 event that the customer discontinues service altogether or switches its service to  
10 another provider.

11 **Q. HOW OFTEN IS THE EQUIPMENT THE CLEC INSTALLS AT THE**  
12 **CUSTOMER'S PREMISES IN NEED OF REPAIR?**

13 A. It is difficult to pinpoint an exact failure frequency. However, for the purposes of  
14 this exercise I would suggest that one visit by a CLEC technician to service the  
15 CLEC equipment every three years would be a reasonable projection. Some  
16 customers may require service sooner or later than once every three years. For  
17 purposes of this analysis, I assume the costs of 1/3 of a repair visit during the  
18 period that the CLEC serves the customer. I would also estimate a single visit  
19 would require one hour to perform the repair work. For the purpose of this  
20 analysis I used an average maintenance cost per year of \$17.42.<sup>31</sup>

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<sup>30</sup> As a proxy for the CLEC technician labor rate for installing the CPE, I used the Maintenance of Service Charges – Basic Time of \$30.93 for the first half hour and \$21.32 for every half hour thereafter from the M2A Appendix Pricing UNE, June 27, 2003. While AT&T continues to believe that these rates are excessive, since they were approved by the Commission, I used them for this analysis.

<sup>31</sup> 1/3 of a visit \* 1.00 hour per visit \* (\$30.93 for the first half hour + \$21.32 for the second half hour).

1 **Q. DOES YOUR ANALYSIS INCLUDE A COST FOR EQUIPMENT**  
2 **REMOVAL IN THE EVENT THAT THE CUSTOMER DISCONNECTS**  
3 **ITS SERVICE WITH THE CLEC?**

4 A. Yes, it does. If the customer stops obtaining service from the CLEC, the CLEC  
5 would have to send a technician to the customer's premises to disconnect and  
6 remove the CPE. For the purposes of the analysis, I estimated \$52.25 in  
7 equipment removal costs. I estimate that the removal of the CLEC's equipment  
8 from the customer's premises would take one hour at a rate of \$30.93 for the first  
9 half hour and \$21.32 for the second. To account for the fact that the equipment  
10 removal costs will take place in the future, I calculated the net present value  
11 ("NPV") of the \$52.25 expenditure assuming the customer will find a different  
12 provider of DS1 service in two years. The ("NPV") of a \$52.25 expenditure made  
13 two years into the future is \$41.42.<sup>32</sup>

14 **Q. HOW WOULD THE CONNECTION FROM THE CPE TO THE CLEC'S**  
15 **SWITCH BE MADE?**

16 A. The connection from the channel bank to the CLEC's collocation is provided by a  
17 4-wire DS1-capable loop that terminates in the ILEC central office on a DSX-1  
18 panel or its equivalent. The DS1 loop provides the connection between the CPE  
19 and the ILEC's central office. Assuming that the ILEC had DS1-capable loops  
20 available at the customer's location, the ILEC could install the DS1 loop in  
21 parallel with the existing analog loops that the customer uses for its POTS service.  
22 The ILEC installation would involve performing cross connections between the  
23 DSX-1 panel and the CLEC's collocation. For purposes of this analysis, the non-

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<sup>32</sup> For the net present value calculation, I used a cost of capital of 12.32%. This figure was determined by adding 2% to the approved cost of capital for SBC in this state (10.32%). I added a 2% premium to the ILEC cost of capital to account for the additional risk lenders face in loaning money to a CLEC industry that is replete with bankrupt CLECs.

1 recurring and recurring costs for a DS1-capable loop and the non-recurring cost  
2 for a DS1 cross connection were used. The non-recurring costs for a DS1 loop  
3 from SBC include both the four wire digital loop cost and the central office access  
4 charge. In Missouri, the non-recurring costs for installation of a DS1 unbundled  
5 loop is \$123.77.<sup>33</sup> The recurring cost of a cross connection for a DS1 unbundled  
6 loop is \$9.00 and the nonrecurring cost is \$45.03.<sup>34</sup>

7 **Q. PLEASE DESCRIBE THE EQUIPMENT A CLEC USES IN ITS**  
8 **COLLOCATION TO RECEIVE THE DS1 LOOP.**

9 A. A multiplexer is required in the CLEC collocation in order to consolidate  
10 individual DS1 loops onto a higher capacity DS3 transport facility connecting the  
11 collocation to the CLEC switching node. The EdgeLink100 from Telco Systems  
12 is a product that is frequently used to multiplex DS1 circuits onto a DS3 circuit.<sup>35</sup>  
13 For the purposes of this analysis, I use a cost of \$3,600 for the Edgelink 100  
14 multiplexer. Assuming that twenty-eight DS1 circuits are being multiplexed by  
15 the multiplexers in the CLEC's collocation, a single DS1 loop would be  
16 responsible for 1/28 of the \$3,600 cost of each multiplexer, or \$128.57.<sup>36</sup>

17 **Q. HOW DOES THE MULTIPLEXED DS3 CIRCUIT REACH THE CLEC'S**  
18 **LOCAL SWITCH?**

19 A. The DS3 circuit would be backhauled from the CLEC's collocation in the ILEC  
20 central office to the CLEC's local switch location. As previously discussed, at the  
21 CLEC's switch location, the DS3 circuit must be demultiplexed back to individual

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<sup>33</sup> M2A Appendix Pricing UNE, Schedule of Prices, June 27, 2003.

<sup>34</sup> M2A Appendix Pricing UNE, Schedule of Prices, June 27, 2003.

<sup>35</sup> A technical description of the Telco Systems EdgeLink 100 is provided in Attachment 2 to this Testimony.

<sup>36</sup> The per DS1 loop investment assumed for this analysis was calculated as follows: 1 multiplexer \* 1/28 \* 3,600 = \$128.57.

1 DS1 circuits. The individual DS1 circuits are terminated at the CLEC's switch  
2 into a DS1 switch port. The DS1 switch port is necessary whether the DS1 is  
3 carrying one line of a customer's voice traffic or the maximum of 24 lines of a  
4 customer's voice traffic. For the purposes of this analysis, I used a monthly  
5 recurring cost of \$17.94 to backhaul the customer's DS1 service on the transport  
6 DS3.<sup>37</sup> For the multiplexing at the CLEC's switching location, CLEC DS1  
7 switching costs and the transport between the CLEC switch serving the customer  
8 and other switches, I used a monthly recurring cost of \$40.60.<sup>38</sup> A diagram of the  
9 DS1 based architecture can be found in Attachment 3.

10 **IV. Operational Issues**

11 **Q. DOES THE MIGRATION OF A CUSTOMER'S SERVICE TO A DS1-**  
12 **BASED SERVICE INVOLVE A HOT CUT AND A LOSS OF SERVICE BY**  
13 **THE CUSTOMER?**

14 A. Yes, it does. For customers with existing POTS service, the process of the CLEC  
15 connecting the customer's inside wire to the channel bank will require some  
16 period of time when the customer is totally out of service and unable to make or  
17 receive incoming telephone calls. In addition, even after the CLEC technician has  
18 completed the process of installing the channel bank and other equipment, the  
19 customer will be unable to receive telephone calls until the customer's telephone  
20 numbers have been ported by the CLEC. The interval between when the CLEC  
21 technician starts the conversion until the CLEC ports the customer's telephone  
22 numbers can be over an hour.

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<sup>37</sup> The backhaul cost conservatively assumes the distance between the collocation and the CLEC's switch node is 3 miles and the backhaul is provided via ILEC special access.

<sup>38</sup> The \$40.60 cost assumed 12 lines were being served at the customer's location. That cost includes the transmission equipment, the switch investment and transport facilities.

1 Much attention has been given lately to the hot cut process for individual  
2 customer analog loops. In that process, the movement of the wires is done by the  
3 ILEC in the ILEC central office. With a DS1 based service, a hot cut with the  
4 accompanying loss of service is still necessary; the difference is that it is  
5 performed by the CLEC at the customer's premises instead of the ILEC at the  
6 ILEC central office.

7 The TRO may have created the mistaken impression that hot cuts are unnecessary  
8 for customers served via a DS1 based service when it stated, "if a customer has  
9 enough lines to justify the expense of purchasing multiplexing equipment and a  
10 high-capacity line, it makes sense to aggregate the customer's loops at the  
11 customer's premises, which avoids the need for hot cuts at the incumbent LEC's  
12 central office."<sup>39</sup> While it is true that hot cuts at the incumbent LEC's central  
13 office would be avoided, it is also true that since wires at the customer's location  
14 must be disconnected and reconnected, a hot cut at the customer's premises would  
15 be required.

16 **Q. DOES THE MIGRATION OF A CUSTOMER'S SERVICE TO A DS1-**  
17 **BASED SERVICE ALSO REQUIRE THE PORTING OF THE**  
18 **CUSTOMER'S TELEPHONE NUMBERS?**

19 A. Yes, it does. Virtually all customers – and certainly all business customers --  
20 want to retain their existing telephone numbers if they change their local service  
21 provider. Thus, a customer served by a DS1 loop must still have its numbers  
22 ported. The steps needed to port a customer's telephone number when the CLEC

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<sup>39</sup> TRO, n. 1544.

1 uses a DS1 based service are the same as if the CLEC migrated multiple analog  
2 loops.<sup>40</sup>

3 **Q. ARE THERE ANY REASONS WHY A CUSTOMER USING MULTIPLE**  
4 **POTS LINES WOULD NOT BE INTERESTED IN A DS1-BASED**  
5 **SERVICE?**

6 A. Yes, there are several. First, the customer must set aside inside and protected  
7 floor or wall space to accommodate the CLEC's channel bank, power  
8 management and backup battery equipment. With a POTS service such as UNE-  
9 P (and even UNE-L), there is no need to install and maintain any CLEC  
10 equipment at the customer's premises. Thus, it is likely that some customers will  
11 be unable or unwilling to set aside the protected space needed to accommodate  
12 the required CLEC equipment. This, in turn, inherently limits the number of  
13 customers that a CLEC could serve with a DS1 based service. At a minimum, it  
14 takes additional sales and related support resources to convince a customer to  
15 allow the CLEC to make the necessary changes at its premises.

16 Second, even if the customer were willing to devote protected space to house the  
17 equipment needed to support a DS1 based service, it must also be subjected to a  
18 premises visit by the CLEC technician and cope with a service outage. These  
19 inconveniences will also limit the number of customers that are willing to change  
20 from multiple ILEC-provided POTS lines to a CLEC-provided DS1 service. And  
21 again, convincing the customer to subject itself to these inconveniences requires

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<sup>40</sup> Therefore, the ILEC must still established the ten digit trigger for the ported numbers before the port, and the CLEC must still send the message to port the customer's telephone numbers to the Number Portability Administration Center ("NPAC") as soon as possible after the customer's inside wire has been connected to the channel bank.

1 considerably more sales support than a UNE-P order, which does not (or at least  
2 should not) require the customer to suffer any inconveniences at all.

3 **IV. The Cost Analysis**

4 **Q. WHAT TYPES OF COSTS ARE GENERALLY CONSIDERED IN THE**  
5 **ANALYSIS?**

6 A. Generally speaking, the analysis considered three types of costs. These include:  
7 1) investment in customer premises equipment (“CPE”) and network equipment,  
8 2) non-recurring costs and 3) monthly recurring expenses.

9 **Q. HOW WERE THE CPE AND NETWORK INVESTMENT COSTS**  
10 **CONSIDERED?**

11 A. The investment costs were converted to an amortized monthly cost using the PMT  
12 function in Microsoft Excel. The costs were amortized based on a CLEC cost of  
13 capital of 12.32.<sup>41</sup> For the CPE, I used an economic life of ten years in the  
14 amortization calculation. As previously discussed, the transmission equipment,  
15 switching investment and the costs of the transport necessary to carry calls to and  
16 from the DS1 customer was converted to a monthly recurring cost.

17 **Q. HOW WERE THE NON-RECURRING COSTS CONSIDERED?**

18 A. The non-recurring costs were converted to an amortized monthly cost again using  
19 the PMT function in Microsoft Excel. The non-recurring costs were amortized  
20 over a two-year period. I estimated that the expected time a CLEC would be

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<sup>41</sup> See footnote 35, above.

1 serving an average customer would be two years.<sup>42</sup>

2 **Q. HOW WERE THE MONTHLY RECURRING EXPENSES**  
3 **CONSIDERED?**

4 A. The monthly recurring expenses were used in the analysis without adjustment.

5 **Q. HOW DID YOU ARRIVE AT THE TOTAL MONTHLY COST FOR THE**  
6 **DS1 BASED SERVICE?**

7 A. The analysis separately calculated the DS1 costs for each rate zone. In calculating  
8 the DS1 costs, I first added the: 1) amortized monthly CPE investment, 2)  
9 amortized monthly network equipment investment, 3) amortized monthly non-  
10 recurring costs and 4) monthly recurring expenses. Then, I divided that total by  
11 the rate zone specific monthly recurring costs for UNE-P.<sup>43</sup> This is the cross over  
12 point because it represents the number of UNE-P lines that would create costs  
13 equal to the monthly costs to provide a customer a DS1 service. After calculating  
14 the cross over point for each rate zone, I next calculated a statewide weighted  
15 average cross over point. The weighted average cross over point was based upon  
16 the percentage of ILEC loops that were found in each rate zone and it was  
17 rounded up to the next whole number. The spreadsheets supporting the analysis  
18 are provided in Attachment 4

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<sup>42</sup> Industry analysts have estimated an annual churn rate for CLECs of 42.8% of the customer base. *See* Banc of America Securities, Research Brief Wireline Telecommunications, *AT&T Corporation A Case for Consumer Services*, April 30, 2003, p. 10. Using that number, a CLEC will, on average, lose a customer within two years.

<sup>43</sup> As discussed above, if the Commission seeks to establish rate zone-specific cross over points(s), the analysis would end here.



1    **IV.    Conclusion**

2    **Q.    WHAT ARE YOUR OVERALL CONCLUSIONS?**

3    A.    When a fact-based, quantitative analysis is performed using cost information from  
4        this state, the point at which it is economically rational for a CLEC to use a DS1-  
5        based service, rather than UNE-P, is when a customer has 13 or more lines. The  
6        evidence used to arrive at this conclusion is objective and quantitative and the  
7        analysis performed was granular and specific to this state. In addition, this  
8        analysis is representative of how a CLEC would view a decision to serve a  
9        customer with UNE-P versus a DS1-based service. As previously discussed, the  
10       Commission can easily use the analysis to calculate cross over points for whatever  
11       markets the Commission eventually identifies.

12   **Q.    DOES THAT CONCLUDE YOUR TESTIMONY?**

13   A.    Yes, it does.