II.   Evaluation Overview

1.0   Objective

The objectives of this Evaluation Overview are to provide:

- Background on the Regional Oversight Committee's consideration of Qwest Communication's (Qwest's) compliance with the requirements of Section 271 of *The Telecommunications Act of 1996* (the Act);

- A summary of the business processes, supporting functions, and interfaces selected for testing as outlined in the *Master Test Plan* (MTP);

- A high-level description of the processes that KPMG Consulting followed in evaluating Qwest's interfaces, systems, policies, procedures, and documentation.

2.0   Audience

KPMG Consulting anticipates that the audiences for this document will fall into two main categories:

- Regulators who will utilize this document during formal regulatory evaluations of Qwest's Operating Support Systems (OSS), including State Commissions; the Federal Communications Commission (the FCC), and the Department of Justice (the DOJ); and

- Other parties who have some interest in the results of Qwest's OSS evaluation, and wish to have insight into the test results, including Qwest, Competitive Local Exchange Carriers (CLECs), and other Incumbent Local Exchange Carriers (ILECs).

While many of the above parties have stated an interest in the test, and its results, only Qwest and the Regional Oversight Committee have contractual rights to this document. Third party reliance on this report is not intended, and is explicitly prohibited. It is expected that each of the participating State Commissions will review this report in forming its own assessment of Qwest's compliance with the requirements of the Act.

3.0   Background

The Regional Oversight Committee is comprised of the 14 state commissions regulating telecommunications in Qwest's operating area. The Regional Oversight Committee is considering the matter of Qwest's compliance with the requirements of the Act. The Act, together with FCC interpretations, requires an ILEC to:

- Provide non-discriminatory access to its OSS on appropriate terms and conditions;

- Provide the documentation and support necessary for CLECs to access and use these systems; and

- Demonstrate that the ILEC's systems are operationally ready, and provide an appropriate level of performance.

Compliance with these requirements is intended to allow competitors to obtain pre-ordering information, execute service orders for resold services and unbundled network elements (UNE), manage troubles, establish and maintain a customer relationships with Qwest, and obtain billing information at a level deemed to be non-discriminatory when compared with Qwest's retail operations.

Thirteen of the fourteen Regional Oversight Committee member states (Arizona excepted) agreed to pursue the collaborative OSS testing effort, of which this Final Report is one work product. This group of participating states will, henceforth, be referred to as the ROC for the purposes of this document.

The ROC Technical Advisory Group (the TAG) includes Staff members from the thirteen State Commissions, as well as representatives from Qwest and many of the CLECs. The TAG was responsible for:

- Developing the principles that were applied during the development and conduct of the collaborative test;

- Developing performance measures that were used during the test; and

- Providing input on various decisions regarding test design and conduct.

4.0   Master Test Plan Scope

The ROC, with significant input from the TAG, developed the *Test Requirements Document* (TRD), dated March 9, 2000, to define the scope and specific approaches to testing. The TRD also set out the roles for three testing vendors: the Test Administrator (TA), the Pseudo-CLEC (P-CLEC), and the Performance Measures Auditor (PMA). The TRD was provided to prospective vendors to solicit proposals for conducting the third-party testing work.

In the TRD, the ROC specified that the third party testing should focus on the following service delivery methods:

- Resale;

- Unbundled Network Element (UNE) loops;

- UNE Platform (UNE-P);

- UNE combinations, such as Enhanced Extended Loops (EELs);

- Other UNEs, such as Unbundled Dedicated Interoffice Transport (UDIT); and

- Any other delivery methods that become available during the test.

Furthermore, the TRD specifically identified four OSS functions to be evaluated:

- Pre-Order, Order, and Provisioning (POP);

- Maintenance and Repair (M&R);

- Billing (BLG); and

- Relationship Management and Infrastructure (RMI).

The TRD also called for normal, peak, and stress volume testing of those OSS interfaces that support pre-ordering, ordering, and maintenance and repair functions for both resale and UNE services.

KPMG Consulting was awarded the role of TA, Hewlett-Packard Consulting (HPC) the role of P-CLEC, and Liberty Consulting the role of PMA. After selection as TA, KPMG Consulting worked with the ROC TAG to develop a *Master Test Plan* that outlined the scope of testing described in the TRD. Please refer to the TRD for additional information regarding the roles and responsibilities of the individual vendors.

5.0   Approach

5.1   Domains

The TRD described four domains, or logical business areas, to facilitate testing of Qwest's wholesale operations. Wholesale operations are defined as those Qwest operations that involve selling local services and providing support to CLECs. Each domain was further divided into several discrete tests in the MTP along functional lines. Organizing the test in this manner facilitated parity comparisons of test results, where appropriate, to those of Qwest's retail operations (i.e., those Qwest operations selling local services and providing support to end-user customers).

The four test domains and associated tests are:

- Pre-Order, Order and Provisioning (POP)

  - Tests 12, 12.7, 12.8, 13, 14, 14.7, 14.8, 15, 22, 24.8, and 24.9;

- Billing (BLG)

  - Tests 19, 19.6, 20, 20.7, and 24.10;

- Maintenance and Repair (M&R)

  - Tests 16, 17, 18, 18.7, and 18.8; and

- Relationship Management and Infrastructure (RMI)

  - Tests 23, 24.3, 24.4, 24.5, 24.6, and 24.7.

Capacity Management evaluations are included in each of the appropriate Pre-Order, Order and Provisioning, Billing, Maintenance and Repair, and Relationship Management and Infrastructure tests.

Within each domain, specific methods and procedures were applied to evaluate Qwest's wholesale performance *vis-à-vis* specific test targets. Details on the evaluation methods, analysis methods, and results of each evaluation are provided in the individual test sections. A summary of the evaluations and results is provided in Section III, Test Summaries.

5.2   Test Types

The ROC OSS test utilized two fundamental types of testing techniques: transaction-based testing; and, operational analysis testing. Each of these techniques develops a different type of

record about Qwest's wholesale operations. In several cases, the results of transaction-based tests were used to supplement the information obtained during execution of operational analysis tests.

5.2.1 Transaction-based Tests

One of the goals of transaction-based testing was to live the CLEC experience. The fundamental idea was to establish a pseudo-CLEC, develop applicable interfaces using Qwest's publicly available documentation, and submit pre-order, order, and repair transactions using those interfaces – much as a real CLEC would do. Transaction-based system testing was utilized extensively in the POP, M&R, and BLG domains. These tests are "non-invasive" in that they depend on arms-length interactions between Qwest and the P-CLEC using publicly available interfaces and documentation.

KPMG Consulting and HPC combined efforts to accomplish the transaction-based tests. KPMG Consulting's roles were those of a CLEC's marketing, billing, and facilities management groups. KPMG Consulting supplied the HPC Ordering group with information about customer requirements, managed the inventory of test accounts and facilities, monitored Qwest's performance, and evaluated carrier-to-carrier bills.

HPC's roles were those of a CLEC's Information Technology and Order Operations groups. HPC established electronic bonding with Qwest, translated back and forth between business rule and electronic interface rule formats; created and tracked orders, resolved problems with missing orders and responses, and entered trouble tickets.

POP test transactions were submitted via the Interconnect Mediated Access - Graphical User Interface (IMA GUI), the Interconnect Mediated Access - Electronic Data Interchange (IMA EDI) interface, facsimile, and a participating CLEC's EXACT/TELIS system.

Bills were processed for the BLG evaluations through three regional (Central, Eastern, and Western) Customer Records Information Systems (CRIS) invoicing systems. Usage was processed through a variety of systems, which identify the CLEC to whom the usage belongs, translate the records into EMI format, and deliver records to the CLEC via the Daily Usage Feed (DUF) distribution process.

M&R trouble tickets were submitted through the Customer Electronic Maintenance and Repair (CEMR) and Electronic Bonding – Trouble Administration (EB-TA) interfaces.

Actual commercial CLEC transaction activity provided an alternative test method for transactions that were not practical to execute in the test environment. Moreover, commercial CLEC transaction activity provided a different perspective on production functionality and performance.

5.2.2 Operational Analysis Tests

Operational analysis tests focused on the form, structure, and content of the business process under study. This testing technique was used to evaluate Qwest's day-to-day operations and operational management practices, including procedural development and procedural change management. These tests were "invasive," in that KPMG Consulting received access to Qwest's

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internal documentation, personnel, and procedural descriptions that are not necessarily publicly available.

Operational analysis techniques were also used to evaluate a Qwest process to determine if the process appeared to function correctly, in accordance with documentation and expectations. In some cases, KPMG Consulting reviewed management practices and operating procedures, comparing the results against legal or statutory requirements or against "best practices" identified by KPMG Consulting.

5.3 Military-style Test Philosophy

In conducting the ROC OSS test, KPMG Consulting employed a "military-style" test philosophy. In a military-style test, a mindset of "test until you pass" is generally adopted so that a baseline set of working systems and processes would be available to the CLECs by the end of the test period. This was believed to be in the best interest of all parties seeking an open, competitive market for local services in the Qwest operating area.

The military-style test process for the ROC worked as follows:

- One of the testing vendors (KPMG Consulting, HPC, or Liberty Consulting) tested a Qwest component (e.g., system, document or process);

- The testing vendor informed Qwest of any problems encountered by creating a written Exception or Observation describing the failed component and the potential impact on a CLEC;

- Qwest prepared a written response to the Exception or Observation, describing any intended fix or providing clarification of the identified issue;

- After any required Qwest fixes were complete, the testing vendor retested the component as required; and

- If the Exception or Observation is cleared, the process is considered complete, and the testing vendor prepared a written closure statement for consideration by the ROC TAG. Otherwise, the testing vendor continued to iterate through the cycle until Exception or Observation closure was reached, or until such time as the ROC TAG or Qwest requested that the Exception or Observation be "Closed/Unresolved." A "Closed/Unresolved" Exception or Observation indicated that the vendor has been directed not to proceed with any additional retesting activities and, therefore, should reflect the "as-is" conditions of the Qwest component in the Final Report.

5.4 Test Bed

In order to accomplish testing, Qwest was required to provision a test bed of initial accounts that represented Qwest's, or another CLEC's, customers to be migrated to the P-CLEC, and P-CLEC accounts that would undergo various change activities during the course of the test. The notion of a test bed is a logical concept, in that the test accounts were created in Qwest's production systems, not in a separate test system.

KPMG Consulting and the ROC TAG cooperated to define the test bed specifications. Using the test scenario descriptions contained in the MTP, KPMG Consulting developed test cases for each

scenario. Based on the test cases, KPMG Consulting delivered a set of line and account requirements to be provisioned by Qwest. These requirements covered a range of customer starting states (e.g., Qwest retail, CLEC UNE); line counts (single and multi-line); service types (business, residential); and features (e.g., call waiting, call forwarding). The test bed accounts were established across thirty-seven central offices (COs) covering different rate centers, population density zones, and switch types.

The test bed specifications that were submitted to Qwest provided no indication of the subsequent order activity planned by KPMG Consulting. In addition to the baseline test bed accounts, Qwest also provided KPMG Consulting with spare facility and customer information (cable-pair assignments, telephone numbers, and addresses) that would be required when populating specific service requests, such as new or add orders.

From discussions regarding the necessary elements of the test bed, three types of test bed accounts were established: Resale and UNE-P testing utilized virtual accounts; UNE-Loop testing utilized physical; and working accounts were used for testing DS1 loops, DUF, and M&R. Virtual accounts used a real Telephone Number (TN) and port on the switch, but used pseudo-address and pseudo-cable pair information. Physical accounts used a real TN and cable pair, a pseudo-address, and were wired to terminate in the CO with dial tone. Working accounts used a real TN and real address, and generally terminated outside the CO. Prior to the initiation of testing, KPMG Consulting validated the provisioning of the test bed by Qwest to ensure the proper start state existed for the test accounts.

In addition to the test bed described above, two other test beds were created for this test. A separate test bed was created by Qwest, using specifications supplied by KPMG Consulting, for accounts to be used for the POP volume test. These accounts were built under a different P-CLEC identity than the one used for all other testing so that the same account could be used multiple times during the execution of the volume test. The third test bed was built to provide KPMG Consulting with a pool of spare accounts that could be used for retest purposes.

Additional details on the individual test beds are provided in the test reports.

5.5 Blindness

As previously stated, one of the objectives of the transaction-based tests was to live the CLEC experience. Yet, it was virtually impossible for all OSS test activities to be truly blind to Qwest. For example, the faults inserted on lines for the M&R test had to be inserted by Qwest employees at KPMG Consulting's direction and oversight.

To partially offset this lack of blindness, KPMG Consulting instituted certain procedures to help ensure that KPMG Consulting and HPC would not receive treatment from Qwest that was obviously different from that received by a real CLEC. For example, KPMG Consulting required that all documents given to HPC be generally available to all CLECs, and that any training courses attended by KPMG Consulting or HPC personnel for test purposes be available to all CLECs. KPMG Consulting and HPC reported problems using the same help desk mechanisms used by CLECs.

Furthermore, a procedure of "sighting" was developed to control knowledge of the P-CLEC's identity within Qwest. A sighted employee was made aware of the P-CLEC's identity, including any related company codes, and given standard instructions regarding the use of this information. Qwest maintained a list of sighted employees, which was updated and distributed on a regular basis. Care was taken in all cases in which the P-CLEC's identity was discussed with Qwest representatives to ensure that no "blind" employees were involved in such discussions. Qwest participation in some meetings and conference calls was prohibited to further preserve the test's blindness.

5.6 Limitations

The MTP was limited to Resale, UNE-P, and UNEs for feature/function testing in the Pre-Ordering, Ordering and Provisioning, Maintenance and Repair, and Billing domains. However, even though the test exercised a set of activities that is much broader than that likely to be undertaken by any single CLEC in the near future, the test was not intended to be exhaustive because it is neither feasible nor desirable to test all possible permutations and combinations of all features and functions across all offered products.

In some cases, it was not practical to simulate certain order types, troubles, and processes in a test situation. Examples include orders with very long interval periods, and provisioning of large volumes of test transactions that would exceed the manual capacity of Qwest's work centers. In some cases, KPMG Consulting and HPC lacked access to telecommunications facilities and equipment needed to perform certain order types, such as the submission of Local Number Portability (LNP). In this example, KPMG Consulting, in collaboration with the ROC, solicited the participation of actual CLECs to execute LNP service requests.

6.0 Results

As of the date of this report, some test execution activities are ongoing. Test results for all domains are based on the information available to KPMG Consulting at the time of the writing of this report. A final report will be prepared by KPMG Consulting for submission to Qwest and the ROC TAG upon completion of all test execution activities and the closure (for evaluation purposes) of all Exceptions.

6.1 Evaluation Criteria and Results

Test targets and their corresponding evaluation criteria provided the basis for conducting tests. Evaluation criteria were the norms, benchmarks, standards, and guidelines used to evaluate items identified for testing. Evaluation criteria also provided a framework for identification of the scope of tests, the types of measures that must be made during testing, and the approach necessary to analyze results.

The ROC TAG collaboratively developed a set of Performance Indicator Definitions (PIDs) that defined the measures and standards to be used for purposes of KPMG Consulting's evaluation. In cases in which a test evaluation criterion mapped to a Qwest PID, the test results were compared against the proposed standards. In cases where a standard did not exist, results were evaluated using explicit standards established by KPMG Consulting, using our professional judgment.

For quantitative evaluation criteria for which a benchmark standard existed, KPMG Consulting applied a "stare and compare" analysis. In such a case, if the test result was less than the standard, that criterion was classified as a failure. For quantitative evaluation criteria for which there was a parity standard, KPMG Consulting applied a dual statistical test to determine whether the result was statistically significant. For details of the statistical approach to parity standards, see Appendix G of the MTP.

In cases in which failure to satisfy the criterion might, in KPMG Consulting's judgment, present a significant business impact to CLECs, KPMG Consulting issued an Exception. Exceptions were a means of identifying to Qwest defects in its OSS components. Where applicable to an evaluation criterion, the significant details of an Exception are documented in the "Comments" column of *Section 3.0 Results Summary* for each test. Other items worthy of mention that might not present a significant business impact to CLECs are also described in the "Comments" column.

For information on all Exceptions, please access the ROC OSS Repository Web site at:

http://www.nrri.ohio-state.edu/oss/oss.htm

Each evaluation criterion was analyzed individually and has its own associated result and comments. The results fall into the following categories:

- Satisfied — KPMG Consulting's analysis demonstrated that the evaluation criterion was satisfied through existing business operations components (e.g., procedure, system, or document). A criterion was satisfied by meeting a quantitative, qualitative, parity, or existence parameter established for purposes of the test.

- Not Satisfied – KPMG Consulting's analysis demonstrated that the evaluation criterion was not satisfied through existing business operations components (e.g., procedure, system, or document). A criterion was not satisfied by failing to meet a quantitative, qualitative, parity, or existence parameter established for purposes of the test.

- Unable to Determine – KPMG Consulting's evaluation and analysis were not able to fully determine that a criterion was satisfied or not satisfied. There were several possible causes for an Unable to Determine result, including: activities that took place inside a system and were, therefore, not visible to the tester; event-driven activities for which no event trigger occurred during the testing period; and activities that are planned to occur in the future, such as planned system or process changes.

- Not Complete – test execution is in progress and/or Exceptions remain open.

- Diagnostic – the PID standard is Diagnostic only.

KPMG Consulting must point out that the criteria are not all of equal importance. Some are less important as stand-alone measures, but are important when considered as a group. Other criteria are significant in their own right. A simple numerical counting or averaging of results by result category is misleading and should be avoided.

6.2   Incorporation of Hewlett-Packard Consulting Results

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In addition to discrete test reports and other components developed by KPMG Consulting, this Draft Final Report contains materials produced by HPC. Specifically, HPC prepared report materials for Tests 10, 12 (A, B, and C), and 24.8, and Appendices A, B, and C. HPC is solely responsible for the content of its materials, which have been incorporated, without review or modification, by KPMG Consulting into this Draft Final Report.