Certification Test Plan

TP-012011-DOM-01

Prepared for:

Vendor Name	Dominion Voting Systems
Vendor System	Sequoia WinEDS 4.0
EAC Application No.	SEQ-40-2007-W1
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Accredited by the Election Assistance Commission (EAC) for Selected Voting System Test Methods or Services

Revision History

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6/24/11	1.0	*D. George*	Initial Submission

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1 INTRODUCTION

This Certification Test Plan outlines the test approach, methodologies and resources SLI Global Solutions will follow and utilize when performing Volume and Hardware Electrostatic Disruption Testing on the **Sequoia WinEDS 4.0 Voting System** against the 2005 Voluntary Voting System Guidelines (VVSG). This document will describe in detail the basis for testing and any additional information utilized in developing the scope of this project. The purpose of this document is to provide a clear understanding of the work SLI will conduct and a detailed plan outlining the test effort.

When the testing is complete, SLI will submit a Certification Test Report that details all test results and findings from the Certification Test effort, as well as a recommendation to the EAC.

1.1 Certification Test Plan Attachments

The following attachments apply to this Certification Test Plan:

1. Attachment A – List of Technical Data Package (TDP) Deliverables from iBeta Quality Assurance
2. Attachment B – Accredited Hardware Test Lab Certification
3. Attachment C – Hardware Test Plans
4. Attachment D – Hardware Testing Results from Hardware Test Laboratories (future submission)
5. Attachment E – Documentation and/or Functional Discrepancy Report – **PROPRIETARY** (future submission)

1.2 References

The following is a listing of all documents that contain material that was used in preparation of this test plan.

1. Election Assistance Commission Voluntary Voting System Guidelines (EAC VVSG), 2005 Version 1.0. Volumes I and II.
2. NIST NVLAP Handbook 150: 2006.
3. NIST NVLAP Handbook and 150-22: 2008.
4. EAC Testing and Certification Program Manual, United States Election Assistance Commission, 2007
5. SLI Quality System Manual, Revision v1.12, prepared by SLI, dated February 2011
6. EAC Notice of Clarification 09-001 Clarification of the Requirements for Voting System Test Laboratories (VSTLs) Development and Submission of Test Plans

1.3 Terms and Abbreviations

The following terms and abbreviations will be used throughout this document:

Table 1 – Terms and Abbreviations

Term	Abbreviation	Description
American Association for Laboratory Accreditation	A2LA	A nonprofit, non-governmental, public service, membership society whose mission is to provide comprehensive services in laboratory accreditation and laboratory-related training.
Ballot Marking Device	BMD	An accessible computer-based voting system that produces a marked ballot (usually paper) that is the result of voter interaction with visual or audio prompts.
Central Count Scanner	CCS	High Speed Optical Scanner is a mark sense-based ballot and vote counting device typically located at a central count facility and is operated by an automated multi-sheet feeding capability.
Compact Flash card	CF	This is a type of flash memory card in a standardized enclosure often used in voting systems to store ballot and/or vote results data.
Commercial Off the Shelf	COTS	Term used to designate computer software, hardware or accessories that are ready-made and available for sale, lease, or license to the general public
Direct Recording Electronic	DRE	Voting systems that, using Touch Screen or other user interfaces, directly record the voter's selections in each race or contest on the ballot in electronic form.
Election Assistance Commission	EAC	An independent, bipartisan commission created by the Help America Vote Act (HAVA) of 2002 that operates the federal government's voting system certification program.
Election Management System	EMS	Typically a database management system used to enter jurisdiction information (district, precincts, languages, etc.) as well as election specific information (races, candidates, voter groups (parties), etc.). In addition, the EMS is also used to layout the ballots, download the election data to the voting devices, upload the results and produce the final results reports.
Electromagnetic Compatibility	EMC	The goal of EMC is to validate the correct functioning of different equipment in the same environment and the avoidance of any interference effects between them.

Term	Abbreviation	Description
Functional Configuration Audit	FCA	The testing activities associated with the functional testing of the system.
Independent Test Authority	ITA	This is a test lab that is not connected with the vendor or manufacturer of the voting system.
Institute of Electrical and Electronics Engineers	IEEE	A non-profit organization, IEEE is the world's leading professional association for the advancement of technology.
National Institute of Standards and Technology	NIST	A non-regulatory federal agency within the U.S. Dept. of Commerce. Its mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.
National Voluntary Laboratory Accreditation Program	NVLAP	A division of NIST that provides third-party accreditation to testing and calibration laboratories.
Physical Configuration Audit	PCA	The testing activities associated with the physical aspects of the system (hardware, documentation, builds, source code, etc.).
Precinct Count Scanner	PCS	A precinct-count optical scanner is a mark sense-based ballot and vote counting device located at a precinct and is typically operated by scanning one ballot at a time.
Request For Information	RFI	A form used by testing laboratories to request, from the EAC, interpretation of a technical issue related to testing of voting systems.
Requirements Matrix	N/A	This is the matrix created by the EAC and maintained by SLI that traces the requirements to the various test modules, and test methods.
Technical Data Package	TDP	This is the data package that is supplied by the vendor and includes: Functional Requirements, Specifications, End-user documentation, Procedures, System Overview, Configuration Management Plan, Quality Assurance Program, and manuals for each of the required hardware, software, firmware components of each voting system.
Voluntary Voting Systems Guidelines Volumes 1 & 2	VVSG	A set of specifications and requirements against which voting systems can be tested to determine if the systems provide all of the basic functionality, accessibility and security capabilities required of these systems.

Term	Abbreviation	Description
Voter Verifiable Paper Audit Trail	VVPAT	An independent verification system for voting machines designed to allow voters to verify that their vote was cast correctly, to detect possible election fraud or malfunction, and to provide a means to audit the stored electronic results.
Voting System Test Lab	VSTL	This is the lab where the voting system is being tested.
Voting System Under Test	VSUT	The designation for a voting system that is currently being tested.
Voting Test Specialist	VTS	An SLI employee within the Compliance division that has been qualified to perform EAC voting system certification testing.

1.4 Purpose

The purpose of this EAC Test Plan is to create clear and precise documentation of the processes that SLI will utilize throughout the course of voting system verification testing. The testing will verify the voting system's compliance to the VVSG requirements specified in this test plan.

This Test Plan:

- Defines the project and test approach.
- Identifies required voting system hardware and software to be tested, and in what configurations.
- Identifies required hardware, support software, and tools to be used to support the testing efforts.
- Defines the types of tests to be performed and against what declared functionality.
- Defines the types of election and vote data required for effective testing.
- Defines the types of voting system threats and vulnerabilities against which the voting system will be tested.
- Defines the process for recording and reporting test results.

1.5 Project Overview

The Sequoia WinEDS project will consist of two focused areas of testing: Volume and Hardware testing of specific Sequoia WinEDS voting system components. The Volume test will strictly involve the Sequoia Central Count scanner and test the device's ability to handle and process a large number of supported ballots. Previous volume testing was conducted on the Sequoia CC scanner (see section

2) and the results were inconclusive to validate that the CC device was compliant with the VVSG Requirements for handling volume. In addition, previous Hardware Electrostatic disruption testing was conducted on the Sequoia HAAT 90, HAAT 100, and Edge2plus model 300 voting components. The validity of testing and test reports was also inconclusive in validating these components' compliance with the VVSG Hardware requirements. This project will include additional ESD Hardware testing on the identified components by a certified third party hardware test lab under the supervision and control of SLI in order to verify compliance to the VVSG requirements.

1.6 Scope of Testing

All testing conducted by SLI will be based on the guidelines established for voting system verification testing as defined by the EAC's 2005 VVSG. This effort will include Hardware and Volume testing of the WinEDS voting system components to demonstrate that the WinEDS voting system is tested against the requirements of the 2005 VVSG, through implementation of the SLI Test Methods and Standard Lab Procedures.

SLI's major task categories for this voting system verification testing, as defined by SLI's National Voluntary Lab Accreditation Program (NVLAP) audited and approved Quality System Manual, as well as the 2005 VVSG, include:

- Functional Configuration Audit (FCA)
    - Review of any relevant prior VSTL testing and results
    - Review of prior hardware testing results
    - Hardware testing
    - Volume testing and validation of the voting system's ability to accurately read and tally a large number of ballot marking positions within the requirements stated in the 2005 VVSG.
- Management of the Dominion supplied deliverables, SLI's test artifacts, and software, firmware, hardware and system test configurations.
- Reporting of all test results.

SLI will develop and submit to the EAC a final test report for this test effort.

1.7 Testing Responsibilities

The following schedule describes the high level tasks and assigned personnel titles that will be involved in the Certification Test effort.

1.7.1 Project Schedule

The project schedule consists of the components listed in the following subsections.

1.7.1.1 Owner Assignments

- The System Analysis and Review will be conducted by the Test Manager.
- Formal Test Execution will be conducted by the Voting Test Specialists, with oversight provided by the Test Manager.
- Third Party testing will be conducted by the subcontracting Third Party Hardware Laboratories, with oversight provided by the Hardware Specialist.

1.7.1.2 Assumptions

- SLI will be provided with all test materials and data required to emulate the previous testing conducted by iBeta Quality Assurance.
- The test cases provided by iBeta Quality Assurance will be reviewed and reproduced by SLI Test Specialists.
- Required preventative maintenance can be performed by SLI Test Specialists as recommended by the manufacturer.
- Dominion will provide onsite support during the official volume test execution on the 400-C Central Count scanner.

1.7.1.3 Formal Test Execution

Official Formal Test Execution of the Volume Testing will be conducted using the declared voting system to verify the system's compliance with the VVSG requirements. Under the VVSG, this portion of the certification is considered to be the FCA.

1.7.1.4 Third Party Hardware Testing

Hardware testing will be conducted by third party certified hardware test laboratories to verify the voting system devices are in compliance with the VVSG hardware requirements.

Other Labs Performing Hardware Testing

SLI Global Solutions is responsible for all core voting system tests as identified in NIST NVLAP Handbook 150-22 (2005). The labs listed below will perform non-core hardware testing for this certification test campaign.

Laboratory	Address	Test(s)	Date(s)
EMC Integrity	1736 Vista View Drive, Longmont CO 80504	Electromagnetic Immunity Tests	TBD

1.7.2 EAC & Manufacturer Dependencies

The Test Plan will require EAC approval prior to finalization.

Dominion will be required to provide all equipment and supporting materials identified as part of the voting system.

In addition, Dominion will be required to provide training on the voting system and support throughout the life of the project.

Dominion will be required build the test election data for use in the volume test under the supervision of SLI.

1.8 Target of Evaluation Description

1.8.1 System Overview

The configuration for testing will emulate a Central Count scanning facility. A central count scanner will be configured with the EMS components per the manufacturer's official documentation.

1.8.2 System Limits

The following table identifies the maximum evaluated and calculated limits for WinEDS and the associated Sequoia machines:

Characteristic	Eval Limit	Calc Limit	Limiting Component	WinEDS	Insight	400-C	Edge
Maximum precincts in election	2,700	5,000	400-C	10,000,000	NA	5,000	NA
Maximum precincts in a pack	150	200	Insight	NA	200*	NA	9999
Maximum contests in election	2,019	5,000	400-C	10,000,000	NA	5,000	NA
Maximum candidates/ counters in election	6,532	8,000	400-C	10,000,000	NA	8,000	65,535
Maximum candidate counters in a precinct	350	1,023	Insight	10,000,000	1,023	8,000	65,535
Maximum ballot styles in election	2,520	10,000	400-C	2,000,000,000	NA	10,000	NA
Maximum contests in a ballot style	110	700	Insight/400-C	10,000,000	700	700	65,535
Maximum candidates in a contest	348	700	Insight/400-C	10,000,000	700	700	65,535

Characteristic	Eval Limit	Calc Limit	Limiting Component	WinEDS	Insight	400-C	Edge
Maximum ballot styles in a precinct	100	100	Insight	2,000,000,000	100	1,024	1,024
Maximum number of parties	15	15	Insight/400-C	36	15	15	255
Maximum vote for in contest	150	255	Edge	10,000	1,023	1,023	255

1.9 Change Control and Configuration Management

The SLI project team follows a standard Change Control and Configuration Management (CM) process. This specifies the methods used by SLI to ensure changes are managed and controlled effectively and efficiently and defines the process for receipt, check-in, storage and disposition of hardware, TDP and non-TDP Documents.

The CM processes and procedures are used by SLI to identify, monitor, and control versions of all of the stated EAC project deliverables, ensuring that the items are constantly and reliably managed throughout the entire duration of the engagement. In addition, the CM process ensures changes are managed and will not result in invalidated or wasted testing efforts.

A summary of these tasks includes:

- Receive TDP documents:
  - Delivery department will perform a check-in of the documents on the server.
  - Documents are placed in the specific project's TDP folder with the delivery date.
  - Delivery department notifies TM of delivery via email.
  - A peer review is done on all written discrepancies and an official Discrepancy Report is provided to the manufacturer.
- Receive Hardware
  - The HW Specialist or designee checks in equipment that is delivered by Dominion
  - Operational Status Checks are performed on all delivered hardware prior to testing.
  - When the equipment comes back from the hardware lab testing, the HW Specialist checks in the equipment and verifies it's the same hardware that was sent to the lab.
  - The equipment is stored in a secure room with controlled access.

2 PRE-CERTIFICATION TESTING AND FINDINGS

Certification Testing was performed by iBeta Quality Assurance Test Lab for the WinEDS 4.0 voting system.

2.1 Evaluation of prior VSTL testing

During testing conducted by iBeta, discrepancy #335 was opened against the 400-C (ver 1.16.9) central count scanner. The discrepancy states that the tallied results were incorrectly reported for certain precincts. It was speculated that the voting device was not properly maintained during testing and as a result flakes and smudges caused false reporting. Discrepancy #335 from reference VSTL WinEDS 4.0 Test Report – Appendix E Discrepancy Report states:

"Ballots were printed and scanned for precincts 2 and 55 only. However, votes are being reported by WinETP in precincts 2, 3, 10, 18, and 55."

The manufacturer response included the following cause:

"During repeated ballot scans, flakes from the scanner can adhere to the ballot or the ballot can be smudged. If this happens in the header mask area, the 400C will read this as a mark and interpret the precinct based on where the mark is found."

It is SLI's determination that it is not clear whether the manufacturer determined cause is the true cause for the identified discrepancy. Additional volume testing on the 400-C voting component is needed to verify the existence of a discrepancy with regards to reporting votes accurately. During testing, manufacturer recommended maintenance cycles must be performed in conjunction with the volume testing to minimize external variables that could impact device performance.

In addition, the EAC has raised concerns with the manufacturer's resolution of several issues identified during electrostatic disruption (ESD) testing. While the test report lists several items as resolved, the reports themselves do not provide an adequate level of information to allow the EAC to understand the nature of the ESD failure and the steps taken to resolve the issue.

As a result, repeat ESD testing on the Edge2plus and the Hybrid Activator, Accumulator & Transmitter (HAAT) components of the system will be performed in order to provide assurance that the issues identified in the iBeta discrepancy report are no longer present in the system. Reference VSTL WinEDS 4.0 Test Report – Appendix E Discrepancy Report numbers 97, 191, 195, 196, 344, and 345.

3 EQUIPMENT & MATERIALS REQUIRED FOR TESTING

The following section specifies the equipment and materials that will be required for the Sequoia WinEDS project. Any materials that are used in an election cycle must be provided to SLI to facilitate testing of the voting system.

3.1 Scope of the Voting System

This section provides a brief definition of the scope of WinEDS voting system components required for testing:

- **400-C** is a high-speed, central optical scan ballot counter (tabulator) used for processing of absentee and early vote ballots (such as vote by mail). The unit is run by custom-made ballot processing application software. It is used for centralized scanning and counting a high volume of paper ballots at high speed.
- **EMS: WinEDS** is the software utilized for election definition and database creation.
- **WinETP** is the software used for tabulation and reporting of election results.
- **HAAT 90** is an electronic table top Activator, Accumulator, and Transmitter. The HAAT 90 is used to create voter cards, consolidate and transmit data. EUT is equipped with a wire line modem.
- **HAAT 100** is an electronic table top Activator, Accumulator, and Transmitter. The HAAT100 is used to create voter cards, consolidate and transmit data. EUT is equipped with a wireless device.
- **Edge2Plus 300** is an electronic floor standing voting machine. The voter uses a touch screen to select candidate's name and answer Yes or No questions. The unit has a printer to provide a hard copy of the items that were selected. A voter inserts a voting card that activates the voting machine. After the activation, the voter follows the instructions on the touch screen. The unit has a hand device that is used by the disabled voter. The hand piece provides output jacks for an audio headset, push button and blow button. The headset, push button and blow button are not supplied by the manufacturer. The voter supplies the accessories.

3.2 Software/Firmware

The following software/firmware is required for the execution of hardware and software tests. This includes all supporting software such as operating systems, compilers, assemblers, application software, firmware, and any applications used for burning of media, transmission of data or creation/management of databases.

3.2.1 Manufacturer Software/Firmware

The following manufacturer software and firmware is required for the execution of the hardware and software tests.

Table 2 – Manufacturer Software/Firmware

Manufacturer	Application	Version
Sequoia	WinEDS	4.0.175
Sequoia	WinETP	1.16.15
Sequoia	Edge2plus	1.2.74

3.2.2 COTS Software/Firmware

No COTS software or firmware is required for the execution of the hardware and software tests.

Table 3 – COTS Software/Firmware

Manufacturer	Application	Version
N/A		

3.3 Equipment

The following equipment is required for the execution of the hardware and Volume tests. This includes system hardware, general purpose data processing and communications equipment, and any test instrumentation required.

3.3.1 Manufacturer Equipment

The following manufacturer equipment will be used in testing:

Table 4 – Manufacturer Equipment

Manufacturer	Hardware	Model
Sequoia	Optech 400-C	3.02
Sequoia	Edge2plus	300
Sequoia	HAAT	100
Sequoia	HAAT	90

3.3.2 COTS Equipment

The following Commercial Off-the-Shelf equipment will be used in testing:

Table 5 – COTS Equipment

Manufacturer	Hardware	Model
Dell	PC	NEED
NEED	Printer	NEED

3.4 Test Materials

The following test materials are required for the performance of testing including, as applicable, test ballot layout and generation materials, test ballot sheets, test ballot cards and control cards, standard and optional output data report formats, and any other materials used in testing.

Table 6 – Test Materials

Manufacturer	Type of Material	Version/Model	Additional Information
Dominion	Pre-defined Election Definition		
Dominion	Pre-printed Ballots		
Dominion	Printer paper		

3.5 Deliverable Materials

The following are documents and materials to be delivered as a part of the *WinEDS* system:

- 400-C Maintenance Documentation
- 400-C Operations Documentation
- WinETP Operations Documentation
- HAAT100 Hardware Specification Documentation
- HAAT100 Operations Documentation

- Edge2plus Maintenance Documentation
- Edge2plus Operations Documentation
- Edge2plus Hardware Specification Documentation

- iBeta Quality Assurance Test cases and scripts (executed from previous ITA testing)

- iBeta Quality Assurance Test Report

- COTS Printer

4 TEST SPECIFICATIONS

The following are the specifications for the Volume and Hardware testing to be conducted on the WinEDS voting system components. The specifications contain details on the focus of testing, configuration(s), and the functions to be tested. Additional information to the specifications will be provided in the associated appendices.

4.1 Requirements

The WinEDS voting system will be tested to the following approved 2005 VVSG requirements. The requirements below are the requirements that were identified in the previous testing conducted by iBeta Quality Assurance (see section 2) that the current scope of testing has been based upon.

- Volume II Appendix A 4.3.5 – Volume
- Volume I 2.3.4.1 d
- Volume I, 4.1.2.8
- Volume I, 4.1.7.1
- Volume I, 2.1.4 (b)
- Volume II, 4.8

4.2 Hardware/Software Configuration and Design

The WinEDS voting system as declared for this test engagement consists of:

Volume Testing

- An EMS workstation with the WinEDS software installed & configured
- The Optech 400-C central count high speed scanner
- The WinETP consolidation, tabulation and reporting software installed & configured on a workstation

Hardware Testing

- The Edge2plus BMD voting device
- The HAAT 100 Activator, Accumulator & Transmitter
- The HAAT 90 Activator, Accumulator & Transmitter

4.3 System Review

This section describes the workings of the Sequoia WinEDS voting system and will assist the reader with understanding the flow of data and system processes.

The WinEDS voting system is a full featured voting system capable of handling a variety of election types. The election management system software WinEDS 4.0 is

used for election definition and database & ballot definition creation for General, Open Primary and Closed Primary elections. Once election data is created through the WinEDS software, it is installed on the Edge2plus BMD and Optech 400-C central count voting devices. Ballots created from the EMS election definition are scanned on the Edge2plus BMD and Optech 400-C devices accumulating vote data. The Hybrid Activator, Accumulator & Transmitter (HAAT 100 & 90) devices are used to tabulate and transmit vote data to the WinETP consolidation, tabulation and reporting software installed and configured on a workstation.

4.4 Volume Test Approach

The WinEDS system operations documentation provided by the manufacturer has been reviewed in order to gain a clear understanding of the system operations. Based on this review, the applicable system functions have been identified for testing. The following approach will be utilized to test the key areas of voting system functionality identified from the review.

4.4.1 Pre-voting Aspects

- **Operational Status Check** – An Operational Status Check (OSC) of the voting system will be used to establish a clean baseline for testing. The purpose of the OSC is to eliminate any potential issues caused by variables external to the test being conducted. The central count voting system components will be configured per the manufacturer's documentation. A test election definition will be installed on the central count scanner. All recommended diagnostics and pre-election reports will be generated to ensure the device is in a 'Ready' state. A sample set of test ballots will be scanned, tabulated, and the results reported to verify the system is functional without errors and ready for testing. All results from the OSC will be documented by SLI prior to execution of volume testing.

- **Volume Test Configuration**–

  Configuration - The Optech 400-C Central Count scanner will be utilized as configured during the OSC test in a ready state. A validated election definition will be installed on the CC scanner by SLI. Pre-printed and pre-marked ballots from the election definition will be created and supplied to SLI from Dominion.

4.4.2 Voting Aspects – Central Count

- **Volume Test Scanning** –

  SLI will create detailed test steps that accurately reflect execution of the Central Count functions for scanning ballots and reporting results. The functions will be executed on the Central Count scanner per the steps inducing ballot scanning and vote data compilation.

The following test metrics will be utilized as the approach for volume testing:

a) 30,000 total ballot scans will be conducted on one 400-C device. 6000 ballots will be separated into batches consisting of 200 ballots per batch. This will require 30 total batches for testing.

b) Each batch of 200 ballots will be scanned 5 times (note 5 times is the manufacturer recommended maximum use per ballot) through the 400-C scanner. This will accumulate 30,000 total scans.

- 200 ballots per batch
- Each batch scanned 5x = 1000 ballots scanned per batch
- 30 batches = 30,000 total ballot scans

Note: SLI will utilize laboratory established processes for tracking testing, anomalies, and discrepancies during the entire testing process.

4.4.3 Post Voting Aspects

- **Volume Test Tabulation and Reporting** – The WinETP consolidation, tabulation and reporting software will be utilized as installed and configured during the OSC test in a ready state. The results from the ballot scans on the 400-C scanner will be transferred to the WinETP for tabulation and reporting. The results reports will be generated and verified by SLI.

4.5 Volume Test Design

4.5.1 Election Definition Creation

An Election Definition will be created by Dominion staff under the supervision of SLI to expedite the election creation process. SLI will review and validate the election definition to ensure it is fit for use in the Volume Test.

Note: The Election Definition will be provided to the EAC for approval prior to use in official testing.

4.5.2 Operational Status Check Test Design

The Operational Status Testing will utilize a test election and test ballots provided by Dominion. The Operational Status Check Test will be developed by SLI utilizing the manufacturer provided operational guides and training.

4.5.3 Volume Test Case Design

SLI will utilize training provided by Dominion and the test case data submitted by iBeta Quality Assurance in order to assist in building out the detailed test steps that SLI will execute during volume testing. Reference Volume 1A Closed Primary -IL TC WinEDSv 4.0 test case (Attachment A). SLI will create the detailed test steps and logically organize the steps into a Volume Test Suite within SLI's Test Management tool QMetry for volume test execution.

4.6 Hardware Testing

The Hardware Electromagnetic Disruption testing on the HAAT 90, HAAT 100, and Edge2plus model 300 will be conducted by a third party certified lab (see section 1.7.1.4). Each device will be configured per the manufacturer documentation and placed into an operational state during hardware ESD testing. Please refer to the Hardware Test Plan included in Attachment C for details on the ESD testing to be performed and more information on the third party laboratory.

5 TEST DATA

Test data for WinEDS 4.0 voting system components has been compiled and all functionality declared will be tested to determine conformance to the standards.

5.1 Data Recording

SLI has evaluated the system functionality as described by manufacturer's technical documentation, as well as requirements as listed in the EAC 2005 VVSG, and made determinations as to expected results of all data inputs into the WinEDS voting system. This includes:

- Election type
- Ballot styles
- Devices used
- Votes cast for each candidate/issue/referendum
- Vote consolidation data from the device to reporting

Testing information will be captured and recorded in the test notebooks utilized according to SLI's standard lab procedure *SLP-VC-30 - Test Notebooks*.

5.2 Test Data Reduction

SLI processes the test data by manually recording input data and validating the results by performing a comparison of the exact output that is generated to the expected result, e.g., validating the vote counts when the data is consolidated.

6 TEST ENVIRONMENT AND CONDITIONS

This section describes the test conditions and procedures for execution of testing. If a particular sequence is mandatory for the execution of testing, a rationale will be given. Additionally, this section is used to describe procedures for setting up equipment that will be utilized in the test execution.

6.1 Facility Requirements

Testing will be performed on site at SLI in Denver, Colorado.

Testing will be conducted in an office environment with the equipment being secured based on SLI's Standard Laboratory Procedures.

All TDP and test documentation is stored on site at SLI's facility in a secure project directory on SLI's secure Voting server.

Environmental ESD hardware testing for the Edge2plus and HAAT hardware components will be performed at either NVLAP or A2LA accredited testing laboratories or at laboratories audited by SLI to NVLAP Handbook 150-22 requirements.

6.2 Test Setup

The hardware will be configured based on the manufacturer operations and user manuals for both Environmental and Volume testing. Volume testing setup will simulate a central count facility configuration.

Successful completion of operational status checks will indicate whether the devices and system are ready for test execution.

6.3 Test Sequence

The sequence of events that will be executed for Volume testing is as follows:

1. Configure equipment
2. Perform Operational Status Check
3. Print and verify zero totals
4. Scan Volume Test ballots
5. Consolidate and tabulate test data
6. Print Results Reports
7. Validate output data against input data.

6.4 Error Recovery

In the event that an error is encountered during testing, SLI will follow the SLP for Anomalies. This procedure will ensure that the issue is properly researched to determine the cause and identify whether it is a problem with the voting system or an external cause. The Test Specialist will record all information gathered during analysis of the issue in the Test Notebook per the SLP for Test Notebooks.

If a determination is made that the issue is with the voting system under test, a discrepancy will be opened per SLI's discrepancy process. If the cause of the issue cannot be determined, the issue will remain tracked as an anomaly with the cause being properly documented per the Anomaly SLP.

Prior to resuming testing, the affected system will be analyzed by the Test Specialist with support from the Test Manager and manufacturer if required (Note: all testing is halted during analysis). The Test Specialist will restore the environment to operating condition and determine what steps must be taken to validate the environment is in the same state as when testing was halted. This may require an additional Operational Status Check test or retesting if the integrity of the test results is found to be impacted.

7 TEST OPERATIONS PROCEDURES

An inventory has been performed to verify the voting equipment received contains hardware and software elements as defined in the TDP prior to commencement of testing.

Throughout the testing effort, test steps will receive one of the following criteria:

- **Accept –** Test is accepted as successful.
- **Reject** – Test is rejected as unsuccessful.
- **NT –** Not Testable is used for test steps that cannot be followed. For example, if failure of one test step precludes attempting subsequent test steps, the latter will be marked as NT.

Test results **Reject** and **NT** will include comments by the VTS explaining the reason for the result.

Issues encountered during testing will be documented on the Discrepancy Report. Issues that do not conform to the requirements of the VVSG 2005 will be marked as **Functional Discrepancies** (a discrepancy occurs when the software does not meet defined software requirements or specifications.).

The complete Discrepancy Report will be provided as an attachment to the final Test Report.

8 Approval Signatures

SLI:

VSTL Director
Date

Client:

Name
Title
Date

End of Certification Test Plan