Sequoia Voting Systems, WinEDS v. 4.0
VSTL Certification Test Plan

EAC Application #: SEQ-40-2007-W1
Prepared for

Sequoia Voting Systems

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Version 3.0

Trace to Standards	
NIST Handbook 150-22	
4.2.3, 5.3.5, 5.3.6, 5.4.2, 5.4.6, 5.5.1, 5.7 thru 5.7.3	
HAVA	
301	
VSS	
Vol. #	**Section(s) #**
1	**2, 3, 4, 5, & 6**
1	**9.6.2.1**
2	**2, 3, 4, 5, & 6**
2	**Appendix A**

iBeta Quality Assurance is accredited for Voting System Testing:

EAC Lab Code: 0702
Effective thru 2/28/2009
Renewal Application was submitted 30 days prior to expiration. The EAC has authorized continued operation.

NVLAP LAB CODE 200749-0

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Version History				
Ver #	Description of Change	Author(s)	Approved By	Approved Date
v.1.0	Initial release report	Carolyn Coggins & Gail Audette	Gail Audette-iBeta PM Ed Smith-Sequoia	July 16, 2008
v2.0	Update based on EAC Technical Reviewer comments and modifications	Gail Audette	Carolyn Coggins Ed Smith - Sequoia	September 22, 2008
V3.0	Updates based on the EAC Letter of 6 April 2009 to include: 1. Reference to EAC Requirements Matrix in Section 1.0 2. Added reference to the PCA Document Review Procedure, the PCA Source Code Review Procedure and the Trusted Build Procedure in Section 1.1 3. Evolution of Testing was added to Section 2.1 4. Volume, Stress, Performance, and Error Recovery were added in Table 12 and in Section 7.6 In addition, the following modifications were incorporated: 1. Numerous grammatical, spelling, and format updates 2. Exclusion added to Section 1.0 3. Update Section 2.1 to include QA and CM activities 4. Updated Section 3.5 and added a CONFIDENTIAL appendix containing the relevant language specific review criteria 5. Added multiple ballot feeds to General 01 Test Method	Gail Audette	Carolyn Coggins, iBeta Director of Voting and Ed Smith, Sequoia VP, Compliance/ Quality/ Certification	April 17, 2009

This Test Plan follows the format identified in Volume 2 Appendix A of the *Voting System Standards 2002.* There a slight differences to the format identified in Appendix A of the *EAC Voting System Test Laboratory Program Manual* and this Test Plan The table below is a traces to the manual.

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1. Introduction

This Test Plan identifies iBeta Quality Assurance's (iBeta) approach to US Election Assistance Certification (EAC) Voting System Test Lab (VSTL) Certification Testing of the Sequoia Voting Systems (Sequoia) WinEDS v.4.0 voting system to the *Federal Election Commission Voting System Standards 2002 (VSS 2002)*. The purpose of this plan is to document the scope and detail of the requirements of certification testing tailored to the design and complexity of software being tested and the type of voting system hardware. The Sequoia WinEDS v.4.0 test effort is an initial EAC Certification. It incorporates an Election Management System and five voting devices, three of which include two hardware models.

- The WinEDS election management system for ballot preparation and central count functions;
- The *EDGE2plus* touch screen Direct Recording Electronic (DRE) video and audio voter editable ballot devices with a Voter Verified Paper Audit Trail (VVPAT) with accessible ballot inputs for voters with manual dexterity limitations (models CO.3 and CO.4);
- The Edge II touch screen DRE video voter editable ballot devices with peripheral hardware to support audio ballot and a VVPAT;
- The Optech Insight and Optech Insight Plus precinct count optical scanners (each has two models, regular and surface mount); and
- The Optech 400-C central count optical scanner, with WinETP.

Detailed definitions of the hardware and software associated with the Sequoia WinEDS v.4.0 are contained in section 1.4 *Terms and Definitions* and section 3 *Materials Required for Testing.*

In addition, this Test Plan is accompanied by the completed and corresponding EAC Certification Program Requirements Matrix.

Non-core hardware environmental testing is outside iBeta's test accreditation scope as a VSTL. Non-core hardware environmental assessments and testing are subcontracted to A2LA or NVLAP accredited laboratories as dictated in NIST Handbook 150-22. iBeta will verify that each and every environmental test lab retains current qualifications that they are accredited to perform the applicable *VSS 2002* identified environmental test methods. The accredited test methods are traced to the applicable *VSS 2002* requirement for:

Accredited Test Method	***VSS 2002* Vol.2 Requirement**
MIL-Std 810 M 516 Transportation Shock	4.6.2 Bench Handling Test
MIL-Std 810 M 514 Road Transport (Bounce- Loose Cargo)	4.6.3 Vibration Test
MIL-Std 810 M 502 Low Temperature	4.6.4 Low Temperature Test 4.7.1 Temperature & Power Variation Test
MIL-Std 810 M 501 High Temperature	4.6.5 High Temperature Test 4.7.1 Temperature & Power Variation Test
MIL-Std 810 M 507 Humidity (Temperature /Humidity)	4.6.6 Humidity Test

Accredited Test Method	***VSS 2002* Vol.2 Requirement**
EN 61000-4-11 Testing and Measurement Techniques-Section 11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Test	4.8.1 Power Disturbance Disruption
FCC Class B Requirements per ANSI C63.4	4.8.2 Electromagnetic Radiation
EN 61000-4-2 Electrostatic Discharge Susceptibility	4.8.3 Electrostatic Disruption
EN 61000-4-3 Radiated Susceptibility, 80 MHz to 1 GHz, Electric Field	4.8.4 Electromagnetic Susceptibility
EN 61000-4-4 Conducted Susceptibility, Electrical Fast/Burst Transients, Signal and Power lines and Cables	4.8.5 Electrical Fast Transient Protection
EN 61000-4-5 Testing and Measurement Techniques-Section 5: Surge Immunity Test	4.8.6 Lightning Surge Protection
EN 61000-4-6 Conducted Susceptibility, Common Mode Cable Injection, 150 kHz to 80 MHz	4.8.7 Conducted RF Immunity
EN 61000-4-8 Testing and Measurement Techniques-Section 18: Power Frequency Magnetic Field Immunity Test	4.8.8 Magnetic Fields Immunity

A Physical Configuration Audit (PCA) of the Sequoia WinEDS voting system shall include a review of the documentation and source code submitted in the Technical Data Package (TDP) to the requirements of the *VSS 2002*.

A Functional Configuration Audit (FCA) of the Sequoia WinEDS voting system shall include a review of the testing performed by Sequoia to:

- The requirements of *VSS 2002*;
- The WinEDS voting system specifications of the Sequoia TDP; and
- The voting system requirements of section 301 of the Help American Vote Act (HAVA).

The FCA also includes identification of the scope of testing, a test plan, customization of test cases, system configuration management, test execution, and analysis of the test results

This test plan contains:

- The voting system and the scope of certification testing;
- The pre-certification test approach and methods;
- The certification test hardware, software, references and other materials for testing;
- The certification test approach and methods;
- The certification test tasks and prerequisite tasks; and
- The certification resource requirements.

As identified in the VSS2002 vol.1 section 4.1.2, software is excluded if it:

- Provides no support of voting system capabilities;
- Cannot function while voting system functionality is enabled; and
- Procedures are provided that confirm software has been removed, disconnected or switched.

The following functions are excluded from the WinEDS 4.0 voting system and therefore not tested in this certification effort:

- Cumulative voting;
- Access to incomplete election returns or interactive queries;
- Telecommunications: No voter authentication, ballot definition, individual vote records, or voter lists are transmitted via telecommunications; and
- Shared Operating Environment: WinEDS 4.0 does not share an environment with other data processing functions.

In addition, the submitted voting system does not have components that are used external to the voting functions.

1.1 *Internal Documentation*

The documents identified below are iBeta internal documents used in certification testing

Table 1 Internal Documents

Version #	Title	Abbreviation	Date	Author (Org.)
v1.0	Voting Certification Master Services Agreement-Statement of Work	MSA contract - SOW	30 May 2007 - 22 June 2007	iBeta Quality Assurance
v2.0	Trusted Build Procedure		January 23, 2009	iBeta Quality Assurance
v2.0	PCA Document Review Procedure		February 4, 2009	iBeta Quality Assurance
v2.0	PCA Source Code Review Procedure		April 14, 2009	iBeta Quality Assurance
	FCA Test Document Review WinEDS 4.0		25 February 2008	iBeta Quality Assurance
	PCA TDP Document Review WinEDS 4.0		4 April 2008	iBeta Quality Assurance
	General Test Method WinEDS 4.0		5 May 2008	iBeta Quality Assurance
	Other Test Methods WinEDS 4.0		27 May 2008	iBeta Quality Assurance

Version #	Title	Abbreviation	Date	Author (Org.)
	Primary Test Method WinEDS 4.0		28 May 2008	iBeta Quality Assurance
	Security Test Method WinEDS 4.0		21 May 2008	iBeta Quality Assurance

1.2 *External Documentation*

The documents identified below are external resources used in certification testing.

Table 2 External Documents

Version #	Title	Abbreviation	Date	Author (Org.)
	Help America Vote Act	HAVA	October 29, 2002	107th Congress
NIST Handbook 150 2006 Edition	NVLAP Voting System Testing	NIST 150	February 2006	National Voluntary Lab Accreditation Program
NIST Handbook 150-22	NVLAP Voting System Testing	NIST 150-22	October 2007	National Voluntary Lab Accreditation Program
	Federal Election Commission Voting System Standards	VSS	April 2002	Federal Election Commission
	EAC Decision on Request for Interpretation 2007-04, 2005 VVSG Vol. 1 Section 3.1.3	Interpretation 2007-04	October 29, 2007	Election Assistance Commission
	EAC Decision on Request for Interpretation 2007-05, 2005 VVSG Vol. 1 Section 4.2.1 (Testing Focus and Applicability)	Interpretation 2007-05	November 6, 2007	Election Assistance Commission
	EAC Decision on Request for Interpretation 2007-06, 2005 VVSG Vol. 1 Section 4.1.1, 2.1.2c &f, 2.3.3.3o and 2.4.3c&d. (Recording and reporting undervotes)	Interpretation 2007-06	November 7, 2007	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-01, 2002 VSS Vol. II, Section 4.7.1 & Appendix C 2005 VVSG Vol. II, Section 4.7.1 & Appendix C	Interpretation 2008-01	February 6, 2008	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-02, Battery Backup for Optical Scan Voting machines	Interpretation 2008-02	February 19, 2008	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-04, Ballot Production - Alternative languages	Interpretation 2008-04	May 19, 2008	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-05, Durability	Interpretation 2008-05	May 19, 2008	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-06	Interpretation 2008-06	August 29, 2008	Election Assistance Commission

Version #	Title	Abbreviation	Date	Author (Org.)
	Battery Back Up for Central Count			
	EAC Decision on Request for Interpretation 2008-07 Zero Report	Interpretation 2008-07	August 27, 2008	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-08, Automatic Bar Code Reader	Interpretation 2008-08	August 1, 2008	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-09, Safety (NRTL)	Interpretation 2008-09	August 25, 2008	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-10 Electrical Fast Transient (EFT)	Interpretation 2008-10	August 26, 2008	Election Assistance Commission
	NOC 07-05: Voting System Test Laboratory (VSTL) responsibilities in the management and oversight of third party testing.	NOC 07-05	September 7, 2007	Election Assistance Commission
	NOC 08-001: Validity of Prior Non-core Hardware Environmental and EMC Testing	NOC 08-001	March 26, 2008	Election Assistance Commission
	NOC 08-002: EAC Mark of Certification Final	NOC 08-002	May 16, 2008	Election Assistance Commission
	NOC 08-003: Conformance Testing Requirements	NOC 08-003	July 30, 2008	Election Assistance Commission
	Voting System Testing and Certification Program Manual		1 January 2007	Election Assistance Commission
	Voting System Test Laboratory Program Manual		21 July 2008	Election Assistance Commission

1.3 *Technical Data Package Documents*

The Technical Data Package Documents submitted for this certification test effort are listed in Section 8.

1.4 *Terms and Definitions*

The Terms and Definitions identified below are used in this test report.

Table 3 Terms and Definitions

Term	Abbreviation	Definition
Detachable Audio Voting Control (ABLE-D)	ABLE-D	Audio voting control for the EDGE2*plus* which provides blind, dexterity challenged Voters and Voters with reading limitations an easy way to vote independently, using an Audio or a Sip & Puff interface. It can be detached from the base unit, attached only by its coiled power/data cord.

Term	Abbreviation	Definition
APS External Printer (Model UTG300)	UTG	APS External Printer, which is used to print and physically record votes and provide election reports for the EDGE2*plus*
Audit Trail Memory	Audit Trail Cartridge	Removable memory cartridge, which contains an unalterable randomized electronic record of all votes cast during an election. Identical data is stored on the Results Cartridge for the voting system. If an Audit Trail Cartridge is present in the aux port, the event log data will be written there as well.
AVC Edge	Edge II	Sequoia Voting Systems' stand-alone DRE polling place voting machine that incorporates a color LCD integral touch screen, integrated (voter) privacy flaps, poll worker panel, internal memory for storing ballot data and voting records, removable results cartridge, and protective & public counters.
Card Activator	Card Activator	A component of the AVC Edge that serves as the voter's access to the AVC Edge (Edge II) direct-record electronic touch-screen voting system by use of a Smart Card (aka Voter Card).
Direct Recording Electronic	DRE	An electronic voting system that utilizes electronic components for the functions of ballot presentation, vote capture, vote recording, tabulation and logically & physically integrated into a single unit.
Edge Audio Voting Accessory	E-AVA	The audio voting device provides an unassisted, private & secure voting experience for the visually impaired. The voter listens to a spoken audio presentation of the ballot while using the audio voting device to navigate through the ballot and cast their vote.
Edge Aux Power Unit		Provides emergency power for up to two AVC Edge for a minimum of two hours.
EDGE2*plus* Model 300	EDGE2*plus*	Sequoia Voting Systems' stand-alone DRE polling place voting machine that incorporates a color LCD integral touch screen, integrated (voter) privacy flaps, poll worker panel, internal memory for storing ballot data and voting records, removable results cartridge, and protective & public counters, and an APS external printer VVPAT (UTG). There are two configurations submitted for federal certification (CO.3 and CO.4).
EDGE2*plus* USB K9K Cartridges	Cartridges (USB)	COTS K9K Series USB format flash memory drives used as Results, Audit Trail, or Vote Simulation cartridges.
Election Management System	EMS	Ballot preparation and central count functionality of a voting system

Term	Abbreviation	Definition
Endorsed Candidates		Used in NJ, NY, NYC, and PA. A Candidate that is endorsed by their own political party along with that of a different political party.
Escrow Agency		EAC identified repository that retains the file signature of the trusted build
Help America Vote Act	HAVA	Legislation enacted in 2002 which includes creation of the EAC, federal voting standards and accreditation of test labs
Hybrid Activator, Accumulator & Transmitter Unit Model 50	HAAT50	A Sequoia Voting Systems' component that provides voter access to the DREs through activation of a Voter/Smart Card interface. The HAAT50 does not consolidate, print or transmit results. There are two configurations submitted for federal certification (v 0.3 and v 1.1)
Hybrid Activator, Accumulator & Transmitter Unit Model 80	HAAT80	A Sequoia Voting Systems' component that provides voter access to the DREs through activation of a Voter/Smart Card interface. The HAAT80 also serves as a precinct level accumulator for consolidating and printing the consolidated results. The HAAT 80 does not transmit.
Hybrid Activator, Accumulator & Transmitter Unit Model 90	HAAT90	A Sequoia Voting Systems' component that provides voter access to the DREs through activation of a Voter/Smart Card interface. The HAAT90 serves as a precinct level accumulator for consolidating and printing the consolidated results and for transmission of unofficial results over fixed telephone line networks to a central tally server.
Hybrid Activator, Accumulator & Transmitter Unit Model 100	HAAT100	A Sequoia Voting Systems' component that provides voter access to the DREs through activation of a Voter/Smart Card interface. The HAAT100 serves as a precinct level accumulator for consolidating and printing the consolidated results and for transmission of unofficial results from all precinct voting devices over CDMA 1X secured networks to a central tally server.
Insight Battery		12 VDC battery which provides emergency power for an Optech Insight during power failures
Insight Memory Pack Reader	IMPR	The IMPR device attaches to the HAAT80, 90, and 100 via a serial port interface. It is used for reading Insight results.
Log Printer		COTS printer connected to the Optech 400-C LP2 port used for log printing.
Memory Cartridge		COTS ATA/PCMCIA flash memory for the AVC Edge 5.1.
Memory Pack Receiver	MPR	The MPR device attaches to a WinEDS workstation and is used to create Insight memory packs and read results.

Term	Abbreviation	Definition
Memory Pack		Removable cartridge containing election parameter data, precinct totals, electronic log data and optional CVR data used by the Optech Insights.
Official Operating Mode		The operating mode used on election day. Vote simulation cannot be performed in the Official mode. Pre-LAT and Post-LAT results cannot be intermixed or accumulated with votes cast in the Official Operating Mode.
Optech 400-C	Sequoia 400-C	Sequoia Voting Systems' central count ballot tabulator that reads ballots, tabulates the results and prepares output reports.
Optech Insight		A portable Precinct Count System that uses Optical Scan Read-Head technology to electronically read and tabulate Optical Scan ballots at the Polling Place, print results and store election totals.
Optech Insight Plus		Same as the Optech Insight, with the addition of an LCD panel display and a ready light.
Optech Insight Surface Mount		Same as the Optech Insight, with the addition of the surface mount board that has the APX firmware embedded. This accepts the blank MemoryPack (no firmware).
Optech Insight Plus Surface Mount		Same as the Optech Insight Surface Mount, with the addition of an LCD panel display and a ready light.
Plain Old Telephone Service	POTS	Terminology used to refer to analog voice-quality telephone service used by some types of telecommunications. The abbreviation is used especially to distinguish it from any digital telephone system.
Political Subdivisions	PSD	A geopolitical unit whose voters vote for one or more offices. One or more precincts (or parts of precincts) are included in a PSD.
Post-election logic and accuracy testing	Post-LAT	Post-LAT mode is used after the election to confirm the vote recording accuracy results match Pre-election LAT results. Vote simulation can be used in Post-LAT mode. Post-LAT mode votes cannot be intermixed or accumulated with Official Mode results.
Pre-election logic and accuracy testing	Pre- LAT	Pre-LAT mode is used for validating accurate vote recording accuracy prior to an election. Vote simulation can be used in Pre-LAT mode. Pre-LAT mode votes cannot be intermixed or accumulated with Official Mode results.

Term	Abbreviation	Definition
Primary – Closed		Voters must declare a party affiliation in order to vote in the primary. The voter declares their party affiliation to the election official and receives a ballot containing only those party-specific contests, along with non-party-specific contests presented at the same election. Unaffiliated voters are permitted to vote only on non-party-specific contests.
Primary – Open (Selective or Pick-A-Party)		Voters do not have to declare a party affiliation in order to vote in the primary. Depending on state law, the voter can declare their party preference to the election official or make their choice of party within the privacy of the voting booth. The voter receives a ballot containing only those party-specific contests, along with non-party-specific contests presented at the same election. Unaffiliated voters are permitted to vote only on non-party-specific contests.
Primary – Open		Voters do not have to declare a party affiliation in order to vote in the primary. A primary election (aka Top Two) that allows voters to choose among all candidates running for each office. Candidates from all parties are listed under the same contest.
Remote Access Server	RAS	Analog (POTS) telephone endpoint at Central Count for a HAAT90 transmission.
Report Printer		COTS printer connected to the Optech 400-C LP1 port used for report printing.
Results Cartridge		Removable memory cartridge for a DRE containing the ballot, election results and audit log
Seiko DPU-414 Printer	Seiko Printer	A 40-column dot matrix printer, which is used to provide election reports for the AVC Edge.
Simulation Cartridge	Vote Simulation	Removable memory cartridge containing a vote simulation script. This is a configuration option for Pre-LAT and Post-LAT operating modes.
Sip & Puff device	Sip & Puff	A DRE ballot navigation and vote selection assistive device, used by individuals with dexterity challenges or limitations on the use of their hands
Smart Card		Same as Voter Card. Card issued by the poll worker to be used as a key to access the ballot on the DRE voting machines for voting purposes.

Term	Abbreviation	Definition
Technical Data Package	TDP	The documentation and code relating to the voting system, submitted by the manufacturer for review by the VSTL.
Training Mode		Training Mode is used for poll worker training and allows voting in an Official Training Mode as indicated on the DRE. This mode allows multiple passes through Official Election mode.
U.S. Election Assistance Commission	EAC	U.S. agency established by the Help America Vote Act of 2002 to administer Federal elections.
Verivote Printer		Sequoia Voting Systems' side-mounted VVPAT printer for an AVC Edge DRE.
Voluntary Voting System Guidelines	VVSG	Federal voting system test standard revision stipulated by HAVA.
Voter Card		Card issued by the poll worker to be used as a key to access the ballot on the DRE voting machines for voting purposes.
Voting System Standards	VSS	Federal voting system test standards, predecessor of the VVSG.
Voting System Test Lab	VSTL	Lab accredited by the EAC to perform certification testing of voting systems.
Voting Variations		Significant variations among state election laws incorporating permissible ballot content, voting options and associated ballot counting logic
Voter Verified Paper Audit Trail	VVPAT	A software independent printed record of the electronic DRE ballot cast which is to be confirmed by the voter as an accurate report of their vote
Windows Election Data System	WinEDS	A client/server election management application for ballot preparation and central count consolidation and reporting of the Election Management of the Sequoia Voting Systems voting system. This system also includes Extended Services and Election Reporting.
WinEDS/HAAT Listener		A server-based application designed to receive encrypted unofficial electoral data and, optionally, configuration data and event logs, from previously authorized transmitting HAAT devices and validates the integrity of all data received, and stores it in a centralized database management system (DBMS). HAAT devices can also use the WinEDS/HAAT Listener server to synchronize their time and date with that of the server, so all HAAT devices will have an approximately similar time.
WinETP		Election Tabulation software Program that enables the Optech 400-C to tabulate ballots and report results.

2. Pre-certification Tests

2.1 *Pre-certification Test Activity*

A review of the test documentation provided by Sequoia was performed to assess the scope of testing and conformance with the *VSS 2002* vol. 1 sect. 2, 3, 4.4, 4.5, 5 and 6 Functional, Usability, Accessibility, Hardware, Software, Telecommunication and Security requirements.

The *VSS 2002* vol.1 sect. 4.2 source code review criteria were customized to reflect the applicable programming languages (C, C#, C++, Java, SQL, VB.Net, PowerBuilder, and Assembly languages, 8051, Z80, 80x86 and PIC) and the Sequoia software coding standards. This customization included confirmation that the manufacturer specific coding standards were accepted best practices as documented by an industry recognized source. Applications identified in Table 5 as COTS were exempted from review.

An assessment of the hardware was initiated to determine the scope of environmental testing. Sequoia submitted hardware and documentation for testing to the *VSS 2002* in an October 2006 NASED qualification test effort of WinEDS 3.1.074 (NASED N-1-07-22-22-004 - 2002). This testing had been performed by Wyle Laboratories or Criterion Technology, Inc. iBeta confirmed that at the time that this testing was conducted these labs were either A2LA or NVLAP ISO/IEC 17025 accredited in the *VSS 2002* specified test methods, as required of non-core test labs under the current EAC program. iBeta evaluated the qualification reports against the hardware and documentation submitted by Sequoia for this initial EAC certification. Once that assessment was completed, the ISO/IEC 17025 accredited environmental and EMC testing labs were contracted to complete an independent hardware configuration and assessment. These labs reviewed Sequoia submitted hardware and Engineering Change Orders against the configurations documented in their internal reports for the WinEDS 3.1.074 test effort. The labs determined and documented the configuration modifications between the equipment they tested and the equipment submitted for the initial EAC certification

Sequoia provides a separate Technical Data Package for each DRE, optical scanner, card activation, results accumulation and transmission product. These unique TDPs follow a consistent format addressing the requirements of the *VVS 2002* vol.2 sect. 2. An initial review of each product specific TDP document was performed in the PCA TDP Documentation Review to assess compliance with the requirements of *VSS 2002* vol.2 sect.2.

Review of Sequoia's Quality Assurance and Configuration Management documentation is part of the PCA Document Review. In addition to the build and installation process, iBeta observes the delivered materials, documents, hardware and software to confirm that Sequoia is consistent with their internal quality procedures and configuration management. The VSS tasks the VSTL with this observation during testing. Any inconsistencies identified by iBeta shall be noted on the discrepancy report as informational. iBeta shall deem that Sequoia follows their policies if no inconsistencies are identified during the test effort. It is additionally noted that Sequoia maintains an ISO 27001 certification program.

In accordance with *VSS 2002* vol. 1 sect. 1.5 titled Evolution of Testing, iBeta reviewed the body of knowledge deposited in the EAC's Voting System Reports Clearinghouse for impact to the Security Test Method submitted herein. The review was conducted on the 39 documents posted to that EAC website as of 10 April 2009.

Many identified vulnerabilities within these documents are attributed to the voting system's dependency on the effectiveness of the election procedures. The *VSS 2002* vol. 1 sect. 2.2.1 states that "System security is achieved through a combination of technical capabilities and sound administrative practices". These election procedures are incorporated in the FCA Security Review.

Review of the Connecticut Optical Scan Report on a competitor's system, the Diebold Optical Scan Voting Terminal, recommended the use of tamper-resistant seals for memory cards, ports, and screws that allow access to the interior of the voting terminal. Although this document review did not result in any modifications to the Test Method as part of this Test Plan; the Security Test Case itself was modified to verify that the Connecticut recommended tamper-resistant seals were incorporated into the Sequoia TDP for both the scanner and DRE voting terminals.

2.2 *Pre-certification Test Results*

A review of the test documentation provided by Sequoia was found to incorporate testing of the voting system to the requirements of the *VSS 2002* and the WinEDS voting system requirements. In accordance with the Conformance Testing Requirements, the Telephony and Cryptographic Test Method (Section 7.5) contains the introduction of errors (out of order packets, duplication, and dropped packets, as examples) that will validate the voting system responses and reporting.

Customization of source code review criteria for the language and manufacture coding standards was completed. Documentation by an industry recognized source of applicable manufacturer specific coding standards was confirmed. The customized criteria were incorporated into the source code review sheets, where the acceptance or rejection of each reviewed module will be captured. In addition, during source code review, areas of focus were identified by the source code reviewers in accordance with the iBeta Source Code Review Procedure. These items were incorporated into the Test Cases and are reflected in the Test Methods delineated in Section 7.

In addition to the full hardware review conducted by iBeta, Criterion Laboratories and Wyle Laboratories' personnel reviewed and assessed all past test results. All concluded that a very limited set of hardware had not changed since the last federal certification test effort for WinEDS 3.1.074 to the *VSS 2002* and many test results were documented prior to the 1 January 2005 such that the test results were not permitted for use as stipulated in NOC 08-001 (Use of previous non-core hardware testing) . As a result, the majority of the hardware testing must be executed (see Section 4.3.2 for full test matrix). Based upon the Criterion Technology review, the Edge2*plus* CO.3 and CO.4 modifications require repeating of a subset of EMI/EMC testing. Criterion Technology will re-issue the test reports under contract to iBeta documenting this review with the reuse of these valid earlier test results in the final report.

Based upon the findings of the preliminary PCA TDP Documentation Review performed to assess compliance with the requirements of *VSS 2002* vol. 2 sect.2, iBeta has found the submitted TDP documents to be generally consistent and contained the overall *VSS 2002* required content Results of the preliminary PCA TDP Documentation Review were submitted to Sequoia in the PCA and FCA Discrepancy Report. This report contained 52 documentation defect issues and 14 informational issues. Prior to preparation of the Test Plan, Sequoia has submitted resolutions for 36 documentation defects. Resolutions submitted by Sequoia and the validations by iBeta are documented in the PCA and FCA Discrepancy Report. This report will be included as an appendix in the final VSTL Certification Test Report. The remaining 16 document defects, listed below, must be resolved and validated prior to the completion of certification testing.

Informational issues are items noted during testing or review for items that do not contravene the standard. They may include cosmetic issues, typos, functional bugs, format errors, or concerns which impact use of the voting system. They are identified for the purpose of disclosure to the manufacturer, EAC, election officials and the public. It is the manufacturer's option to address them. They are included in the appendix of the final report. At this time seven have been resolved and validated.

Table 4 PCA and FCA Discrepancies

#	Type	Location	Issue Description	Guideline
20	Documentation Defect	Various MPR documents	The following MPR documents incorrectly reference the WinEDS/AERO System and documentation. The AERO System is no longer in use: MPR System Overview v1.0 MPR Operators Manual v1.3 MPR Maintenance Manual v1.2 MPR Personnel & Training Requirements v1.00 MPR Security Specification v1.00 MPR Software Specification v.1.00 MPR Technical Data Package v1.00 4/10/08 Rejected: References to Aero were found	v1: 7.7a: Vendors are required to produce documentation to support the development and formal testing of voting systems…This documentation shall: Be sufficient to serve the needs of the ITA, voters, election official and maintenance technician.

#	Type	Location	Issue Description	Guideline
			in: MPR Security Specification v.1.02 section 4.0 MPR Technical Data Package v.1.02 section 6.4	
37	Documentation Defect	Various Insight and Insight Plus documents	The following Insight and Insight Plus documents incorrectly reference the obsolete SPR Host system. The SPR Host system is deemed obsolete by the vendor. Optech Insight System Overview v1.04 Optech Insight Plus System Overview v.1.04 Optech Insight Functional Specification v1.04 Optech Insight Plus Functional Specification v1.04 Optech Insight Hardware Specification v1.06 Optech Insight Plus Hardware Specification v1.04 Optech Insight Maintenance Manual v1.06 Optech Insight Plus Maintenance Manual v1.05 Optech Insight Operators Manual v1.08 Optech Insight Plus Operators Manual v1.05 Optech Insight Security Specification v1.03 Optech Insight Plus Security Specification v1.02 Optech Insight Software Specification v1.04 Optech Insight Plus Software Specification v1.04 Optech Insight Technical Data Package v1.02 Optech Insight Plus Technical Data Package v1.04 Insight Modem Operators Manual v1.02 5/23/08 Rejected: References to Aero were found in: Optech Insight Functional Specification v1.04 Optech Insight Plus Functional Specification v1.04 Optech Insight Hardware Specification v1.06 Optech Insight Plus Hardware Specification v1.04 Insight Modem Operators Manual v1.02 (this manual should not be submitted)	v1: 7.7a: Vendors are required to produce documentation to support the development and formal testing of voting systems…This documentation shall: Be sufficient to serve the needs of the ITA, voters, election official and maintenance technician.
40	Documentation Defect	Optech 400-C System Overview v1.07 Optech 400-C Operators Manual v1.08 Optech 400-C Security Specification v1.06	These documents reference only the use of floppy diskette for file transfer to the Summary System (WinEDS). Standard USB flash drives have been demonstrated to be used in such a file transfer.	v1: 7.7a: Vendors are required to produce documentation to support the development and formal testing of voting systems…This documentation shall: Be sufficient to serve the needs of the ITA, voters, election official and maintenance technician.
48	Documentation Defect	WinEDS 4.0 Security Specification v1.0	Section 3.3 is missing a description of port protection devices or a justification of why they are unnecessary (see also #52).	V1 6.2.2c The vendor shall provide a detailed description of all system access control measures designed to permit authorized access to the system and prevent unauthorized access. Examples of each measure include: c. One-end or two-end port protection devices;
49	Documentation Defect	WinEDS 4.0 Security Specification v1.0 HAAT90 Security Specification v2.0	Section 4.2.1 stipulates an approved firewall but does not define an approved firewall 3/3/08 Same stipulation appears in section 1.3.8.5 of the HAAT90	v1: 6.4.2 Voting systems shall deploy protection against the many forms of threats to which they may be exposed such as file and macro viruses, worms, Trojan horses, and logic bombs. Vendors shall develop and document the procedures to be

#	Type	Location	Issue Description	Guideline
				followed to ensure that such protection is maintained in a current state.
50	Documentation Defect	WinEDS 4.0 Security Specification v1.0	Section 5.1 Subsection c and e need more justification than "N/A" since they both refer to software. Section 5.1, especially sections b, c & e use N/A after stating the requirement. N/A does not justify why the requirement is not applicable to WinEDS or what the boundaries of the WinEDS system are. For example WinEDS may operate on a COTS PC containing COTS firmware, but it nevertheless contains firmware.	v1: 6.4.1 the system shall meet the following requirements for installation of software, including hardware with embedded firmware
51	Documentation Defect	WinEDS 4.0 Security Specification v1.0	Section 5.2 Refers to a "recommended security application" but never states what this application is. Judging from the rest of the paragraph this is a COTS software item that needs to be provided in the COTS software sections of the requirements. Paragraph does not address how the "security application" protects the WinEDS computer and operating system but only discusses protecting the WinEDS application. Sentences are confusing. For example the phrases "Use a virus protection program" and "Run hash programs" appear in the bullets describing the actions of the security application. It is unclear if these statements are an instruction to the jurisdiction or actions performed by the "security application". The term "recommended" suggests the "security application" need not be present to run WinEDS. If so the jurisdiction needs specific direction to indicate when the system is conforming to EAC requirements and when it is not.	v1: 6.5.4 Protection Against External Threats thru v1:6.5.4.3 (see VSS for complete text)
52	Documentation Defect	WinEDS 4.0 Security Specification v1.0	The applicable connections of the HAAT90 and HAAT100 are: - HAAT100 <-> Wireless Internet Access <-> HAAT Listener <-> Cartridges DB <-> WinEDS; and - HAAT90 <-> Public Telecommunications Network <-> Possible Connection to the Internet <-> HAAT Listener <-> Cartridges DB <-> WinEDS. As these network interconnections directly or indirectly connect WinEDS to a public telecommunications network, VSS v.1:6.5.4 thru 6.5.4.3 must be addressed.	v1: 6.5.4 Protection Against External Threats thru v1:6.5.4.3 (see VSS for complete text)
53	Documentation Defect	WinEDS 4.0 Security Specification v1.0	Section 6.3 does not specifically address the situation where an emerging threat appears too late to be corrected.	v1: 6.5.4.3.f Address threats emerging too late to correct the system at least one month before the election,
54	Documentation Defect	Optech 400-C Software Specification v.1.07	Section 9.5 is missing a description of structures used in interfaces such as pDIVFAILURE, pSTUCKBALLOT. 400-C System Overview describes providing tally data to a "Summary System" via floppy diskette, but the interface is not described. Appendix K is mentioned in the document overview, but not in Section 9 and it does not completely describe the interface between the WinETP and WinEDS system (i.e. it is missing structure definitions used in the interface).	v1: 2.5.3 d: Additional information for each item that includes: 1) Item identification 2) General description 3) Software requirements performed by the item 4) Identification of interfaces with other items that provide data to, or receive data from, the item 5) Concept of execution for the item
55	Documentation Defect	Optech 400-C Software	Characteristics are not described (files are binary, text, mixed, XML, BER etc.), tolerances are not described (minimum and or maximum sizes,	v1: 2.5.6.1a A definition of the inputs to the function or mode (with characteristics, tolerances

#	Type	Location	Issue Description	Guideline
		Specification v.1.07	candidate numbers, candidate name length or file structure)	or acceptable ranges, as applicable)
56	Documentation Defect	Optech 400-C Software Specification v.1.07	Missing characteristics, tolerances or any detailed description of outputs produced	v1: 2.5.6.1c A definition of the outputs produced (again, with characteristics, tolerances, or acceptable ranges as applicable).
58	Documentation Defect	HAAT Listener Operators Manual v.1.05 HAAT Listener System Overview v.1.06 WinEDS Installation Guide v.1.02	The HAAT Listener Operators Manual describes a computer with 2 Ethernet network adapters. Neither this document nor the Overview contain information about specific network connections and the objects connected (such as gateways, firewalls, open/closed ports, SSL/TLS certificates, SSL/TLS configuration, RAS server connections (network/POTS), and RAS server configuration). Additionally review of the WinEDS Installation Guide did not provide an adequate description or reference to the interconnection of the central count features of the election management system configuration.	v2: 2.4.2 The vendor shall provide sufficient data, or reference to data, to identify unequivocally the details of the system configuration submitted for qualification testing. The vendor shall provide a list of materials and components ... and a description of their assembly into major system components and the system as a whole. v2: 2.6.5 The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure software (including firmware) installation to meet the specific requirements of Volume I, Section 6.5 of the Standards.
59	Documentation Defect	WinEDS Security Spec v.1.00	Section 1.1.4 of the WinEDS Software Spec (v.1.0 Jan/2008) introduces the concept of a Regional Tally Center connected to the WinEDS System via a VPN (and also covered in more detail in section 3.1.4). As described in the section 3.1.4, VPN's "data travels across public network." This transmission capability could be over a public telecommunications network as defined in v.1 section 5.1 of the 2002 standards. Section 6.9 "Transmitting Data over Public Networks" does not address this possibility.	v.2: 2.6.5 The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure data transmission to meet the specific requirements of Volume I, Section 6.5:
65	Documentation Defect	HAAT50 TDP package	The HAAT50 TDP package has not been tendered with the exception of the hardware changes introduced in the HAAT50 for the A 1.1 revision.	V1: 9.6.1.2.a Pre-test Preparation: The vendor shall prepare and submit a complete TDP to the ITA ... V2: 2.1.1.1 Required Content for Initial Qualification: At minimum, the TDP shall contain the following documentation: …
66	Documentation Defect	HAAT80 TDP package	The HAAT80 TDP package has not been tendered.	V1: 9.6.1.2.a Pre-test Preparation: The vendor shall prepare and submit a complete TDP to the ITA ... V2: 2.1.1.1 Required Content for Initial Qualification: At minimum, the TDP shall contain the following documentation: …
75	Functional Defect	SEQ-40-2007-W1 scope and WinEDS	Sequoia submitted a revised application to the EAC removing the Advantage. The current TDP documents the WinEDS functionality for Advantage ballot preparation and election results tabulation. With the removal of the Advantage polling place device from the scope of testing, functional and performance testing of this WinEDS functionality	EAC Testing & Certification Program Manual 4.3.2.4 System Overview. The Manufacturer must submit with the application form a copy of the voting system's System Overview documentation submitted to the

#	Type	Location	Issue Description	Guideline
			cannot be completed for the integrated system.	VSTL as a part of the Technical Data Package. This document must meet the requirements of the VVSG (VVSG 2005—Version 1.0, Vol. II, Section 2.2) (Note: 2005 requirement is Identical to 2002) v.2: 2.2: In the system overview, the vendor shall provide information that enables the test authority to identify the functional and physical components of the system, how the components are structured and the interfaces between them. v.2:1.4.i: The ITA follows the general sequence of activities...Functional and performance testing of the integrated system, including testing of the full scope of system functionality... and examination and testing of the System Operations Manual.

3. Materials Required for Testing

The System Identification stipulates the following materials are required for testing of the Sequoia WinEDS voting system.

3.1 *Voting System Software*

The software listed in Table 5 is the baseline documented configuration of the Sequoia WinEDS voting system.

Table 5 Voting System Software

Application	Manufacturer	Version	Description (identify COTS)
EMS Software			Ballot preparation/Central Count
WinEDS Election Management System	Sequoia Voting Systems	4.0.122	DRE ballot preparation, optical scanner programming & central count EMS software
Extended Services	Sequoia Voting Systems	1.0.49.0	A suite of common services and features for ballot preparation, programming, and central count
Election Reporting	Sequoia Voting Systems	4.0.44	Election Reports and flat file exports providing election night tally, historical summary data repository, and additional reporting capabilities
Memory Pack Receiver	Sequoia Voting Systems	3.01	Firmware for the MPR (peripheral device connected via serial interface to a WinEDS workstation), that reads from and writes to Insight memory packs.
Polling Place Voting Software			
Card Activator	Sequoia Voting Systems	5.1.28	Polling place software to program voter activation Smartcards
Edge Audio Unit	Sequoia Voting Systems	8.7.5	Polling place software to support audio ballots on the Edge II
AVC Edge	Sequoia Voting Systems	5.1.25	Polling place firmware for the Edge II
EDGE2*plus*	Sequoia Voting Systems	1.2.62.0	Polling place software for the EDGE2plus
VeriVote	Sequoia Voting Systems	1.04	VVPAT polling place software
Insight Memory Pack Receiver	Sequoia Voting Systems	2.14	Polling place software to read MemoryPacks used by the Insight optical scanners and transfers election results to the HAAT80, 90, and 100.
Insight/Insight Plus (APX)	Sequoia Voting Systems	K2.16.080711.1775	Polling place firmware directing the movement and operations of paper ballots through the Insight optical scanners
Insight/Insight Plus (HPXA) Surface Mount	Sequoia Voting Systems	K1.44A.080422.1500	Polling place firmware that scans and reads paper ballots on the Insight scanners
Insight/Insight Plus (HPX)	Sequoia Voting Systems	K1.44.080501.1500	Polling place firmware that

Application	Manufacturer	Version	Description (identify COTS)
			scans and reads paper ballots on the Insight scanners
HAAT (50, 80, 90, 100)	Sequoia Voting Systems	2.6.20.0	Polling place software to activate Vote session Smartcards for the DREs (50, 80, 90, & 100) and accumulate, print results (80, 90, & 100), and transmit results (90 wired & 100 wireless).
HAAT Listener	Sequoia Voting Systems	1.6.9	Central count software to receive election results transmitted from the HAAT90 or HAAT100
Central Count Voting Software			
WinETP	Sequoia Voting Systems	1.16.6	Central count EMS software for the 400-C

3.2 *Voting System Hardware and Equipment*

The equipment listed in Table 6 is the documented configuration of the Sequoia WinEDS voting system.

Table 6 Voting System Hardware and other Equipment

Hardware or Equipment	Manufacturer	Version	Description (identify COTS)
Election Management System (WinEDS- Ballot Preparation and Central Count)			Ballot preparation & Central Count
WinEDS 4.0 Server: PowerEdge 1900 Windows Server 2003 R2 Intel Xeon CPU 1.60GHz, 1.99GB of Ram	Dell	5XNXRF1	DRE ballot preparation and optical scan ballot programming PC (WinEDS 4.0 and SQL Server) and central count
WinEDS 4.0 Workstation: Optiplex 330 Windows XP Pro SP2 Intel Pentium Dual CPU 1.60GHz, 0.98GB of Ram	Dell	BMVTRF1	DRE ballot preparation and optical scan ballot programming PC (WinEDS 4.0 and SQL Server)
WinEDS 4.0 Server: PowerEdge 1900 Windows Server 2003 R2 Intel Xeon CPU 1.60GHz, 1.99GB of Ram	Dell	Service Tag: 4XNXRF1	DRE ballot preparation and optical scan ballot programming PC (WinEDS 4.0 and SQL Server) and central count
WinEDS 4.0 Workstation: Optiplex 330 Windows XP Pro SP2 Intel Pentium Dual CPU 1.60GHz, 0.98GB of Ram	Dell	Service Tag: CMVTRF1	DRE ballot preparation and optical scan ballot programming PC (WinEDS 4.0 and SQL Server)
Edge II			DREs & associated hardware
AVC Edge 5.1 (Edge II)	Sequoia Voting Systems		Sequoia Voting Systems' stand-alone touch screen DRE polling place voting device that incorporates a color LCD integral touchscreen, poll worker panel, integrated (voter) privacy flaps, internal memory for

Hardware or Equipment	Manufacturer	Version	Description (identify COTS)
			storing ballot data and voting records, removable Results Cartridge, and protective & public counters.
Card Activator	Sequoia Voting Systems	Rev D and E	A component of the AVC Edge 5.1 that serves as the voter's access to the AVC Edge 5.1 (Edge II) direct-record electronic touch-screen voting system by use of a Voter/Smart Card.
Edge Audio Voting Accessory 5.1 (E-AVA)	Sequoia Voting Systems	Rev A	A six button device designed for use with the AVC Edge 5.1 that allows unassisted, private & secure voting for the visually impaired and non-reading voters using a spoken, audio ballot format.
Verivote Printer	Sequoia Voting Systems	Rev C	Sequoia Voting Systems' optional side-mounted VVPAT printer to an AVC Edge 5.1 machine, to produce a paper record that can be reviewed by the Voter as they vote.
Seiko Printer	Seiko	DPU-414	A COTS 40-column dot matrix printer, which is used to provide election reports for the AVC Edge 5.1.
Edge Aux Power Unit	Lien Engineering	BTC80W	COTS emergency power unit that provides power for two AVC Edges for an extended period of time.
Memory Cartridge	COTS	ATA/PCMCIA	Removable flash memory for the AVC Edge 5.1.
EDGE2*plus*			DRE & associated hardware
EDGE2*plus* Model 300	Sequoia Voting Systems	CO.3	Sequoia Voting Systems' stand-alone touch screen DRE polling place voting device that incorporates an LCD voter display panel, poll worker panel, integrated (voter) privacy flaps, internal memory for storing ballot data and voting records, removable Results Cartridge, protective & public counters, an APS external printer VVPAT (UTG) and ABLE-D audio voting control .
EDGE2*plus* Model 300	Sequoia Voting Systems	CO.4	Same as EDGE2*plus CO.3 except* for changes (including the change of the LCD) reflected in Change Order 4 (CO.4).
APS External Printer	Sequoia Voting Systems	UTG300	Permanently attached COTS 40-column election report VVPAT thermal printer for the EDGE2*plus*.

Detachable Audio Voting Control (ABLE-D)	Sequoia Voting Systems		An eight-button device integrated into and designed for use with the EDGE2*plus* that provides unassisted, private and secure voting for visually impaired, non-reading and voters with dexterity challenges or limitations on the use of their hands.
Results USB Cartridge	COTS Series K9K	Series 700	COTS USB flash drive used to capture Election Day ballot, results & audit log
Simulation USB Cartridge	COTS Series K9K	Series 700	COTS USB flash drive used to simulation script used for Pre and Post Election Logic & Accuracy Test mode
Audit Trail USB Cartridge	COTS Series K9K	Series 700	COTS USB flash drive used to contain unalterable randomized electronic record of all votes cast during an election.
Insight & Insight Plus			Optical scanners & associated hardware
Optech Insight	Sequoia Voting Systems	G04	A portable Precinct Count System that uses Optical Scan Read-Head technology to electronically read and tabulate Optical Scan ballots at the Polling Place, print results and store election totals.
Optech Insight Plus	Sequoia Voting Systems	A04	Same as the Optech Insight, with the addition of an LCD panel display.
Optech Insight Surface Mount	Sequoia Voting Systems	A.01	Same as the Optech Insight, with the addition of the surface mount board that has the APX firmware embedded. This accepts the blank MemoryPack (no firmware).
Optech Insight Plus Surface Mount	Sequoia Voting Systems	A.01	Same as the Optech Insight Surface Mount, with the addition of an LCD panel display.
MemoryPack	Sequoia Voting Systems	Rev C	Removable cartridge containing election parameter data, precinct totals, electronic log data and optional CVR data used for the Optech Insights.
Insight Battery	Powersonic Rechargeable Battery	PS 12180 F2	COTS 12 VDC battery which provides emergency power for an Optech Insight during power failures
400-C			Optical scanner & associated hardware
Optech 400-C	Sequoia Voting Systems	3.00P	Sequoia Voting Systems' central count ballot tabulator that reads marked ballots, tabulates and prepares output reports.
Reports Printer	COTS		COTS printer connected to the Optech 400-C LP1 port used for

Hardware or Equipment	Manufacturer	Version	Description (identify COTS)
			reports printing.
Log Printer	COTS		COTS printer connected to the Optech 400-C LP2 port used for log printing.
WinETP			Central count hardware
Desktop Personal Computer Intel Celeron 2 - 2.53 GHz RAM: 256 MB	Dell	Dimension 1100	Personal computer that runs the WinETP application for the Optech 400-C.
Other Hardware			Other associate hardware
Hybrid Activator, Accumulator & Transmitter Unit Model 50	Sequoia Voting Systems	A0.3	A Sequoia Voting Systems' component that provides voter access to the DREs through activation of a Voter/Smart Card interface.
Hybrid Activator, Accumulator & Transmitter Unit Model 50	Sequoia Voting Systems	A1.1	Functionality the same as HAAT Model 50 except for 7 hardware changes.
Hybrid Activator, Accumulator & Transmitter Unit Model 80	Sequoia Voting Systems	A1.1	A Sequoia Voting Systems' component that provides voter access to the DREs through activation of a Voter/Smart Card interface. The HAAT80 also serves as a precinct level accumulator for consolidating and tallying results and a thermal printer for printing the results
Hybrid Activator, Accumulator & Transmitter Unit Model 90	Sequoia Voting Systems	A1.1	A Sequoia Voting Systems' component that provides voter access to the DREs through activation of a Voter/Smart Card interface. The HAAT90 serves as a precinct level accumulator for consolidating and tallying results, a thermal printer for printing the results and for transmitting unofficial results over fixed telephone line networks to central tally server.
Hybrid Activator, Accumulator & Transmitter Unit Model 100	Sequoia Voting Systems	A0.7	A Sequoia Voting Systems' component that provides voter access to the DREs through activation of a Voter/Smart Card interface. The HAAT100 serves as a precinct level accumulator for consolidating and tallying results, a thermal printer for printing the results and for transmission of unofficial results from all precinct voting devices over CDMA 1X/TLS secured networks to a central tally server.
Insight Memory Pack Reader (IMPR)	Sequoia Voting Systems	A1.0	Serial Port interface for the HAAT80, 90, and 100 to read Insight MemoryPacks.
Insight Memory Pack Reader	Sequoia Voting Systems	C1.1	Functionality the same as the

Hardware or Equipment	Manufacturer	Version	Description (identify COTS)
(IMPR)			IMPR A1.0 except for 3 minor hardware changes.
Voter/Smart Card	Various COTS		Card issued by the poll worker to be used as a key to access the ballot on a DRE for voting purposes.
MemoryPack Receiver (MPR)	Sequoia Voting Systems	Rev D	A desktop device, which is connected to a PC via COM port which was developed specifically to work in conjunction with WinEDS 4.0 (Windows Election Database System) installed on a PC, to encode precinct election data from WinEDS 4.0 to a MemoryPack.

Table 7 Sequoia WinEDS Voting Device Hardware Configuration Options

	Touch Screen DRE		Optical Scanners – Optech		
Peripheral Hardware	**EDGE2-*plus*** **(C0.3 & C0.4)**	**Edge II**	**Insight** **(G04 & A.01 Surface Mount)**	**Insight Plus** **(A04 & A.01 Surface Mount)**	**400-C** **(WinETP)**
Only Activators					
Card Activator (D/E)		☑			
HAAT50 (A0.3)	☑	☑			
HAAT50 (A1.1)	☑	☑			
Activators Accumulators & Printers					
HAAT80 (A1.1)	☑	☑	☑	☑	
HAAT90 (A1.1)	☑	☑	☑	☑	
HAAT100 (A0.7)	☑	☑	☑	☑	
Printers					
APS (UTG300) Printer	☑				
Seiko DPU-414 Printer		☑			
VeriVote Printer (Rev C)		☑			
COTS Report Printer (LP1)					☑
COTS Log Printer (LP2)					☑
Receivers, Modems & Readers					
MPR			☑	☑	
IMPR (A1.0 & C1.1)			☑	☑	
Memory Cartridge ATA/PCMCIA (Sandisk)		☑			
Accessibility					
Audio (E-AVA) 5.1 (Rev A)		☑			
ABLE-D	☑				
Memory					
MemoryPack (APX 2.16)			☑	☑	

	Touch Screen DRE		Optical Scanners – Optech		
Peripheral Hardware	**EDGE2-*plus* (C0.3 & C0.4)**	**Edge II**	**Insight (G04 & A.01 Surface Mount)**	**Insight Plus (A04 & A.01 Surface Mount)**	**400-C (WinETP)**
Only Activators					
MemoryPack (No-FW)			☑		
Memory Cartridge - Flash ATA/PCMCIA (Sandisk)		☑			
USB Cartridge (K9K series - 700)	☑				
COTS memory options: USB, CD-ROM DVD Rom, floppy disc & LAN (PC WinETP)					☑
Other					
Edge Aux Power	☑	☑			
Insight Battery			☑	☑	
Smart Card	☑	☑			
Personal Computer (WinETP 1.16.6)					☑

3.3 *Testing Software, Hardware and Materials*

The software, hardware and materials listed in Table 8 are needed to support testing and in test simulations of elections of the Sequoia WinEDS voting system.

Table 8 Testing Software, Hardware and Materials

Software, Hardware or Material	Description	Description of use in testing
3 1/8" x 300' paper rolls	COTS Verivote printer rolls	VVPAT validation on the Edge II; compatible for HAAT report printing
112mm x48mm x12mm paper rolls	COTS Thermal printer rolls	Edge II report printing
3 1/8' x 273' x 7/16" paper rolls	COTS Insight thermal printer rolls	Report printing on the Insights; ; compatible for HAAT report printing
3 1/8" (UTG300 58-400) paper rolls	COTS E2P UTG printer rolls	Report printing and VVPAT validation on the EDGE2*plus*; compatible for HAAT report printing
Pigma Micron 08 marker pens	COTS marking pens.	Paper ballot voting marking pens.
Paper Sleeves	Paper sleeves used by the Edge II Verivote printer.	Edge II report printing
U.S. Robotics 56K USB Fax modem	COTS 56K USB Fax modem	HAAT Model 90 transmitting component.

Software, Hardware or Material	Description	Description of use in testing
Multiple desktop and laptop PCs	A variety of PCs running Microsoft operating systems	Supplied by iBeta: Preparation, management and recording of test plans, test cases, reviews and results
Repository servers	Separate servers for storage of test documents and source code, running industry standards operating systems, security and back up utilities	Supplied by iBeta: Documents are maintained on a secure network server. Source code is maintained on a separate data disk on a restricted server
Microsoft Office Professional Enterprise Edition 2003	Excel, Word and Visio software and document templates	Supplied by iBeta: The software used to create and record test plans, test cases, reviews and results
SharePoint Portal Server 2003	TDP and test documentation repository	Supplied by iBeta: TDP and test documentation repository and configuration management tool
Other standard business application software	Internet browsers, PDF viewers email	Supplied by iBeta: Industry standard tools to support testing, business and project implementation
Center 325 Mini Sound Level Meter	IEC 651 Type 2 handheld sound level meter	Supplied by iBeta: Measure decibel level
Visual Studio 2003 v.7.1.3808 (Microsoft)	Build and source code review Integrated Development Environment	Supplied by iBeta: View source code review
RSM v.7.40 (M Squared Technologies)	C, C++, Java & C# static analysis tool	Supplied by iBeta: identify line counts and cyclomatic complexity
Beyond Compare 2 v.2.5.1 (Scooter Software)	Comparison utility	Supplied by iBeta: used to compare file/folder differences
WinDiff 5.1 (Microsoft)	Comparison utility	Supplied by iBeta: used to compare file/folder differences
Hash.exe v.7.08.10.07.12 (Maresware)	Hash creation utility	Supplied by iBeta: used to generate hash signatures for Trusted Builds
NistNet -- version 2.0.12.c	Packet switching and network packet analysis tool	NIST tool used in testing Public Telecommunications Networking
Nessus v. 3.2.0	Network port scanner and vulnerability testing tool	Supplied by iBeta: used to scan ports of Public Telecommunications Networking for vulnerabilities
WireShark v. 1.0 (Formerly Ethereal v. 0.99.0)	An open source network packet capture and analysis tool	Supplied by iBeta: used to capture packets for later analysis of cryptography
LANForge CT970-16	Network-related testing and simulation tool	Supplied by iBeta: (FIRE) used to generate Public Telecommunications signals and (ICE) used to insert duplicate and reordered packets to test the receiving software
Automation Anywhere v4.0.1	Functional automation tool	Supplied by iBeta: used to simulate keystrokes inputs to WinEDS and WinETP during EMI/EMC testing of the 400-C and MPR

3.4 *Deliverable Materials*

Sequoia delivered separate Technical Data Packages for each product. The documents are listed in the Appendix - TDP Documents. The documents listed are delivered as part of the Sequoia WinEDS voting system.

The materials listed in Table 9 are to be delivered as part of the Sequoia WinEDS voting system (see Tables 5 and 6 for hardware, software, and firmware versions).

Table 9 System Materials

Material	Material Description	Use in the Voting System
WinEDS	Voting software	Ballot preparation and central count software
Memory Pack MPR	MemoryPack Recorder	Attached to WinEDS that reads and writes to Insight MemoryPacks.
AVC Edge II	DRE (Touch Screen) voting hardware	DRE polling place device for recording votes.
Edge Audio Voting Accessory (E-AVA)	Audio Unit Device	Audio unit device attached to Edge II to assist in audio voting
Edge Aux Power Unit	Lien Engineering Power Back-up unit	COTS Power back-up for Edge II
Card Activator	Smartcards activation hardware	Polling place device used to program voter/smart cards for access to Edge II.
Verivote Printer	Printer for Edge II	Printer attached to Edge II used to print out voter ballot for voter verification.
Seiko Printer	COTS Thermal Printer: Model DPU-414	Printer attached to Edge II used to print out system audit logs.
Memory Cartridge (2)	COTS SATA/PCMCIA Flash Memory	External/Detachable memory device used on Edge II for installing election and capturing election ballot, results and audit logs.
EDGE2*plus*	DRE (Touch Screen) voting hardware	DRE polling place device for recording votes
APS External Printer	Report Printer Model: UTG 300	Election Report printer for the EDGE2*plus*
Detachable Audio Voting Control (ABLE-D)	Eight (8) button assistive device with headphone input.	Audio device attached to EDGE2*plus* that allows voters to vote in audio mode, audio visual mode, and any assisted device with 2 channel, 3 mm connectors
Results/AUX Cartridge (2)	COTS USB Flash Memory	External/Detachable memory device used on EDGE2*plus* for installing election and capturing election ballot, results and audit logs.
Optech Insight	Paper ballot optical Scanner (G04)	Polling place paper ballot scanner
Optech Insight	Paper ballot optical Scanner (A.01)	Polling place paper ballot scanner
Optech Insight Plus	Paper ballot optical Scanner (A04)	Polling place paper ballot scanner
Optech Insight Plus	Paper ballot Optical Scanner (A.01)	Polling place paper ballot scanner
MemoryPack	Insight memory cartridge	Removable memory device used to program and transfer election results from Optech Insight and Insight Plus.

Material	Material Description	Use in the Voting System
Insight Battery	Backup power PS 12180 F2	Back-up power equipment for the Insights.
Optech 400-C	Paper ballot optical scanner	Central Count paper ballot optical scanner.
WinETP	400-C software	400-C software for controlling ballot scanner and counting/recording votes.
HAAT (Hybrid Activator, Accumulator & Transmitter) 50	Sequoia smartcard activation device	Device to activate smartcard for access to DRE.
HAAT (Hybrid Activator, Accumulator & Transmitter) 80	Sequoia smartcard activation and vote consolidator device. Version A1.1	Device to activate smartcard for access to DRE, consolidate and print vote totals from cartridges.
HAAT (Hybrid Activator, Accumulator & Transmitter) 90	Sequoia smartcard activation, vote consolidator, and transmitter device. Version A1.1	Device to activate smartcard for access to DRE, consolidate and print vote totals from cartridges. Also transmit vote totals via telephone line.
HAAT (Hybrid Activator, Accumulator & Transmitter) 100	Sequoia smartcard activation, vote consolidator, and transmitter device. Version A07	Device to activate smartcard for access to DRE, consolidate and print vote totals from cartridges. Also transmit vote totals via wireless telephone.
Insight Memory Pack Reader (IMPR)	Serial port device attached to HAAT (80/90/100).	Device attached to HAAT (80/90/100) units to read Memory Pack from Insights.
Voter/Smart Card	COTS data card.	Polling place card to provide DRE voter access.

3.5 *Proprietary Data*

All software, hardware, documentation and materials shall be considered by iBeta as proprietary to Sequoia. None of the elements submitted for certification testing may be used outside the scope of testing. No release or disclosure may occur without the written authorization of Sequoia. Authorization for release to the EAC is contained in the MSA contract.

No information submitted to the EAC within this test plan has been identified by Sequoia as subject to restriction on use, release or disclosure.

iBeta has provided internal process documentation to the EAC to assist in the review of their test plan. This information includes programming language specific review criteria in Appendix A. These documents are tendered in separate electronic files and identified as confidential and protected from release as a trade secret because they are a description of how the process is performed and the end result of substantial effort. This information is explicitly prohibited from release by the FOIA and the Trade Secrets Act (18 U.S.C. §1905).

4. Test Specifications

Testing for conformance to the *VSS 2002* shall be conducted as identified below. The test methods for the system level (functional, integration, security, volume, telephony and cryptographic), environmental, accuracy (accuracy, volume, stress, reliability, and availability) characteristics (recovery, usability, accessibility, and maintainability) test cases are contained in the appendix. A test case shall be provided for each test method. Documentation of all test iterations shall be maintained with a separate record of the configuration and results of each test execution.

4.1 *Hardware Configuration and Design*

The baseline hardware configuration of the Sequoia WinEDS voting system submitted for testing is identified in Table 6. It is recorded in the PCA Configuration document. If during testing there is any change to the configuration of the system, the complete voting system configuration will be recorded on a new tab. The new tab will reflect the date upon which the new configuration was documented. All test cases identified in Tables 11 and 12 will include verification and documentation of the test environment against the applicable PCA Configuration tab

4.2 *Software System Functions*

Testing of the software system functions defined in the *VSS 2002* include:

- Identification of the functional test scope based upon the PCA TDP Document Review (Vol. 2, Sect. 2) and FCA review of the Sequoia WinEDS voting system testing (Vol.2 Appendix A.2)
- PCA TDP Source Code Review of all new or changed code (Vol.2 Sect. 5.4)
- Witness the build of the reviewed code for the baseline version of the system intended to be sold by the vendor and delivered to the jurisdiction. (Vol.2. Sect. 6.2)
- Development of a Certification Test Plan and Test Cases (Vol. 2, Appendix A.)
- Execution of Functional/System Integration Test Cases: General 1 thru General 4,Primary 1 thru Primary 6, Accuracy Optical Scan , Accuracy DRE. (Vol. 2, Sect. 6)
- Testing of the performance and sequence of system hardware and software functions identified in System Operations, Maintenance and Diagnostic Testing Manuals: General 1 thru General 4, Primary 1 thru Primary 6, Accuracy Optical Scan, Accuracy DRE, Characteristics Edge II, Characteristics EDGE2*plus*, Characteristics Insight/Insight Plus and Characteristics 400-C (Vol. 2. Sec. 6.8) Completion of a trusted build by the VSTL with file signatures provided to the escrow agency.

4.3 *Test Case Design*

4.3.1 Hardware Qualitative Examination Design

iBeta conducted a review of all submitted testing of the Sequoia WinEDS voting system. The review was conducted in accordance with vol.2 Appendix A.4.3.1 (a-d) of the *VSS 2002* and Section 301 of HAVA. The results of this review were recorded in the FCA Test Document Review and mapped to the applicable iBeta test cases. As a result of this review it was determined that iBeta will conduct testing to determine the quality of the hardware design. This will be assessed in the Characteristic (Usability, Accessibility and Maintenance) and Security Test Cases. iBeta will also conduct tests to determine the quality of the overall voting capabilities, pre-voting, voting and post voting functions of the Sequoia WinEDS voting system. These will be assessed in the General 1 through 4, Primary 1 through 6 Functional System Level Test Cases and the Accuracy Test Cases.

An examination of the Sequoia voting system was conducted to confirm that it contains only COTS electronic dexterity equipment. The results of this review were recorded in the FCA Test Document Review and mapped to the applicable iBeta standard test cases. As a result of this review it was determined that the voting system will be examined for all functionality listed within the *VSS 2002*.

4.3.2 Hardware Environmental Test Case Design

For the hardware environmental test case design, iBeta completed a full review of each component of the Sequoia voting system submitted for certification testing. The results of the analysis associated with the summary of the testing that will be conducted as provided below in Table 10.

- Vol.1 sections 3.2.2.5 through 3.2.2.12 only require electrical testing for vote scanning and counting equipment.

The Accuracy Test Case will be executed during the 48 hour temperature and humidity chamber test. It also contains the test steps for reliability, availability, volume, and stress.

Table 10 Environmental Hardware Test Matrix

		MIL-STD 810D						FCC								OSHA
Equipment	**Summary of Testing Required**	516.3 Bench Handling	514.3 Category 1 Vibration	502 Low Temp	501 High Temp	507-2 Humidity	501 & 502 Temp & Power Variation With Accuracy & 163 hour Reliability Tests	Electromagnet Radiation Part 15 Class B	Power Disturbance 61000-4-11	Electrostatic Disruption 61000-4-2	Electromagnetic Susceptibility 61000-4-3	Electrical Fast Transit 61000-4-4	Lightening Surge 61000-4-5	RF Immunity 61000-4-6	Magnetic Fields Immunity 61000-4-8	Safety Title 29, Part 1910
EDGE2*plus* CO.3 with audio and flash drive	Mil-Std Testing only - reuse EMI/EMC from Criterion 2006 testing (see Section 2.2)	☑	☑	☑	☑	☑	☑									☑
EDGE2*plus* CO.4 with audio and flash drive (CO.3 plus the CO.4 change order)	All except EMI/EMC 4.8.1 (Power Disturbance), 4.8.6 (Lightning Surge), and 4.8.8 (Magnetic Field Immunity) - reuse of those test results from Criterion 2006 testing. (see Section 2.2)	☑	☑	☑	☑	☑	☑	☑		☑	☑	☑		☑		☑
HAAT50 A0.3	All Mil-Std 810D. The HAAT50 is not vote scanning or counting equipment.	☑	☑	☑	☑	☑	☑									☑
HAAT50 A1.1	All Mil-Std 810D. The HAAT50 is not vote scanning or counting equipment.	☑	☑	☑	☑	☑	☑									☑
HAAT80 A1.1	None - unit is hardware equivalent to HAAT90															
HAAT90 A1.1	Reuse of all EMI/EMC except 4.8.2 - VSS. All Mil-Std Testing (see Section 2.2).	☑	☑	☑	☑	☑	☑	☑								☑
HAAT100 A0.7	All	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑

		MIL-STD 810D						FCC									OSHA
Equipment	**Summary of Testing Required**	516.3 Bench Handling	514.3 Category 1 Vibration	502 Low Temp	501 High Temp	507-2 Humidity	501 & 502 Temp & Power Variation With Accuracy & 163 hour Reliability Tests	Electromagnet Radiation Part 15 Class B	Power Disturbance 61000-4-11	Electrostatic Disruption 61000-4-2	Electromagnetic Susceptibility 61000-4-3	Electrical Fast Transit 61000-4-4	Lightening Surge 61000-4-5	RF Immunity 61000-4-6	Magnetic Fields Immunity 61000-4-8	Safety Title 29, Part 1910
IMPR A1.0	All but tested in conjunction with HAAT100 A0.7 The IMPR is not vote scanning or counting equipment.	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
IMPR C1.1	All but testing in conjunction with HAAT90 A1.1. The IMPR is not vote scanning or counting equipment.	☑	☑	☑	☑	☑	☑	☑								☑
MPR Revision D	All - test results are prior to Jan 1, 2005 (11/15/2004) and impacts from RFI 2008-02.	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Edge2 with VeriVote and audio	All	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insight with UPS	All	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Insight Plus with UPS	All EMI/EMC due to battery configuration. Reuse of Mil-Std testing based on the 2006 test results but a run in tandem with multiple units will obtain up-to-date test results. Accuracy testing requires the 48 hour chamber test.	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Surface Mount Insight with UPS	All	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Surface Mount Insight Plus with UPS	All	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
400-C with UPS	All - test results are prior to Jan 1, 2005 as dictated by the EAC NOC 08-001.	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑	☑
Card Activator	All - MIL-Std test results are prior to Jan 1, 2005 as dictated by the EAC NOC 08-001. The Card Activator is not vote scanning or counting equipment.	☑	☑	☑	☑	☑	☑									☑

4.3.3 Software Module Test Case Design and Data

Based upon the FCA Document Review of the Sequoia tests the iBeta standard test cases were customized to cover the applicable requirements of the *VSS 2002*.

These test cases cover the scope of Security, Accuracy, Integrity, System Audit, Error Recovery, Accessibility, Vote Tabulation, Ballot Counter, Telecommunications, Data Retention, and Reporting. The Pre and Post vote testing scope will include Ballot Preparation, Ballot Formatting, Ballot Production, Election Programming, Ballot and Program Installation and Control, Readiness Testing, Activating the Ballot (DRE Systems), DRE Standards for Accessibility, Casting Ballots, Consolidating Vote data, Vote tabulation and Reporting. Testing on Voting variables for the EMS will include Closed and Open Primary, Non-partisan Offices, Write-In Voting, Primary Presidential Delegation Nominations, Ballot Rotation, Straight Party Voting, Cross-Party Endorsement, Vote N of M, Recall Issues, with options, Ranked Order Voting, Tabulation of Ranked Order Votes, Provisional/Challenged Ballots, Overvotes, Undervotes, Blank Ballots, and Display/Printing of Multi-Lingual Ballots.

The customized test cases include the identification of the flow control parameters between the applications, user interfaces, and hardware interfaces with the capture of entry and exit data (see Tables 11 and 12 and Appendix - Test Methods).

4.3.4 Software Functional Test Case Design

A review of the Sequoia functional test cases against the 2002 Voting System Standards and the WinEDS voting system functional requirements has been performed. Tests covering system functional requirements are incorporated into a standard set of system level integration test cases. These test cases identify Accept/Reject performance criteria for certification based upon the VSS *2002* and the WinEDS voting system software and hardware specifications

The Sequoia WinEDS voting system functions and the iBeta Test Cases are identified in Table 11. Greater description of each Test Case is found in the Test Methods. (See the Appendix.) Detailed test steps and test data are found in the separate individual Test Case documents.

Table 11 System Function and Test Cases

System Function	Test Case
a. Ballot Preparation Subsystem	
1) Creation of Election Database: select election type, state and election parameters; set and assign user, roles and workstation; set tally types, precincts, PSD, voting location, voting machines and assignments; and Create offices and contests. 2) Setting up an election; assign candidates to offices and contests 3) Setting up a ballot; generate layouts and ballot styles; export Optech ballots; generate and edit header masks; and view ballots for proofing. 4) Create cartridges; installing ballots onto voting systems; perform Pre-Lat testing and verification.	General 1, 2, 3 & 4 Primary 1,2,3,4,& 5 Security Accuracy
b. Test operations performed prior to , during and after processing of ballots, including:	
1) Logic Test: Interpretation of Ballot Styles & recognition of precincts; displaying ballot styles correctly by election type, precinct, precinct splits and party.	General 1, 2, 3 & 4 Primary 1,2,3,4,& 5
2) Accuracy Tests: Clearly identifiable voting fields associated with candidates and measures; Optech paper ballot reading accuracy on optical scanners; correctly mark and scan paper ballot; and correctly voted and recorded votes on DRE and with audio.	General 1, 2, 3 & 4 Primary 1,2,3,4, & 5 Accuracy
3) Status Tests: Initialize voting systems, card activator and HAATs; confirm operational status of system and Ready mode; and check buttons, touch-panel ,scanner, display, and ballot.	General 1, 2, 3 & 4 Primary 1,2,3,4, & 5 Accuracy

System Function	Test Case
4) Report Generation: Produce, view and print Voting system (DREs and Optech Scanners) reports; and produce consolidated central count reports.	General 1, 2, 3 & 4 Primary 1,2,3,4, & 5 Accuracy
5) Report Generation: Produce, view and print Voting system (DREs and Optech Scanners) and central count (WinEDS) audit data reports.	General 1, 2, 3 & 4 Primary 1,2,3,4, & 5 Accuracy
c. Procedures applicable to equipment used in a Polling Place for:	
1) Opening the polls; print zero proof report; and activate for accepting ballots; display, vote and cast ballots.	General 1, 2, 3 &4 Primary 1, 2, 3, 4, & 5 Security Accuracy
2) Monitoring equipment status ready and non-ready modes; and voting booths provide privacy.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Accuracy Characteristics
3) Equipment response to commands; confirm voting enabled; fleeing voter enabled; audio and visual ballots activated; write-ins, review of votes, casting the ballot; activation of authorized ballot content (election information, election type, precinct, party, supported variations); usable and accessible generation/display of all voter facing messages and notifications.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Accuracy Characteristics
4) Generating real-time audit messages for election installation, equipment status, opening/closing polls, vote activations, poll worker interference, power fault and recovery; and report processing.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Security Accuracy Characteristics
5) Polls are close; Ballot activation is disabled; visible indication of system status.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Security Accuracy
6) Generating election data reports; Vote consolidation via the HAAT; and Post-Lat testing and verification.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Accuracy
7) Transfer ballot count to central counting location via results cartridges and memory pack.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Security Accuracy
8) Electronic network transmission on the HAAT 90/100. HAAT90 using POTS and HAAT100 uses wireless transmission.	General 3 & 4 Telephony and Cryptography
d. Procedures applicable to equipment used in Central Count	
1) Read in results cartridges, memory pack and removable media for >1 precinct to WinEDS for tallying.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Security Accuracy
2) Monitoring equipment status for ready and non-ready mode. Cartridges and Memory Pack readers are correctly connected to WinEDS and are ready to process results cartridges.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Accuracy
3) Equipment response to commands; WinEDS reads votes from results cartridges, memory pack and external memory device from 400-C; write-ins identified; faulty cartridges (already read cartridges and tampered cartridges) rejected.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Security Accuracy
4) Integration with peripherals equipment or other data processing systems.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Security Accuracy
5) Generating real-time audit messages: election installation,	General 1, 2, 3 & 4

System Function	Test Case
cartridge creation, equipment status checks, power recovery, report processing; and cartridge result tally status.	Primary 1, 2, 3, 4, & 5 Security Accuracy
6) Generating precinct-level election data reports: view and print reports with partial and complete precinct votes.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Accuracy
7) Generating summary election data reports: view and print zero proof reports; and view and print vote summary reports with partial and complete votes.	General 1, 2, 3 & 4 Primary 1, 2, 3, 4, & 5 Accuracy

4.3.5 System Level Test Case Design

System Level Test Cases have been prepared to assess the response of the hardware and software to a range of conditions. Greater description of each Test Case is found in the Test Methods. (See the Appendix.) Detailed test steps and test data are found in the separate individual Test Case documents.

Table 12 System- Level Test Cases

	Test Cases
a. Volume Test	
Using the Sequoia defined system limitations, confirm that the voting system limit exceed the documented limits when those limits are combined in a worse case scenario in a Primary and General Election. Using the defined system limits, verify that the maximum capacity is successfully prepared and processed without errors for: -Total number of ballots processed by each precinct shall reflect the: Maximum number of active voting positions Maximum number of ballot styles in a precinct Maximum number of precincts in a Memory Cartridge Maximum number of candidates voted for in a single precinct Maximum number of parties -Process the maximum number of Precincts -Process the maximum expected number of races and the number of candidates per race - Process the maximum expected number of total candidates in an election - Process the maximum number of races per precinct - Process the maximum number of ballot styles in an election - Process the maximum number of contests in a ballot style Verify that during the expected hours of operation audit entries are successfully recorded without errors. During the Accuracy Test a minimum of 1,549,703 ballot positions will be exercised to confirm that this volume is handled by the voting system. In order to complete the Reliability requirements additional ballots will be run. Two units will operate for 85 hours. Edge II and EDGE2*plus* with VVPAT: • 2 units of @ DRE, running 1,607 ballots per unit (Total 4,608); • Total predicted volume of 5,253,120 ballot positions; and • Voter selections are recorded, reported and available for consolidation; errors are correctly reported. Insight, Insight Plus, Insight Surface Mount, Insight Plus Surface Mount, and 400-C: • Optech Insight & Insight Plus: 2 units, 1 of @ running 8,500 ballots 100/hour (total 17,000 ballots with 4,080,000 ballot positions); • Optech Insight & Insight Plus Surface Mounts: 2 units, 1 of @	Volume Test Cases Accuracy DRE and Optical Scan Test Cases

	Test Cases
running 8,500 ballots 100/hour (total 17,000 ballots with 4,080,000 ballot positions); • Optech 400-C: 2 units, @ running 25,500 ballots 300/hour (total 51,000 with 12,240,000 ballot positions) (Alternative: 1 unit running 163 hours for 48,900 ballots with 11,736,000 ballot positions); and • Voter selections are recorded, reported and available for consolidation; errors & misfed ballots are correctly reported.	
b. Stress Test	
Stresses for hardware-generated interrupts are initiated in the Environmental - Electrical Testing for the Edge II, EDGE2*plus*, Insight, Insight Plus, and 400-C. Successful completion of the post electrical test Operational Status Checks provides validation. Insight, Insight Plus, Insight Surface Mount, Insight Plus Surface Mount, and 400-C shall include processing of ballots at the equipment's maximum rate with an overvoted ballot injecting a hardware wait state and a mutilated ballot injecting a hardware interrupt. Accurate vote recording and reporting provides validation. Edge II and EDGE2*plus* shall include processing of a voting session with a hardware interrupt. Appropriate error handling and voting recording provides validation when a VVPAT reaches the end of the role. Using the Sequoia defined system limits, verify that the voting system provides an appropriate response to an overloading conditions: • Polling place devices shall be subjected to ballot processing at the high volume rates at which the equipment can be operated. • Central counting systems shall be subjected to similar overloads including continuous processing through all readers simultaneously. Stress scenarios exceeding the maximum limitations will be executed to confirm any applicable error handling. If error messages are generated they are: • Stored and reported as they occur • Errors requiring intervention clearly display issues and action instructions or with indicators • Incorrect responses will not lead to irreversible errors. If error messages are not generated: • The system processes without error; or • If there are any system errors then the system shall recover without any loss of data.	Post Environmental Electrical Testing Operational Status Checks Accuracy Optical Scan Test Case Accuracy DRE Test Case Volume Test Cases
c. Usability Tests:	
In the system level test cases election databases, DRE and paper ballots will be prepared, installed, voted and reported exercising the input controls, error content, and audit message content of the voting system. • A review will assess the content and clarity of instructions and processes.	General 1 through 4 Primary 1 through 5
d. Accessibility Tests:	
Audio and visual ballots will be programmed in the default language (English), a secondary language using a Western European font (Spanish), an ideographic languages (Chinese) and non-written audio	General 2 & 4, Primary 2 and Characteristics

	Test Cases
ballot. Votes will be cast to confirm: • All ballot and instructions can be printed or displayed in supported languages; • DRE ballots, instructions and voting system controls can be accessed visually, aurally or with non-manual dexterity aids in all supported languages; and • DRE ballots and instructions can be accessed visually , aurally, and with non-manual controls adjusting screen contrast, ballot display settings (colors & text), and audio ballot controls within the ranges identified in the *VSS 2002*; • DRE voter sound cues and alerts are accompanied by visual cues; and • Precinct voting systems physical measurements of the voting systems will comply with Vol.1 Sect. 2.2.7.1 a through f.	
e. Security Tests:	
A PCA Security Document Review of each Voting System shall be executed to verify a means of implementing the following capabilities: • Software/hardware access controls • Effective password management • Segregation of duties • Individual Access Privileges • Controlled System functions • Safeguards to protect against tampering during system repair or interventions in system operations During System Function testing steps will be incorporated into the pre-vote, vote, and post-vote election phases. These steps shall test: • Security access controls that limit or detect access to critical system components (ballot preparation, opening/closing of polls, voter card activation, ballot activation, tallying of results, reading/transfer data, audit functions); • System functions are executable only if the defined function predecessors are met; and • Restoration of device to operating condition existing immediately prior to an error or non-catastrophic failure (power failure, memory device failure, voter card error). *See recovery test section g of this table for more recovery testing.* Security specific test cases shall include: • Attempts to bypass or defeat voting system security including: changing vote data, copying voter cards, ability to bypass user passwords, modifying data in audit logs, and accessing controlled functions without appropriate validation; • Voter denial of service attacks introduced via the voter card or results cartridges. • Attempts to circumvent physical security devices, without detection, including, destructible seals and system components locks for cartridge slots, polls switches, keypads, and hardware components; and • Poll workers, voters, and operators as threat agents to access the ability of the voting system to resist or detect attacks, log and/or report attempts. After defining language specific review criteria, a software source code review will be executed to confirm that: • Audit logs report the date and time of normal and abnormal events;	General 1, 2, 3 & 4 Test Cases PCA Document Review: Security Specifications Source Code Review Security

	Test Cases
• Data processing methods are verified through the use of check-sums; • Modules have single entry/exit point; • There are no voter counter overflow; • There are no self modifying code; • Messages are encrypted; • There is separate and redundant ballot image, vote and audit recording; • There are no computer-generated passwords; and • Voting systems halt execution at the loss of critical systems.	
f. Performance Tests:	
During the system level and accuracy testing election databases will be programmed for the functions identified in Table 11. WinEDS will be used to create the test election databases. These will include: • One or more DRE and one or more optical scanner; • Specific voting variations that are supported by the hardware and state specific election databases; and • Election setup and management reports. The voting equipment shall be programmed to verify: • Ballot instructions, formats, errors and status are presented to the appropriate voter (geographic, party, visual, audio, English, and/or multi-lingual); • Ballots can be viewed, voted, reviewed, cancelled, and votes modified and prior to casting; • Ballots can be cast in all voting modes (visual, audio, non-manual, English, and/or multi-lingual); • Votes can be accurately recorded and reported; • DRE optional/ required Voter Verified Paper Audit Trails can be viewed, modified, cancelled and cast; and • Optional/ required activation, accumulation, and transmission of votes. Election results shall be centrally compiled to verify: • Accurate reporting at the required election, precinct and party level; and • Accurate reporting of optional Election Day and Post Election management reports.	General 1 through 4 Primary 1 through 5 Accuracy DRE and Optical Scan Test Cases Volume Test Cases
g. Recovery Tests:	
Test will be conducted to determine that the Edge II, EDGE2*plus*, Insight, Insight Plus, Insight Surface Mount, Insight Plus Surface Mount, and 400-C are able to: • Recover from power or other system failure, without loss of vote data; and • Be supported on back up power for a minimum of two hours. Consistency assessment of Source Code to confirm that the single exit point is the point where control is returned. At that point, the data that is expected as output is appropriately set. The exception for the exit point is where a problem is so severe that execution cannot be resumed. In this case, the design explicitly protects all recorded votes and audit log information and implements formal exception handlers provided by the language. If during Volume and Stress testing there are system errors that cause a crash the system shall recover without any loss of data.	Characteristics Test Case PCA Source Code Review Volume Test Cases

5. Test Data

5.1 *Test Data Recording*

The results of testing and review to the Sequoia WinEDS voting system to the *VSS 2002* are recorded in the test case and review forms prepared by iBeta. Environmental test data will be recorded in the manner appropriate to the test equipment with output reports detailing the results and analysis. Electronic copies of all testing and reviews will be maintained.

5.2 *Test Data Criteria*

The results of the voting system tests and reviews shall be evaluated against the documentation of the WinEDS voting system TDP, and the requirements of the *VSS 2002* The WinEDS voting system shall be evaluated for its performance against the standard and the expected results identified in each test case.

5.3 *Test Data Reduction*

Test data will be processed manually.

6. Test Procedures and Conditions

6.1 *Facility Requirements*

All software testing and review will be performed at iBeta laboratory in Aurora, Colorado

All Sequoia documentation, test documentation and results will be maintained in the Sequoia WinEDS voting system project folder on the SharePoint server in the Voting. Only project assigned test personnel will have access to the Sequoia repository. Sequoia source code will be maintained on a separate server. Only project assigned test personnel will have access to the source code repository. Repositories are backed up daily using industry standard utilities.

6.2 *Test Set-up*

As part of the PCA, the Sequoia WinEDS voting system test platform will be set-up in the manner identified in the system configuration identified in the *WinEDS 4.0 Configuration Management Plan*. The test platform will be documented. Installation of the witnessed build will be observed and documented. An inventory of any accessories or preloaded applications will be documented.

6.3 *Test Sequence*

There is no prescribed sequence for the testing of the voting system. The only sequence requirement is that predecessor tasks are completed prior to initiation of a task.

Table 13 –Sequence of Certification Test Tasks

Certification Test Task	Predecessor Task	Test Personnel
Identify scope of project for contract negotiation	Determination of voting system status (new or changed)	Gail Audette
Set up Project and Repositories	Contract Authority	Gail Audette Carolyn Coggins
Reporting of Discrepancies	Commencement of the project	All
PCA TDP Document Review	Project repository and TDP Documents received	Mary Ricketts Deb Harwood Charles Cvetezar Lich Le Kevin Wilson Michael Libman
PCA TDP Source Code Review	Project repository and TDP Documents & Source Code received	Lauren Laboe Kevin Wilson Charles Cvetezar Kenyatta Thomas Kalpana Siddhatham Lich Le Ken Mathis
FCA Testing Review and Test Scope/ Requirements Identified	TDP Test Documents received	Ken Mathis Gail Audette Deb Harwood
Certification Test Plan	Preliminary PCA TDP Document Review & FCA Testing Review	All
FCA Test Case preparation	TDP Documentation received, FCA Testing Review, Identification of Test Scope and Requirements	Mary Ricketts Deb Harwood Charles Cvetezar Lich Le Kevin Wilson Gail Audette Carolyn Coggins
PCA System Configuration	TDP Documentation, hardware and software received	All
PCA Witness Build	PCA Source Code Review	Kevin Wilson

Certification Test Task	Predecessor Task	Test Personnel
		Lich Le
FCA Environmental Hardware Test Case Execution	FCA Test Case preparation & PCA System Configuration	Charles Cvetezar Gail Audette
FCA Accuracy Test Case	FCA Test Case preparation, PCA System Configuration, Temperature and Power Variation Environmental Test	Carolyn Coggins Charles Cvetezar
FCA Functional/System Level Test Case Execution	FCA Test Case preparation & PCA System Configuration	All
FCA Characteristics. Test Case Execution	FCA Test Case preparation & PCA System Configuration	Deb Harwood
FCA Security Review & Testing	FCA Test Case preparation & PCA System Configuration	Kevin Wilson Lich Le
FCA Telephony and Cryptography Review and Test Case	FCA Test Case preparation & PCA System Configuration	Kevin Wilson Lich Le
Regression Testing of Discrepancy Fixes	Receipt of applicable fix or response from Sequoia and PCA Witness Build of reviewed code, if applicable	All
VSTL Certification Report	Successfully complete all FCA and PCA tasks	All
Deliver the Certification Report for EAC Review	Completion of VSTL Certification Report	Gail Audette
Re-issue the Certification Report with the EAC Certification Number	Acceptance of the Certification Report by the EAC	Gail Audette

6.4 *Test Operations Procedures*

Test cases and review criteria are contained in separate documents. They are provided to the iBeta test staff and Environmental Hardware Subcontractor with step-by-step procedures for each test case or review conducted. Test and review instructions identify the methods for test or review controls. Results are recorded for each test or review step. Possible results include:

- **Accept:** the expected result of the test case is observed; an element of the voting system meets the *VSS 2002*
- **Reject:** the expected result of the test case is not observed; an element of the voting system did not meet the *VSS 2002*
- **Not Applicable (NA):** test or review steps that are not applicable to the scope of the current Certification are marked NA.
- **Not Testable (NT)**: rejection of a previous test step prevents execution of this and subsequent test steps.

Reject, Not Applicable and Not Testable results are marked with an explanatory note. The note for rejected results contains the discrepancy number.

Issues identified in testing or reviews are logged on the Discrepancy Report. Issue types include:

- Document Defects: a documentation element of the voting system did not meet the *VSS 2002.* Resolution of the defect is required for certification.
- Functional Defects: a hardware or software element of the voting system did not meet the *VSS 2002.* Resolution of the defect is required for certification.
- Informational: an element of the voting system which meets the *VSS 2002* but may be significant to either the vendor or the jurisdiction. Resolution of Informational issues is optional. Unresolved issues are disclosed in the certification report.

Test steps are numbered and a tabulation of the test results is reported in the test case. Test operation personnel and their assignments are identified in Table 13.

7. Appendix- Test Methods

7.1 *System Level Test Cases*

The TDP documents utilized to create the following test methods are the most recent delivered as identified in Section 8.0. The receipt and review of all TDP documents after the submittal of this test plan for approval will be recorded in the Test Method and in a Test Plan update.

7.1.1 General Elections

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
Test Case Name	General 1 - FL	General 2 - MI	General 3 - WA	General 4 - PA
Scope - identifies the type of test	A general election system level test incorporating validations of the *VSS 2002* required functionality. Testing includes validation of measurable performance including accuracy, processing rate, and ballot format handling capability of the WinEDS voting system configured with : • Edge II polling place DRE with Verivote (VVPAT) • Optech Insight Plus precinct based paper ballot reader • Card Activator • HAAT80 • MPR used in conjunction with the Edge II and Insight Plus voting machines. Functional aspects include error recovery, security, and usability of the hardware, software and procedures (manuals) in the pre-vote, voting, and post-voting operations of a voting system, logging and the Reports Module.	Same as General 1 except configured with: • Edge II DRE (w/o VVPAT) • EDGE2*plus* Model 300 (w/ VVPAT) • HAAT50 and HAAT90 (w/o transmission) • Optech Insight Plus. Additional functions include: - Straight party ballot - Synthesized English Audio - Voting Accessibility switching input device - VVPAT w/o barcode - DRE functional accessibility (audio in the voting mode is included. - Paper ballots: approved and non-approved marking devices	Same as General 1 except configured for rotation with the following configuration(s): • EDGE2*plus* Model 300 (w/ VVPAT) • Optech Insight Additional functions include: - VVPAT w/o barcode - Manual Entry - Selection Code Generation - Backup & Restore - Results transmission (via phone line) HAAT90 to central count is included. - HAAT Listener	Same as General 1 except configured with the: • Edge II DRE with Verivote (VVPAT) and E-AVA, • EDGE2*plus* Model 300 & ABLE-D • Optech 400-C ballot tabulator running WinETP Additional functions include - using externally produced audio in mp3 format and modified by WinEDS) files for languages other than English - Straight party ballot (PA method) - Cross Party Endorsement (PA) - VVPAT w/ barcode - DRE functional accessibility (multi-lingual) in the voting mode - Results transmission (wireless) HAAT100 to central count is included. - HAAT Listener Non-English audio files are not produced by WinEDS. They are files that have to be produced externally and input into the election. This functionality is precisely the same for Primary elections thus tested only in this election.
Test Objective	Validation of the ability to accurately and securely create, install, vote, count and report the results of a general election on the Edge II DRE with Verivote and Optech Insight Plus including the identified voting variations.	Validation of the ability to accurately and securely create visual and audio ballots, install, vote, count and report the results of a general election on the Edge II DRE with Audio, EDGE2*plus* Model 300 DRE with Audio, Voting Accessibility switching	Validation of the ability to accurately and securely create, install, vote, count, report and transmit the results of a general election on the EDGE2*plus* Model 300 DRE and Optech Insight mark-sense ballot tabulator including the identified	Validation of the ability to accurately and securely create English and multilingual visual, and audio ballots, install, vote, count, report and transmit the results of a general election on the Edge II DRE with VeriVote, EDGE2*plus* Model 300 DRE with

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
		device and VVPAT, and Insight Plus including the identified voting variations.	voting variations.	VVPAT, Optech Insight & Optech 400-C ballot tabulator including the identified voting variations.
Test Variables: Voting Variations (as supported by the voting system)	General elections Partisan/non-partisan offices Write-in votes- (certified) Split precincts Vote for N of M Manuals testing: - WinEDS - Edge II - Verivote Printer - Card Activator - Insight Plus - MPR (ballot prep) - HAAT (80 & IMPR) Extended Services: - Election Reporting - Manual Data Entry - Selection Code Generation - Database Manager Terminology (Replace WinEDS terms w/ Jurisdiction Specific)	General elections Partisan/non-partisan offices Write-in votes (free-for-all) Vote for N of M Straight Party voting Audio (synthesized English) Manuals testing: - WinEDS (straight party & audio) - Edge Audio (E-AVA) - EDGE2plus - ABLE-D - HAAT (50, card activation) - HAAT (90, reports printing)	General elections Partisan/non-partisan offices Write-in votes Precinct Rotation Multiple & Split Precincts Vote for N of M Recall "C" (see below) Provisional voting (excluded from precinct totals) Manuals testing: - Insight - HAAT (90 with transmit) - HAAT Listener (with phone line connect)	General elections Straight Party (PA) Cross Party Endorsement (PA) Partisan/non-partisan offices Write-in votes Vote for N of M Multi-lingual ballots (Spanish, Chinese) Audio (externally produced .wav & .mp3 for languages other than English) Early voting and Election Day Manuals testing: - HAAT (100 with transmit) - HAAT Listener (with wireless connect) - Optech 400-C - WinETP
A description of the voting system type and the operational environment (See below for the HW, SW & FW configuration detail)	Testing of the Sequoia WinEDS voting system shall include: The WinEDS 4.0 SW ballot preparation & central count SW installed on a Windows XP Professional SP2 OS PC. Votes shall be cast on the: Edge II DRE running AVC Edge FW - Ballot & election results transfer (internal copy) memory (CF) - Ballot & election results transfer Memory Cartridge (ATA/PCMCIA) - Card Activator HW & Smartcards for ballot activation - Verivote Printer HW for software independent vote validation Optech Insight Plus precinct count optical scanner	Testing of the Sequoia WinEDS voting system shall include: WinEDS: Same as General 1 English votes (synthesized English speech audio, visual and paper ballots) shall be cast on the: Edge II DRE (Same as General 1) with Edge Audio Voting Accessory (E-AVA) EDGE2*plus* Model 300 DRE and Detachable Audio Voting Control (ABLE-D) ballot tool - Ballot & election results transfer Cartridge (USB) - COTS CF redundant Flash Memory - VVPAT for software independent vote validation - Smartcards for voting activation	Testing of the Sequoia WinEDS voting system shall include: WinEDS: Same as General 2 with HAAT Listener (SW) on Linux server (HW) for wired results receiving verification from HAAT90. Votes (English, & excluded provisional ballots) shall be cast on the: EDGE2*plus* Model 300 DRE (Same as General 2 except w/o the ABLE-D) Paper precinct and absentee ballots shall be tabulated on the: Optech Insight precinct count optical scanner - Ballot & election results transfer MemoryPack - MPR for transferring ballot data to MemoryPack	Testing of the Sequoia WinEDS voting system shall include: WinEDS: Same as General 1 with HAAT Listener (SW) on Linux server (HW) for wireless results receiving verification from HAAT100 WinETP central count software installed on the Optech 400-C central count tabulator English and multilingual votes (visual and paper ballots) shall be cast on the: Edge II DRE running AVC Edge 5.1 FW - Edge Audio Voting Accessory (E-AVA) with accessibility switching device - Ballot & election results transfer

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	- MPR HW for transferring data to the MemoryPack - MemoryPack for ballot & election results transfer HAAT80 HW for precinct report printing test and compare (with Seiko report) - IMPR HW for MemoryPack election results transfer to HAAT80	Optech Insight Plus Surface Mount HAAT90 for card activation and election results accumulation & printing	- IMPR for MemoryPack election results transfer to HAAT90 HAAT90 for Smartcard activation, election results accumulation, printing & wired transmission	(internal copy) memory (CF) - Ballot & election results transfer Memory Cartridge (ATA/PCMCIA) - Smartcards for ballot activation - Verivote Printer for software independent vote validation - Seiko printer for precinct report printing - HAAT100 & Smartcards for ballot activation and election results accumulation, report printing & transmission. EDGE2*plus* DRE C0.3 - ABLE-D (Audio with accessibility switching device) - Ballot & election results transfer Cartridge (USB) - Batch Processing of Results Cartridges - CF Flash Memory - VVPAT for vote validation - APS Printer for precinct report printing - HAAT100 & Smartcards for ballot activation and election results accumulation, report printing & wireless transmission. Paper ballots shall be tabulated on the: Optech 400-C central count optical tabulator WinETP - COTS Floppy diskette or other COTS media for file transfer to WinEDS
VSS 2002 vol. 1	2.2.1 thru 2.2.6, 2.2.8, 2.2.9, 2.3 thru 2.3.5, 2.4 thru 2.5.3.2	2.2.1 thru 2.2.6, 2.2.7.2. thru 2.2.10, 2.3 thru 2.5.3.2 HAVA a thru c2	2.2.1 thru 2.2.6, 2.2.8 thru 2.2.10, 2.3 thru 2.5.3.2	Same as General 2
VSS 2002 vol. 2	6.2 thru 6.4.1, 6.6, 6.7	6.2 thru 6.4.1, 6.5 thru 6.7	Same as General 1	Same as General 2
Hardware, Software voting system configuration and test location	**EMS: WinEDS** SW - WinEDS 4.0. OS - WinEDS Windows XP Pro SP2 (COTS) HW - COTS Windows PC Workstation - MemoryPack Receiver (MPR, Rev D)	**EMS: WinEDS :** Same as General 1 Manuals: Same as General 1 DRE: Edge II (Same as General 1) FW - AVC Edge 5.1 HW - Edge II (Same as General 1) with Edge Audio Voting Accessory (E-AVA) Rev A	**EMS: WinEDS** Same as General 1 SW - HAAT Listener 2.6.8 HW - Linux SUSE 10 server Manuals: Same as General 1 WinEDS/HAAT Listener™ Operator's Manual HW – RAS Server (COTS PC	**EMS: WinEDS:** Same as General 1 **& WinETP** (see Optech 400-C for HW & SW) Manuals: OPTECH 400-C Operators Manual v.1.08 DRE: Edge II

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	Manuals: WinEDS 4.0 System Operations Procedures WinEDS 4.0 Election Reporting Operators Manual WinEDS Election Data System Reference Guide Software Release 3.1 v6.05 WinEDS 4.0 SDK - AVC Edge MPR Maintenance Manual MPR Operators Manual MPR Security Specification **DRE: Edge II** FW - AVC Edge HW - Edge II Memory Cartridge (APX 2.16 FW) Smartcards Verivote printer (Rev C) COTS Seiko DPU-414 printer Card Activator Manuals: AVC Edge 5.1® Operators Manual AVC Edge 5.1® Poll Workers Manual AVC Edge 5.1® Security Specification v1.02 AVC Edge 5.1® System Overview v1.02 Card Activator 5.1® Poll Workers Card Activator 5.1® Operators & Maintenance Verivote Printer® Operators Manual Verivote Printer® Maintenance Manual Edge Aux Power Unit Poll Workers & Operators **Paper: Optech Insight Plus** FW- Optech Insight Plus (APX and HPX) MemoryPack Receiver (MPR) HW- Optech Insight Plus optical	Manuals: Same as General 1 for the Edge II w/o Card Activator manual Edge Audio Voting Access. Poll Workers & Operators **DRE: EDGE2*plus*** FW -Edge2plus HW -Edge2plus Model 300 CO.3 APS external printer UTG300 (VVPAT) Detachable Audio Voting Control (ABLE-D) USB Ballot & Results Cartridge (HW - K9K Series, FW - 700) Smartcards CF 128MB Flash Memory (COTS) Manuals: EDGE2plus Model 300 C0.3 Operators ABLE-D Operators Manual **Paper: Optech Insight Plus Surface Mount** A.01 FW- Optech Insight (APX and HPXA) HW- Optech Insight optical scanner MemoryPack (same as General 1) Manuals - Optech Insight Surface Mount Operators Manual **Other: HAAT** HAAT50 SW: HAAT OS: Windows CE (COTS) HW: HAAT Unit Model 50 A0.3 HAAT90 SW: HAAT OS: Windows CE (COTS) HW: HAAT Unit Model 90 A1.1 Insight Memory Pack Reader (IMPR, C1.1) Manuals - HAAT90 Operations and	running Windows Server 2003) **DRE: EDGE2*plus*** Same as General 2 except w/o the ABLE-D Manuals: Same as General 2 except w/o the ABLE-D **Paper: Optech Insight** FW- Optech Insight (APX and HPX) HW- Optech Insight optical scanner MemoryPack (same as General 1) Manuals - Optech Insight Operators Manual **Other: HAAT & IMPR** HAAT90 same as General 2 Insight Memory Pack Reader (IMPR, A1.0) Manuals - Same as General 2 WinEDS/HAAT Listener™ Operator's Manual WinEDS/HAAT Listener™ System Overview Test Location: iBeta, Aurora, CO (Lab 22)	Edge II Same as General 2 except with: E-AVA(Audio) Verivote Printer Edge AUX Power Unit Manuals: Same as General 3 **DRE: EDGE2*plus*** Same as General 3 except w/ ABLE-D (Audio) Manuals: Same as General 3 Paper: Optech Insight Same as General 3 except S-A HW Manuals: Same as General 3 **Paper: Optech 400-C** HW - Optech 400-C SW - WinETP OS - Windows XP Home (COTS) Manuals: Optech 400-C Operators Manual WinETP Reference Guide COTS report & log printers **Other: HAAT** HAAT100 SW - HAAT OS - Windows CE HW - HAAT Unit Model 100 A0.7 Manuals - Same as General 3 HAAT100 Operations and Maintenance HAAT100 System Overview HAAT100 Security Specification HAAT100 Operations and Maintenance Manual Test Location: iBeta, Aurora, CO (Lab 22)

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	scanner MemoryPack APX FW MemoryPack Receiver (MPR) Rev D Manuals - Optech Insight Plus Operators Optech Insight Plus Security Specification APX and HPX Optech Insight Plus Operators Manual APX and HPX Optech Insight Plus Maintenance Manual APX and HPX **Other: HAAT** SW - HAAT OS - HAAT (COTS Windows CE.NET 5.0) HW - HAAT Unit Model 80 (A.1.1) HW - Insight Memory Pack Reader (IMPR, A1.0) Manuals - HAAT Operations and Maintenance HAAT System Overview HAAT Security Specification HAAT Operations and Maintenance Manual Test Location: iBeta, Aurora, CO (Lab 22)	Maintenance HAAT90 System Overview HAAT90 Security Specification HAAT90 Operations and Maintenance Manual Test Location: iBeta, Aurora, CO (Lab 22)		
Pre-requisites and preparation for execution of the test case.	Complete the prerequisites; - Record the testers & date - System has been set up as identified in the user manual(s) - Gather any necessary materials or manuals. - Ensure customization of the test case template is complete - Use a Supervisory level access user and password for WinEDS	Same as General 1 - HAAT units 50 & 90 are fully charged	Same as General 1 - HAAT unit 90 is fully charged - Connect phone cable to the HAAT Unit 90 - POTS Telephone line	Same as General 1 - HAAT unit 100 is fully charged - Verizon Wireless Access account
Getting Started Checks	Check the voting system to : - Verify the test environment and system configuration is documented in the PCA Configuration and vendor described configuration. - Validate installation of a witnessed build Testers understand that no change	Same as General 1	Same as General 1	Same as General 1

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	shall occur to the test environment without documentation in the test record and the authorization of the project manager.			
Documentation of Test Data & Test Results	Test Data: - Record all programmed & observed election, ballot & vote data fields and field contents on the corresponding tabs to provide a method to repeat the test - Preserve all tabs for each instance the test is run. Test Results: - Enter Accept/Reject on the Test Steps - In Comments enter any deviations, discrepancies, or notable observations - Log discrepancies on the Discrepancy Report and insert the number in the Comments	Same as General 1	Same as General 1	Same as General 1
Pre-vote: Ballot Preparation procedures verifications	Ballot Prep: -An election database can be accurately/securely defined & formatted. -A ballot (candidates & propositions) can be accurately/securely defined & generated. -Election media can be accurately/securely programmed & installed -The user manual is sufficiently detailed for preparation of a General Election ballot -Precinct Splits Election Reporting Extended Services: -Manual Data Entry -Selection Code Generation -Database Manager	Ballot Prep: Same as General 1 - The user manual is sufficiently detailed for preparation of a General Election ballot - Straight Party ballots - Synthesized English audio ballots	Ballot Prep: Same as General 1 - The user manual is sufficiently detailed for preparation of a General Election ballot - Precinct rotation - Provisional (excluded) ballots HAAT90 preparation	Ballot Prep: Same as General 1 - The user manual is sufficiently detailed for preparation of a General Election ballot - English & Multilingual ballots with audio can be prepared - VVPAT w/barcodes - Straight party (PA) and Cross party endorsement (PA) HAAT100 preparation
Pre-vote: Ballot Preparation Security	Ballot Prep: -Security access controls limit or detect access to critical systems and the loss of system integrity,	Same as General 1	Same as General 1	Pre-Vote Security during ballot definition installation: - Security access controls limit or detect access to critical systems and

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	availability, confidentiality & accountability -Functions are only executable in the intended manner, order & under intended conditions -Prevents execution of functions if preconditions weren't met -Implemented restrictions on controlled functions - Documentation of mandatory administrative procedures. COTS -Authentication is configured on the local terminal & external connection devices, -Operating systems are enabled for all session & connection openings, & closings, all process executions & terminations & for the alteration or detection of any memory or file object -Configure the system to only execute intended & needed processes during the execution election software. Processes are halted in the event of termination of critical system processes (such as audit).			the loss of system integrity, availability, confidentiality and accountability are recorded in the audit logs. - Functions are only executable in the intended manner, order and under the intended conditions - Prevented execution of functions if preconditions were not met - Implemented restrictions on controlled functions - Provided documentation of mandatory administrative procedures. - Valid Cartridges are only accepted by the system. - Audit logs reflect all events. - Election data has to be installed before ballots can be read. - Polls can only be open after preconditions are met. - Access to the WinETP workstation below requires the proper username and password - 400-C Audit logs reflect access and power cycle of machine. - Interruption of power during preparation of system requires system to be prepared again. - Voter card can only be activated after HAAT is prepared. - HAAT audit logs reflect all access attempts. - Authentication is configured on the local terminal and external connection devices, - Operating systems are enabled for all session and connection openings, and closings, all process executions and terminations and for the alteration or detection of any memory or file object - Configure the system to only execute the intended and necessary processes during the execution of the election software. Election software processes are halted until the

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
				termination of any critical system process, such as system audit.
Readiness Testing and Poll Verification	Voting system is ready for the election: - Status & data reports are generated - The election is correctly installed - The voting system functions correctly - Test data is segregated from voting data, with no residual effect The polling place voting system functions properly including a formal record of: - Election, polling place, voting system & ballot format identification - Zero count report - A list of all ballot fields - Other information to confirm readiness & accommodate administrative reporting requirements Test confirmation that there are: - No hardware/software failures - The device is ready to be activated to accept votes	Same as General 1 - Confirmation testing of audio ballot availability - Confirmation testing of Voting Accessibility switching input device	Same as General 1 - Verify Transmit totals and reports via HAAT Unit 90 from precinct to the central count PC running HAAT Listener, RAS, and WinEDS	Same as General 1 - Confirmation testing of multi-lingual ballot availability for display and audio - Confirmation testing of Voting Accessibility switching input device for multi-lingual - Verify Transmit totals and reports via HAAT Unit 100 from precinct to the central count PC running HAAT Listener and WinEDS
Pre- vote: Opening the Polls Verification	Precinct Count: - The system is disabled until the internal test is successfully completed. Paper based: - Means to verify ballot marking devices are properly prepared & ready for use - Activating & verifying the ballot counting device is correctly activated & functioning - Identification of any failures & corrective action - Test acceptability of approved (felt tip Sequoia Voting System #960-28096-00) markers DRE - Security seal, password, or data code recognition capability preventing inadvertent or unauthorized poll opening - Means to enforce the proper	Same as General 1	Same as General 1	Paper Based: See Post Vote: Central Count DRE Same as General 1

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	sequence of steps to open the polls - Means to verify correct activation - Identification of any failures & corrective action			
Voting: Ballot Activation and Casting Verifications	Protects secrecy of ballot/vote - Records selection/non-selection for each contest Paper-based - Allow voter to identify & mark candidates - Mark ballots with approved felt tips, #2 pencil, soft lead pencil, and Sequoia Voting System #960-28096-00 - Allow placement of voted ballots into a precinct ballot counter or secure receptacle - Gives feedback & an opportunity to correct, before the ballot is counted (under/overvotes) DRE - Voter can make selections based on ballot programming & indicate selection, cancellation, & non-selection (undervotes) - Alert overvotes; permit review & change before casting - Alert selection's complete; prompt confirmation as casting is irrevocable, - Alert successful/unsuccessful storage of cast ballot; give instruction to resolve unsuccessful casting - Prevent modification of vote & access until the polls close - Increment the ballot counter Fleeing voters (cast, canceled) - with selection(s) made - blank ballot	Same as General 1 - Straight party: Make one selection to vote for all candidates of one party in a general election Cast a votes using accessory device using English synthesized audio	Same as General 1 - Ballots rotation is correctly displayed for each precinct and precinct split	Same as General 2 - Multi-lingual .wav & .mp3 audio ballot using accessibility switching device vote input - When the voter selects a Yes or No response to the recall proposal, that voter will be allowed to cast a vote for a candidate in the recall linked office. An undervote will not allow a vote in the second contest to be counted. An overvote will not allow a vote in the second contest to be counted. - Cross endorsed candidates in an N of M contest can only receive a single vote
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	The system audit provides a time stamped always available, report of normal/abnormal events that can't be turned off when the system is in operating mode. Status message are part of the real time audit record. - Critical status messages requiring	Same as General 1 except - Errors requiring intervention by the voter or poll worker are clearly audible issues & action instructions in easily understood audible English or with visual/audible indicators	Same as General 1	Same as General 1 - Errors requiring intervention by the voter or poll worker are clearly multi-lingual audible issues & multi-lingual action instructions in easily understood audible or with visual/audible indicators

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	operator intervention shall use clear indicators or text Error messages are: - Are generated, stored & reported as they occur - Errors requiring intervention by the voter or poll worker clearly display issues & action instructions in easily understood text language or with indicators including ballot jams due to multiple feeds - The text for any numeric codes is contained in the error or affixed to the inside of the voting system - Incorrect responses will not lead to irreversible errors. - Nested conditions are corrected in the sequence to restore the system to the state before the error occurred			
Post-vote: Closing the Polls	Once the polls are closed the precinct count voting system - prevents further casting of ballots with polls closed - internally tests and verifies that the closing procedures has been followed and the device status is normal - visibly displays the status - produces a test record that verifies the sequence of events and indicates the extraction of vote data is activated	Same as General 1 Early Voting (set up as a tally type)	Same as General 1	Same as General 1
Post-vote: Central Count	Vote Consolidation: Consolidated reported votes match predicted votes from polling places, & optionally other sources (absentee) Reports include: - Geographic reports of votes; each contest by precinct & other jurisdictional levels - Printed reports of ballots counted by tabulator, with votes, undervotes & overvotes - Report of system audit information printed or in electronic memory - Report identifying overvotes - Prevent data from being altered or	Paper Based: - Paper: Test acceptability of approved (felt tips, #2 pencil, soft lead pencil, and Sequoia Voting System #960-28096-00) and non-approved writing devices (red, green, black and blue inks which are highly reflective or transparent to colors) The central count voting system includes: - Same as General 3 Vote Consolidation: - Same as General 1 DRE - Same as General 1	Same as General 1 Wired results transmission The central count voting system includes: - Election identification - Zero count report - Information to confirm readiness & accommodate administrative reporting requirements Vote Consolidation: - Same as General 1 - Accurately process provisional (excluded) ballots (add into central count) DRE	Same as General 1 Wireless results transmission Paper Based: - 400-C ballot processing: Damaged ballots Blank ballots Write-in ballots Overvoted ballots Undervoted ballots Outstacking of ballots (main, center, rear bins)

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	destroyed by report generation, transmission over telecommunication lines or extraction from portable media - Permit extraction & consolidate votes from programmable memory services or data storage medium - Consolidate the votes from multiple voting systems into a single polling place report DRE: -Electronic ballot images of votes cast by each voter, extracted from a separate process & storage location, is reported in human readable form Paper Based: - Test acceptability of approved (felt tips, #2 pencil, soft lead pencil, and Sequoia Voting System #960-28096-00) and on the 400-C, a variety of writing devices (red, green, black and blue inks which are highly reflective or transparent to colors)		- Same as General 1	
Post-vote: Security	The central count: - Security access controls limit or detect access to critical systems and the loss of system integrity, availability, confidentiality and accountability -Audit logs reflect all events even the events of where non authorized user of a function trying to gain access to a specific function of the system - Non registered voting machine results cannot be read by WinEDS - Functions are only executable in the intended manner, order and under the intended conditions - Prevented execution of functions if preconditions were not met - Implemented restrictions on controlled functions - Provided documentation of mandatory administrative procedures. - Operation of vote tally continues when power gets restored, all	The central count: - Security access controls limit or detect access to critical systems and the loss of system integrity, availability, confidentiality and accountability - Functions are only executable in the intended manner, order and under the intended conditions - Prevented execution of functions if preconditions were not met - Implemented restrictions on controlled functions - Provided documentation of mandatory administrative procedures. - No official voting after the polls close - DRE shall maintain redundant ballot images of votes being cast. - Polls cannot be reopened once it has been closed. - Memory Cartridge can only be consolidated once	The central count: Same as General 2 COTS systems Same as General 2 See Security and Telephony & Cryptography Test Cases	The central count: Same as General 2 COTS systems Same as General 2 See Security and Telephony & Cryptography Test Cases

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	unsaved data will be required to be re-added. - System can not be re initialized after polls have been closed. - Edge2 system reset does not erase the results cartridge. - Only valid memory cartridges are accepted during vote tallying. - Login into Election Reporting needs correct username/password and correct profile/report name. COTS systems -Authentication is configured on the local terminal and external connection devices, -Operating systems are enabled for all session and connection openings, and closings, all process executions and terminations and for the alteration or detection of any memory or file object - Configure the system to only execute the intended and necessary processes during the execution of the election software. Election software processes are halted in the event of termination of any critical system process, such as system audit.	- Error messages are displayed when trying to consolidate incorrect number of cartridges on the HAAT. - Memory cartridges need to be closed prior to being consolidated. - Interruption of power during consolidation requires consolidation of previous memory devices. - Audit logs reflect all activities during post vote COTS systems -Authentication is configured on the local terminal and external connection devices, -Operating systems are enabled for all session and connection openings, and closings, all process executions and terminations and for the alteration or detection of any memory or file object - Configure the system to only execute the intended and necessary processes during the execution of the election software. Election software processes are halted until the termination of any critical system process, such as system audit.		
Post-vote: System Audit	The system audit provides a central count, time stamped, always available, report of normal and abnormal events that cannot be turned off when the system is in operating mode. Status message are part of the real time audit record.	Same as General 1 also applied to HAAT	Same as General 1 also applied to HAAT	Same as General 1 also applied to HAAT DRE: barcodes printed on Verivote & VVPAT.
Expected Results are observed	Review the test result against the expected result: • Accept: the expected result is observed • Reject: the expected result of the test case is not observed • Not Testable (NT): rejection of a previous test step prevents execution of this step, or tested in another TC. • Not Applicable (NA): not applicable	Same as General 1	Same as General 1	Same as General 1

Method Detail	General Election 1 Test Method	General Election 2 Test Method	General Election 3 Test Method	General Election 4 Test Method
	to test scope			
Record observations and all input/outputs for each election;	All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. - Any failure against the requirements of the EAC guidelines will mean the failure of the system, and shall be reported as such. - Failures will be reported to the vendor as Defect Issues in the Discrepancy Report. - The vendor shall have the opportunity to cure all discrepancies prior to issuance of the Certification Report. - If cures are submitted the applicable test will be rerun. Complete information about the rerun test will be preserved in the test case. The cure and results of the retest will be noted in the - Discrepancy Report and submitted as an appendix of the Certification Report. - Operations which do not fail the requirements but could be deemed defects or inconsistent with standard software practices or election practices will be logged as Informational Issues on the Discrepancy Report. It is the vendor's option to address these issues. Open items will be identified in the report.	Same as General 1	Same as General 1	Same as General 1 DRE: Barcodes on VVPAT

7.1.2 Primary System Level Test Cases 1 through 5

An installed WinEDS database is state specific.

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
Test Case Name	Primary 1 - CO	Primary 2 - WI	Primary 3 - AZ	Primary 4 - CA	Primary 5 - WA

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
Scope - identifies the type of test	A "Closed Primary Election" system level test incorporating validations of the VSS 2002 required functionality. Testing will include validations of measurable performance including accuracy, processing rate, and ballot format handling capability of: WinEDS voting system configured for Election Day voting • AVC Edge II DRE (w/VVPAT), EDGE2*plus* model 300 DRE(w/ VVPAT • Optech Insight Plus Functional aspects include error recovery, security, and usability of the hardware, software and procedures in the pre-vote, voting, and post-voting operations of a voting system.	Same as Primary 1 except for a "Selective Primary Election" configured with the: • AVC Edge II DRE with Verivote (VVPAT • EDGE2*plus* Model 300 DRE (w/ VVPAT w/o barcode) • Optech Insight Plus DRE functional accessibility (English and multilingual) in the voting mode using audio Converted to PCM files Non-English audio files are not produced by WinEDS. They are produced externally and input into the election. This functionality is the same for both Primary and General elections (tested in General 4) MP3 convert to PCM	Same as Primary 1 except for an "Open Public Selection Primary Election" (set up in the same manner as a "Closed Primary:; configured with the: • AVC Edge II DRE • EDGE2*plus* Model 300 DRE (w/ VVPAT w/ barcode) • Optech Insight Plus optical scanner DRE's configured for early and Election Day voting • Challenged ballots • Arizona Rotation	Same as Primary 1 "Closed Primary" configured with the: • AVC Edge II DRE • EDGE2*plus* Model 300 • Optech Insight optical scanner - RCV (Ranked Choice Voting)	Same as Primary 1 except for a "Washington Pick-A-Party" primary configured with the: • Optech Insight Surface Mount Optech 400-C.
Test Objective	Validation of the ability to accurately and securely create, install, vote, count and report the results of a Closed Primary Election with Split Precincts on the AVC Edge II, EDGE2*plus* and Optech Insight Plus including the identified voting variations.	Validation of the ability to accurately and securely create English and multilingual visual ballots. Install, count and report the results of a Selective Primary Election utilizing the AVC Edge II, EDGE2*plus* and Optech Insight Plus.	Validation of the ability to accurately and securely create, install, count, audit and report the results of an Open Public Selection Primary election with Arizona Rotation and Challenged ballots utilizing the AVC Edge II, EDGE2*plus*, and Optech Insight Plus.	Validation of the ability to accurately and securely create, install, count, audit and report the results of an Closed Primary election with RCV (Rank Choice Voting), utilizing the AVC Edge II, EDGE2*plus,* and Optech Insight.	Validation of the ability to accurately and securely create, install, count, audit and report the results of an Open Primary election with Washington Pick-A-Party utilizing the Optech Insight Surface Mount and Optech 400-C.
Test Variables: Voting Variations (as supported by the voting system)	Closed Primary (same function as an Open Public Selection) Partisan/non-partisan offices Certified Write-in Primary Presidential Delegation Nominations Split precincts Vote for N of M Colorado Provisional	WI Selective Primary (Open Primary w/ private selection in the voting booth) Selection is the same as Pick-a-party - private. Multi-lingual Partisan/non-partisan offices Write-in	Open Public Selection Primary (same function as a Closed) AZ Rotation Challenged ballots (ballots are included in poll report) Single Precinct Partisan/non-partisan offices Write-in votes	Closed Primary RCV (Ranked Choice Voting) Manuals Testing: WinEDS Extended Services (RCV)	Open Primary Washington Pick-A-Party Partisan/non-partisan offices Write-in votes Vote for N of M

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
	VVPAT w/o barcodes Manuals Testing WinEDS (primary functionality)	Vote for N of M VVPAT w/o barcodes	Vote for N of M Early Voting VVPAT w/ barcode		
A description of the voting system type and the operational environment	Testing of the Sequoia WinEDS voting system shall include: The WinEDS 4.0 ballot preparation & central count SW installed on a Windows XP O/S PC with an Insight Memory Pack Reader (MPR) HAAT50 (A1.1) - Voter/Smart Cards for ballot activation HAAT80 (A1.1) - IMPR (C1.1) for consolidating vote total from Insight MemoryPack. - Printer functions for reports Votes shall be cast on the: Edge II DRE running AVC Edge - Ballot & election results transferred via Memory Cartridge - Seiko DPU-414 Printer - Verivote Printer for software independent vote validation - Edge Aux Power Unit EDGE2*plus* DRE C0.4 - Ballot & election results transfer USB Memory Cartridge (K9K series - 700) - APS External Printer (UTG300) for software independent vote validation Paper ballots shall be tabulated on the: Optech Insight Plus A.01 precinct count optical scanner Insight APX and HPXA FW - MPR HW for transferring data to the MemoryPack	Testing of the Sequoia WinEDS voting system shall include: The WinEDS 4.0 ballot preparation & central count SW installed on a Windows XP O/S PC with an Insight Memory Pack Reader (MPR) HAAT80 (A1.1) - IMPR (C1.1) for consolidating vote total from Insight MemoryPack - Voter/Smart Cards for ballot activation (EDGE2*plus*) - Printer functions for reports Votes (visual, English and multilingual) shall be cast on the: Edge II DRE running AVC Edge - Ballot & election results transfer Memory Cartridge - Voter/Smart Cards for ballot loading - Seiko DPU-414 Printer - Verivote Printer for software independent vote validation - Edge Aux Power Unit - Card Activator - EDGE2*plus* DRE C0.3 - APS External Printer (UTG300) for software independent vote validation - Ballot & election results transfer USB Memory Cartridge (K9K series - 700) Paper ballots shall be tabulated on the:	Testing of the Sequoia WinEDS voting system shall include: The WinEDS 4.0 ballot preparation & central count SW installed on a Windows XP O/S PC with an Insight Memory Pack Reader (MPR) HAAT80 (A1.1) - IMPR (C1.1) for consolidating vote total from Insight MemoryPack - Voter/Smart Cards for ballot activation - Printer functions for reports Votes shall be cast on the: Edge II DRE with AVC Edge FW - Ballot & election results transfer Memory Cartridge - Seiko DPU-414 Printer - Verivote Printer for software independent vote validation - Edge Aux Power Unit EDGE2*plus* DRE C0.4 FW - APS External Printer (UTG300) for software independent vote validation - Ballot & election results transfer USB Memory Cartridge (K9K series - 700) Paper ballots shall be tabulated on the: Optech Insight Plus Surface Mount A.01 precinct count optical scanner Insight APX and HPXA FW - MPR HW for transferring	Testing of the Sequoia WinEDS voting system shall include: The WinEDS 4.0 ballot preparation & central count SW installed on a Windows XP O/S PC with an Edge II and a HAAT 80. HAAT80 (A1.1) - IMPR (A1.0) for consolidating vote total from Insight MemoryPack. - Voter/Smart Cards for ballot activation - Printer functions for reports Votes shall be cast on the: Edge II DRE with AVC Edge FW - Ballot & election results transfer Memory Cartridge - Seiko DPU-414 Printer - Verivote Printer for software independent vote validation - Edge Aux Power Unit EDGE2*plus* DRE C0.3 FW - APS External Printer (UTG300) for software independent vote validation - Ballot & election results transfer USB Memory Cartridge (K9K series - 700) Paper ballots shall be tabulated on the: Optech Insight (G04) precinct count optical scanner Insight APX K2.16 - HPX 1.44 FW - MPR HW for transferring data to the MemoryPack	Testing of the Sequoia WinEDS voting system shall include: The WinEDS 4.0 ballot preparation & central count SW installed on a Windows XP O/S PC with an Insight MemoryPack Receiver (HW) Paper ballots shall be tabulated on the: Optech Insight Surface Mount (A.01) precinct count optical scanner Insight APX and HPXA FW - MPR (Rev D) HW for transferring data to the MemoryPack - MemoryPack HW (no FW) for ballot & election results transfer Optech 400-C central count optical tabulator WinETP SW - COTS external media for file transfer to WinEDS - COTS printer for reports - COTS printer for logs

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
	- MemoryPack HW (No FW) for ballot & election results transfer	Optech Insight Plus (A02) precinct count optical scanner Insight APX and HPX FW - MPR HW for transferring data to the MemoryPack - MemoryPack HW (APX FW) for ballot & election results transfer	data to the MemoryPack - MemoryPack HW (no FW) for ballot & election results transfer	- MemoryPack HW (APX FW) for ballot & election results transfer Optech 400-C central count optical tabulator WinETP SW - COTS external media for file transfer to WinEDS - COTS printer for reports - COTS printer for logs	
VSS 2002 vol. 1	2.1 thru 2.4	Same as Primary 1	Same as Primary 1	Same as Primary 1	Same as Primary 1
VSS 2002 vol. 2	6.2 thru 6.4.1, 6.6 & 6.7	Same as Primary 1 plus 6.5	Same as Primary 1	Same as Primary 1	Same as Primary 1
Hardware, Software voting system configuration and test location	**EMS: WinEDS** HW & SW - Same as General 1 Manuals - Same as General 1 **DRE: Edge II** HW & SW - Same as General 2 Manuals - Same as General 2 **DRE: EDGE2*plus*** HW -Edge2plus Model 300 CO.4 APS external printer UTG300 (VVPAT) Detachable Audio Voting Control (ABLE-D) USB Ballot & Results Cartridge (HW - K9K Series, FW - 700) Smartcards CF 128MB Flash Memory (COTS) SW - Same as General 2 Manuals - Same as General 2 **Paper: Optech Insight Plus** HW & SW - Same as General 2 Manuals - Same as General 2 **Other: HAAT80** HW & SW - Same as General 1 Manuals - Same as General 1 **HAAT50 (A1.1)**	**EMS: WinEDS** HW & SW - Same as General 1 Manuals - Same as General 1 **DRE: Edge II** HW & SW - Same as General 4 w/o the VVPAT barcode Manuals - Same as General 4 **DRE: EDGE2*plus*** HW & SW - Same as General 2 Manuals - Same as General 2 **Paper: Optech Insight Plus** HW & SW - Same as General 1 Manuals - Same as General 1 **Other: HAAT80** HW & SW - Same as General 1 Manuals - Same as General 1 Test Location: iBeta, Aurora, CO -	**EMS: WinEDS** HW & SW - Same as General 1 Manuals - Same as General 1 **DRE: Edge II** HW & SW - Same as General 1 w/ a VVPAT barcode & Edge AUX Power Unit Manuals - Same as General 1 **DRE: EDGE2*plus*** HW & SW - Same as Primary 1 Manuals - Same as General 4 **Paper: Optech Insight Plus Surface Mount** HW & SW - Same as General 2 Manuals - Same as General 2 **Other: HAAT80** HW & SW - Same as General 1 Manuals - Same as General 1 Test Location: iBeta, Aurora, CO	**EMS: WinEDS** HW & SW - Same as General 1 Manuals - Same as General 1 **DRE: Edge II** HW & SW - Same as General 1 Manuals - Same as General 1 **DRE: EDGE2*plus*** HW & SW - Same as General 2 Manuals - Same as General 2 **Paper: Optech Insight** HW & SW - Same as General 3 Manuals - Same as General 3 **Paper: Optech 400-C** w/WinETP HW & SW - Same as General 4 Manuals - Same as General 4 **Other: HAAT80** HW & SW - Same as General 1 Manuals - Same as General	**EMS: WinEDS** HW & SW - Same as General 1 Manuals - Same as General 1 **ETP: WinETP** Manuals - WinETP Reference Guide **Paper: Optech Insight Surface Mount** HW & SW - Same as General 2 Manuals - Same as General 2 **Paper: Optech 400-C** w/WinETP HW & SW - Same as General 4 Manuals - Same as General 4 **Other: MPR** HW - MemoryPack Receiver (Rev D) Manuals - MPR Operators Manual Test Location: iBeta, Aurora, CO -

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
	HW & SW - Same as General 2 except with HAAT50 (A1.1) Manuals - Same as General 2 Test Location: iBeta, Aurora, CO			1 Test Location: iBeta, Aurora, CO	
Pre-requisites and preparation for execution of the test case.	Prior to execution of testing the following prerequisites must be completed; - Record the testers & date - System set up as identified in the user manual - Perform and Install witness/'trusted build of EMS software and firmware for Sequoia Voting Systems - Gather any necessary materials or Technical Reference Manuals. - Ensure customization of the test case template is complete - Use a Supervisory level access user and password for WinEDS - HAAT unit 50 is fully charged - HAAT unit 80 is fully charged	Same as Primary 1 without the HAAT50	Same as Primary 1 without the HAAT50	Same as Primary 1 without the HAAT50	Same as Primary 1 without the HAAT50 and HAAT80
Getting Started Checks	Before initiating testing: - Verify the test environment and system configuration is documented in the PCA Configuration and vendor described configuration. - Validate installation of a witnessed/ trusted build - Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager.	Same as Primary 1	Same as Primary 1 except with the HAAT90	Same as Primary 1 except with the HAAT100	Same as Primary 1 without the HAAT50 and HAAT80
Documentation of Test Data & Test Results	Test Data: - Record all programmed & observed election, ballot & vote data fields and field contents on the corresponding tabs to provide a method to repeat the test - Preserve all tabs for each	Same as Primary 1	Same as Primary 1	Same as Primary 1	Same as Primary 1

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
	instance the test is run. Test Results: - Enter Accept/Reject on the Test Steps - In Comments enter any deviations, discrepancies, or notable observations - Log discrepancies on the Discrepancy Report and insert the number in the Comments				
Pre-vote: Ballot Preparation procedures verifications	Ballot Prep: -A Closed Primary election database can be accurately/securely defined & formatted. -Multiple partisan ballots and a separate non-partisan ballot (candidates & propositions) can be accurately/securely defined & generated. -Election media can be accurately/securely programmed & installed. Checks -Optech Ballot styles can be defined, generated and reviewed for the Insight Plus	Same as Primary 1, except a Selective Primary (an "Open Primary" with private selection)	Same as Primary 1 ("Open Public Selection Primary Election" is set up in the same manner as a "Closed Primary")	Same as Primary 1 setup with Ranked Choice Voting (RCV)	Same as Primary 1, except as an "Open Primary" with Washington Pick-A-Party
Pre-vote: Ballot Preparation Security	Ballot Prep: See Security Test for detail During execution confirm: -Security access controls limit or detect access to critical systems and the loss of system integrity, availability, confidentiality & accountability -Functions are only executable in the intended manner, order & under intended conditions -Prevents execution of functions if preconditions weren't met -Implemented restrictions on controlled functions - Documentation of mandatory administrative procedures. COTS	Same as Primary 1	Same as Primary 1	Same as Primary 1	Same as Primary 1

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
	-Authentication is configured on the local terminal & external connection devices, -Operating systems are enabled for all session & connection openings, & closings, all process executions & terminations & for the alteration or detection of any memory or file object -Configure the system to only execute intended & needed processes during the execution election software. Processes are halted until termination of critical system processes (such as audit).				
Readiness Testing and Poll Verification	CO Primary Election Prior to installation of the ballot perform maintenance diagnostic checks: - DRE: LCD calibration; printer test; event log report - Optical scanner: Install the ballot and perform the Pre-election Logic and Accuracy Test - Run the LAT election, verifying correct election information - Test data is segregated from simulation voting data, with no residual effect - The polling place voting system functions properly including a formal record of: - Election, polling place, voting system & ballot format identification - Zero count report which contains the list of all ballot fields (specifically list candidates and offices - all fields part of the ballot) - Other information to confirm readiness & accommodate administrative reporting	Same as Primary 1 with no provisional but with WI Selective Primary (Pick-a-Party) and Multi-lingual visual ballot vote.	Same as Primary 1 with no provisional Except with AZ rotation and Early voting (as a Tally Type)	Same as Primary 1 with no provisional CA Closed Primary - RCV	WA Pick-A-Party Primary Election Prior to installation of the ballot perform maintenance diagnostic checks: - Optical scanner: Install the ballot and perform the Pre-election Logic and Accuracy Test - Run the LAT election, verifying correct election information and visual simulation ballots can be voted and reported - Test data is segregated from simulation voting data, with no residual effect - The polling place voting system functions properly including a formal record of: - Election, polling place, voting system & ballot format identification - Zero count report - A list of all ballot fields - Other information to confirm readiness & accommodate administrative reporting

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
	requirements Test confirmation that there are no hardware/software failures & the device is ready to be activated to accept votes				requirements Test confirmation that there are no hardware/software failures & the device is ready to be activated to accept votes
Pre- vote: Opening the Polls Verification	Precinct Count: - The system is disabled until the internal test is successfully completed. Paper based: - Means to verify ballot marking devices are properly prepared & ready for use - Activating & verifying the ballot counting device is correctly activated & functioning - Identification of any failures & corrective action DRE - Security seal, password, or data code recognition capability preventing inadvertent or unauthorized poll opening - Means to enforce the proper sequence of steps to open the polls - Means to verify correct activation - Identification of any failures & corrective action	Same as Primary 1	Precinct Count: - The system is disabled until the internal test is successfully completed. Paper based: - Means to verify ballot marking devices are properly prepared & ready for use - Activating & verifying the ballot counting device is correctly activated & functioning - Identification of any failures & corrective action DRE - Means to verify correct activation - Identification of any failures & corrective action	Same as Primary 3	Precinct Count: Same as Primary 3, except no DRE
Voting: Ballot Activation and Casting Verifications	Check the voting system to : Protects secrecy of ballot/vote - Records selection/non-selection for each contest Paper-based - Allow voter to identify & mark candidates - Allow placement of voted ballots into a precinct ballot counter or secure receptacle - Gives feedback & an opportunity to correct, before the ballot is counted (under/overvotes/error/blank) DRE	Same as Primary 1 with multi-lingual visual ballot voting	Same as Primary 1 with Early voting as a tally type	Same as Primary 1	Same as Primary 1 for paper only

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
	- Voter can make selections based on ballot programming & indicate selection, cancellation, & non-selection (undervotes) - Not allow overvotes - Alert undervotes; permit review & change before casting - Alert selection's complete; prompt confirmation as casting is irrevocable, - Alert successful/unsuccessful storage of cast ballot; give instruction to resolve unsuccessful casting - Prevent access of vote reporting until the polls close - Increment the ballot counter				
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	The system audit provides a time stamped always available, report of normal/abnormal events that can't be turned off when the system is in operating mode. Status message are part of the real time audit record. - Critical status messages requiring operator intervention shall use clear indicators or text Error messages are: - Are generated, stored & reported as they occur - Errors requiring intervention by the voter or poll worker clearly display issues & action instructions in easily understood text language or with indicators - The text for any numeric codes is contained in the error or affixed to the inside of the voting system - Incorrect responses will not lead to irreversible errors. - Nested conditions are corrected in the sequence to restore the system to the state before the error occurred	Same as Primary 1	Same as Primary 1 with logging of early voting session as a tally type	Same as Primary 1	Same as Primary 1
Post-vote:	Once the polls are closed the	Same as Primary 1	Same as Primary 1 with Early	Same as Primary 1	Same as Primary 1

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
Closing the Polls	voting system - prevents further casting of ballots or reopening of the polls - internally tests and verifies that the closing procedures has been followed and the device status is normal - visibly displays the status - produces a test record that verifies the sequence of events and indicates the extraction of vote data is activated		voting poll closing		
Post-vote: Central Count	Paper Based: The central count voting system includes: - Election identification - Zero count report - Information to confirm readiness & accommodate administrative reporting requirements Vote Consolidation: Consolidated reported votes match predicted votes from polling places, & optionally other sources (absentee, provisional, etc) Reports include: - Geographic reports of votes; each contest by precinct & other jurisdictional levels - Printed reports of ballots counted by tabulator, with votes, undervotes & overvotes - Report of system audit information printed or in electronic memory - Report identifying the combination of candidates receiving overvotes - Prevent data from being altered or destroyed by report generation, transmission over telecommunication lines or extraction from portable media - Permit extraction & consolidate votes from programmable	Same as Primary 1 except no Provisional ballots	Same as Primary 1 except no Provisional ballots - Correctly process challenged ballots (included in central counts) - Correctly process and report early and Election Day voting	Same as Primary 1 except no Provisional ballots - Correctly process Ranked Choice Voting	Same as Primary 1 for paper only and no Provisional ballots

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
	memory device or data storage medium - Consolidate the votes from multiple voting systems into a single polling place report DRE -Electronic ballot images of votes cast by each voter, extracted from a separate process & storage location, is reported in a human readable form Correctly process challenged ballots (excluded in central counts)				
Post-vote: Security	The central count: See Security Test for detail During execution confirm: - Security access controls limit or detect access to critical systems & the loss of system integrity, availability, confidentiality and accountability - Functions are only executable in the intended manner, order & under the intended conditions - Prevented execution of functions if preconditions were not met - Implemented restrictions on controlled functions - Provided documentation of mandatory administrative procedures. COTS systems -Authentication is configured on the local terminal and external connection devices, -Operating systems are enabled for all session and connection openings, and closings, all process executions and terminations and for the alteration or detection of any memory or file object - Configure the system to only	Same as Primary 1 as needed for system components not previously tested. No identification of multilingual or assisted voter	Same as Primary 1 as needed for system components not previously tested	Same as Primary 1 as needed for system components not previously tested	Same as Primary 1 as needed for system components not previously tested.

Method Detail	Primary Election 1 Test Method	Primary Election 2 Test Method	Primary Election 3 Test Method	Primary Election 4 Test Method	Primary Election 5 Test Method
	execute the intended and necessary processes during the execution of the election software. Election software processes are halted until the termination of any critical system process, such as system audit.				
Post-vote: System Audit	The system audit provides a central count time stamped always available, report of normal and abnormal events that cannot be turned off when the system is in operating mode. Status message are part of the real time audit record.	Same as Primary 1	Same as Primary 1	Same as Primary 1	Same as Primary 1
Expected Results are observed	Same as General 1	Same as General 1	Same as General 1	Same as General 1	Expected Results are observed
Record observations and all input/outputs for each election;	Same as General 1	Same as General 1	Same as General 1	Same as General 1	Record observations and all input/outputs for each election;

7.2 *Environmental Test Method*

Method Detail	Environmental Test Method
Test Case Name	Environmental Test
Scope - identifies the type of test	Execution and provision of test results identified in the *VSS 2002* hardware operating and non-operating environmental tests. This set of hardware environmental test cases is outside the scope of iBeta's VSTL accreditation. It is performed by: Wyle Laboratories Criterion Laboratories iBeta coordinates and oversees subcontractor testing. iBeta shall review the test records, results and reports to confirm testing was performed under an appropriate mode as a voting system and to determine acceptance or rejection of some or all testing.
Test Objective	Validation of the polling place hardware to meet the Non-Operating/Operating Environmental test standards of the EAC VSS/VVSG.
Test Variables	Tests shall be conducted incompliance with the identified standard: Power disturbance disruption - IEC 61000-4-11 (1994-06). Electromagnetic radiation- FCC Part 15 Class B requirements - ANSI C63.4. Electrostatic disruption - IEC 61000-4-2 (1995-01). Electromagnetic susceptibility - IEC 61000-4-3 (1996). Electrical fast transient protection - IEC 61000-4-4 (1995-01). Lightning surge protection - IEC 61000-4-5 (1995-02). RF immunity - IEC 61000-4-6 (1996-04).

Method Detail	Environmental Test Method
	AC magnetic fields RF immunity - IEC 61000-4-8 (1993-06). MIL-STD810-D: High temperature method 501.2 Procedures I-Storage maximum 140 F degrees Low temperature - method 502.2, Procedure I-Storage minimum -4 F degrees Temperature & power variations - method 501.2 & 502.2 Humidity - method 507.2 Vibration - method 514.3-1 Category 1 - Basic Transportation Common Carrier Bench handling - method 516.3 procedure VI Safety - OSHA CFR Title 29, part 1910
A description of the voting system type and the operational environment	DRE - EDGE2*plus* CO.3 with audio and flash drive DRE- EDGE2*plus* CO.4 with audio and flash drive (CO.3 plus the CO.4 change order) HAAT50 Version A0.3 HAAT50 Version A1.1 HAAT80 Version A1.1 HAAT90 Version A1.1 HAAT100 Version A0.7 IMPR MPR Revision D DRE EdgeII with VeriVote and audio Optical Scanner Insight with UPS Optical Scanner Insight Plus with UPS Optical Scanner Surface Mount Insight with UPS Optical Scanner Surface Mount Insight Plus with UPS Optical Scanner 400-C with UPS Card Activator Revision D and E
VSS 2002 vol. 1	3.2.2 thru 3.2.2.14, 3.4.8, Interpretation 2007-05
VSS 2002 vol. 2	4.6.1.5 thru 4.7.1 & 4.8
Hardware, Software voting system configuration and test location	See Tables 6 and 9. Test Locations: Wyle Laboratories, Huntsville AL and Criterion Labs, Rollinsville CO • iBeta provides the test labs with the environmental hardware test case outlining methods, instructions to document the configuration, test environment, lab accreditations, tester qualifications, and operational status check performance. • iBeta personnel execute the accuracy testing in conjunction with the Temperature and Power Variations provide and oversee the operational status checks.
Pre-requisites and preparation for execution of the test case.	Complete the prerequisites; - Validation and documentation of the subcontractor test labs' A2LA or NVLAP accreditation in the specific test method identified in the Test Variables - Record the testers & date - System has been set up as identified in the user manual - Gather any necessary materials or manuals. - Ensure customization of the test case template is complete The iBeta approved Operational Status Check script is provided that includes: - Checking the operation of all buttons, switches and lights - Opening the polls & running a zero totals report - Checking appropriate error conditions for correct prompts or responses. (Error conditions will depend upon the type of equipment being

Method Detail	Environmental Test Method
	tested.) - Accessibility features are operational. - Power off and on with no loss of function. - Close the polls and print all reports. (Totals & Audit Logs)
Getting Started Checks	Check the voting system to: - Verify the test environment and system configuration is documented in the PCA Configuration and matches the vendor described configuration. - Validate installation of the witnessed build - Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager. - Confirm the tester understands the recording requirements of the iBeta test case. - Operational status check procedures is available and successfully run. - An automated script to loop system operation for use during the EMC operational tests exercises all necessary functionality.
Documentation of Test Data & Test Results	Test Results: - Enter Accept/Reject on the Test Steps - In Comments enter any deviations, discrepancies, or notable observations - Log discrepancies on the Discrepancy Report and insert the number in the Comments
Standard Environmental Tests	Follow test method in the identified standard and Interpretation 2007-05
Expected Results are observed	Review the test result against the expected result: • Pass: meets the requirements • Fail: does not meet the requirements; document the failure in the comments • Not Testable (NT): not testable; provide a reason in the comments
Record observations and all input/outputs for each election;	All test results will be recorded in the test case. - Any failure against the requirements will mean the failure of the system and shall be reported as such. - Failures will be reported to the vendor as Defect Issues in the Discrepancy Report. - The vendor shall have the opportunity to cure all discrepancies prior to issuance of the Certification Report. - If cures are submitted the applicable test will be rerun. Complete information about the rerun test will be preserved in the test case. The cure and results of the retest will be noted in the - Discrepancy Report and submitted as an appendix of the Certification Report. - Operations which do not fail the requirements but could be deemed defects or inconsistent with standard software practices or election practices will be logged as Informational Issues on the Discrepancy Report. It is the vendor's option to address these issues. Open items will be identified in the report.

7.3 *Characteristics (Recovery, Accessibility, Usability & Maintainability) Test Method*

Method Detail	Characteristics Test Method
Test Case Name	Characteristics Test Case
Scope - identifies the type of test	Accessibility, usability and maintainability are characteristics of voting systems. Accessible approach is applicable to DREs and Precinct Count Optical Scanners. Audio and non-manual vote input methods are applicable to DREs Maintainability is applicable to all voting systems These characteristics are performed as a single combined functional test. Validation of the integration of security and accuracy functions of the usability and accessibility features are tested in the system level tests.
Test Objective	The objective of characteristics testing is to verify the accessibility, usability and maintainability requirements of the guidelines and HAVA are

Method Detail	Characteristics Test Method
	met.
Test Variables: Voting Variations (as supported by the voting system)	An audio/visual straight party ballot with multi-lingual capabilities will be used. - One contest shall have a write-in vote. - One contest shall have more candidates or text than can be displayed on a single screen. - Visual access to the ballot display/controls shall be restricted
A description of the voting system type and the operational environment	Testing of the Sequoia WinEDS voting system shall include: Same as General 4 for the Edge II, EDGE2*plus*, Optech Insight/Plus and Optech 400-C English and multilingual votes (visual, audio and paper ballots) cast with audio and non-manual inputs: Audio, non-manual input, and visual ballots Accessibility & Maintenance - DRE: Edge II - DRE: EDGE2*plus* Facility Accessibility only & Maintenance - Paper: Optech Insight G04 - Paper: Optech Insight Plus A04 - Paper: Optech Insight Surface Mount A.01 Maintenance only - Paper: Optech 400-C
VSS 2002 vol. 1	2.2.7.1.a thru g, 2.2.7.2.a thru i, 2.4.3.1.a & e, 2.2.5.2.1 f.& g, 3.3.1, 3.3.2, 3.3.3, 3.4.1 thru 3.4.2, 3.4.4.1 a thru d, 3.4.4.2, 3.4.5 a thru d, 3.4.6 a thru c, 3.4.9.a thru e HAVA 301a.3 & 4
VSS 2002 vol. 2	4.7.2, 6.5, 6.7
Hardware, Software voting system configuration and test location	Test Location: iBeta Quality Assurance Aurora CO Hardware: DRE: Edge II DRE: EDGE2*plus* Paper: Optech Insight G04 Paper: Optech Insight Plus A04 Paper: Optech Insight Surface Mount A.01 Paper: Optech Insight Plus Surface Mount A.01 Paper: Optech 400-C System Configuration(s) noted in the PCA Configuration Document
Pre-requisites and preparation for execution of the test case.	A test election is prepared and installed on the polling place device • During installation of the election confirm the operational readiness of the voting system. • System has been set up as identified in the user manual • Record the testers & date • Gather any necessary materials or manuals. • Ensure customization of the test case template is complete
Getting Started Checks	Test Data: Record all programmed & observed election & ballot data fields and field contents on the corresponding tabs to provide a method to repeat the test Preserve all tabs for each instance the test is run. Test Results: • Enter Accept/Reject on the Test Steps • In Comments enter any deviations, discrepancies, or notable observations

Method Detail	Characteristics Test Method
	• Log discrepancies on the Discrepancy Report and insert the number in the Comments
Documentation of Test Data & Test Results	Test Results: • Enter Accept/Reject on the Test Steps • In Comments enter any deviations, discrepancies, or notable observations • Log discrepancies on the Discrepancy Report and insert the number in the Comments
Polling Place Hardware & Recovery	Validations of operations in the voting mode: • Adjust or magnify the font • Power supply interruption without corruption of data • Power supply interruption provide the voter the capability to complete casting a ballot, allow for graceful shutdown without loss or degradation of the voting and audit data • Permit additional voting session after a voting system has reverted to backup power without loss or degradation of the voting and audit data • Telecommunications interruption without corruption of data (no telecommunications are used for the casting of a ballot) • Three second response time
Accessibility- Common Standards	The voting station provides • Forward reach w/ no obstruction: max high reach 48 in, min low reach 15 in. • Forward reach over an obstruction with knee space below; maximum level forward reach: 25 in. • Forward reach w/ obstruction >20 inches deep: max high forward: 48 in; obstructions >20 and <25 inches: 44 in. • Position of operable control is determined with respect to a vertical plan 48 in. in length, centered on the operable control, and at the maximum protrusion of the product within the 48 in. length. • Where any operable controls = or > 10 in. behind the reference plane, height is > 15 and <54 from the floor. • Where any operable control is >10 in. and < 24 in. behind the reference plane, height is >15 and <46 in. from the floor. • Operable controls are not >24 in. behind the reference plane.
DRE Standards	DRE voting systems shall provide the capability to provide access to voters with a broad range of disabilities. - Voters are not required to bring their own assistive technology to a polling place
DRE Standards - Audio information and stimulus	Audio information: • Provides complete content of the ballot is communicated to the voter • Provides instruction to the voter in operation of the voting device • Provides instruction so that the voter has the same vote capabilities and options as those provided by the system to individuals who are not using audio technology • Enable the voter to review the voter's write-in input, edit that input and confirm that the edits meet the voter's intent • Enable the voter to request repetition of any information provided by the system • Supports the use of headphones that may be discarded after each use • Provide the audio signal through an industry standard connector for private listening using a 1/8 inch stereo headphone jack and support personal headsets • Provide a volume control with and adjustable amplification up to a maximum of 105dB • Volume automatically resets to the default for each voter
DRE Accessibility - Telephone handset	No telephone style handset is use to provide audio information to the voter
DRE Accessibility- Wireless	No wireless device is used to provide audio information to the voter
DRE Accessibility- Electronic image displays	Voters are permitted to: • Adjust the contract settings

Method Detail	Characteristics Test Method
	• Adjust color settings, when color is used • Adjust the size of the text so that the height of the capital letters varies over a range of 3 to 6.3 millimeters
DRE Accessibility- Touch-screen or contact sensitive controls	The input method uses mechanically operated controls or keys: • Tactilely discernible without activating the controls or keys • Operable with one hand and not require tight grasping, pinching or twisting of the wrist • Require a force <5 lbs (22.2N) to operate • Provide no repeat function
DRE Accessibility- Response time	If the system is set to require a response by a voter in a specific period of time alert the voter before this time period expires and allow the voter additional time to indicate that more time is needed
DRE Accessibility- Sound cues	Sound cues used as an alert are accompanied by a visual cue
DRE Accessibility- Biometric measures	If the system uses biometric measures for primary voter authentication, verify there is a secondary means of voter identification.
Physical Characteristics	Physical Characteristics • The size of each voting machine is compatible with its intended use and the location at which the equipment is to be used. • Physical Characteristics • The weight of each voting machine should be compatible with its intended use and the location at which the equipment is to be used.
Transport, Storage, Materials, & Durability	Transport & Storage of Precinct Systems • A means to safely handle, transport, and install voting equipment is provided. • The voting system provides a protective enclosure to withstand: impact, shock and vibration loads associated with surface and air transportation; stacking loads associated with storage • Durability • The voting system is designed to withstand normal use without deterioration and without excessive maintenance cost for a period of ten years. • Materials • The voting system is designed and constructed so that the frequency of equipment malfunctions and maintenance requirements are reduced to the lowest level consistent with cost constraints. • TDP includes an approved parts lists
Maintainability	Maintainability- The voting system and maintenance documentation include the: • Presence of labels and the identification of test points • Provision of built-in test and diagnostic circuitry or physical indicators of condition • Presence of labels and alarms related to failures • Presence of features that allow non-technicians to perform routine maintenance tasks (such as update of the system database) • An assessment of the system maintenance attributes to confirm maintainability at an acceptable level for: • Ease of detecting that equipment has failed by a non-technician • Ease of detecting that equipment has failed by a non-technician • Low false alarm rates (i.e., indications of problems that do not exist) • Ease of access to components for replacement • Ease with which adjustment and alignment can be performed • Ease with which database updates can be performed by a non-technician • Adjust, align, tune or service components
Availability	Availability-

Method Detail	Characteristics Test Method
	The vendor specifies the typical system configuration to be used to assess availability, and any assumptions made with regard to any parameters that impact the MTTR. The factors include at a minimum: • Recommended number and locations of spare devices or components to be kept on hand for repair purposes during periods of system operation • Recommended number and locations of qualified maintenance personnel who need to be available to support repair calls during system operation • Organizational affiliation (i.e., jurisdiction, vendor) of qualified maintenance personnel
Human Engineering - Controls and Displays	Controls and displays: Controls and displays: • Controls used by the voter or equipment operator are conveniently located • Control designs are consistent with their functions • Instruction plates are provided as needed to avoid ambiguity or incorrect actuation • Displays are large enough to be readable by voters and operators without disabilities • Displays are consistent with the DRE Accessibility requirements (above) • Status displays meet the same requirements as data displays • Green, blue or white are used to indicate normal status • Amber is used to indicate warnings or marginal status • Red is used to indicate error conditions, equipment states that may result in damage, or hazards to personnel • Equipment that is not designed to halt under conditions of damage or hazard provide an audible alarm • Color coding shall be selected to assure correct perception by voter and operators with color blindness • Color shall not be the only means to convey information, indicate an action, prompt a response or distinguish a visual element • Systems display shall not use flashing or blinking text objects or other elements having a flash or blink frequency >2Hz and < 55Hz
Expected Results are observed	Review the test result against the expected result: • Accept: the expected result is observed • Reject: the expected result of the test case is not observed • Not Testable (NT): rejection of a previous test step prevents execution of this step, or tested in another TC. • Not Applicable (NA): not applicable to test scope
Record observations and all input/outputs for each election;	All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. • Any failure against the requirements of the EAC guidelines will mean the failure of the system and shall be reported as such. • Failures will be reported to the vendor as Defect Issues in the Discrepancy Report. • The vendor shall have the opportunity to cure all discrepancies prior to issuance of the Certification Report. • If cures are submitted the applicable test will be rerun. Complete information about the rerun test will be preserved in the test case. The cure and results of the retest will be noted in the - Discrepancy Report and submitted as an appendix of the Certification Report. • Operations which do not fail the requirements but could be deemed defects or inconsistent with standard software practices or election practices will be logged as Informational Issues on the Discrepancy Report. It is the vendor's option to address these issues. Open items will be identified in the report.

7.4 *Accuracy (Accuracy, Reliability, Availability, Volume, and Stress) Test Method*

iBeta Definition	Accuracy (Accuracy, Reliability, Availability, Volume, and Stress)	
Test Case Name	Accuracy- Optical Scan (Accuracy, Reliability, Availability, & Volume)	Accuracy- DRE (Accuracy, Reliability, Availability, Volume, and Stress)
Scope - identifies the	Accuracy testing validates the individual ballot positions in terms of an a	Accuracy testing validates the individual ballot positions in terms of an a

iBeta Definition	Accuracy (Accuracy, Reliability, Availability, Volume, and Stress)	
type of test	maximum error rate while processing a specified volume of data. A large number of ballot positions and large numbers of votes incorporate volume test conditions. Reliability and availability test requirements are incorporated into the test. (see Test Variables)	maximum error rate while processing a specified volume of data. Incorporation of a test ballot which exceeds the 1100 ballot positions and generation of votes for 85 hours provide stress and volume test conditions. Reliability and availability is measured in the results of the Accuracy Test.
Test Objective	Validation of the ability to reliably capture, record, store consolidate and report a predicted total of paper ballot vote selections and the absence of vote selection for a minimum of 1,549.703 ballot positions without error or with an acceptable level of error under varied temperature and power conditions over a minimum of 163 hours.	Same as Accuracy - Optical Scan
Test Variables: Accuracy Volume Stress	**Ballot Preparation & Programming Variables:** **Volume & Availability Test:** Paper Ballot: 9.75" x 14 • Columns (front & back) @ w/ 2 contests = 12 total contests; • A contest = title & 20 ballot positions; 4/inch ballot density; 240 total ballot positions; Optech Insight , Insight Plus , Insight A.01, and Insight Plus A.01 2 units: • 1 @ runs 8500 ballots 100/hr = 17,000 ballots with 4,080,000 ballot positions Optech 400-C: • If 2 units @ runs 25,500 ballots 300/hr = 51,000 ballots with 12,240,000 • If 1 unit run 48,900 ballots with 11,736,000 ballot positions Validate voter selections are recorded, reported & available for consolidation; errors & misfeeds are correctly reported. **Vote Consolidation & Reporting Variables:** **Accuracy Test** Ballots are marked in 4 configurations using all ballot positions; • 1 configuration manually marked w/ black felt tip marker; • configurations machine marked Go/No Go Batch 1 • Confirm a minimum of 26,997 ballot positions are accurately recorded & reported; • If errors=1 reject; if errors = 0 continue; • Complete the Insight & Insight Plus votes in hour 2 • Complete the 400-C votes in hour 1 Complete Accuracy Batches 2 through 4 • Confirm a minimum of 1,522,706 ballot positions are accurately recorded & reported • If errors=0 accept; if errors = 2 reject; if errors=1 run 1,576,701 additional positions , for a minimum of3,126,404 with 1 error • Complete the Insight & Insight Plus votes in hour 65; • Complete the 400-C votes in hour 23. **Volume & Availability Test:**	**Ballot Preparation & Programming Variables:** **Volume & Availability Test:** Program a General Election for the Edge II and EDGE2*plus*: with a Vote for 1 in 6 contests: • 190 candidates in each contest; 190 ballot positions x 6 = 1,140 total ballot positions **Vote Consolidation & Reporting Variables:** **Accuracy Test** Manual and automatically generate votes in 7 voting sessions as identified on the Vote tab.; • In session 1 vote only manually;1 configuration manually marked w/ black felt tip marker; • In sessions 2 though 7 vote both manually and with an automated script. Go/No Go -Session 1 • Confirm a minimum of 26,997 ballot positions are accurately recorded & reported in electronic memory, VVPAT list and bar code; • If errors=1 reject; if errors = 0 continue Complete Accuracy - Session 2 through 7 • Confirm a minimum of 1,522,706 ballot positions are accurately recorded & reported in electronic memory, VVPAT list and bar code; • If errors=0 accept; if errors = 2 reject; if errors=1 run 1,576,701 additional positions , for a minimum of3,126,404 with 1 error **Volume & Availability Test:** Continue processing votes until hour 85Validate that all voter selections are reported and consolidated correctly to the predicted totals. **Reliability Chamber & Non-chamber operation:** Edge II and EDGE2*plus*: • 2 units of each DRE; run the pre-testing operational status check • Run 48 hrs Temp & Power Variations; • Power down, move from chamber; power up; • Run 37 hours at ambient;

iBeta Definition	Accuracy (Accuracy, Reliability, Availability, Volume, and Stress)	
	Continue processing votes until hour 85. (Hour 163 if only one unit is used.) Validate that all voter selections are reported and consolidated correctly to the predicted totals. **Reliability Chamber & Non-chamber operation:** Optech Insight& Insight Plus: • 2 units; run the pre-testing operational status check • Run 48 hrs Temp & Power Variations; • Power down, move from chamber; power up; • Run 37 hours at ambient; • Run the post-testing Operational Status Check Optech 400-C: • 2 units; run the same as the Insights, however, if there's only 1 unit run 115 hours at ambient. **Stress:** Scan ballots at the maximum system operation rate to confirm accurate ballot recording and reporting in the following hardware-generated interrupts and wait states: • With a single overvote ballot wait state; • With a single mutilated ballot interrupt; and • Ballots without any interrupts or wait states. Optech Insight & Insight Plus: • For each interrupt or wait state scenario individually hand feed 20 ballots; initiate an interrupt or wait state on a single ballot. Optech 400-C: • For each condition feed 400 ballots at the maximum rate. (400/minute); initiate an interrupt or wait state on a single ballot.	• Run the post-testing Operational Status Check **Stress:** See Security Test Method:: • VVPAT reaching the end of the roll.
A description of the voting system type and the operational environment	Ballot preparation/programming and central count vote consolidation/reporting on a Windows laptop running WinEDS software; MemoryPack, Memory Pack Receiver running MPR software • Precinct Counters: Optech Insight & Insight Plus running APX & HPX firmware, Optech Insight & Insight Plus Surface Mount running APX & HPXA • Central Counter: Optech 400-C; with a Windows Personal Computer running WinETP software	Ballot preparation/programming and central count vote consolidation/reporting on a Windows laptop running WinEDS software; • Edge II with Verivote Printer • EDGE2*plus*
VSS 2002 vol. 1	2.2.2 thru 2.2.2.1, 2.2.5, 3.2.1, 3.2.5.2, 3.2.6.1, 3.2.6.1.1, 3.4.3, 3.4.5,	2.2.2 thru 2.2.2.2, 3.2.1, 3.2.5.2, 3.2.6.2, 3.2.6.2.2, 3.4.3, 3.4.5
VSS 2002 vol. 2	4.7.1, 4.7.1.1, 4.7.3 thru 4.7.4.d.i, 6.1, 6.2.3, A.4.3.5	4.7.1, 4.7.1.1, 4.7.3 thru 4.7.4.d.i, 6.1, 6.2.3, A.4.3.5
Hardware, Software voting system configuration and test location	Version information is listed in Tables 4 & 5 Election Management System • HW: COTS Windows Laptop • OS: Windows XP • HW: MemoryPack APX • SW: WinEDS v.4.0 • HW: Memory Pack Receiver	Version information is listed in Tables 4 & 5 Election Management System • HW: COTS Windows Laptop • OS: Windows XP • HW: MemoryPack APX • SW: WinEDS v.4.0 DRE::

iBeta Definition	Accuracy (Accuracy, Reliability, Availability, Volume, and Stress)	
	• FW: Memory Pack Receiver Precinct Scanner: • HW: Optech Insight & Insight Plus with Optech Printer • HW: Optech Insight & Insight Plus Surface Mount • FW: Insight & Insight Plus (APX) • FW: Insight & Insight Plus (HPX) • FW: Insight & Insight Plus Surface Mount (HPXA) Central Count Scanner • HW: Optech 400-C • HW: COTS Windows Personal Computer • OS: Windows XP • SW: WinETP Precinct Accumulator and Consolidator • SW - HAAT • OS - HAAT (COTS Windows CE.NET 5.0) • HW - HAAT80 (A.1.1) • HW - Insight Memory Pack Reader (IMPR, A1.0 & C1.1) Test Location: Temperature & Power variation- Wyle Laboratories Huntsville, AL The test will be run in conjunction with the Temperature & Power Variation as described in the Test Variables	• HW: Edge II • HW: Verivote Printer • SW: AVC Edge • HW: EDGE2*plus* C0.3 and C0.4 • SW: EDGE2*plus* Precinct Accumulator and Consolidator • SW - HAAT • OS - HAAT (COTS Windows CE.NET 5.0) • HW - HAAT90 (A.1.1) and HAAT100 (A0.7) Test Location: Temperature & Power variation- Wyle Laboratories Huntsville, AL The test will be run in conjunction with the Temperature & Power Variation as described in the Test Variables
Pre-requisites and preparation for execution of the test case.	Validate Wyle's chamber can be accessed in a way that ensures the integrity of the test temperature environment during ballot counting. Complete the prerequisites: • Record the testers, subcontractor accreditation, environmental test method, chamber calibration date & date • System has been set up as identified in the user manual • Use the Environmental Test Case for instructions on the Temperature & Power Variations test method (MIL-STD 810D Method 501.2 & 502.2). • Ensure customization of the test case template is complete Confirm error logs and audit reports are enabled	Same as Accuracy Optical Scan Validate the automatic vote generation tool for the Edge II and the EDGE2*plus* inputs votes as identified in the script. Record the detail of the validation in the Test Tool Validation Log (Sequoia tab).
Getting Started Checks	Validate that the method for initiation of ballot counting cycles in the chamber can be accessed by a method that maintains the temperature environment. Check the voting system to : • Verify the test environment and system configuration is documented in the PCA Configuration and matches the vendor documented configuration. • Validate installation of the witnessed build • Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager.	Same as Accuracy Optical Scan

iBeta Definition	Accuracy (Accuracy, Reliability, Availability, Volume, and Stress)	
	• Initiate an operational status to confirm the correct function of the voting system prior to initiation of Accuracy testing. • Record the start time.	
Documentation of Test Data & Test Results	Test Data: • In the Test Case record all programmed & observed Election, Ballot & Vote data fields and field contents on the corresponding tabs to provide a method to repeat the test • Preserve all tabs for each instance the test is run. Test Results: • Enter Accept/Reject on the Test Steps • In Comments record any deviations, discrepancies, or notable observations • Log discrepancies on the Discrepancy Report and insert the number in the Comments	Same as Accuracy Optical Scan
Accuracy: Paper-based voting systems Processing	Paper-based voting systems, verify for each Optech scanner: • All ballot positions on paper ballots can be scanned and detect selections for individual candidates and contests, converting them to digital data. (Receive electronic signals produced by vote marks and timing information; perform logical and numerical operations upon the data; and reproduce the contents of memory without error (including ballot style/precinct, a vote for a specific candidate/contest) • The voting system does not record extraneous marks, smudges or folds. • The voting system does not reject more than 2% of ballots that meet the vendor's specifications for marking. • Vote selection data from multiple precinct-based voting machines is stored with the generated jurisdiction-wide vote counts • Consolidated reports are accurate against a predicted vote total	Verify that the Edge II and EDGE2*plus* do not permit the scanning of paper ballots, marked by the voters, for selection of individual candidates and contests.
Accuracy: DRE Voting Systems Processing	Verify the Optech scanners do not permit voters to directly record individual vote selections and cast such selections into electronic memory	
Accuracy: Error Rate	Errors are from any source while testing the specific processing function and its related equipment. • **Reject:** 1 error before counting 26,997 consecutive ballot positions correctly or 2 errors in any number • **Accept:** 1,549,703 (or more) consecutive ballot positions read correctly. If there's 1 error with > 26,997 ballot positions but < 1,549,703, continue testing another 1,576,701 consecutive ballot positions; or 3,126,404 with 1 error	Same as Accuracy - Optical Scan
Reliability	Reliability shall be identified by determination of the Mean Time Between Failure (MTBF) during the minimum test period of 163 hours with 1 unit (or 85 hour each with 2 units). The MTBF is the value of the ratio of operating time to the number of failures.	Same as Accuracy - Optical Scan

iBeta Definition	Accuracy (Accuracy, Reliability, Availability, Volume, and Stress)	
	• A failure occurs if 1 or more functions is loss; • Performance degrades so that the device is unable to perform its intended function for longer than 10 seconds.	
Availability	Voting system availability (Ai) for the function of all combined devices and components must be equal or greater than 99%. Ai = (MTBF)/(MTBF + MTTR) MTTR. Inherent availability (Ai) = % system is functional Mean Time Between Failure (MTBF) = total operation time Mean Time To Repair (MTTR) = average time required to perform a corrective maintenance task during periods of system operation. Corrective maintenance = on-site repair or substitution of the device or a component Corrective maintenance task time = active repair time + logistic /administrative time (notification and travel time of qualified maintenance personnel)	Same as Accuracy - Optical Scan
Expected Results are observed	Same as General 1	Same as General 1
Record observations and all input/outputs for each election;	Same as General 1	Same as General 1

7.5 *Security and Telephony/Cryptographic Test Methods*

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
Test Case Name	Security Test Case	Telephony & Cryptographic Test Case
Scope - identifies the type of test	Security testing crosses into several areas of voting system testing and thus must be tested at the integrated system level. System Level Tests are customized for the specific voting system to test the security elements incorporated into the pre-vote, voting and post voting functions. Further examination is performed in Telephony and Cryptographic Tests. A review of the security documentation addresses Access Controls, Physical Security and Software Security.	Telephony and Cryptographic testing validates/verifies that transferring of data through any means of telephony is correct and secured. This includes the accumulated Optech Insight, Edge II and/or EDGE2*plus* precinct results transferred via the HAAT90 through a dial-up modem and wired connection, or via the HAAT100 through a wireless Internet connection, to the HAAT Listener subsystem. The activator, accumulator and printing functions of the HAAT 90/100 units do not incorporate telephony or information transmission via telecommunications and those functions are addressed in functional test methods. Printing functionality will be used as a means of verification of the telecommunications transmitted information. (Note: HAAT50 and 80 have no telecommunications transmission capabilities.)
Test Objective	The objective of security testing is to minimize the risk of accidents, inadvertent mistakes and errors; protect from intentional manipulation, fraud or malicious mischief;	The object of the Telephony and Cryptographic testing is to validate the VSS additional security and cryptographic requirements due to the transmission of results via telecommunications by the HAAT90 and 100 to the HAAT Listener

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
		subsystem and internal transfer to the WinEDS database. The overall objective is to confirm the security of election results and WinEDS are not compromised due to transmission via the public networks.
Test Variables: Voting Variations (as supported by the voting system)	In the System Level Functional tests of general and primary elections validate the security of the pre-vote, voting, and post voting functions of the voting system by test incorporating overflow conditions, boundaries, password configurations, negative testing, inputs to exercise errors and status messages, protection of the secrecy in the voting process and identification of fraudulent or erroneous changes. Including unauthorized changes to system capabilities for: • Defining ballot formats, • Casting and recording votes, • Calculating vote totals consistent with defined ballot formats, • Reporting vote totals, • Alteration of voting system audit trails, • Changing or preventing the recording of a vote, • Introducing data not cast by an authorized voter, • Changing calculated vote totals, • Preventing access to vote data, including individual votes and vote totals, to unauthorized individuals, and • Preventing access to voter identification data and data for votes cast by the voter such that an individual can determine the content of specific votes cast by the voter.	Same as General 3 TC (HAAT90) Same as General 4 TC (HAAT100) Tests conducted shall include: • Injection of delays • Dropping and reordering packets • Modified packets • Duplicate transmissions • Transmission interruption • Wireless denial of service • Telephone outages • Cryptographic approved software • Symmetric encryption • Digital signature • Best-practice web server configuration • Verification of the installation of COTS software to mitigate security threats and that the COTS software has the capability to mitigate the specific security threats described in the VVS including integrity of data, confirmation of data received, detecting any threats, removing the threats, prevention of storing any threats, finding existing threats, and logging of any threats processed.
A description of the voting system type and the operational environment	The voting system types and operational environments are the same as General 1, 2, 3 and 4 Test Cases. General 1 will incorporate security testing of the: • WinEDS ballot preparation, access controls and cartridge creation of the Edge II. • Edge II DRE • Verivote Printer (Rev C) • Seiko DPU-414 Printer • Internal Memory (CF) • Memory Cartridge ATA/PCMCIA (Sandisk) • Edge AUX Power Unit • Card Activator 5.1 • Voter/Smart Card • HAAT80 (A1.1) General 2 will incorporate security testing of the: • WinEDS cartridge creation of the EDGE2*plus* • EDGE2*plus* DRE (C0.3 & C0.4 have same software/functions, only difference are hardware) • APS (UTG300) Printer	Same as General 3 TC (HAAT90) Same as General 4 TC (HAAT100)

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	• ABLE-D (attached) (Audio/Sip & Puff) • USB Cartridge (K9K series - 700) • Voter/Smart Card • HAAT50 (A0.3) • HAAT90 (A1.1) General 3 will incorporate security testing of the: • WinEDS cartridge creation for the Insight • Optech Insight Precinct Count Optical Scanner • IMPR (A1.0 & C1.1) • Insight Battery • MemoryPack (APX 2.16) • MPR (REV D) General 4 will incorporate security testing of the: • WinEDS cartridge creation for the Edge II, EDGE2*plus s*, Optech 400-C • WinEDS Central Count • Optech 400-C Central Count Scanner & WinETP • HAAT100 (A0.7)	
VSS 2002 vol. 1	2.2.1, 2.2.4 thru 2.2.5.2.3, 6.2 thru 6.4	2.2.10, 5.1 thru 5.2.7, 6.2 thru 6.2.2, 6.5 thru 6.6.2.2
VSS 2002 vol. 2	6.4 thru 6.4.2	6.3 thru 6.4.2
Hardware, Software voting system configuration and test location	Same as General 1, 2, 3, & 4 for security testing that is appropriately tested in end-to-end system level testing Other security testing will be performed. Capture of ghost images has been incorporated into the General 1, 2, 3 & 4 test cases. These images will be used to perform special security tests manipulation of election databases and election results. Testing is performed at the iBeta test lab in Aurora, CO.	Same as General 3 TC (HAAT90) Same as General 4 TC (HAAT100) with the addition of • NISTNET or LanForge for packet testing • Nessus for vulnerability testing
Pre-requisites and preparation for execution of the test case.	Same as General 1	Same as General 3 and General 4 plus • Document the system under test (especially from a security perspective) • Set up NISTNET or LanForge (consult IT) • Set up Nessus for HAAT100
Getting Started Checks	Same as General 1 Prior to testing Verify the following through Document Review: • AVC Edge II, EDGE2*plus* and Insight identify procedural requirements for the usage of Destructible Seals. • AVC Edge II and EDGE2*plus* provide adequate procedural requirements for polling place security. • AVC Edge II and EDGE2*plus* identify procedure requirements for storage of the voting machines. • Manual identifies all required access control security measures.	Confirm NISTNET/Lanforge is not visible to the voting system and does not change system function. Prior to testing, verify by source code review: • Data is encrypted prior to transmission and the algorithm and bit strength meet NIST SP800-57 (esp. Table 4) strengths. • Encryption software used is FIPS 140-2 certified, if applicable (a list of Nessus vulnerability plug-ins may be downloaded from http://www.nessus.org/plugins/index.php?view=all. These plug-ins are automatically installed in the scanner tool via the nessus plug-in feed as described at http://www.nessus.org/plugins/.) • Data transmitted is protected by a CRC or hash and the CRC or hash is

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	• Manual identifies all roles and responsibility of each user. • WinEDS manual identifies all required software and upgrades. • WinEDS manual identify database security. • Operations manual identifies specific instructions during a failure to input or storage devices.	verified prior to acceptance of the transmission at the opposite end (this includes the transmission of the ACK or NACK from the HAAT Listener to the HAAT). • HAAT transmission is protected with a digital signature of minimal strength (1024 bits/80 bits) • Prior to testing verify by document review: • HAAT Listener identifies all required open ports for its operation. • HAAT and HAAT Listener/WinEDS subsystems define the boundaries (physical and logical) between the jurisdictional control and the public control of the telecommunications boundary. • HAAT and HAAT Listener (or WinEDS) documentation and manuals enforce a physical access policy that includes not allowing public telecommunications workers access to the internal network. • After setup, prior to testing, verify: • The network layer configuration of the HAAT Listener and WinEDS system conforms to the recommendations or requirements of the vendor. • The HAAT Listener configuration satisfies v1: 6.5.4.2 requirements for the use of COTS protective software. Verify that the HAAT Listener documentation includes methods to upgrade this protective software in fielded systems prior to an election. • Determine if the WinEDS workstation computer and WinEDS server computer share the same network environment as the HAAT Listener (no DMZ) • If so, then those systems also must satisfy v1: 6.5.4.2 for the use of COTS protective software. • If the WinEDS application computer does not share the same network environment as the HAAT Listener then verify that its network configuration protects it from threats. For example, can an internet browser view the internet? Document the open ports (incoming) (lower 1056) and a justification for each one. (See in particular NIST SP800-53 SC-7) • After determining users allowed logical access to the HAAT Listener subsystem, verify that only the administrator/ administrator group has the ability to disable SSL/TLS or its underlying encryption agreement protocol. (If this test is performed prior to other testing be sure and restore the original configuration utilizing SSL/TLS). Document the Certification Path, Certificate Details and TLS configuration details (ssl.conf, ssl.default.conf, httpd.conf and any other files it is necessary or possible to modify to perform the test)
Documentation of Test Data & Test Results	Same as General 1	Same as General Test Cases
Pre-vote: Ballot Preparation procedures verifications	Same as General 1 , 2, 3 & 4	Same as General 3, General 4 Test Cases

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
Pre-vote: Ballot Preparation Security	During system set-up and ballot preparation in General 1 TC (Step 1), perform the following security TC and validation on WinEDS: • Attempt to create a password that does not conform to the Sequoia "strong password" (defined as a password consisting of at least 1 special character, 1 alphanumeric character and 1 number), verify that passwords that does not confirm cannot be created. • Attempt to access WinEDS as a user of a non-specified workstation, verify that users can only access their specified workstation. • Attempt to access WinEDS functions not assigned to the user, verify that users can only access their described/specified functions. • Attempt to delete/modify WinEDS audit logs, verify that WinEDS audit logs cannot be modified nor deleted. • Password field on WinEDS are encrypted and cannot be copied while the user is inputting in the password, validate this by attempting to copy/paste the password field • WinEDS election database and profile have unique name, validate this by attempting to gain access to a database without using the exact database name. • View audit logs to verify that all access attempts are recorded (date/time) WinEDS Stand-Alone Security Test: • Ghost Image before creating cartridge, Create cartridge A and replace cartridge. Create cartridge B with the image replaced. Compare both cartridge numbers and verify that the cartridge numbers are unique.	Ballots Preparation does not utilize telephony.
Readiness Testing and Poll Verification	Before installing election data in the DRE (General 1 and 2 - Step 10), perform the following validation test on the DRE (Gen1 – Edge II/ Gen2 – EDGE2*plus*): • Valid firmware can be installed with correct password, validate this by attempting to install firmware without using the correct password to the system. Audit log records the firmware upgrade date/time and version. • No malicious code can be installed into the system from the firmware, verify by attempting to install virus into the cartridge and attempt to install the firmware. The system will reject the firmware and will not install the firmware; audit logs record the rejected firmware. • Attempt to pull Compact Flash (CF) memory device from system, verify that system cannot operate with any device being inoperable.	Same as General 3, General 4 plus • If the HAAT has the ability to operate in non-FIPS-140 mode, verify that the HAAT mode of operation is recorded in the audit log. • Attempt to modify the time in the HAAT100 to a time after the start of the election via the TCP/IP connection. Fail if time is changed. • During pre-vote testing or other times when the systems are connected to the internet, use Nessus or a similar internet/network security scanning tool to verify that known vulnerabilities are blocked. (General 4 only) • Attempt to connect to the HAAT Listener RAS from another telephone line. If successful and a TCP connection is made perform Nessus or similar vulnerability scanning as in the HAAT100 test case (General 3 only). A list of Nessus vulnerability plug-ins may be downloaded from http://www.nessus.org/plugins/index.php?view=all. These plug-ins are automatically installed in the scanner tool via the nessus plug-in feed as described at http://www.nessus.org/plugins/.

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	• Only valid memory cartridge can initialize the DRE, validate this by attempting to initialize the system with bad cartridges (cartridge with wrong serial number, cartridge missing correct election data definition, cartridges that are modified) • System is non-functional if one of the removable parts contains an error, validate this by attempting to use the system with the CF (located on the CPU board) is removed or is not in working condition (attempt to fry the CF memory). Before loading ballot on DRE, perform a system reset (General 1 and 2 – Step 11) validate the following validation test on the DRE (Gen1 – Edge II/ Gen2– EDGE2*plus*): • Polls can only be opened after election data is installed into the system, validate this by attempting to open polls before election data is installed and before election data is installed completely. • Attempt to empty out the Password file from the PCMCIA card and insert into the Card Activator, verify that the Passwords file must not be empty to accept initialization (note that the documentation is changing and this password file is empty). • Verify that audit logs record events that pertain to opening the polls including attempting to initialize with invalid cartridge, attempt to open polls when system is not ready, and hardware failure. During loading ballot onto DRE (General 1 and 2 – Step 12) validate the following validation test on the DRE (Gen1 – Edge II/ Gen2- EDGE2*plus*): • Power can be interrupted and restored without loss of election data, validate this by pulling the power during ballot installation; verify that when power is restored; ballot initialization picks off from the beginning. Audit log record (time/date) of power interruption and restore. Before performing “activate polls open using poll open/close switch” (General 1 and 2 – Step 13) validate the following validation test on the DRE (Gen1 – Edge II/ Gen2 – EDGE2*plus*): • No votes can be recorded prior to opening the polls, validate this by attempting to record vote when polls are not open. If; however, there is a successful recording of votes, the audit log reflects the event that there is an attempt to cast a vote i.e. insertion of a voter card when system is not ready, and if the vote is casted successful the audit log will reflect that	

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	there has a been a ballot casted. During system test and prior to installing election data on Insight (General 3 – Step 11) validate the following validation test for the Insight: • No ballots can be read prior to opening the polls, validate this by attempting to feed ballot without a valid Memory Pack inserted with polls being open. • Only valid Memory Pack are accepted by the Insight, validate this by attempting to insert non-valid Memory Packs (a closed poll Memory Pack, a modified Memory Pack, a blank memory pack) and verify that the non-valid Memory Packs are rejected and recorded in the audit log. Insight Stand-alone TC – Ghost image for WinEDS and create a cartridge for Insight. Perform the following validation: • Vote totals cannot be printed without closing the polls; validate this by casting a vote (to open polls) and attempt to print vote totals without closing the polls. Attempt is logged in the audit log During system test and prior to activation of the HAAT90 (General 2 – Step 11), verify the following validation test on the HAAT90: • Attempt to activate a voter card without preparing the HAAT90; verify that voter card cannot be activated without preparing the HAAT90. During activation the HAAT90 (General 2 – Step 12) verify the following validation test on the HAAT90: • During preparation of the HAAT90, attempt to power cycle the HAAT. Validate the power interruption during preparation of the HAAT90, the HAAT90 will not be prepared and will need to be prepared again. Message on the HAAT90 will show “NOT PREPARED” After completion of step 12 for activating the HAAT90; (General 2 – Step 12) verify the following validation test on the HAAT90: • Verify HAAT state to NONE, attempt to activate a voter card. Verify that voter card cannot activate if in the NONE state. • Attempt to prepare an “already prepared” HAAT90 without resetting HAAT90, verify that resetting the HAAT90 is required before re-preparing is allowed, and with the Resetting Password from the original HAAT data. • Print audit log for the HAAT90, verify that the audit log record (time/date) of all the preparation events and power cycle events.	

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	HAAT90 Stand-Alone: Ghost WinEDS and create a cartridge to perform the following HAAT90 validation: • Modify the password field inside the configuration xml file from the HAAT directory from the results cartridge; verify that the HAAT uses the modified password, and that passwords on the HAAT are not hardcoded in the HAAT. • Modify election files on the HAAT directory on the cartridge, verify that the HAAT90 will reject the files and will not prepare the system.	
Pre- vote: Opening the Polls Verification	After activation of poll with open/close switch (General 1 and 2 – Step 13), perform the following validation for the DRE (Gen1 – Edge II/ Gen2 – EDGE2*plus*): • Cast 3 votes on the DRE, interrupt power and restore, the DRE during restoration, checks the memory cartridges and will reject if the memory cartridge is not the same; validate this by changing the memory cartridges during a power interruption and restore. After verification of correct ballot being displayed to the voter (General 1 and 2 – Step 14) perform the following validation for the DRE (Gen1 – Edge II/ Gen2 – EDGE2*plus*): • Attempt to remove cartridge from system and resume voting, verify that the system will alert and that voting will not continue if memory cartridge is removed. • Verify that the audit log reflect event (time and date) of power interruption, closing the polls without meeting criteria, removal of cartridges (when machine is powered off, the EDGE2*plus* will record when power is restored), and transition of Pre-Lat to Official voting. Edge II and EDGE2*plus* Stand-Alone Security Test; Ghost image on WinEDS and perform the following Security Validation Test: • Set in WinEDS “allows polls closed with no votes” to be NO, and set minimum opening time to be 10 minutes, attempt to close the polls without meeting both condition. Verify that polls cannot be closed without satisfying both conditions. • Verify that each created cartridges (using WinEDS) has their own unique cartridge version by creating 2 cartridges for the same voting machines and view cartridge version numbers on the cartridge files. • With 2 cartridges created for the same DRE, verify that the DRE records the cartridge into the system and will use the serial number to validate that the cartridge are the same, validate this by installing 1 cartridge and attempt to swap the cartridge. Confirm this is not a problem prior to opening the	Same as General 3, General 4

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	polls. Confirm it is an issue once polls are opened. • Attempt to go from Pre-Lat voting to Official voting without first closing the polls to the PRE-LAT, verify that Official Voting cannot be opened without first going through Pre-Lat • Attempt to install a virus into the compact flash while waiting for a zero-report procedure to activate, verify that the system will detect that there is malicious data inside the memory component and will not operate After Insight has been initialized with MemoryPack installed (General 3 – Step 13) perform the following Insight security validation: • Attempt to interrupt power and restore, verify that system resumes normal operation when power is restored. • Verify audit logs reflect activities of power interruption and restore.	
Voting: Ballot Activation and Casting Verifications	During Vote and Ballot Casting (General 1 and 2 – Step 15) validate the following validation on the DRE (Gen1 – Edge II/ Gen2 – Edge1): • Attempt to vote more than once with the same voter card without reactivating the card, Verify that the system detects a voted card and keeps the voter card and prompts for poll worker. • Attempt to disconnect/turn off VVPAT printer during voting, verify that the system will detect that a printer is inoperable and will alert for poll worker. System will not be operable until problem is resolved. • Verify that voting is not enabled if the VVPAT is out of paper and that votes are not cast if paper runs out while voting Edge II and EDGE2*plus* Stand-Alone Test: • Attempt to upgrade system Firmware during voting, verify that system upgrades are only during system diagnostic and cannot be accessed when polls are open. • Attempt to obtain a cartridge from another TC, install into DRE and verify that election data (such as poll, ID, ballot style) is made visible for poll worker verification or that it is stated to be an invalid cartridge. • View audit logs to verify that audit logs reflect each security attempt.	Same as General 3, General 4 TC Ballot Activation and Casting Ballots does not utilize telephony.
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	During Ballot Casting (General 1 and 2 – Step 15) validate the following validation for the DRE (Gen1 – Edge II/ Gen2 – EDGE2*plus*) • Attempt to vote on system with a bad voter card, different precinct voter card. Verify that the voter cannot access ballots with the bad voter cards, and that the system does not eject	Same as General 3, General 4 TC Audit logging between poll open and the transmission of results on the HAATs do not use telephony.

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	the card and prompts for a poll worker. • Attempt to access “voter fled” option without proper usage of the activation button on the DRE, verify that these options are not accessible with improper usage of the activation button • Attempt to access “blank ballot” option without proper usage of the activation button on the DRE, verify that these options are not accessible with improper usage of the activation button • Power interruption and restore resumes voting operation, validate this by interrupt power and restore, verifying that a new voting session can be initiated Edge II and Edg2Plus Stand-Alone Security Test: • Ballot images cannot be viewed/printed without closing the polls, verify this by attempting to view/print ballot images when polls are still open. • Attempt to print results prior to closing the polls, verify that polls need to be closed prior in order to view results report. • Attempt to unwind the VVPAT paper to view previous votes without opening up the VVPAT, verify that viewing previous votes cannot be viewed on the VVPAT without opening up the VVPAT. During Ballot Casting (General 3 – Step 15) validate the following validation for the Insight: • Attempt to feed in ballots that are torn, ripped, not of standard, incorrect data, incorrect precinct. Verify that only valid ballots of the correct election and precinct are accepted, all others are rejected. • Attempt to accept reject ballots without pressing the override key, verify that only the override key is allowed to accept ballots rejected by the system • Verify that whenever an override key is pressed to override a ballot, the audit trail prints out the override at that moment. • Voting continues after a power interruption and restore, verify this by attempting to interrupt power and then restore.	
Post-vote: Closing the Polls	After polls are closed and during Errors and Status Indicators (General 1 and 2 – Step 18) verify the following validations for the DRE (Gen1- Edge II/Gen2 – EDGE2*plus)*: • Verify that once a system is in post-lat, the system cannot go back to “official” by attempting to go back to official once it is in post-lat. • Attempt to cast another vote after polls have been closed, verify that no additional votes can be counted after polls have been closed.	Using the Optech Insight, Edge II and EDGE2*plus* memory cartridges prepare to transmit election results validate: Using General 3 (HAAT90) validate: • When HAAT90 phone line is pulled prior to transmission, it logs the failure. • When HAAT90 phone line is pulled in the middle of a transmission (using as many cartridges as possible), it logs the failure. The HAAT Listener should also log the failure, but is not required in this instance. • Using General 4 (HAAT100) validate: • When the antenna of the HAAT100 is disconnected prior to a transmission,

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	Edge II and EDGE2*plus* Stand-Alone Security Test: Ghost WinEDS and perform the following security validation: • Create another cartridge for the DRE, attempt to reopen polls with another cartridge, verify that the system will detect that new (different) cartridge is inserted and will not reopen polls. • System cannot be reused after polls are closed unless system has been reset, verify this by attempting to reinstall election data to begin the voting process on a already closed polls DRE. • Results cartridge will not be erased if system is to be reset, verify this by attempting to reset system with results cartridge still inside. Validate that results cartridge is not erased. • Attempt to modify election data on cartridge after polls have been closed, verify that the reports that the cartridge has been modified. After closing the polls and during Error and Status Indicators (General 3 – Step 19) verify the following validations for the Insight: • Insert a closed polls status MemoryPack back into the Insight and verify that message polls closed and no more ballots reading is printed and displayed. GA: If you reopen the polls. • Attempt to record a vote after polls have been closed, verify that vote cannot be added after polls have been closed. Insight Stand-Alone Security Test: • Attempt to change polls closed status on the memory pack to polls open, and reopen polls for adding more votes, verify that changing polls open/closed status is not possible. During HAAT consolidation (General 2 – Step 19) verify the following validations for the HAAT90: • Attempt to consolidate a cartridge with polls being closed twice, verify that the HAAT detects the same cartridge and does not consolidate the cartridge. And error report will be printed. • Print total and closed polls on the Insight, consolidate the memory pack. Insert the MemoryPack into the Insight and reopen polls by performing the reopen polls (follow procedure). Cast 2 votes and then close polls again. Reconsolidate the MemoryPack with the HAAT90. Verify that the HAAT90 rejects the MemoryPack due to the fact that the first attempt the MemoryPack has closed polls status. HAAT90 Stand-Alone Security Test: Take ghost image on	it logs a failure, if it cannot succeed. • When the antenna of the HAAT100 is covered with a wire mesh (Faraday cage), it logs a failure, if it cannot succeed. (If this test fails to prevent transmission a wireless phone jamming device is to be used instead of the Faraday cage.

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	WinEDS and verify the following validations: • Create 2 cartridges for the same voting machine (From WinEDS), vote on 1 cartridge and attempt to modify data on the other cartridge making it a valid cartridge, attempt to read both cartridges into the HAAT90, verify that the HAAT90 consolidates the valid cartridge and rejects the modified cartridge. • Modify election data on cartridge and attempt to consolidate it, verify that HAAT90 does not consolidate the data.	
Post-vote: Central Count	During readiness testing for the 400-C (General 4 – Step 11) verify the following for the Optech 400 – C: • Attempt to log into the PC hosting WinETP without the proper username and password, verify that access to WinETP requires the proper username and password. • Attempt to read in ballots prior to installing election data; verify that election data has to be installed before ballots can be read. During Ballot Casting for the 400-C (General 4 – Step 15) verify the following validation for the 400-C: • Read in ballots of different type (incorrect precinct, different election ballot); verify that these ballots are rejected by the 400-C. Ballot rejection is logged in the audit log. • Attempt to power cycle the machine, verify that votes already counted are recorded and votes in progress need to be started again. Optech 400-C Stand-Alone Security Test: Ghost image of WinETP is to be perform before verifying the following: • Attempt to modify election data for the Optech 400-C, attempt to load the election data using WinETP; verify that WinETP cannot load the election data. • Modify 400-C election result file, attempt to read the result file into WinEDS, verify that WinEDS rejects the file after the necessary checksums were performed. • During Testing of General 5 using 400-C mixed mode, attempt to add in 1 ballot from another election and verify that the 400-C can detect the ballot and discard the ballot. During Tallying using WinEDS (General 4 – Step 20) verify the following validation for WinEDS: • During consolidation and tallying, gather each type of cartridge (USB results cartridge, Edge II memory cartridge, Insight Plus Memory Pack, and 400-C results file) attempt to tally the cartridge twice. Verify that cartridges cannot be	Using the Optech Insight, Edge II and EDGE2*plus* memory cartridges transmit the General 3 (HAAT90) & General 4 (HAAT100) election results validate: • Transmission of the precinct vote count and/or voter list is successful. • Delays do not prevent transmission of vote count and/or voter list • Failure or success in transmission as a result of reordering/dropping packets is recorded at both the HAAT and HAAT Listener. • Duplicate transmission is unsuccessful and includes notification. • HAAT results printed prior to a transmission failure and WinEDS results printed after a transmission failure agree. • If the HAAT Listener is disconnected from the incoming network, an attempted transmission from the HAAT reports a failure and offers instructions for further action. • Keys are computer generated. Validate this by listening into the data being sent to the HAAT Listener or check source code from HAATs to verify that keys being sent to the Listener are unique and computer generated. • If errors are observed and logged by changing 1 or 2 bits in the data package transmitted. Verify that this failure is logged (although not necessarily in the audit log) • Using General 3 validate: • When dialing into the RAS system from an external line (not the HAAT90 line). Attempt to make a SOAP request via this line. Verify that all SOAP requests are logged by the HAAT Listener. • Using General 4 validate: • If an attempt to reach the HAAT Listener without using a HAAT system (via Internet) if successfully connected, the Listener will not accept bad data, bogus connection attempts will be logged (identifying where) and the bogus SOAP requests will be logged in the audit log. • Using NISTNET if the HAAT Listener (outbound) packets response to a successful HAAT transmission is dropped the HAAT reports a failed transmission. Reconfiguring NISTNET to allow all packets, the HAAT Listener accepts the transmission when the attempt is repeated.

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	tallied more than once. WinEDS Stand-Alone Security Test: Ghost images are taken on WinEDS prior to performing the following validation: • Modify election results on each type of cartridge; verify that WinEDS will not tally the election results. • Attempt to delete audit logs in WinEDS, verify that audit logs cannot be deleted from WinEDS.	
Post-vote: Security	Post-Vote Security is divided into 3 sections. Security for closing the polls, security at the central count and security for system audit.	See the Post-vote Central Count regarding duplicate transmission, key generation, audit logging, attempts to insert bad data, and dropped transmission.
Post-vote: System Audit	During system audit for WinEDS (General 1 – Pg 8) verify the following validation for WinEDS: • Review audit logs for event of cartridge creation, log in attempts, and cartridge tallying; verify that all access attempts are recorded and cartridge creation logs are recorded. During system audit for WinEDS (General 1 and 2 – Step 24) verify the following validation for the DRE (Gen1 – Edge II/ Gen2 – EDGE2*plus*): • Compare compact flash, results cartridge and Aux cartridge audit logs, verify that the audit logs in each memory device holds the same information. • Compare vote total on the VVPAT and the results cartridge, verify that the vote totals are the same. During system audit for the Insight (General 3 – Step 24) verify the following validation for the Insight: • Compare vote totals on memory cartridge with printed vote total; verify that the vote totals are the same. • Verify that the numbers of ballots scanned are reflected in the audit logs. During System Audit for the 400-C (General 4 – Step 24) verify the following validation for the 400-C: • Review audit logs for event (time and date) to verify that audit log record all events (startup, ballot counts, ballot rejection, power cycle).	See Post-vote Closing the Polls & Central Count regarding the audit logging of successful/unsuccessful transmissions at the originator and audit or other logging records of all attempts to invade the HAAT Listener system
Additional Security	Source Code Review for each Edge II and EDGE2*plus*: • Verify through source code that election data from the results cartridge are only accepted if the validation between the system and the Results cartridge are correct. • Verify through source code that the system writes an encrypted message to the Smart Card indicating that the smart card has been voted.	

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	• Verify through source code that the system records and safely stores the cartridges serial number. • Verify through source code that the audit logs are recorded in all the memory devices. • Verify through source code that the system detects bad voter cards. Source Code Review for Insight: • Verity through source code that the Insight only accepts valid and closed poll memory pack. • Verify through source code that polls must be closed before vote totals can be printed. • Verify through source code that same data are being sent to the printer and the LCD screen on the Insight Plus, if true then Insight and Insight Plus have the same software just different hardware. Source Code Review for WinEDS: • Review Password encryption algorithm, verify that the algorithm meets the criteria. • Verify through source code, that password input fields are encrypted while passwords are being entered. • Verify through source code, that passwords are stored securely. • Verify through source code that audit logs record time and date of events that are being recorded into the audit logs. • Verify through source code that WinEDS generates a random unique cartridge version number to each cartridges created. Source Code Review for 400-C WinETP: • Verify through source code that WinEDS Files (.ofc, .rpt, .pre as provided in the WinEDS TDP), Precinct Results File, and Other Runtime files are the only files accept by WinETP • Verify through source code that WinETP uses an approved algorithm (CRC) to check for uncorrupted files • Verify through source code that WinETP "mixed mode" can distinguish ballot from 1 precinct to another Non functional security (if applicable) Locks and Keys: • Attempt to pick lock in 10 minutes, verify that locks cannot be picked within the time frame. • Attempt to open up the EDGE2*plus* using 1 key, verify that the *Edge2plus* uses a different key for each compartment. • Attempt to open up the Insight Plus using 1 key, verify that	

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	the Insight uses a different key for each compartment. • Attempt to make duplicate copies of keys, verify that the keys cannot be easily duplicated and create. Destructible seals (if applicable) • Attempt to open up seals without breaking the seals • Attempt to make duplicated seals	

7.6 *Volume, Performance, Stress, and Error Recovery Test Method*

During test case design of the following Volume Test Methods, iBeta reviewed the system limitations provided in the TDP (specifically the WinEDS 4.0 Limitation Doc_r20090213) which established the volume test parameters in accordance with the *VSS* Volume II Section 8.4.3.5 to processing more than the expected number of ballots/voters per precinct, to processing more than the expected number of precincts, or to any other similar conditions that tend to overload the system's capacity to process, store, and report data. The stress aspect of the test design, per the *VSS*, was to process ballots at high volume rates. For verification of the performance requirement, the processing rate, ballot format handling capability and the other aspects documented within the Vendor TDP was reviewed and incorporated into the Test Methods below. For error recovery, the testing was designed to verify the ability of the voting system to recover from hardware errors generated as a result of this Volume, Stress, and Performance testing and for the verification of the ability of the voting system to recover from data errors, iBeta relied on the source code review to the requirements of the *VSS* Volume I Section 4.2.3e (see Appendix C for the review criteria associated with those requirements).

The methodology for this testing was to combine as many of the limits in a test case as possible to stress the limits in combination. As general elections historically support the most number of voters, a general election was planned for the majority of the limits; however, the number of parties, ballot styles, and contests in a ballot style is historically much higher in a primary so the most ballots and votes will be processed in a Primary Election.

The limits document contained a limit on the DREs of 255 parties; however, a search of political parties in the United States that have fielded candidates since 1960 yielded on 54 parties and this test method reflects the lower 54 number of parties.

This testing will be conducted in conjunction with the Data Accuracy Test methods provided in Section 7.4.

iBeta Definition	Volume (Data Acuracy, Volume, Stress, Performance, and Error Recovery) Test 1	Volume (Data Accuracy, Volume, Stress, Performance, and Error Recovery) Test 2
Test Case Name	Data Accuracy, Volume, Stress, Performance, and Error Recovery - Primary Test Election - IL	Data Accuracy, Volume, Stress, Performance, and Error Recovery - General Test Election - WA
Scope - identifies the type of test	Volume testing crosses into several areas of voting system testing and is included in the PCA TDP Document Review, the PCA Source Code Review, and in System Level Tests. A review of the vendor documentation will be completed to identify the documented limits, assess the historical election data, assess the testing conducted by the vendor, and assess the testing conducted by end users (jurisdictions) to establish test parameters that reasonably represent the expected limits that the voting system components will be subjected to in use.	Same as Test 1

iBeta Definition	Volume (Data Acuracy, Volume, Stress, Performance, and Error Recovery) Test 1	Volume (Data Accuracy, Volume, Stress, Performance, and Error Recovery) Test 2
Test Objective	The objective is to validate the ability to process, store and report data using the allowed maximum number of voter groups categories, voter groups per voter group category, precincts and ballot styles (cards) within an election. Volume: - Total number of ballots processed by each precinct shall reflect the: Maximum number of active voting positions Maximum number of ballot styles in a precinct Maximum number of precincts in a Memory Cartridge Maximum number of candidates voted for in a single precinct Maximum number of parties - Process the maximum number of Precincts Stress: - Test the system's response to transient overload conditions. • Polling place devices shall be subjected to ballot processing at the high volume rates at which the equipment can be operated. • Central counting systems shall be subjected to similar overloads including continuous processing through all readers simultaneously. Performance - Verify accuracy, processing rate, ballot format handling capability, and other performance attributes claimed by the vendor Error Recovery - Verify the ability of the system to recover from hardware and data errors.	The objective is to validate the ability to process, store and report data using the allowed maximum number of voter groups categories, voter groups per voter group category, precincts and ballot styles (cards) within an election. Volume: - Total number of ballots processed by each precinct shall reflect the: Maximum number of active voting positions Maximum number of parties - Process the maximum expected number of races and the number of candidates per race - Process the maximum expected number of total candidates in an election - Process the maximum number of races per precinct - Process the maximum number of ballot styles in an election - Process the maximum number of contests in a ballot style Performance - Verify accuracy, processing rate, ballot format handling capability, and other performance attributes claimed by the vendor Error Recovery - Verify the ability of the system to recover from hardware and data errors.
Test Variables: Volume Stress Performance Recovery	Test Variables will be established to test the following: - EMS: WinEDS election definition and accumulation of election results - Election Day: Edge2plus and Insight Plus as used on election day (traditional vote center) with HAAT90. - Early voting devices: Edge 2 and Insight which operate a longer time period and a higher volume of precincts and ballots. - Absentee/Early voting devices: 400-C which handles a much higher volume of precincts and ballots.	Test Variables will be established to test the following: - EMS: WinEDS election definition and accumulation of election results - Election Day: EDGE2plus, Insight , and Edge2 as used on election day (traditional vote center) with HAAT100. - Early voting devices: EDGE2plus, Insight Plus, and Edge2 which operate a longer time period - Absentee voting devices: 400-C
A description of the voting system type and the operational environment	The WinEDS 4.0 includes: - Election Reporting - HAAT Listener - Extended Services All testing will be conducted in an office environment to simulate election day, early voting, and absentee voting environments.	Same as Test 1
VSS 2002 vol. 1	2.2.5.2.2 Audit/Error messages 2.2.3.2.3 Audit/Status messages 2.2.3 Error Recovery 2.2.2 thru 2.2.2.2, 2.2.5, 3.2.1, 3.2.5.2, 3.4.3, and 3.4.5 (Data Accuracy)	2.2.5.2.2 Audit/Error messages 2.2.3.2.3 Audit/Status messages 2.2.3 Error Recovery

iBeta Definition	Volume (Data Acuracy, Volume, Stress, Performance, and Error Recovery) Test 1	Volume (Data Accuracy, Volume, Stress, Performance, and Error Recovery) Test 2
VSS 2002 vol. 2	6.2.3 Volume (maximum number of ballot styles) A4.3.5 Volume (maximum and exceeding more than the maximum number of precincts) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of precincts and ballot styles) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates-graceful shut down and recovery without loss of data) 4.7.1.1, 4.7.3 thru 4.7.4.d.i, 6.1, 6.2.3 (Data Accuracy)	6.2.3 Volume A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates-graceful shut down and recovery without loss of data)
Hardware, Software voting system configuration and test location	The WinEDS 4.0 Voting System consist of the following: - WinEDS application - MPR Rev D and application - WinETP application - HAAT Listener (and RAS Server for HAAT90) - iMPR C.1.1 and application - Extended Services - Election Reporting - Edge2 Model A and B and application - VeriVote and application - Edge2plus CO.3 and CO.4 and application - HAAT90 and 100 and application - Insight and Insight Plus - HPX and APX applications - 400-C All testing will be perform by at the Mil-Std 801D test lab.	Same as Test 1
Pre-requisites and preparation for execution of the test case.	Complete the prerequisites; Identify system configuration, validate automate tools for use, and verify voting system component operation. Test Method Validation: Technical review to be conducted for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. -	Same as Test 1
Getting Started Checks	Check the voting system to: - Verify the test environment and system configuration is documented in the PCA Configuration and vendor described configuration. - Validate installation of the trusted build - Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager.	Same as Test 1
Documentation of Test Data & Test Results	Test Data: - Record all programmed & observed election, ballot & vote data fields and field contents on the corresponding tabs to provide a method to repeat the test - Preserve all tabs for each instance the test is run. Test Results: - Enter Accept/Reject on the Test Steps - In Comments enter any deviations, discrepancies, or notable observations - Log discrepancies on the Discrepancy Report and insert the discrepancy number in the Comments field of Test Step.	Same as Test 1

iBeta Definition	Volume (Data Acuracy, Volume, Stress, Performance, and Error Recovery) Test 1	Volume (Data Accuracy, Volume, Stress, Performance, and Error Recovery) Test 2
Volume: Voting systems Processing	Ballot Prep: Scenario 1) Primary Election Day (values may be adjusted based on historical elections and TDP limits review) -An election database can be accurately/securely defined & formatted. -Ballots (candidates & propositions) can be accurately defined & generated. - Check WinEDS reports for election set up Election media on Insight, InsightPlus, Edge2 (models A and B), EDGE2plus (models CO3 and CO4), and the 400-C can be installed with a Primary Election with 51 races: 1-9 Jurisdiction wide with 15 parties and candidates ranging from 1 to 5 10-29 Non-Partisan (NP), 2 districts, 5 candidates each 30-39 Questions, NP, yes/no 40 NP, jurisdiction wide, 5 candidates 41-50 NP, no rotation, jurisdiction wide, 2 candidates 51 NP, no rotation, jurisdiction wide, 20 candidates - If there are any system errors that cause the WinEDS ballot preparation applications to crash then verify the applications recover without any loss of data.	Ballot Prep: Scenario 2) General Election Day (values may be adjusted based on historical elections and TDP limits review) -An election database can be accurately/securely defined & formatted. -Ballots (candidates & propositions) can be accurately defined & generated. - Check WinEDS reports for election set up Election media can be installed with a General Election with 5000 races: 1 Jurisdiction wide, 54 candidates (1 in each party), vote for 1 = 54 candidates 2 Jurisdiction wide, 250 candidates, vote for 250 = 250 candidates 3 - 1000 precinct level races with 1 candidate and a write-in, vote for 1 = 1998 candidates 1001 - 3000 district level questions, non-partisan, yes/no = 2000 ballot positions 3001 - 3500 district level races, partisan (2 parties), 2 candidates, vote for 1 = 1000 candidates 3501 - 4000 district level races, non-partisan, 1 or 2 candidates, vote for 1 = 698 candidates 4001-5000 precinct level questions, retain/reject = 2000 ballot positions - If there are any system errors that cause the EMS ballot preparation applications to crash then verify the applications recover without any loss of data.
Volume	System response to processing more than the expected number of precincts and maximum number of ballot styles. Maximum limit or capacity is successfully processed without errors for the following: - Maximum number of active voting positions - Maximum number of ballot styles in a precinct - Maximum number of precincts in a Memory Cartridge - Maximum number of candidates voted for in a single precinct - Maximum number of parties - Capacity limit of the data storage devices	System response to processing more than the expected number of precincts and maximum number of ballot styles. Maximum limit or capacity is successfully processed without errors for the following: - Total number of ballots processed by each precinct shall reflect the: Maximum number of active voting positions Maximum number of parties - Process the maximum expected number of races and the number of candidates per race - Process the maximum expected number of total candidates in an election - Process the maximum number of races per precinct - Process the maximum number of ballot styles in an election - Process the maximum number of contests in a ballot style When importing over the allowed precincts and/or ballot styles into the WinEDS errors are generated.

iBeta Definition	Volume (Data Acuracy, Volume, Stress, Performance, and Error Recovery) Test 1	Volume (Data Accuracy, Volume, Stress, Performance, and Error Recovery) Test 2
Stress	System responses to overloading conditions: - Maximum rate (limit) of ballot processing for election day voting components - Maximum rate (limit) of ballot processing for Absentee/Early Voting components - Maximum limit of interconnected voting components simultaneously processing ballots - Maximum limit of number of voting components downloading results simultaneously to WinEDS - Vary the order in which the election cartridges are loaded into WinEDS for tally	Not a test attribute.
Performance	No system degradation (ballot format handling capability and processing rates): - When importing large amount of data into the WinEDS - When installing an election onto any device - The system will not slow down throughout the testing to the point where it takes 10 times longer to complete a function	Same as Test 1
Error Recovery	In the event that functional testing causes error recovery to trigger, the voting system gracefully shuts down (no crash) and recovers from errors caused by overloading the number of precincts and ballots styles. - Ballot format handling capabilities and processing capabilities-graceful shut down and recover without loss of data - Critical Status Messages The error recovery requirement is addressed also through the source code review of VSS vol 1: 4.2.3.e.	Same as Test 1
Readiness Testing and Poll Verification	Voting system is ready for the election: - The election is correctly installed (Election ID, polling place name, precincts) - Test data (run 2 different precincts to validate the system is ready) is segregated from voting data, with no residual effect' Test confirmation that there are: - No hardware/software failures - The device is ready to be activated to accept votes (No Identification of any failures & corrective action)	Same as Test 1
Pre- vote: Opening the Polls Verification	Precinct Count/ Paper based: - Zero count report (to verify no votes are on the components prior to starting precinct, early, and absentee voting)	Same as Test 1
Voting: Ballot Activation and Casting Verifications	Protects secrecy of ballot/vote - The Insights and Edges are set to Voting mode. - The 400-C and Insights, if there are any system errors that cause the machines to shut down then the component shall recover without any loss of data.	Same as Test 1
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	The system audit provides a time stamped, always available, report of normal/abnormal events found. Error messages are: - Are generated, stored & reported as they occur - Errors requiring intervention by the voter or poll worker clearly display issues & action instructions in easily understood text language or with indicators - Incorrect responses will not lead to irreversible errors.	Same as Test 1

iBeta Definition	Volume (Data Acuracy, Volume, Stress, Performance, and Error Recovery) Test 1	Volume (Data Accuracy, Volume, Stress, Performance, and Error Recovery) Test 2
Post-vote: Closing the Polls	Once the polls are closed the voting system, obtain: - Printed reports of ballots counted by tabulator - Reported votes match predicted votes from tabulator with votes and undervotes.	Same as Test 1
Post-vote: Central Count	Election Day with 2 EDGE2plus (25 vote sessions per hour per machine) casting 4800 ballots. The 2 Insight Plus (100 ballot cards per hour per machine) will cast 9,600 cards. All memory cartridges will be uploaded to the WinEDS via a single HAAT90 (with iMPR C1.1) also within the chamber (but removed for transmission). Due to the polls being closed and new cartridges being installed every 12 hours, there will be 16 EDGE2plus USBs and 8 Insight Plus cartridges to upload. The upload will be in varying order between the memory cartridge types into the HAAT90. Early Voting with 2 EDGE2 (25 vote session per hour per machine) casting 4800 ballots. The 2 Insights (100 ballot cards per hour per machine) will cast 9,600 ballot cards. All memory cartridges will be uploaded to the WinEDS via the MPR and USB ports. There will be 4 EDGE2 PCMCIA cards and 2 Insight memory cartridges to upload. The upload will be in varying order between the memory cartridge types and will include the processing of the 400-C absentee memory cartridges. The Election Day vote import processing will also occur at the same time. Absentee Voting with 2 400-C to process 38,400 ballots. - Zero count report (to verify no votes are on the prior to starting voting) - If there are any system errors that cause any component to shut down or crash then the component shall recover without any loss of data. Vote Consolidation: WinEDS consolidated reports match the predicted votes. Reports include: - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report (containing all precincts) - View and Print Precinct by Precinct Reports	Election Day with 2 EDGE2plus and 2 Edge2 to each process 1 vote session per hour for 12 hours for a total of 48 ballots per each type of DRE. The Insight will process 1 ballot per hour for 12 hours. All memory cartridges will be uploaded to the WinEDS via a single HAAT100 (with iMPR C0.7). There will be 2 EDGE2plus USBs, 2 Edge2 PCMCIA cards, and 2 Insight Plus cartridges to upload. The upload will be in varying order between the memory cartridge types into the HAAT100 Early Voting with 2 EDGE2plus and 2 Edge2 to each process 1 vote session per hour for 120 hours for a total of 480 ballots per each type of DRE. The Insight will process 1 ballot per hour for 120 hours. All memory cartridges will be uploaded to the WinEDS via the MPR and USB ports. There will be 2 EDGE2 PCMCIA cards, 2 Edge2plus USBs, and 2 Insight memory cartridges to upload. The upload will be in varying order between the memory cartridge types and will include the processing of the 400-C absentee memory cartridges. The Election Day vote import processing will also occur at the same time. Absentee Voting with 2 400-C processing 300 ballots. - Zero count report (to verify no votes are on the prior to starting voting) - If there are any system errors that cause any component to shut down or crash then the component shall recover without any loss of data. Vote Consolidation: WinEDS consolidated reports match the predicted votes. Reports include: - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report (containing all precincts) - View and Print Precinct by Precinct Reports
Expected Results are observed	Review the test result against the expected result: • Accept: the expected result is observed • Reject: the expected result of the test case is not observed • Not Testable (NT): rejection of a previous test step prevents execution of this step, or tested in another Test Case. • Not Applicable (NA): not applicable to test scope	Same as Test 1

iBeta Definition	Volume (Data Acuracy, Volume, Stress, Performance, and Error Recovery) Test 1	Volume (Data Accuracy, Volume, Stress, Performance, and Error Recovery) Test 2
Record observations and all input/outputs for each election;	All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. - Any failure against the requirements of the EAC guidelines will mean the failure of the system. and shall be reported as such. - Failures will be reported to the vendor as Defect Issues in the Discrepancy Report. - The vendor shall have the opportunity to cure all discrepancies prior to issuance of the Certification Report. - If cures are submitted the applicable test will be rerun. Complete information about the rerun test will be preserved in the test case. The cure and results of the retest will be noted in the - Discrepancy Report and submitted as an appendix of the Certification Report. - Operations which do not fail the requirements but could be deemed defects or inconsistent with standard software practices or election practices will be logged as Informational Issues on the Discrepancy Report. It is the vendor's option to address these issues. Open items will be identified in the report.	Same as Test 1

8. Appendix - TDP Documents

Sequoia delivered a separate TDP for each product. Multiple TDP deliveries have been grouped into a single table if they are closely related. Example: Insight, Insight Plus and MPR have been grouped into a single table. The documents listed are delivered as part of the Sequoia WinEDS voting system.

Table 14 - WinEDS Technical Data Package Documents

Title	Version	Date	Author (Organization.)
WinEDS 4.0 Personnel & Training Requirements	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 Quality Assurance Program	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 Sample Reports	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 SDK - Optech 400-C	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 SDK - AVC Edge	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 SDK - Optech Insight	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 SDK - Sequoia Miscellaneous	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 System Database	1.04	June 2008	Sequoia Voting Systems
WinEDS 4.0 Visio Templates: Edge/Edge2Plus	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 Test & Verification Specification	1.03	June 2008	Sequoia Voting Systems
WinEDS 4.0 Functional Specification	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 Graphical User Interface	1.01	June 2008	Sequoia Voting Systems
WinEDS 4.0 Security Specification	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 System Overview	1.03	June 2008	Sequoia Voting Systems
Sequoia Voting Systems WinEDS 4.0 – TDP Cross-Reference	No version	February 2008	Sequoia Voting Systems
WinEDS 4.0 System Operations Procedure	1.6	July 16, 2008	Sequoia Voting Systems
WinEDS 4.0 Build Process	1.03	June 2008	Sequoia Voting Systems
WinEDS 4.0 Configuration Management Plan	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 Technical Data Package	1.02	June 2008	Sequoia Voting Systems
WinEDS 4.0 Installation Guide	1.04	June 2008	Sequoia Voting Systems
WinEDS Election Reporting Operator's Guide Release 4.0	2.05	June 2008	Sequoia Voting Systems
WinEDS Extended Services Operator's Guide Release 4.0	Draft 2.07	July 2008	Sequoia Voting Systems
WinEDS 4.0 Software Specification	1.06	July 2008	Sequoia Voting Systems
WinEDS 4.0 Technical Data Package Master Document Change Log	No Version	July 2008	Sequoia Voting Systems
WinEDS 4.0 Rank Choice Voting Functional Specification	1.08	July 2008	Sequoia Voting Systems

Table 15 - EDGE2*plus* Technical Data Package Documents

Title	Version	Date	Author (Organization.)
EDGE2PLUS MODEL 300 Configuration Management Plan	3.04	June 2008	Sequoia Voting Systems
EDGE2PLUS MODEL 300 DIAGNOSTICS APPLICATION MANUAL	3.05	June 2008	Sequoia Voting Systems
Trace to Vendor Testing and Technical Data Package	None	June 2008	Sequoia Voting Systems
EDGE2PLUS MODEL 300 FUNCTIONAL SPECIFICATION	3.03	June 2008	Sequoia Voting Systmes
EDGE2PLUS MODEL 300 HARDWARE SPECIFICATION	3.05	June 2008	Sequoia Voting Systems
EDGE2PLUS MODEL 300	3.03	June 2008	Sequoia Voting Systems

Title	Version	Date	Author (Organization.)
MAINTENANCE MANUAL			
EDGE2PLUS MODEL 300 OPERATOR'S MANUAL	3.05	August 2008	Sequoia Voting Systems
EDGE2PLUS MODEL 300 PERSONNEL & TRAINING REQUIREMENTS	3.02	June 2008	Sequoia Voting Systems
EDGE2PLUS MODEL 300 QUALITY ASSURANCE PROGRAM	3.02	June 2008	Sequoia Voting Systmes
EDGE2PLUS MODEL 300 SECURITY SPECIFICATION	3.03	June 2008	Sequoia Voting Systems
EDGE2PLUS MODEL 300 SOFTWARE SPECIFICATION	3.06	September 2008	Sequoia Voting Systems
EDGE2PLUS MODEL 300 SYSTEM OVERVIEW	3.03	June 2008	Sequoia Voting Systems
EDGE2PLUS MODEL 300 TECHNICAL DATA PACKAGE	3.02	June 2008	Sequoia Voting Systems
EDGE2PLUS MODEL 300 Test & Verification Specification	3.04	June 2008	Sequoia Voting Systems
VSS Test Suite	3.02	August 2007	Sequoia Voting Systems
Edge2plus Model 300 C.03 Supported Functionality Declaration	None	July 2007	Sequoia Voting Systems
ABLE-D™ Operators Manual	3.01	July 2007	Sequoia Voting Systems
Edge2plus Hardware Revision C0.3 Release Notes	1.00	September 25, 2007	Sequoia Voting Systems
Edge2plus Hardware Revision C0.4 Release Notes	1.00	September 25, 2007	Sequioa Voting Systems
Edge2plus Model 300 version C0.3 Approved Parts List	3.02	July 2007	Sequoia Voting Systems

Table 16 - AVC Edge Technical Data Package Documents

Title	Version	Date	Author (Organization.)
Card Activator 5.1 Operations & Maintenance Manual	1.01	March 2008	Sequoia Voting Systems
Card Activator 5.1® Poll Workers Manual	1.00	September 2007	Sequoia Voting Systems
Edge Aux Power Unit Operations & Maintenance Manual	1.05	March 2008	Sequoia Voting Systems
Edge Audio Voting Accessory 5.1 Poll Workers & Operators Manual	1.01	March 2008	Sequoia Voting Systems
AVC Edge 5.1 Approved Parts List	1.04	March 2008	Sequoia Voting System
AVC Edge 5.1 Change Release Summary	1.01	March 2008	Sequoia Voting System
AVC Edge 5.1 Configuration Management Plan	1.03	March 2008	Sequoia Voting System
Requirements of the FECVSS 2002 Trace to Vendor Testing and Technical Data Package	1.05	March 2008	Sequoia Voting System
AVC Edge 5.1 Functional Specification	1.04	March 2008	Sequoia Voting System
AVC Edge 5.1 Hardware Specification	1.04	March 2008	Sequoia Voting System
AVC Edge 5.1 Maintenance Manual	1.04	March 2008	Sequoia Voting Systems
AVC Edge 5.1 Operators Manual	1.04	March 2008	Sequoia Voting System
AVC Edge 5.1 Personnel & Training Requirements	1.03	March 2008	Sequoia Voting System
AVC Edge 5.1 Poll Workers Manual	1.03	March 2008	Sequoia Voting System
AVC Edge 5.1 Quality Assurance Program	1.03	March 2008	Sequoia Voting Systems
AVC Edge 5.1 Sample Reports	1.03	March 2008	Sequoia Voting Systems
AVC Edge 5.1® Security Specification	1.02	September 2007	Sequoia Voting Systems
AVC Edge 5.1 Software Specification	1.05	March 2008	Sequoia Voting Systems

Title	Version	Date	Author (Organization.)
AVC Edge 5.1 System Overview	1.04	March 2008	Sequoia Voting Systems
AVC Edge 5.1 Technical Data Package	1.05	March 2008	Sequoia Voting Systems
AVC Edge 5.1 Test & Verification Specification	1.03	March 2008	Sequoia Voting Systems
AVC Edge 5.1® Penetration Analysis	1.00	March 2007	Sequoia Voting Systems
Verivote Printer Maintenance Manual	1.07	March 2008	Sequoia Voting Systems
Verivote Printer Operations Manual	1.11	March 2008	Sequoia Voting Systems
ASSY, AUDIO, EDGE TYPE 2, FINAL PN 460-32500-00 B.O.M	none	3/16/05	Sequoia Voting Systems

Table 17 - Insight, Insight Plus and MPR Technical Data Package Documents

Title	Version	Date	Author (Organization.)
OPTECH INSIGHT PENETRATION ANALYSIS (APPENDIX B TO SECURITY SPEC)	1.02	July 2007	Sequoia Voting Systems
OPTECH INSIGHT APPROVED PARTS LIST	1.03	January 2008	Sequoia Voting Systems
APPROVED PARTS LIST	1.01	February 2005	Sequoia Voting Systems
OPTECH INSIGHT CHANGE RELEASE SUMMARY	1.02	January 2008	Sequoia Voting Systems
OPTECH INSIGHT CONFIGURATION MANAGMENET PLAN	1.02	January 2008	Sequoia Voting Systems
Requirements of the FEC VSS 2002 Trace to Vendor Testing and Technical Data Package	1.04	January 2008	Sequoia Voting Systems
OPTECH INSIGHT FUNCTIONAL SPECIFICATION	1.04	January 2008	Sequoia Voting Systems
OPTECH INSIGHT HARDWARE SPECIFICATION	1.06	January 2008	Sequoia Voting Systems
OPTECH INSIGHT MAINTENENCE MANUAL	1.06	January 2008	Sequoia Voting Systems
OPTECH INSIGHT OPERATORS MANUAL	1.08	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PERSONNEL & TRAINING REQUIREMENTS	1.02	January 2008	Sequoia Voting Systems
OPTECH INSIGHT QUALITY ASSURANCE PROGRAM	1.03	January 2008	Sequoia Voting Systems
OPTECH INSIGHT SAMPLE REPORTS	1.02	January 2008	Sequoia Voting Systems
OPTECH INSIGHT SECURITY SPECIFICATION	1.03	January 2008	Sequoia Voting Systems
OPTECH INSIGHT SOFTWARE SPECIFICATION	1.04	January 2008	Sequoia Voting Systems
OPTECH INSIGHT SYSTEM OVERVIEW	1.04	January 2008	Sequoia Voting Systems
OPTECH INSIGHT TECHNICAL DATA PACKAGE	1.02	January 2008	Sequoia Voting Systems
OPTECH INSIGHT TEST & VERIFICATION SPECIFICATION	1.03	January 2008	Sequoia Voting Systems
INSIGHT BATTERY OPERATORS MANUAL	1.01	September 2005	Sequoia Voting Systems
INSIGHT MODEM OPERATORS MANUAL	1.02	July 2007	Sequoia Voting Systems
SPR HOST FOR OPTECH EAGLE/INSIGHT OPERATORS MANUAL	1.06	July 2007	Sequoia Voting Systems
Optech Insight Documentation Updates	0.01	January 2008	iBeta Quality Assurance

Title	Version	Date	Author (Organization.)
INSIGHT BATTERY OPERATORS MANUAL	1.01	September 2005	Sequoia Voting Systems
INSIGHT MODEM OPERATORS MANUAL	1.02	July 2007	Sequoia Voting Systems
OPTECH INSIGHT PLUS PENETRATION ANALYSIS (APPENDIX B TO SECURITY SPEC)	1.01	July 2007	Sequoia Voting Systems
OPTECH INSIGHT PLUS APPROVED PARTS LIST	1.02	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS APPROVED PARTS LIST	1.00	September 2005	Sequoia Voting Systems
Optech Insight Plus Change Release Summary APX K2.16 - HPX 1.44	1.02	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS CONFIGURATION MANAGEMENT PLAN	1.02	January 2008	Sequoia Voting Systems
Requirements of the FEC VSS 2002 Trace to Vendor Testing and Technical Data Package	1.05	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS FUNCTIONAL SPECIFICATION	1.04	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS HARDWARE SPECIFICATION	1.04	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS MAINTENENCE MANUAL	1.05	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS OPERATORS MANUAL	1.05	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS PERSONNEL & TRAINING REQUIREMENTS	1.02	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS QUALITY ASSURANCE PROGRAM	1.03	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS SAMPLE REPORTS	1.02	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS SECURITY SPECIFICATION	1.02	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS SOFTWARE SPECIFICATION	1.04	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS SYSTEM OVERVIEW	1.04	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS TECHNICAL DATA PACKAGE	1.04	January 2008	Sequoia Voting Systems
OPTECH INSIGHT PLUS TEST & VERIFICATION SPECIFICATION	1.03	January 2008	Sequoia Voting Systems
SPR HOST FOR OPTECH EAGLE/INSIGHT OPERATORS MANUAL	1.06	July 2007	Sequoia Voting Systems
Optech Insight Plus Documentation Updates	0.01	January 2008	iBeta Quality Assurance
SC33024B9	B	5/6/2008	Sequoia Voting System
PCB, SPU-SM, INSIGHT (NEW)	B	10/13/06	Sequoia Voting Systems
PCA, SPU-SM, INSIGHT (NEW)	B	10/13/06	Sequoia Voting Systems
PCA, SPU-SM, TESTED INSIGHT	B	4/24/08	Sequoia Voting Systems
ASSY. MEM-PAK TRAY/PRINTER / CPU-SM	A	4/24/08	Sequoia Voting System
ASSY. MEM-PAK TRAY/PRINTER / CPU-SM	A	4/24/08	Sequoia Voting System

Title	Version	Date	Author (Organization.)
ASSY. CHASSYS COMPLETED W/ SPU-SM	A	4/24/08	Sequoia Voting Systems
FINAL UNIT (AS STOCKED) INSIGHT W/ CPU-SM	A	4/24/08	Sequoia Voting Systems
ASSY, MEM-PAK TRAY/ PRT/ CPU-SM/ LCD	A	4/24/08	Sequoia Voting Systems
ASSY, MEM-PAK TRAY/ PRT/ CPU-SM/ LCD	A	4/24/08	Sequoia Voting Systems
ASSY, MEM-PAK TRAY/ PRT/ CPU-SM/ LCD	A	4/24/08	Sequoia Voting Systems
ASSY. CHASSIS COMPLETED W/SPU-SM/LCD	A	4/24/08	Sequoia Voting Systems
Insight Hybrid w/LCD and battery backup	A	4/24/08	Sequoia Voting Systems
ENGINEERING CHANGE ORDER	NUMBER:697	4/21/08	Sequoia Voting Systems
Insight Master CPU Schematic	B	10/12/06	Sequoia Voting Systems
Insight Master CPU Schematic	B	10/12/06	Sequoia Voting Systems
Insight Master CPU Schematic	B	10/12/06	Sequoia Voting Systems
Insight Master CPU Schematic	B	10/12/06	Sequoia Voting Systems
Insight Master CPU Schematic	B	10/12/06	Sequoia Voting Systems
Insight Master CPU Schematic	B	10/12/06	Sequoia Voting Systems
Insight Master CPU Schematic	B	10/12/06	Sequoia Voting Systems
Insight Master CPU Schematic	B	10/12/06	Sequoia Voting Systems
Bill of Material	n/a	no date	Sequoia Voting Systems
PCA, CPU-SM, INSIGHT (NEW)	B	10/13/06	Sequoia Voting Systems
MemoryPack Receiver Penetration Analysis	1.02	Feb-08	Sequoia Voting Systems
MPR Configuration Management Plan	1.02	Feb-08	Sequoia Voting Systems
MPR FEC Cross-Reference	1.02	Feb-08	Sequoia Voting Systems
MPR Functional Specification	1.02	Feb-08	Sequoia Voting Systems
MPR Hardware Specification	1.3	Feb-08	Sequoia Voting Systems
MPR Maintenance Manual	1.5	Feb-08	Sequoia Voting Systems
MPR Operators Manual	1.5	Feb-08	Sequoia Voting Systems
MPR Personnel & Training Requirements	1.02	Feb-08	Sequoia Voting Systems
MPR Quality Assurance Program	1.02	Feb-08	Sequoia Voting Systems
MPR Security Specification	1.02	Feb-08	Sequoia Voting Systems
MPR Software Specification	1.02	Feb-08	Sequoia Voting Systems
MPR System Overview	1.03	Feb-08	Sequoia Voting Systems
MPR Technical Data Package	1.02	Feb-08	Sequoia Voting Systems
MPR Test & Verification Specification	1.3	Feb-08	Sequoia Voting Systems

Table 18 - HAAT and HAAT Listener Technical Data Package Documents

Title	Version	Date	Author (Organization.)
HAAT50 ACCEPTANCE TESTING GUIDE	1.01	June 2008	Sequoia Voting Systems
HAAT50 APPROVED PARTS LIST HW REVISION A0.3	1.01	June 2008	Sequoia Voting Systems
HAAT50 APPROVED PARTS LIST HW REVISTION A1.1	1.01	June 2008	Sequoia Voting Systems
HAAT50 APPROVED PARTS LIST HW REVISION A1.2	1.01	June 2008	Sequoia Voting Systems
HAAT50 Configuration Management Plan	1.03	July 2008	Sequoia Voting Systems
HAAT50 Functional Specification	1.02	July 2008	Sequoia Voting Systems
HAAT50 Hardware Specification	1.03	July 2008	Sequoia Voting Systems
HAAT50™ Operations & Maintenance Manual	1.02	July 2008	Sequoia Voting Systems

Title	Version	Date	Author (Organization.)
HAAT50 PERSONNEL & TRAINING REQUIREMENTS	1.01	June 2008	Sequoia Voting Systems
HAAT50 POLL WORKERS MANUAL	1.01	June 2008	Sequoia Voting Systems
HAAT50 QUALITY ASSURANCE PROGRAM	1.01	June 2008	Sequoia Voting Systems
HAAT50 SECURITY SPECIFICATION	1.01	June 2008	Sequoia Voting Systems
HAAT50 SOFTWARE SPECIFICATION	1.01	June 2008	Sequoia Voting Systems
HAAT50 SYSTEM OVERVIEW	1.01	June 2008	Sequioa Voting Systems
HAAT50 TEST & VERIFICATION SPECIFICATION	1.01	June 2008	Sequoia Voting Systems
HAAT80 ACCEPTANCE TESTING GUIDE	1.01	June 2008	Sequoia Voting Systems
APPROVED PARTS LIST HW REVISION A1.1	1.01	June 2008	Sequoia Voting Systems
HAAT80 APPROVED PARTS LIST HW REVISION A1.2	1.01	June 2008	Sequoia Voting Systems
HAAT80 Configuration Management Plan	2.02	July 2008	Sequoia Voting Systems
HAAT80 Functional Specification	2.02	July 2008	Sequoia Voting Systems
HAAT80 Hardware Specification	2.03	July 2008	Sequoia Voting Systems
HAAT80 Operations & Maintenance Manual	2.02	July 2008	Sequoia Voting Systems
HAAT80 PERSONNEL & TRAINING REQUIREMENTS	2.01	June 2008	Sequoia Voting Systems
HAAT80 POLL WORKERS MANUAL	1.01	June 2008	Sequoia Voting Systems
HAAT80 Quality Assurance Program	2.02	July 2008	Sequoia Voting Systems
HAAT80 SECURITY SPECIFICATION	2.01	June 2008	Sequoia Voting Systems
HAAT80 SOFTWARE SPECIFICATION	2.01	June 2008	Sequoia Voting Systems
HAAT80 System Overview	2.02	July 2008	Sequoia Voting Systems
HAAT80 TEST & VERIFICATION SPECIFICATION	2.01	June 2008	Sequoia Voting Systems
HAAT90 ACCEPTANCE TESTING GUIDE	1.04	June 2008	Sequoia Voting Systems
HAAT90 Configuration Management Plan	2.04	July 2008	Sequoia Voting Systems
HAAT90 FUNCTIONAL SPECIFICATION	2.01	June 2008	Sequoia Voting Systems
HAAT90 OPERATIONS & MAINTENANCE MANUAL	2.02	June 2008	Sequoia Voting Systems
HAAT90 Personnel & Training Requirements	2.02	July 2008	Sequoia Voting Systems
HAAT90 Quality Assurance Program	2.02	July 2008	Sequoia Voting Systems
HAAT90 SECURITY SPECIFICATION	2.02	June 2008	Sequoia Voting Systems
HAAT90 SYSTEM OVERVIEW	2.04	June 2008	Sequoia Voting Systems
HAAT90 TEST & VERIFICATION SPECIFICATION	2.01	June 2008	Sequoia Voting Systems
HAAT90 Hardware Specification HW Revision A1.1	1.04	March 2008	Sequoia Voting System
HAAT90 POLL WORKERS MANUAL	1.04	June 2008	Sequoia Voting Systems
HAAT90 SOFTWARE SPECIFICATION	1.05	June 2008	Sequoia Voting Systems
HAAT90 APPROVED PARTS LIST HW REVISION A1.1	1.01	June 2008	Sequoia Voting Systems
HAAT90 APPROVED PARTS LIST HW REVISION A1.2	1.01	June 2008	Sequoia Voting System
HAAT90 Hardware Specification	1.08	July 2008	Sequoia Voting Systems
HAAT100 Configuration Management Plan	1.04	July 2008	Sequoia Voting Systems
HAAT100 ACCEPTANCE TESTING GUIDE	1.01	June 2008	Sequoia Voting Systems
HAAT100 FUNCTIONAL SPECIFICATION	1.01	June 2008	Sequoia Voting Systems
HAAT100 Hardware Specification HW Revision A0.7	1.00	March 2008	Sequoia Voting Systems

Title	Version	Date	Author (Organization.)
HAAT100 HARDWARE SPECIFICATION HW REVISION A1.2	1.02	June 2008	Sequoia Voting Systems
HAAT100 OPERATIONS & MAINTENANCE MANUAL	1.01	June 2008	Sequoia Voting Systems
HAAT100 Personnel & Training Requirements	1.02	July 2008	Sequoia Voting Systems
HAAT100 POLL WORKERS MANUAL	2.01	June 2008	Sequoia Voting Systems
HAAT100 QUALITY ASSURANCE PROGRAM	1.01	June 2008	Sequoia Voting Systems
HAAT100 SECURITY SPECIFICATION	1.01	June 2008	Sequoia Voting Systems
HAAT100 SOFTWARE SPECIFICATION	1.02	June 2008	Sequoia Voting Systems
HAAT100 SYSTEM OVERVIEW	1.02	June 2008	Sequoia Voting Systems
HAAT100 TEST & VERIFICATION SPECIFICATION	1.01	June 2008	Sequoia Voting Systems
WinEDS/HAAT Listener™ System Overview	1.06	August 2007	Sequoia Voting Systems
WinEDS/HAAT Listener™ Configuration Management Plan	1.06	August 2007	Sequoia Voting Systems
WinEDS/HAAT Listener™ Functional Specification	1.03	July 2006	Sequoia Voting Systems
WinEDS/HAAT Listener™ Operator's Manual	1.05	August 2007	Sequoia Voting Systems
WinEDS/HAAT Listener™ Personnel & Training Requirements	1.01	October 2006	Sequoia Voting Systems
WinEDS/HAAT Listener™ Quality Assurance Program	1.03	August 2007	Sequoia Voting Systems
WinEDS/HAAT Listener™ Security Specification	1.03	August 2007	Sequoia Voting Systems
WinEDS/HAAT Listener™ Software Specification	1.07	September 2007	Sequoia Voting Systems
WinEDS/HAAT Listener™ Technical Data Package	1.04	October 2006	Sequoia Voting Systems
WinEDS/HAAT Listener™ Test & Verification Specification	1.02	January 2006	Sequoia Voting Systems
WinEDS/HAAT Listener Test Plan	none	no date	Sequoia Voting Systems
FVSS 2002 Vendor Testing and TDP Trace	none	no date	Sequoia Voting Systems

Table 19 - Optech 400-C – WinETP Technical Data Package Documents

Title	Version	Date	Author (Organization.)
OPTECH 400-C PENETRATION	1.04	September 2007	Sequoia Voting Systems
OPTECH 400-C APPROVED PARTS LIST	1.05	January 2008	Sequoia Voting Systems
APPROVED PARTS LIST	1.00	March 2004	Sequoia Voting Systems
OPTECH 400-C CHANGE RELEASE SUMMARY	1.06	January 2008	Sequoia Voting Systems
OPTECH 400-C CONFIGURATION MANAGEMENT PLAN	1.06	January 2008	Sequoia Voting Systems
Requirements of the FECVSS 2002 Trace to Vender Testing and Technical Data Package	1.08	January 2008	Sequoia Voting Systems
OPTECH 400-C FUNCTIONAL SPECIFICATION	1.07	January 2008	Sequoia Voting Systems
OPTECH 400-C HARDWARE SPECIFICATION	1.07	January 2008	Sequoia Voting Systems
OPTECH 400-C MAINTENANCE MANUAL	1.08	January 2008	Sequoia Voting Systems
OPTECH 400-C OPERATORS MANUAL	1.08	January 2008	Sequoia Voting Systems

Title	Version	Date	Author (Organization.)
OPTECH 400-C PERSONNEL & TRAINING REQUIREMENTS	1.05	January 2008	Sequoia Voting Systems
OPTECH 400-C QUALITY ASSURANCE PROGRAM	1.05	January 2008	Sequoia Voting Systems
OPTECH 400-C SECURITY SPECIFICATION	1.06	January 2008	Sequoia Voting Systems
OPTECH 400-C SOFTWARE SPECIFICATION	1.07	January 2008	Sequoia Voting Systems
OPTECH 400-C SYSTEM OVERVIEW	1.07	January 2008	Sequoia Voting Systems
OPTECH 400-C TECHNICAL DATA PACKAGE	1.07	January 2008	Sequoia Voting Systems
OPTECH 400-C TEST & VERIFICATION SPECIFICATION	1.07	January 2008	Sequoia Voting Systems
WinETP (Election Tabulation Program for Windows) REFERENCE GUIDE	1.06	January 2008	Sequoia Voting Systems
WinETP (Election Tabulation Program for Windows) REFERENCE GUIDE	1.06	January 2008	Sequoia Voting Systems

Table 20 - Optech Printers Technical Data Package Documents

Title	Version	Date	Author (Organization.)
Optech III-Pe & IV-C Ballot Specification Drawing Voting Tracks	B	8/26/2003	Sequoia Voting Systems
Optech III-Pe & IV-C Ballot Specification Drawing Single-Sided Ballots	B	8/26/2003	Sequoia Voting Systems
Optech III-Pe & IV-C Ballot Specification Drawing Voting Layout Options	B	8/26/2003	Sequoia Voting Systems
Optech III-Pe & IV-C Ballot Specification Drawing Voting Ballot Components	B	8/26/2003	Sequoia Voting Systems
Ballot, Cut Line Detail Optech III-Pe & IV-C	A	5/1/1990	Sequoia Voting Systems
Ballot, Voting Arrow	B	4/27/1990	Sequoia Voting Systems
Optech III-Pe / 400-C 3 Wide Ballot - 2 Stubs	A	8/22/1990	Sequoia Voting Systems
Optech III-Pe & IV-C Ballot Specification Drawing Voting Layout Dimensions	J	8/26/2003	Sequoia Voting Systems
FOR OPTECH EAGLE/INSIGHT AND 400-C Optech Printers Manual	1.07	July 2007	Sequoia Voting Systems