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July 16, 2001

By Hand

David Waddell
Executive Secretary
Tennessee Regulatory Authority
460 James Robertson Parkway
Nashville, Tennessee 37243

RE: Docket to Establish Generic Performance Measurements, Benchmarks and Enforcement Mechanisms for BellSouth Telecommunications, Inc.
Docket No. 01-00193

Dear Mr. Waddell:

Enclosed please find the original and thirteen copies of the Direct Testimony of Cheryl Bursh and Robert Bell on behalf of the CLEC Coalition, in the above captioned proceeding. A copy has been sent via facsimile to BellSouth, and copies have been sent via U.S. Mail to all other parties. If you have questions, please call me.

Sincerely,

Jim Lamoureux

Encls.

cc: Parties of service

CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the following Direct Testimony has been forwarded via U.S. Mail, postage prepaid, to the following on this 16th day of July, 2001.

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with permission
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BEFORE THE TENNESSEE REGULATORY AUTHORITY

TESTIMONY OF CHERYL BURSH

ON BEHALF OF

CLEC COALITION

DOCKET NO. 01-00193

JULY 16, 2001

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Cheryl Bursh. My business address is 1200 Peachtree Street, Atlanta, Georgia.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I am employed by AT&T Corp. as a District Manager. I am responsible for performance measurement and remedy plan advocacy for the AT&T – Southern Region. My area of expertise is the development of an effective methodology for measuring BellSouth's performance. I have represented AT&T in several regulatory proceedings, including performance measurement workshops and hearings conducted in Louisiana, Florida, Tennessee and Georgia. I have held a variety of management positions at AT&T over the last 20 years, including strategic planning, sales of large business systems and telecommunications services, system development for operation support systems, product marketing and technical support for computer systems. I have a Bachelor of Science Degree

from Johnson C. Smith University and a Master of Science Degree from George Washington University.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. My testimony focuses on the enforcement mechanism this Authority adopted as a base for this docket.[1] I explain the attributes of this base enforcement mechanism that contribute to an effective remedy plan. I also suggest several enhancements to the base enforcement mechanism that are designed to ensure that CLECs receive the level of service from BellSouth that will enable them to successfully compete in the provision of local telephone service in Tennessee.

In particular my testimony discusses why (1) the permanent remedy plan should contain a procedural cap as opposed to an absolute cap; (2) the plan should contain the level of disaggregation discussed in the testimony of Ms. Kinard; and (3) Tier II remedies should apply on a monthly basis. Additionally, I describe why the adoption of these enhancements will ensure that (1) BellSouth is providing service to CLECs that is in parity with that it provides to its own retail operations and affiliates; (2) the telephone industry in Tennessee is open to competition in the provision of local service; and (3) Tennessee's telephone industry remains open to competition in the event BellSouth obtains 271 approval.

Q. WHAT DO YOU MEAN BY SELF-EXECUTING PERFORMANCE ENFORCEMENT MECHANISM?

A. A self-executing enforcement mechanism is a system of monetary and non-

[1] Tennessee Regulatory Authority, In re: Docket to Establish Generic Performance Measurements, Benchmarks, and Enforcement Mechanisms for BellSouth Telecommunications, Inc., NOTICE OF EXTENSION OF TIME TO FILE COMMENTS AND TO INTERVENE, Docket No. 01-00193, March 30, 2001.

monetary consequences assessed against BellSouth for not meeting performance standards established by the Tennessee Regulatory Authority ("TRA"). Self-executing means that the enforcement mechanisms are automatically triggered upon an objective demonstration that BellSouth has failed to provide service at the level required.

Q. CAN THE TERMS REMEDIES AND ENFORCEMENT MECHANISM BE USED INTERCHANGEBLY?

A. Yes. Both remedies and enforcement mechanisms refer to the monetary and non-monetary consequences assessed against BellSouth for not meeting the established performance standards.

Q. WHY IS THERE A NEED FOR A REMEDY PLAN?

A. There must be a plan in place to assure swift and appropriate action if a Regional Bell Operating Company ("RBOC"), like BellSouth, does not provide access to services and facilities in a nondiscriminatory manner as required by the Telecommunications Act of 1996 (the "Act").[2] The Federal Communications Commission ("FCC") has confirmed that the RBOCs' performance for CLECs will continue to be evaluated under the public interest standard in determining whether markets are irreversibly open to competition.[3] Nondiscriminatory access to services and facilities must be evident in BellSouth's performance in order for BellSouth to show that its markets are irreversibly open to competition. When

[2] 47 U.S.C Section 251 c (2) c and (d).

[3] See, In the Matter of: Application by Bell Atlantic New York for Authorization Under Section 271 of the Communications Act To Provide In-Region, InterLATA Service in the State of New York (the "BA-NY Order"), CC Docket No. 99-295, Rel. December 22, 1999, Para. 8, in which the FCC reaffirmed that the adoption of a performance measures system that includes a "strong financial incentive for post-entry compliance with the section 271 checklist" is particularly important in opening local markets to competition consistent with the Telecommunications Act of 1996.

results from the performance measures system show that BellSouth's provision of access to services and facilities falls below acceptable standards, the self-executing nature of a remedy plan removes the unreasonable delay and expense associated with traditional litigation.

The CLECs believe that self-executing remedies are needed to enforce the Section 251 market opening provisions of the Act and are not solely designed to prevent Section 271 backsliding. States such as Texas, Pennsylvania, Massachusetts and Georgia have implemented remedies to enforce non-discriminatory and reasonable performance that were effective prior to the ILEC receiving 271 approval.

Q. WHY ARE REMEDIES IMPORTANT TO LOCAL COMPETITION?

A. Remedies are important to ensuring local competition because BellSouth is in the unique position of being the main supplier of services to CLECs, and also their main competitor. Consequently, BellSouth has much to gain by providing poor service to CLECs. As the testimony of the CLECs demonstrates, BellSouth is capable of seriously affecting a CLEC's ability to enter the local market and successfully serve its customers. Therefore, a remedy structure must be established that makes it more economical for BellSouth to cooperate and provide quality service, than to discriminate against competing providers to the detriment of local competition.

Developing appropriate performance standards is only the first step to ensuring that CLECs receive parity service from BellSouth as required by the Act. If there is no incentive for BellSouth to abide by the performance standards, then those

standards are useless. Remedies provide the incentive for BellSouth to comply. Therefore, remedies must be significant enough to ensure that it is more beneficial for BellSouth to comply with the performance standards than to pay the remedies for non-compliance. If remedies are not sufficient enough to motivate BellSouth to provide CLECs parity service, significant competition will not develop and BellSouth will continue to hold a monopoly in the local telephone market in Tennessee.

Q. WHAT PRINCIPLES DID THE TENNESSEE CLEC COALITION JOINTLY AGREE ARE THE FOUNDATION OF AN EFFECTIVE REMEDIES PLAN?

A. There are several principles that should guide the analysis of whether a remedy plan is sufficient. Those principles are:

1. Remedies must be great enough to motivate BellSouth to meet its obligations under the Act to provide nondiscriminatory access to services and facilities.

2. The structure of a remedy plan should be based on a verified (audited) system with verifiable data and processes. There should be a thorough audit of the performance measurements system by a recognized neutral party who utilizes a disclosed and industry-reviewed methodology before it is officially implemented for the industry. An effective plan should provide reasonable assurances that the reported data is accurate. See *BA-NY Order*, at para. 433. For example, there should be a validation of BellSouth's processes and systems used for data collection, reporting, storage, and retrieval.

3. Remedies must be self-executing – no delay, no expense to the harmed CLEC, no litigation required to invoke remedies. The FCC has stated that an effective enforcement plan shall "have a self-executing mechanism that does not leave the door open unreasonably to litigation and appeal." See *BA-NY Order*, at para. 433.

4. Remedies must escalate according to the duration and magnitude of poor performance.

5. The remedies plan should be structured so that it is simple to implement and administer.

6. Interest must accumulate on monetary payments that are not paid in accordance with the remedy plan.

Q. HAS THIS AUTHORITY PREVIOUSLY ADOPTED REMEDIES TO PROTECT THE PUBLIC INTEREST?

A. Yes. The TRA ordered[4] the enforcement mechanism specified in the ITC^DeltaCom "Best and Final Offer" in the ITC^DeltaCom/BellSouth arbitration. The remedy plan recommended by ITC^DeltaCom in the arbitration proceeding was based on the Performance Incentive Plan that CLEC Coalitions have proposed in other states throughout the region.

Q. DOES THE REMEDY PLAN ADOPTED BY THE TRA AS A BASE FOR THIS GENERIC PROCEEDING REPRESENT A GOOD STARTING POINT?

A. Yes. The work done by the TRA in adopting performance measurements, performance standards and enforcement mechanisms in the

[4] Tennessee Regulatory Authority, In RE: Petition For Arbitration By ITC^DeltaCom Communications, Inc. With BellSouth Telecommunications, Inc. Pursuant To The Telecommunications Act Of 1996, Final Order Of Arbitration, Docket 9900430, February 23, 2001. p. 10.

ITC^DeltaCom/BellSouth arbitration, Docket No. 99-00430, represents a significant step toward ensuring nondiscriminatory treatment of competitive carriers in Tennessee. By building upon the important achievements in that docket, the TRA can continue to develop and update enforcement mechanisms to accurately measure Bellsouth's performance, to ensure BellSouth's compliance with its contractual and legal obligations, and to enforce appropriate remedies when Bellsouth's fails to meet its contractual and legal obligations.

Q. DO THE CLECS AGREE WITH THE GENERAL STRUCTURE OF THE REMEDY PLAN THE TRA ADOPTED AS A BASE FOR THIS PROCEEDING?

A. Yes. The CLECs agree with the general structure of the base remedy plan, which is described below:

- The base remedy plan is structured to evaluate: (1) the quality of support delivered to each individual CLEC as compared to its own retail operations, and (2) the quality of service BellSouth delivers to the CLEC industry as a whole when compared to BellSouth's own retail operations. Monetary consequences in the former situation are payable to the affected CLEC as liquidated damages; in the latter, they are payable as regulatory fines to the TRA, to protect the public interest.
- BellSouth's service to CLECs and to its own retail operations are gauged using a comprehensive set of performance measurements, referred to as "sub-measures." These sub-measures cover the full panoply of BellSouth's activities that CLECs must rely upon in order

to deliver their retail service offerings in the local market place. Every sub-measure is designed to identify and measure a key area of activity that affects CLEC and BellSouth customers, and consequently, the development of competition in Tennessee's local telecommunications market. All sub-measures proposed are included in the determination of remedy payments.

- The performance standard for each sub-measures included in the base remedy plan fall into two categories, retail analogs and benchmarks. Retail analogs are for those measures for which the performance standard requires BellSouth to provide service to CLECs that is in parity with service it provides to its own retail operations. In order to make a parity determination, a retail analog is established for each sub-measure being compared. A direct comparison is then made between BellSouth's performance data for its retail operations and a CLEC's performance data. For parity determinations, a statistical methodology is then used to determine if any observed differences in the data are significant.
- Statistical procedures are used for parity determinations. Statistical procedures can be used to determine whether BellSouth's performance is in compliance with the retail analog set for a particular sub-measure. Dr. Bell's testimony will addresses the details relating to an appropriate statistical methodology.

- There is no statistical test needed or applied to measures using a benchmark as the performance standard. Measures for which the performance standard is a benchmark require BellSouth to meet an absolute level of required performance. For example, if a benchmark for a particular order requires BellSouth to complete ninety-five percent of the orders within 3 days, but BellSouth completed only seventy percent of the orders for a given month in 3 days only, BellSouth's performance would not be compliant.
- Remedy payments for discriminatory performance by BellSouth or any other ILEC operate on two tiers. Tier I addresses the remedies for non-compliant performance delivered to an individual CLEC. Tier I remedies are paid to the individual CLECs for the harm suffered by the CLEC and its customers. Under Tier I, however, remedies are only generated for an individual CLEC if that CLEC's business activity touches upon a particular sub-measure. For example, a CLEC who does not sell port and loop combinations (UNE P) would not have compliance determinations made for the sub-measure Missed Installation Appointment – UNE P.
- Tier II addresses the remedies for non-compliant performance delivered to the CLEC industry as a whole. Tier II remedies are paid to the state for harm done to the competitive market and consumers as a whole. Tier II remedies are calculated based on CLEC market penetration levels.

Q. DO YOU AGREE THAT ALL PROPOSED MEASURES SHOULD BE SUBJECT TO REMEDIES AS SPECFIED IN THE BASE REMEDY PLAN?

A. Yes. Self-enforcing remedies must be based upon an underlying set of performance measurements that cover the full panoply of BellSouth activities upon which CLECs must rely to deliver their own retail service offerings. No measures are excluded from the remedy plan because each measures an activity that affects customers and ultimately the openness of the market. Every measure is designed to identify key areas of activity that are necessary for the development of competition and the opening of BellSouth's local market. When talking about the remedy plan, we refer to these disaggregated measures as the "sub-measures." However, in practice, all the sub-measures may not generate remedies. If there is no activity in a given sub-measure, then no remedies apply for that sub-measure.

Q. SHOULD REMEDIES APPLY TO PERFORMANCE MEASURES THAT ARE SHOWN TO BE DUPLICATIVE OF OR CORRELATED WITH OTHER MEASURES?

A. Remedies should be carefully applied to all measures. The decision whether or not to apply a remedy depends on the strength of the correlation between measures. Because a measure appears to be duplicative or correlated does not mean it is. An analysis of the data is required to make a determination. The data-dictated degree of correlation will determine whether remedies are appropriate. Without data, there cannot be any correlation determination. If a thorough and appropriate data investigation discloses that two measures are highly correlated, then they are in effect measuring the same thing. In that case, applying penalties to each of them could double the consequences and remedies are not appropriate

for both measures. If the correlation is determined to be small to moderate, the metrics are not measuring the same thing and remedies should apply.

CLECS, BellSouth and TRA have not agreed upon or implemented tests to assess the possibility of correlation between BellSouth's measures in Tennessee. Thus, there is currently no basis for exempting measures from remedies due to correlation.

Q. SHOULD REMEDIES APPLY TO MEASURES THAT REFLECT MANUAL AND PARTIALLY MECHANIZED PROCESSING?

A. Yes. Discriminatory performance can occur no matter what the level of mechanization. Manual orders can represent key aspects of a CLEC's business. Moreover, in some cases, for example branded OS/DA, CLECs have no choice but to use non-mechanized ordering. BellSouth should not be able to discriminate against a CLEC who uses non-mechanized ordering. Accordingly, remedies should be applied to sub-measures that report on manual and partially mechanized order processing.

Q. WHAT IS DISAGGREGATION?

A. Disaggregation is the process of breaking down performance data into sufficiently specific categories or dimensions so that like-to-like comparisons can be made. For example, BellSouth's retail offerings contain a number of varying products. In order to compare Bellsouth's performance for its own retail customers to its performance for CLECs, it is necessary for UNE analog loop products to be compared separately with BellSouth's retail POTS product.

Q. WHY IS DISSAGREGATION CRITICAL TO AN EFFECTIVE REMEDY PLAN?

A. Disaggregation is critical to an effective remedy plan because it prevents poor performance in one area (such as xDSL) from being obscured by being lumped together with dissimilar performance data. For example, comparing central office provisioning work to field dispatch provisioning work masks discriminatory performance. Sufficient disaggregation is absolutely essential for accurate comparison of results to expected performance. This is true regardless of whether a retail analog or a benchmark serves as the performance standard.

Q. WHAT ARE APPROPRIATE AREAS OF DISAGGREGATION?

A. Disaggregation should be required by interface type, pre-order query type, product, volume category, work activity type, trouble type, trunk design and type (for trunk blockage measurements), maintenance and repair query type, and collocation category.

Q. WHAT IS THE APPROPRIATE LEVEL OF DISAGGREGATION FOR PURPOSES OF DETERMINING WHETHER TO REQUIRE REMEDY PAYMENTS?

A. Disaggregation should proceed to a level where like-to-like comparisons can be made. There are analytical procedures that allow factual conclusions to be made regarding how much disaggregation is sufficient. Inadequate disaggregation of results means that not all key factors driving differences in performance results have been identified, which injects needless variability into the computed results. Therefore, disaggregation must be sufficient to ensure accurate comparison of results to expected performance.

Q. DOES THE BASE REMEDY PLAN ADOPTED BY THE TRA INCLUDE DISAGGREGATION?

A. Yes. The TRA ordered[5] the associated definitions for the BellSouth SQM's (September 15, 1999) and selected measurements from the Texas Plan.

Q. CAN THE CLECS SUPPORT THE DISAGGREGATION IN THE BASE REMEDY PLAN ADOPTED BY THE TRA?

A. Yes, but the CLECs recommend that the disaggregation be expanded to ensure accurate performance determinations. When dissimilar products are lumped together, the performance results are not reflective of reality and not appropriate for making performance determinations. CLEC experiences since September 1999 warrant a more specific and expanded level of disaggregation than what was primarily adopted as the base from the BellSouth September 15, 1999 SQM. Therefore, the CLECs recommend that the desegregation be updated as represented in the testimony of Ms. Kinard.

Q. AS REFLECTED IN THE BASE REMEDY PLAN ADOPTED BY THE TRA, DO YOU AGREE THAT THE PERFORMANCE STANDARDS APPLIED IN THE REMEDY PLAN SHOULD BE THE SAME AS THE PERFORMANCE STANDARDS USED IN REPORTING PERFORMANCE?

A. Yes. Basing remedies and reporting performance on different performance standards would be both confusing and meaningless.

Q. DO YOU AGREE THAT STATISTICAL PROCEDURES SHOULD BE APPLIED WHEN MAKING PARITY DETERMINATIONS?

A. Yes. This issue is addressed in depth in the testimony of Dr. Robert Bell.

Q. WHEN IS THE STATISTICAL METHODOLOGY APPLIED?

[5] Tennessee Regulatory Authority, In Re: Petition For Arbitration Of ITC^DeltaCommunications, Inc. With BellSouth Telecommunications, Inc. Pursuant To The Telecommunication Act Of 1996., Docket 99-00430, August 11,2000. ¶ 15.

A. The statistical methodology is applied only to parity measures, those for which there are retail analogs. Those measures, which compare the performance between what BellSouth provides to its own retail operations and the performance it provides to CLECs, apply a statistical methodology for making parity determinations. There are no statistical tests needed or applied to benchmark measures. BellSouth either passes or fails (with degrees of severity) on those measures according to the benchmark level and proportion that is in place.

Q. DO YOU AGREE WITH HOW REMEDY PAYMENTS ARE CALCULATED FOR TIER I MEASURES IN THE REMEDY PLAN ADOPTED AS A BASE FOR THIS PROCEEDING?

A. Yes. CLECs support the remedy calculation adopted from the ITC^DeltaCom "Best And Final Offer". In the base plan adopted by the TRA, Tier I has three categories of violations, depending upon the size of the gap between the performance BellSouth provides for itself, or its affiliates, and the performance it provides to CLECs. Once a sub-measure failure is identified, the calculated remedy should be a function of the severity of the failure as measured by the magnitude of the test statistic. The amount of consequences as a function of severity is most simply accomplished by the use of a quadratic function of the measured test statistic compared to the balancing critical value as described in Table I.

TABLE I[6]

[6] z represents the z-statistic used to make a parity determination and z* represents the balancing critical value. The coefficients of the consequence function are a=5625, b=-11250, & c=8125.

Range of Test Statistic value (z)	Performance Designation	Applicable Consequence ($)
greater than or equal z*	Compliant	0
less than z* to 5z*/3	Basic Failure	$a(z/z^*)^2 + b(z/z^*) + c$
less than 5z*/3 to 3z*	Intermediate Failure	
less than 3z*	Severe Failure	25,000

When the benchmark serves as the performance standard, the measurement establishes a performance failure directly and assesses the degree to which performance departs from the standard. For benchmark measures, the performance is expressed as "B% meet or exceed the benchmark" where B% is a proportion figure set less than 100%. Accordingly, a performance failure should be declared if the calculated performance is not equal to or greater than the "B%" level. As with measurements that are judged against a parity standard, those compared to a benchmark standard should be subject to additional consequences as the performance becomes increasingly worse compared to the benchmark as specified below:

TABLE 2[7]

Range of Benchmark Result (x)	Performance Designation	Applicable Consequence ($)
Meets or exceeds B%	Compliant	0

[7] In Table 2, the quantity x is the actually measured proportion and the coefficients are d=25000, e=-45000, f=22,500, and g=2500.

Meets or exceeds (1.5B-50)% but worse than B%	Basic Failure	$d[x/(100-B)]^2 + eB[x/(100-B)^2] + f[B/(100-B)]^2 + g$
Meets or exceeds (2B-100)% but worse than (1.5B-50)%	Intermediate Failure	
Worse than (2B-100)%	Severe Failure	25,000

Q. WHEN MEASUREMENT SETS ARE SMALL, HOW ARE TIER I PAYMENTS CALCULATED FOR BENCHMARK MEASURES?

A. As discussed above, benchmark measures are "pass/fail". However, the CLECs recognize that in some instances the number of transactions (e.g., in a particular geographic area) may be small. In those situations, it could be harder for BellSouth to meet the benchmark.

Consider this example:

The benchmark for a particular submeasure requires BellSouth to perform a function in 2 hours, 95% of the time. Due to desegregation, there could be a situation where there are only 4 transactions that can be used to determine BellSouth's performance. With only 4 transactions, BellSouth fails this benchmark if it misses the measure only one time. The remedy plan allows for adjustments to be made when the size of the data set is very small, such as in the example above. The CLECs support the Benchmark Adjustment Table adopted by the TRA in the base remedy plan.

Q. DO YOU AGREE THAT ADDITIONAL REMEDIES SHOULD APPLY FOR CHRONIC TIER I FAILURES AS REFLECTED IN THE BASE REMEDY PLAN?

A. Yes. Chronic Tier I violations should incur additional remedies. CLECs support a $25,000 payment to the CLEC for "chronic" or recurring performance failures.

The $25,000 payment is levied beginning with the third month that a particular sub-measure is missed. The $25,000 monthly payment continues for every month until the performance for that sub-measure returns to the "compliant" level as shown above. One month of compliant performance resets the clock. For Tier I violations, chronic failures are remedied at the same rate as severe violations.

Q. DO YOU AGREE WITH HOW REMEDY PAYMENTS ARE CALCULATED FOR TIER II MEASURES IN THE REMEDY PLAN THE TRA ADOPTED AS A BASE FOR THIS PROCEEDING?

A. Yes. No measures are excluded from the Tier II evaluation.

In Tier II, there are two levels of severity for non-complaint performance for parity and benchmark submeasures: Market Impacting and Market Damaging. The Table 3 below describes how a Tier II payment is calculated for parity submeasures, (those with a retail analog):

TABLE 3[8]

Range of Test Statistic value (z)	Performance Designation	Applicable Consequence ($)
greater than or equal 5z*/3	Indeterminate	0
less than 5z*/3 to 3z*	Market Impacting	$n [a(z/z^*)^2 + b(z/z^*) + c]$
less than 3z*	Market Constraining	n25,000

The following table specifies when a Tier II payment is triggered for benchmark submeasures:

[8] z represents the Test Statistic value and z* represents the balancing critical value. The coefficients of the consequence function are a=5625, b=-11250, & c=8125. The quantity n is the market penetration factor.

Range of Benchmark Result (x)	Failure Designation	Applicable Consequence ($)
Meets or exceeds (1.5B-50)%	Indeterminate	0
Meets or exceeds (2B-100)% but worse than (1.5B-50)%	Market Impacting	$n \{d[x/(100-B)]^2 + eB[x/(100-B)^2] + f[B/(100-B)]^2 + g\}$
Worse than (2B-100)%	Market Constraining	n25,000

All violations are counted. Tier II payments are paid directly into a state designated fund in which BellSouth has no direct or indirect interest. For example, the State Treasury.

Q. DO YOU AGREE THAT THE TIER II REMEDY AMOUNT SHOULD BE BASED ON CLEC MARKET PENETRATION LEVELS AS REFLECTED IN THE BASE REMEDY PLAN?

A. Yes. As competition becomes established, the size of the applicable Tier II consequence is reduced to zero if the ILEC no longer provides a majority of the local lines to the CLECs in its serving area. The factor "n", specified in the Tier II remedy calculation, corresponds to the number of CLEC-served lines in the state of Tennessee.

Q. WHAT IS THE "n" FACTOR USED IN THE TIER II REMEDY CALCULATION FOR BENCHMARK AND PARITY MEASURES?

A. The factor "n" in the Tier II remedy calculation is a multiplier. The value of "n" depends upon the openness of the local market to competition. In other words, "n" is based on CLEC market penetration levels. The value of "n" decreases as the number of CLEC served lines increases. This results in Tier II payments

decreasing as the CLEC market penetration increases. The following table illustrates how the market penetration adjustment is determined:

Tier II – Determining "n"

Lines provided to CLECs	Value of "n"
more than or equal to 40% less than 50%	1
more than or equal to 30% less than 40%	2
more than or equal to 20% less than 30%	4
more than or equal to 10% less than 20%	6
more than or equal to 5% less than 10%	8
0% to less than 5%	10

Q. ARE SPECIAL ADJUSTMENTS FOR BENCHMARK MEASURES WITH SMALL SAMPLE SIZES APPLICABLE FOR TIER II CALCULATIONS?

A. Yes. The same business rules used in Tier I for benchmark measures with small sample sizes apply for Tier II calculations.

Q. IN THE ITC^DELTACOM/BELLSOUTH ARBITRATION, DID THE TRA ADOPT THE TEST STATISTIC RECOMMENDATION FROM ITC^DELTACOM?

A. No. ITC^DeltaCom recommended modified Z as the Test Statistic. However, in the remedy plan adopted as the base for this proceeding, the TRA adopted truncated Z for determining compliance.

Q. CAN THE CLECS SUPPORT THE PROCESS FOR DETERMINING COMPLIANCE IN THE REMEDY PLAN ADOPTED AS THE BASE?

A. Yes. Although CLECs have advocated another procedure for determining compliance in all other proceedings, given other aspects of the base remedy plan adopted by the TRA, the CLECs can support the process for compliance in the remedy plan adopted as a base for this proceeding. For example, the base remedy plan subjects all measures to remedies. Therefore, the sub-measures in the base remedy plan, while not completely adequate, are less inferior to the sub-measures BellSouth proposed be subject to remedies in its arbitration with ITC^DeltaCom. The CLEC's support of this process for determining compliance is also contingent upon validation that the truncated Z is properly implemented. In other words, the aggregation must be properly implemented. Dr. Bell addresses issues concerning improper aggregation in his testimony.

Q. DO YOU AGREE, AS REFLECTED IN THE BASE REMEDY PLAN ADOPTED BY THE TRA, THAT THE REMEDY PLAN SHOULD APPLY TO OTHER PERFORMANCE FAILURES?

A. Yes. Payments should be made when BellSouth posts performance data and reports late. If performance data and associated reports are not available to the CLECs by the due date, the ILEC should be liable for payments of $5,000 for every day past the due date the reports and data are not available. The ILECs' liability should be determined based on the latest report delivered to a CLEC. These payments would be paid into a state fund.

If performance data and reports are incomplete, or if previously reported data and reports are inaccurate, then BellSouth should be liable for payments of $1,000 to a state fund for every day past the original due date the reports remain uncorrected.

Q. DO THE CLECS AGREE THERE ARE REMEDIES THAT THE CLECS COULD PURSUE IN ADDITION TO THE TIER I AND TIER II PAYMENTS?

A. Yes. The CLECs reserve their right to seek individual legal and regulatory remedies for harm they incur due to BellSouth's performance. This Authority also retains its authority to monitor BellSouth's performance and initiate proceedings to investigate the status of competition within this state. In addition, the FCC retains its ability under the Act to suspend or revoke authority that BellSouth may attain in the future to provide in-region, interLATA long distances services.

Q. ARE THERE ASPECTS OF THE BASE REMEDY PLAN ADOPTED AS A BASE BY THE TRA THAT DETRACT FROM THE EFFECTIVENESS OF THE PLAN TO MOTIVATE BELLSOUTH TO PROVIDE COMPLIANT SUPPORT?

A. Yes. The following aspects of the base plan detract from the effectiveness of the plan:

- An absolute cap
- Tier II remedies being triggered by 3 consecutive months of failure
- Insufficient desegregation

Q. WHAT IS AN ABSOLUTE CAP?

A. An absolute cap represents a limit on BellSouth's liability for providing non-compliant service to CLECs.

Q. WHY IS AN ABSOLUTE CAP INAPPROPRIATE?

A. An absolute cap is inappropriate because it sends the signal that once BellSouth's performance deteriorates to a particular level—i.e., reaches the absolute cap—then further deterioration in performance is irrelevant. Consequently, an absolute cap provides BellSouth with the means to evaluate the cost of market share retention through the delivery of non-compliant performance and to simply treat the payments as a cost of doing business. Absolute caps also create complexity and ambiguity regarding how legitimate remedies should be apportioned among the CLECs, and between the CLECs and the State.

Q. DO THE CLECS RECOMMEND AN ALTERNATIVE TO AN ABSOLUTE CAP THAT WILL ELIMINATE BELLSOUTH'S OPPORTUNITY TO EVALUATE THE COST OF MARKET SHARE RETENTION?

A. Yes. The CLECs recommend a procedural cap. A procedural cap establishes a preset level of remedies that when reached, would allow BellSouth to seek regulatory review of additional remedy amounts that are due. However, the procedural cap would not automatically exempt BellSouth from liability for a violation. A procedural cap, avoids both the problems of absolute caps. It does not provide BellSouth with the opportunity to evaluate the "cost" of retaining share through non-compliance and does not exempt BellSouth from consequences for unchecked performance deterioration.

If a procedural cap is adopted, it should not stop Tier I payments to CLECs because Tier I payments are intended to at least partially compensate CLECs for the harm incurred because of the performance failure. It also affords the same protection to BellSouth as would an absolute cap.

Q. WHAT WOULD HAPPEN ONCE THE PROCEDURAL CAP IS REACHED?

A. If the procedural cap is reached, BellSouth should continue to make Tier II payments into an interest-bearing registry or escrow account that earns a minimum interest rate as approved by the Authority. BellSouth would have the burden of showing that the amount due for poor performance to the CLECs in aggregate is not warranted. The Authority would then decide whether, and to what extent, remedies in excess of the procedural cap should be paid out. The procedural cap needs to be set at a sufficiently high level so as not to negate the benefits of self-executing remedies.

Q. AS SPECIFIED IN THE BASE REMEDY PLAN ADOPTED BY THE TRA, CAN TIER II FAIL TO SANCTION POOR PERFORMANCE?

A. Yes. In the base remedy plan, Tier II remedies are not incurred until BellSouth has provided non-compliant support to the industry for 3 consecutive months. Therefore, BellSouth could potentially have 2 consecutive months of industry-wide, non-compliant performance and not incur any consequences if the third month was complaint. It's damaging for CLEC customers to receive deplorable service for two consecutive months and BellSouth not face any consequences. In essence, BellSouth could actually provide non-compliant support at the industry level for 8 months of the year and not incur any consequences.

Q. SHOULD TIER II CONSEQUENCES BE TRIGGERED WHEN BELLSOUTH PROVIDES NON-COMPLIANT SUPPORT FOR A GIVEN MONTH?

A. Yes. Given the impact of non-compliance at the industry level for a given month, consequences should be incurred in the month that a determination of non-compliance is made. A determination of non-compliance in Tier II means that

CLEC customers are impacted in greater volumes. Tier II consequences are designed to counterbalance BellSouth's incentive to damage, not just individual companies, but the competitive marketplace itself. A month of non-compliance is too damaging to too many CLEC customers and therefore warrants consequences on a monthly basis.

Q. CAN YOU ELABORATE ON HOW INSUFFICENT DISAGGREGATION HINDERS THE ABILITY TO DETECT PERFORMANCE FAILURES?

A. Yes. The level of desegregation in the base remedy plan allows consolidation of dissimilar products for comparisons. As an example, DS3 Loops and ADSL Loops for provisioning metrics such as Average Completion Interval are aggregated together, even though each of the various UNEs has a different provisioning interval. Aggregating these products is inappropriate and does not contribute to "like-to-like" comparisons. Such aggregation masks differences and makes detection of inferior performance less likely. Consequently, insufficient product desegregation will allow BellSouth to influence the type and pace of developing competition.

Q. WHAT REVIEW PROCESS, IF ANY, SHOULD BE INSTITUTED TO CONSIDER REVISIONS TO THE PERFORMANCE ASSESSMENT PLAN THAT IS AOPTED BY THIS AUTHORITY?

A. A collaborative work group, including CLECs, the Tennessee Regulatory Authority and BellSouth, should be established to review the Performance Assurance Plan for additions, deletions and modifications. A review cycle should start six months after the date of the Tennessee Regulatory Authority order. BellSouth and the CLECs should file any proposed revisions to the Performance Assessment Plan one month prior to the beginning of each review period.

BellSouth may be ordered by the Tennessee Regulatory Authority to modify or amend any aspect of the plan including measures and remedies. Nothing should preclude either party from participating in any proceeding or from advocating modifications. In the event a dispute arises regarding the ordered modifications, the parties will refer the dispute to the Tennessee Regulatory Authority.

Q. DOES THE TRA HAVE THE LEGAL AUTHORITY TO ORDER A REMEDY PLAN IN TENNESSEE?

A. I am not an attorney; however, it is the CLEC Coalition's position that the TRA does have authority under the Telecommunications Act of 1996 to order the implementation of a self-executing remedy plan without BellSouth's consent. The TRA has already demonstrated this authority in the ITC^DeltaCom arbitration.

Q. DO THE CLECS RECOMMEND THAT THE TRA ADOPT, WITH THE ENHANCEMENTS RECOMMENDED BY THE CLECS, THE BASE REMEDY PLAN AS THE PERMANENT REMEDY PLAN?

A. Yes. The TRA should adopt its "Base" remedy plan with the following enhancements:

1. The permanent remedy plan should contain a procedural cap as opposed to an absolute cap given that the absolute cap provides BellSouth the means to evaluate the cost of market share retention through the delivery of non-compliant performance.
2. The desegregation level discussed in the testimony of Ms. Kinard should be adopted given that an additional year of experience necessitates

expanding the desegregation for emerging markets such as ADSL, HDSL, Line Splitting, Line Sharing, etc.

3. Tier II violations should be remedied on a monthly basis, so that BellSouth will not be allowed to provide discriminatory support for 8 months of the year without any consequences.

4. Implementation of truncated z should be reviewed to ensure that dissimilar products are not being inappropriately aggregated.

Q. WHY SHOULD THE TRA ADOPT THE REMEDY PLAN ADOPTED AS A BASE BY THE TRA AND THE ENHANCEMENTS PROPOSED BY THE CLECS?

A. The TRA should adopt the remedy plan adopted as a base by the TRA and the enhancements proposed by the CLECs because:

1. The multi-tiered structure serves to motivate BellSouth to provide compliant service by escalating consequences for continued violations.

2. The Plan includes all measures to properly reflect all parts of customer experiences.

3. Consequences under the plan escalate with increased level of severity of violation.

4. The Plan provides for two separate evaluations: (1) the quality of support delivered to each individual CLEC, and (2) the quality of support delivered to the CLEC industry in the aggregate.

5. The Plan includes consequences payable to individual CLECs and consequences payable to a public fund identified by this Authority.

6. Benchmarks are established for measures that do not have retail analogs.

7. The Tier II consequence calculation takes CLEC market penetration levels into consideration.

8. The consequences are applied at the submeasure level.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes.

BEFORE THE TENNESSEE REGULATORY AUTHORITY

TESTIMONY OF ROBERT M BELL, PH.D.

ON BEHALF OF

CLEC COALITION

DOCKET NO. 01-00193

JULY 16, 2001

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Robert M. Bell. My business address is AT&T Labs-Research, 180 Park Avenue, Florham Park, New Jersey 07932.

Q. PLEASE DESCRIBE YOUR EDUCATIONAL AND PROFESSIONAL BACKGROUND.

A. I received a Ph.D. in Statistics from Stanford University in 1980. From 1980 to 1998, I was promoted to Senior Statistician at RAND, a non-profit institution that conducts public-policy analysis. While at RAND, I supervised the design and/or analysis of many projects including large multi-site evaluations in the fields of preventive dentistry, drug prevention, and depression care. I also headed the RAND Statistics Group from 1993 to 1995 and taught statistics in the RAND Graduate School from 1992 to 1998. In 1998, I joined the Statistics Research Department at AT&T Labs-Research, where I am a Principal Member of Technical Staff. I have authored or co-authored 50 refereed articles on statistical analysis that

have appeared in a variety of professional journals. I am a fellow of the American Statistical Association. I currently serve on the Panel to Review the 2000 Census organized by the National Academy of Sciences.

Q. PLEASE DESCRIBE THE ISSUES ADDRESSED IN YOUR TESTIMONY.

A. My testimony discusses the statistical methodology, adopted as a base by the Tennessee Regulatory Authority (TRA),[1] for use in comparing the performance BellSouth provides to itself and its affiliates with the performance it provides to Competitive Local Exchange Carriers (CLECs). I discuss use of the truncated z test statistic, use of the balancing critical value methodology to balance Type I and Type II errors, and selection of the appropriate delta parameter to be used as part of the balancing methodology.

Q. WHY ARE STATISTICAL TESTS USEFUL TOOLS?

A. Merely reporting averages of performance measurements, without further analysis, does not indicate whether differences in performance results for CLEC customers versus a retail analog reflect actual discrimination or simply random variation. Once appropriate measures and comparison samples have been established, statistical tests compare the size of

[1] Tennessee Regulatory Authority, In re: Docket to Establish Generic Performance Measurements, Benchmarks, and Enforcement Mechanisms for BellSouth Telecommunications, Inc., TRANSCRIPT OF PROCEEDINGS, Docket No. 01-00193, May 1, 2001.

observed differences with the amount that could be expected to occur by chance under conditions of true parity of service. These comparisons help to determine quantitatively whether BellSouth has provided nondiscriminatory treatment to CLECs for measures with a retail analog. The FCC supported the use of statistical comparisons in its Bell Atlantic Order for New York. See *In the Matter of Application of Bell Atlantic for Provision of In-Region InterLATA Services In New York*, CC Docket No. 99-295 (December 23, 1999), Appendix B, Para. 2&4. In that Order, the FCC stated:

> When making a parity comparison, statistical analysis is a useful tool to take into account random variations in the metrics. In the Second BellSouth Louisiana Order, we encouraged BOCs to submit data allowing us to determine if any detected difference between the wholesale and retail metrics is statistically significant.

Q. WHAT STATISTICAL TEST DID THE TRA ADOPT IN ITS BASE PLAN FOR COMPARING THE SERVICE BELLSOUTH PROVIDES CLECS WITH THE SERVICE IT PROVIDES ITSELF AND IT'S AFFILIATES?

A. The TRA adopted truncated z as part of its base statistical methodology for making compliance determinations. Truncated z aggregates modified z scores that are used to compare results in disaggregated cells. For each cell, BellSouth's performance for its retail operation (or that of its affiliates) is compared with the performance it provides to a given CLEC to create a z score (the modified z statistic), which then is used to determine

whether BellSouth's performance for a CLEC is in parity with its performance for its retail operation.

Q. CAN YOU SUPPORT TRUNCATED Z AS THE TEST STATISTIC FOR USE IN COMPARING THE SERVICE BELLSOUTH PROVIDES TO CLECS WITH THE SERVICE IT PROVIDES ITSELF AND ITS AFFILIATES?

A. I can support the truncated z statistic as long as it is used to aggregate results from homogeneous cells. However, aggregation methods—including truncated z—should not be used to aggregate heterogeneous cells.

Q. WHAT DO YOU MEAN BY HOMOGENEOUS AND HETEROGENEOUS CELLS?

A. The modified z statistic tries to answer the same question for a number of cells. How good is the service that BellSouth provides CLECS compared with the service it provides itself and its affiliates? Homogeneous cells are cells for which the true answers to those questions are approximately the same. By heterogeneous cells, I mean a group of cells where BellSouth provides parity, or better service, in some cells and much worse than parity service in other cells.

Q. WHY SHOULD RESULTS ONLY BE AGGREGATED FOR HOMOGENOUS CELLS?

A. Truncated z was designed to combine results from cells for which BellSouth's performance relative to parity is expected to be similar. It only makes sense to distill a large number of answers (modified z scores) into a single answer (a truncated z score) if the true answers for the cells are approximately the same. If parity service is being provided in some cells while very poor service is being provided in others, then there is no single correct answer to the question that truncated z is designed to answer.

Q. WHAT CAN GO WRONG IF HETEROGENEOUS CELLS ARE AGGREGATED USING TRUNCATED Z?

A. Truncated z can allow parity service in some cells to conceal discrimination in other cells. The truncation step, setting $Z_j^* = \min(0, Z_j)$, is designed to keep a single cell where the CLEC's customers receive much better than parity service from canceling out poor service in other cells. However, it does not prevent parity, or better, service in a large number of cells from concealing very poor service in other cells. Suppose that in cells being aggregated, BellSouth provides very poor service in a few cells (e.g., modified z scores extreme enough to rule out random variation as the explanation) and parity service in other cells. The more parity cells that are included, the greater the chance is that truncated z will not be significant. The reason is that each cell that is found to be in parity

increases the value of the truncated z statistic (high values are taken as evidence of parity). In addition, each new cell (whether in parity, or not) decreases the balancing critical value that truncated z must fall below to be judged significant. Similarly, parity service in just a few large cells can conceal very poor service in much smaller cells because truncated z weights the modified z scores according to sample sizes in the cells.

Q. CAN YOU PROVIDE A SIMPLE ILLUSTRATION OF HOW THIS WORKS?

A. Yes. Consider a simple example with just two cells, using delta equal to 0.25. Assume that BellSouth provides a very large number of DS3 and POTS loops to itself with means and standard deviations of 5 days for each product. Now suppose that BellSouth provides a CLEC 200 DS3 loops in an average of 7 days and 2000 POTS loops in an average of 5.05 days. The modified z for DS3 is –5.65, overwhelming evidence of discrimination, and easily significant compared with the balancing critical value (BCV) of -1.77. The modified z for POTS is –0.45, which is not significant compared with a BCV of -5.58. If the two cells are aggregated using truncated z, the resulting truncated z score of –2.79 is much less extreme than the modified z for DS3 alone and is not close to significant when compared with the BCV of –7.08 for the aggregated test. Consequently, no remedy would be paid despite the clear evidence of

large discrimination for DS3. Similar examples could easily be given for other values of delta.

Q. DOES THIS MEAN THAT TRUNCATED Z SHOULD NOT BE USED?

A. No. Aggregation using truncated z can be an appropriate methodology as long as it is not used to aggregate heterogeneous cells.

Q. HOW CAN IT BE DETERMINED WHICH GROUPS OF CELLS ARE LIKELY TO BE HETEROGENEOUS?

A. Both historical data and business judgment can inform this conclusion. The CLECs have not received access to the detailed data necessary to answer this question. Lacking those data, the CLECs have identified a level of disaggregation that they believe is needed to produce homogenous groups of cells (see testimony of Ms. Kinard).

Q. SHOULD THE AGGREGATION BE REVIEWED AND VALIDATED PRIOR TO IMPLEMENTATION?

A. Yes. This will contribute to ensuring that non-compliant performance is not masked as discussed above.

Q. WHAT IS THE CRITICAL VALUE AND WHY IS IT IMPORTANT?

A. The critical value is used, along with the test statistic, to determine whether the performance for a particular measure is considered to be in

violation. Negative values of the test statistic provide evidence that a CLEC's customers are receiving worse service than the corresponding BellSouth customers, with large negative numbers providing the most evidence. The value of the test statistic is compared with a pre-specified negative number, called the critical value. If the test statistic is more negative than the critical value, then the measure is determined to be in violation. Otherwise, the measure is not determined to be in violation, even though service for the CLEC customers may have been worse than service received by the retail customers.

Q. PLEASE EXPLAIN THE CONCEPT OF "ERROR" IN CONNECTION WITH STATISTICAL TESTING.

A. Because statistical tests are based on finite amounts of data, they are subject to error. For tests of parity, there is some chance that a measure will be determined in violation when, in fact, the two processes were in perfect parity (i.e., any difference was purely due to random variation). Likewise, when the two processes are out of parity such that the CLEC's customers receive systematically worse service, there is a chance that the statistical test will fail to find the measure in violation, again due to random variation.

Q. WHAT IS A TYPE I ERROR?

A. A Type I error occurs if the statistical test indicates that BellSouth is favoring its retail operations when, in fact, parity service exists. Type I errors occur because of random variation.

Q. WHAT IS A TYPE II ERROR?

A. A Type II error occurs if the statistical test fails to indicate that BellSouth is favoring its retail operations when, in fact, a certain degree of disparity does exist. Like Type I errors, Type II errors occur because of random variation. In contrast to Type I errors, determination of the probability of a Type II error requires specification of an alternative hypothesis that quantifies the degree of service disparity.

Q. HOW DOES THE CHOICE OF THE CRITICAL VALUE AFFECT TYPE I AND TYPE II ERRORS?

A. The critical value trades off between the probabilities of Type I and Type II errors. A large negative critical value holds down the probability of a Type I error, but allows the probability of a Type II error to grow larger. A less negative critical value keeps down the probability of a Type II error but allows the probability of a Type I error to grow. Put simply, a large negative critical value reduces the possibility of determining noncompliance when BellSouth is in fact providing parity service, while less negative values reduce the possibility of determining BellSouth is compliant when in fact they are providing noncompliant support.

Q. DO YOU SUPPORT THE BALANCING CRITICAL VALUE METHODOLOGY?

A. Yes. The balancing methodology addresses problems with the obvious alternative—a fixed critical value—because it explicitly accounts for both Type I and Type II errors. As long as the method uses a reasonable alternative hypothesis, balancing is a good method for protecting the interests of both BellSouth and the CLECs.

Q. HOW SHOULD THE ALTERNATIVE HYPOTHESIS FOR THE BALANCING METHOD BE DETERMINED?

A. The alternative hypothesis should describe the minimum degree of disparity that constitutes a "material impact" on competition. The balancing method recognizes that small degrees of disparity may not significantly hinder competition, and thereby do not require protection for the CLECs. However, the degree of disparity specified by the alternative hypothesis should not exceed the minimum amount that would constitute a material impact on competition because doing so would deny the CLECs adequate protection against that degree of discrimination.

Q. WHAT IS THE PARAMETER "DELTA" AND WHY IS IT IMPORTANT?

A. The parameter delta can be used to define the degree of violation of parity (i.e., the alternative hypothesis) for which the probability of Type II error is

balanced against the probability of Type I error under parity. Delta specifies the difference between the CLEC mean and the BellSouth mean. To account for the fact that performance measures do not share a common scale, the difference between the CLEC and BellSouth means is stated as delta times the standard deviation for BellSouth customers.

Q. HOW CAN THE TRA ASSESS 0.25 AND OTHER POTENTIAL VALUES FOR DELTA?

A. To understand the implications of delta = 0.25 and various alternative values of delta, consider what they imply for an interval measure. For example, suppose that the measure Order Completion Interval has a mean of 5.0 days and a standard deviation of 5.0 days for BellSouth customers. Then specifying delta sets the alternative hypothesis for which Type II error is balanced against Type I error. This alternative hypothesis states that the CLEC mean equals the BellSouth mean (5.0 days) plus a disparity of delta times the BellSouth standard deviation (delta x 5.0 days). Table 1 shows what this implies for three values of delta: 0.25, 0.50, and 1.00. A value of delta equal to 0.50 would be justified only if any disparity of less than 2.5 days is judged *not* to pose a material impact on competition. A delta of 1.00 would be justified only if any disparity of less than 5.0 days is judged *not* to pose a material impact on competition—i.e., only if doubling the order completion interval was judged to be immaterial.

Table 1

Implied Disparity for Order Completion Interval,

by Value of Delta

	Delta		
Item	0.25	0.50	1.00
	(Days)		
Disparity [a]	1.25	2.50	5.00
CLEC mean under alternative hypothesis [b]	6.25	7.50	10.00

Table assumes the BellSouth mean and standard deviation are both 5.0 days.

[a] Disparity = delta x BellSouth standard deviation

[b] CLEC mean = BellSouth mean + disparity

Next, consider a counted measure indicating a particular service problem that is triggered for 1 percent of BellSouth's own customers. Column 1 of Table 2 shows that the degree of disparity quantified by delta equal to 0.25 implies that 5.0% of CLEC customers would encounter the same problem; that is, the CLEC rate is five times the BellSouth rate.[2] Subsequent rows of the same column show the problem rates for CLEC

[2] The table assumes use of arcsine square root transformation to stabilize the variance of observed proportions. Using this function, transformed proportions have a nearly constant variance across the range of possible true proportions.

customers implied by a delta of 0.25 for problems that affect 5, 10, or 20 percent of BellSouth customers. The CLECs judge that disparities of this size pose material obstacles to competition. Therefore, delta should be no more than 0.25. Any larger value of delta would require even greater disparities before balancing takes place. For example, for a problem that occurs for 1 percent of BellSouth customers, a delta value of 0.50 would not balance until the CLEC rate reached 11.8%, nearly a twelve-fold increase. These disparities are highlighted in Table 2.

Table 2

Percentage of CLEC Customers Receiving Bad Service,
by BellSouth Percent and Delta

	Delta		
BellSouth Percent	0.25	0.50	1.00
1.0	5.0	11.8	31.9
5.0	11.8	21.0	44.0
10.0	18.7	29.3	53.6
20.0	30.8	42.8	67.4

Q. CAN THE CLECS SUPPORT THE DELTA VALUE OF 0.25 ORDERED BY THE ARBITRATORS?

A. Yes. The CLECs believe that the sizes of the disparities implied by a delta of 0.25—e.g., a mean Order Completion Interval of 6.25 days versus 5.0 days—would constitute material obstacles to competition. Therefore, the CLECs believe that the TRA should adopt 0.25 or less as the parameter delta value for all submeasures.

Q. WHAT ARE THE CONSEQUENCES IF DELTA IS SET TOO LARGE?

A. Suppose that delta is set substantially above the minimum value that represents material impact on competition for a particular measure. Then the CLECs will face greater risk of a Type II error in the face of disparity constituting material impact than BellSouth would face of a Type I error under parity. In other words, proper balancing would not occur. This problem would be magnified for large sample sizes, because balancing can produce unconventionally large, negative critical values. For example, with samples sizes of 2,500 and 250 for BellSouth and a CLEC, respectively, a delta equal to 0.50 yields a balancing critical value of –3.77, corresponding to a Type I error probability of 0.00008 (i.e., 1 in 12,000), far below any conventional significance level used in statistical testing. A delta equal to 1.00 would yield a balancing critical value of –7.54, corresponding to a microscopically small Type I error probability.

Consequently, compelling statistical evidence of discrimination, e.g., a z score of –6.0, might be ignored.

Q. PLEASE SUMMARIZE YOUR TESTIMONY.

A. The CLECs support the statistical methodology adopted by the TRA as the base plan as long as truncated z is not used to aggregate heterogeneous cells in ways that could mask discrimination. The CLECs support the balancing critical value methodology and support a value of 0.25 for the parameter delta.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes.