FTS Networx – Enterprise

7 – OSS Verification Test Plan

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</table>
TABLE OF CONTENTS

1 Introduction ...........................................................................................................1
2 Sprint Testing Organization Structure...............................................................2
3 Integrated Test Management............................................................................6
4 Sprint OSS Verification Testing .........................................................................11
5 Networx OSS Verification Test Plan .................................................................13
   5.1 Service Ordering Test Plan (Section C.3.5) ..............................................13
   5.1.1 Order Placement..................................................................................13
   5.1.1.1 Services To Be Demonstrated ......................................................15
   5.1.2 Order Acknowledgements ..................................................................17
   5.1.3 Bulk Order Placement .......................................................................18
   5.2 Inventory Management Validation Testing (Section C.3.8) ......................18
   5.3 Billing System VERIFICATION Testing (Section C.3.6) .........................19
   5.3.1 Direct Billing Testing (Section C.3.6.1) ..............................................19
   5.3.2 Centralized Billing Testing (Section C.3.6.2) .....................................20
   5.3.3 Shared Tenant Billing Testing (Section C.3.6.4) ................................20
   5.3.4 Usage Charges .................................................................................21
   5.3.5 Billing Data Dictionary Package .......................................................21
   5.4 Security Management (Section C.3.3.2) .................................................21

TABLE OF FIGURES

Figure 2-1. EDP Process Involves Multiple Sprint Organizations ......................3
Figure 2-2. ITM/TEO Testing Process Flow ......................................................5
Figure 3-1. Test Terminology and Test Stage Overview .....................................10

LIST OF TABLES

Table 5.1-1. Acknowledgements Compliance ..................................................18
1 INTRODUCTION

Following contract award and before telecommunications services are transitioned to, migrated to, or implemented on the Sprint network, Sprint will conduct validation tests on its systems developed or enhanced to support delivery of Networx services. (J.9 ID 10906)

Sprint will cooperate with the Government to test the processing of service orders as well as their associated billing and usage charges. Sprint testing will ensure that the information provided on service orders is properly processed into the Sprint billing system, as well as ensure the capabilities of the billing system to produce a complete, accurate and correct invoice. Sprint will also test access to, and performance of, the Sprint data system(s) which will be used to support Networx. As part of the verification testing required by the Government, or at any time prior to Government acceptance in accordance with the agreed upon testing schedule, the Government may provide test data or records which Sprint will process through its system(s). The testing schedule agreed to by Sprint and the Government will accommodate Government observation of Sprint tests to ensure they meet the RFP specifications. Sprint will use this test execution schedule to guide the testing process for Networx to successful completion within the timelines prescribed by the RFP. Upon test completion, Government acceptance or rejection of the systems will be performed in accordance with test acceptance criteria outlined in Section E.3, OSS Verification Testing and delivery of acceptable test results to the Government by Sprint.
2. SPRINT TESTING ORGANIZATION STRUCTURE

This section describes the internal organizational structure Sprint employs to support corporate release of information systems used to support service delivery and management for Sprint’s customers. Various organizations throughout Sprint support different roles. 

Figure 2-1 presents a view of the process model illustrating overlay of the roles in the EDP process.
Figure 2-1. EDP Process Involves Multiple Sprint Organizations

A well-defined OSS Test Plan Involves ITS, Test Managers, Subject Matter Experts and the Government ensuring Optimal Systems with minimal errors.
To highlight some of the Sprint roles most involved during the EDP project life cycle:

• **IT Solutions Architect** – Determines IT architectural approach – an integrated view; creates Architecture Blueprint; validates integrated data models for the project.

• **Business Project Manager** – Manages production development lifecycle; manages business and functional requirements.

• **Integrated Test Analyst** – Determines test requirements; creates Integrated Test Plan; performs integrated testing.

• **IT Requirements Manager** – Facilitates definition of functional and system requirements; ensures quality and integrity of requirements.

• **Integration Test Environment Analyst** – Sets up the integration test environment and test data; supports integration testing.

• **IT Infrastructure Project Manager** – Manages IT Operations, scope, cost and schedule throughout the IT infrastructure build-out lifecycle.

• **IT Pipeline Manager** – Manages, supports and load balances projects, releases and resources within composite delivery view of ITS Pipeline. Responsible for the initiation and documentation of Requests for Change (RFC) associated with a concept (CARD).

• **Account Manager** – Supports business units as an advocate of ITS; Ultimately accountable to the business for projects and RFCs success; Facilitates the ideation step of the Define Phase; Creates/Updates approach and financial information for concepts.

The high level process flow in Figure 2-2 illustrates how integrated testing is planned and executed within the internal EDP Process.
Integrated Test Cycles, Fully Managed by Dedicated Resources, Enable a Robust OSS in Support of Networx Users.
The following section describes Sprint’s internal testing deliverables for Integrated Test Management.

3 INTEGRATED TEST MANAGEMENT

Sprint’s Integrated Test Management requires creation of a Master Project Test Plan (MPTP) document to define, document, and communicate the initial and final plans for System, Inter-application Connectivity, End-to-End, and Production Readiness Testing. This document contains all testing information related to the project including: a Test Application Matrix, Project Contact List, details regarding Test Defect Management, Phase Gate Review Process, Test Data Requirements, Release and Test Environment Information, Assumptions and Synergies, Test Execution Schedule and the Key Stakeholder signoffs. A more detailed description of each section of our internal test plan follows.

Note: End-to-End Testing includes Regression and Acceptance Testing, as applicable. Production Readiness Testing includes Load, Stress, Volume, and Performance Testing, and Production Shakeout Testing, as applicable.

• Test Application Matrix (TAM) – The TAM provides a central location that contains a complete list of impacted applications in the project. Sprint uses Change Requests to update this matrix to include all applications entering a given project.

• Project Contact List – Provides a central repository for all project related contacts needed for support of a project. The Contact List is accessible via Sprint’s internal Test Defect Management website.

• Test Defect Management (TDM) – Test Defect Management is responsible for ensuring that test defects are resolved expeditiously to meet the project Release Service Level Agreements (SLAs). Sprint TDM partners with Sprint internal stakeholder groups to assign and
work all pre-production defects to resolution by the appropriate individuals/groups across our application teams and vendors. TDM gathers and documents Root Cause Analysis/Irreversible Corrective Action (RCA/ICA) information for each testing defect. Before a ticket can be moved to 'Resolved' / 'Concluded' status, the TDM team gathers the root cause information from the Fix Agent/Vendor. TDM uses a template that details the group responsible for the resolution, the type of resolution, description of the resolution, and the root cause of why the problem occurred. Along with this information, an Irreversible Corrective Action (ICA) is specified, if possible.

• Phase Gate Reviews – After each integrated test phase, a review is held with all impacted parties and Release Management to verify the requirements for each phase have been satisfactorily met. During the meetings, defect/testing metrics will be reviewed to evaluate the status of the project and determine if a Risk Assessment is needed.

• Application Code and Test (System Testing) – All the application related testing materials will be attached to the MPTP, including but not limited to, application design documents and application system test plans. A Signoff on system test plans and test cases by Sprint stakeholders is required.

• Integrated Testing Test Approach Statement – Based on the project requirements, the Test Approach Statement lists the types of integrated testing to be performed (i.e. End-to-End, UAT, Regression, Production Readiness & Load and Performance) along with an approach for each type of testing. This will also identify the organization which will be performing the testing required, as well as document any automation processes to be used.
• **Test Workflow Diagram** – Depicts the flow of all the systems involved in testing of the project.

• **Test Durations Matrix** – A summary statement about the durations and the factors involved in each test phase.

• **Test Data Requirements** – Description of data needs, not already captured in TAM, including any scenarios, matrix documents, etc.

• **Test Execution Schedule** – An Execution Schedule documents the order in which test conditions is executed and the duration of each task in each test phase. The Test Execution schedule is documented in Microsoft Project.

• **Project Test Assumptions, Synergies, Dependencies** – A list of any assumptions which impact the project is outlined in this section. Also outlined is a list of any projects which have synergies or dependencies on the project being described in the MPTP.

• **Integrated Testing Metrics and Reporting** – Integrated Test Management has an internal website that provides a status of each project targeting a Major/Minor corporate release. This includes the number of test cases captured for each testing phase and how many have been tested to date with pass/failure rates.

Use of the Sprint Integrated Test Environment (ITE) enables a knowledgeable, independent group to thoroughly test all software modifications before release into production. ITM's independent and verifiable testing process allows Sprint to carefully control the software modification process.

ITE includes all software applications and data components needed to complete a full billing cycle. All program modules are moved from development libraries to the ITE acceptance library. All modules are compiled
separately by the Testing Environment Operations (TEO) staff to conduct tests with load modules that correspond to the received source code. The TEO test beds perform both regression analysis and acceptance testing. If errors occur during testing, Sprint will perform regression testing before production release.

Figure 3-1 describes the testing process and types of testing that Sprint currently supports. Based on the change specifications, development teams will develop the required program changes, enhancements, and test cases. Once the development staff has determined that the software is complete and correct, the software is turned over to the TEO staff. The software is then moved into a secure environment and a data test bed is developed. On completion of all of these steps, the new software is moved into production under the control of Production Management.
Figure 3-1. Test Terminology and Test Stage Overview

Multiple Test Stages enable Delivery of the Networx OSS with minimal defects.
4 SPRINT OSS VERIFICATION TESTING

Sprint internal OSS verification Testing employs the Integrated Test Management Process described above. Sprint has a comprehensive set of tools and methods for its testing process that provides checks and balances throughout each test phase. Before each test phase begins, all test cases and expected results are documented to keep the testing on track and completed in an accurate and timely manner. The TEO team and ITM teams work closely to prepare environments and load data before execution of testing begins. All test case results are compared to the expected results and if applicable, variances are noted and/or verified prior to initiation of the next stage/step of the testing process. A test plan and execution schedule is available to guide the Networx testing process to a successful conclusion. Execution of various test phases uses the Sprint OSS Integrated Test Environment. Sprint also uses this environment to re-verify the systems upon modification of rate tables and/or application software modules.

At minimum, Sprint internal OSS verification testing will incorporate the activities and/or elements listed below:

• Test conditions covering all major system functions and processing paths
• Test data designed to meet all identified conditions
• Test cycles defining the tests to be run – Test cycles consist of test data grouped by business function and for logical consistency. Test cycles are controls that ensure all tests are run in correct sequence and are properly reviewed and approved. Test cycles also verify a complete cycle and that all related cycles are rerun after corrections to software
• Expected results from each test cycle – Sprint provides procedures and tools to show how to efficiently and thoroughly compare actual results with expected results.

The use of a Sprint OSS Integrated Testing Environment under the control of the TEO team along with the Integrated Test Management team within the Information Technology Services Department ensures a knowledgeable, independent group to thoroughly test all software modifications before they are released into production. The independent and verifiable testing process also allows Sprint to carefully control the software modification process.

The Sprint OSS Integrated Test Environment includes all software applications and data components needed to complete a full billing cycle. All program modules are moved from the developmental libraries to the ITE acceptance library. All modules are compiled separately by the TEO staff to conduct tests with load modules that correspond to the received source code.

Both regression analysis and acceptance testing is performed in the Integrated Test Environment.

Regression analysis confirms that all previously valid conditions are still valid for a new release. Acceptance testing verifies that a new release functions according to the new specifications for that release. A unique test bed is developed for each new release. The Sprint OSS Integrated Test Management staff does the following:

• Ensures the requirements supplied
• Identifies defects and code performance issues, resulting in the prevention of production outages and disruptions, thereby improving production stability.
• Conducts Root Cause Analysis (RCA) and implement Irreversible Corrective Action (ICA) to reduce recurring issues.
Based on the change specifications, resulting from the ITM process, Sprint development creates the required program changes, enhancements, and test cases. Once the Sprint development staff determines that the software is complete and correct, the software is turned over to the TEO staff. TEO then moves the software into its secure environment and develops a data test bed that meets the objectives of the test plan. After a thorough testing review and certification by Integrated Test Management, the results will be accepted and certified as having passed ITM. On completion of all of these steps, the new software is moved into production under Production Management’s control.

5 NETWORX OSS VERIFICATION TEST PLAN

The Networx OSS Verification Test Plan to be performed with the Government uses the Integrated Test Environment approach described above extensively. Other tests will be developed as necessary to cover additional aspects of the support systems based on the RFP’s OSS verification testing requirements. The Sprint OSS Verification Test Plan will include test cases to demonstrate capabilities of the Sprint OSS in accordance with E.3-1. (J.9 ID 11025)

5.1 SERVICE ORDERING TEST PLAN (SECTION C.3.5)

5.1.1 Order Placement

Sprint will test the operation of systems for the receipt, administration and processing of service orders, price quotes, and for directing and accomplishing provisioning of each of the requested services as listed in RFP Section C.2.
Each order submitted will adhere to the order type data elements as required by RFP Section J.12.1.

The following parameters within each order will be validated:

- **Authorization of Orders.**
  Sprint tests will enable the Government to confirm that the service ordering system uses discretionary access controls to verify that the individual requesting the service is authorized to submit the type of service order requested. If the individual requesting the service is not authorized, the system will reject the service request. The Ordering module sends a notification to the requestor notifying them of the rejection with an explanation of why the order was rejected.

- **Agency Hierarchies.**
  Sprint test results will demonstrate that each order submitted will contain a valid Agency Hierarchy code.

- **Contract Line Item Number (CLIN).**
  This test enables the Government to confirm that every service element billed has a CLIN number and includes all the data elements required to verify accuracy of the CLIN. During the test, Sprint will also verify that every Service Order Completion Notice (SOCN) contains a valid CLIN for the service element ordered.

- **Unique Billing Identifier (UBI).**
  This test allows the Government to confirm that each billed record is assigned a UBI to allow for easy identification of a single service and all its components separately from all other services being provided within the same category.

- **Service Ordering Data Dictionary Package.**
  This test will demonstrate the ability for the Government to submit orders directly to Sprint while adhering to the requirements in RFP Section C.3.5.1.3.2.
This test will also demonstrate that the ordering system can provide Order Receipt Acknowledgements and SOCNs containing the data elements specified in Attachments J.12.2.1, Order Receipt Acknowledgement, and J.12.2.5, Service Order Completion Notice (SOCN). These capabilities will be demonstrated using Internet secure access, electronic mail, or electronic file transfer. (J.9 ID 11026)

5.1.1.1 Services To Be Demonstrated

The Networx OSS Verification testing will demonstrate that an authorized Government user can place an order using Internet secure access, electronic mail, or electronic file transfer, and the order populates the fields in the Networx OSS ordering system in a way that meets the requirements of J.12.1, Ordering Data Elements. (J.9 ID 11026)

Service orders demonstrated for the Networx OSS Verification test will include:

(1) Telecommunications Services Type
   (a) Communications Transport Services Category
      (1) Voice Service RFP Section C.2.2.1
      (2) Frame Relay Service RFP Section C.2.3.1
   (b) IP-Based Services Category
      (1) Premises Based IP VPN Service RFP Section C.2.7.2
(2) Network Based IP VPN Service  
(3) Voice over IP Transport Service  
(4) Content Delivery Network Service  
(5) Converged IP Service  
(6) IP Telephony Service  
(7) Internet Protocol Service  
(8) IP Video Transport Service

(2) Management and Applications Services Type
(1) Video Teleconferencing Service  
(2) Managed Network Service  
(3) Audio Conferencing Service  
(4) Teleworking Service  
(5) Call Center/Customer Contact Center Service  
(6) Web Conferencing Service  
(7) Dedicated Hosting Service  
(8) Collocated Hosting Service  
(9) Storage Service  
(10) Customer Specific Design & Engineering Service

(3) Security Services Type
(1) Managed Firewall Service  
(2) Intrusion Detection & Prevention Service  
(3) Managed E-Authentication Service  
(4) Vulnerability Scanning Service
(5) Anti-Virus Management Service  RFP Section C.2.10.4
(6) Incident Response Service  RFP Section C.2.10.5
(7) Secure Managed E-Mail Service  RFP Section C.2.10.8
(8) Managed Tiered Security Service  RFP Section C.2.7.4

(4) Special Services Type
(1) Land Mobile Radio Service  RFP Section C.2.14.6

(5) Wireless Services Type
(1) Cellular/Personal Communication Service  RFP Section C.2.14.1
(2) Multi-Mode/Wireless LAN Service  RFP Section C.2.14.3

5.1.2 Order Acknowledgements

The Networx OSS Verification tests allow the Government to confirm that Order Acknowledgements required by the RFP are created per section C.3.5.1.2.2 while meeting the respective data element requirements for each type of Acknowledgement. The tests will also demonstrate that the Networx OSS ordering system can provide Order Receipt Acknowledgements and SOCNs containing the data elements specified in Attachments J.12.2.1, Order Receipt Acknowledgement, and J.12.2.5, Service Order Completion Notice (SOCN). These capabilities will be demonstrated using Internet secure access, electronic mail, or electronic file transfer.

Table 5.1-1 below depicts the various acknowledgements and Sprint’s compliancy.
Table 5.1-1. Acknowledgements Compliance

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<td>Section J. 12.2-1 Unit 2</td>
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<td>Order Rejection Notice</td>
<td>Section C.3.5.1.2.2.3</td>
<td>Section J.12.2.3-1 Unit 3</td>
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<td>Section J. 12.2.4-1 Unit 4</td>
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<td>Service Order Completion Notice (SOCN)</td>
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5.1.3 Bulk Order Placement

The Networx OSS Verification tests will demonstrate that the OSS ordering system can accept multiple instances of the same service (bulk order) under a single Agency Service Request Number (ASRN) for each service type outlined in Section 5.1.1.1 of this plan using Internet secure access, electronic mail, or electronic file transfer. The OSS tests will demonstrate the system’s ability to provide a single instance of each of the following for each bulk order: Order Receipt Acknowledgement, Service Order Confirmation, Firm Order Commitment Notice, and SOCN and service order number in accordance with RFP Section C.3.5.1.2.2, Agency Places Order and Contractor Provides Agency with Acknowledgement.

5.2 INVENTORY MANAGEMENT VALIDATION TESTING

The Networx OSS Online Inventory Management test will allow the Government to verify its ability to access the database that maintains a complete and accurate inventory of all Networx services as established by service orders created in Sections 5.1.1.1 and 5.1.3 of this plan.
Sprint will demonstrate that authorized Government users can access this database using secure Web queries in accordance with RFP Section C.3.8.2.4. Sprint will also demonstrate the ability to access data, initiate queries, obtain reports, and perform periodic downloads for audit purposes. The ability to perform billing verifications will be tested to meet the requirements outlined in RFP Section C.3.8.

- Inventory Management RFP Section C.3.8
- Inventory Management Definition RFP Section C.3.8.1
- Inventory Management Functional Requirements RFP Section C.3.8.2
- Inventory Management Data Requirements RFP Section C.3.8.3
- Inventory Management Report Requirements RFP Section C.3.8.4

5.3 BILLING SYSTEM VERIFICATION TESTING

Networx OSS Billing System Verification tests will allow the Government to verify that the Networx OSS system correctly processes billing charges, produces accurate invoices, and can exchange data with the Government. The test output will verify the accuracy of invoices created for the variety of billing options in RFP Section C.3.6. Sprint will demonstrate that the output of its billing system is consistent with the orders entered into its ordering system test cases, that the billing data elements meet the requirements of RFP Attachments J.12.4, Billing Invoice and Detail; J.12.4.1, Invoice File; and J.12.4.2, Detail Billing File, and that the charges are accurate and assigned in a manner that is consistent with the Agency Hierarchy Code.

5.3.1 Direct Billing Testing

The OSS Direct Billing verification test allows the Government to verify the Networx OSS system’s ability to create a Direct Billed invoice, Detail Billing,
Adjustments, and the required GSA files associated with a Direct Billed customer. Direct Billed invoices will show any adjustment and discounts as separate entries. Invoices will be created per the requirements in RFP Section C.3.6.1 while adhering to the data elements in RFP Section J.12.4.2.

- Direct Billing Process Definition RFP Section C.3.6.1.1
- Direct Billing Functional Requirements RFP Section C.3.6.1.2
- Direct Billing Data Requirements RFP Section C.3.6.1.3
- Direct Billing Report Requirements RFP Section C.3.6.1.4

5.3.2 Centralized Billing Testing

The OSS Centralized billing verification test will enable the Government to verify that the Networx Centralized Bill contains all charges correctly shown on the invoice without additional extraneous information, so that the Government can determine the price of a call, service, feature or discount. The invoice will show any adjustments and discounts as separate entries. Invoices will be created per the requirements in RFP Section C.3.6.2 while adhering to the data elements in RFP Section J.12.4.2.

- Centralized Billing Process Definition RFP Section C.3.6.2.1
- Centralized Billing Functional Requirements RFP Section C.3.6.2.2
- Centralized Billing Data Requirements RFP Section C.3.6.2.3
- Centralized Billing Report Requirements RFP Section C.3.6.2.4

5.3.3 Shared Tenant Billing Testing

The OSS billing verification test will allow the Government to verify the OSS billing system’s ability to create a Shared Tenant Bill that contains all charges correctly shown on the invoice so that no additional information, tapes or materials are required to determine the price of a call, service, feature or discount. The shared tenant invoice will show any adjustments and
discounts as separate entries. Invoices will be created per the requirements in RFP Section C.3.6.4 while adhering to the data elements in RFP Section J.12.4.2.

- Shared Tenant Billing Process Definition RFP Section C.3.6.4.1
- Shared Tenant Billing Functional Requirements RFP Section C.3.6.4.2
- Shared Tenant Billing Data Requirements RFP Section C.3.6.4.3
- Shared Tenant Billing Report Requirements RFP Section C.3.6.4.4

5.3.4 Usage Charges

The Usage Charges verification test will demonstrate that the Networx OSS service order processing and billing system records are complete, accurate, and display correct usage charges, including Call Detail Records, for all applicable services listed in RFP Section J.12.4.2.

5.3.5 Billing Data Dictionary Package

The Billing Data Dictionary Package verification test allows the Government to confirm Sprint’s ability to create the necessary billing files required to create invoices. The verification will demonstrate that the required Billing Data Dictionary package contains all data elements and instructions for each billing related file (e.g., Invoice file, Detail Billing File, adjustments file).

5.4 SECURITY MANAGEMENT

Sprint will demonstrate that the Networx OSS identifies and authenticates each authorized user and that each user can only access the information each user is authorized to access based on the user profile. The Security Management test will ensure the Government’s ability to keep information secure by encrypting user information. Also tested will be the ability to log alarms and generate audit trails to record security violations in accordance with RFP requirements.