iBeta Quality Assurance

Election Systems & Software
Unity 3.2.0.0 Voting System
VSTL Certification Test Plan

Prepared for
Election Systems & Software
11208 John Galt Blvd.
Omaha, NE 68137
EAC Application # ESS0701

Version 1.0

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			
VVS		VVSG	
Vol. #	Section(s) #	Vol. #	Section(s) #
1	2, 3, 4, 5, & 6	1	2, 3, 4, 5, 6, & 7
1	9.6.2.1	2	1.8.2.1
2	2, 3, 4, 5, & 6	2	2, 3, 4, 5, & 6
2	Appendix A	2	Appendix A

iBeta Quality Assurance is accredited for Voting System Testing:

U.S. Election Assistance Commission
VSTL

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®

NVLAP LAB CODE 200749-0

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Version History				
Ver #	**Description of Change**	**Author**	**Approved by**	**Date**
v.1.0	Initial release to the EAC	Jenn Garcia, Kelly Swift, & Carolyn Coggins	Carolyn Coggins & Sue Munguia	3/10/09

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 VSTL Certification Testing of the Election System & Software (ES&S) Unity 3.2.0.0 voting system to the Voting System Standards 2002 (VSS 2002). The purpose of this plan is to document the scope and detail the requirements of certification testing tailored to the design and complexity of software being tested and the type of voting system hardware.

The ES&S Unity 3.2.0.0 voting system has been submitted to iBeta for testing to support ES&S' application # ESS0701 to the US Election Assistance Commission (EAC) for certification to the VSS 2002.

The Unity 3.2.0.0 is a paper-based voting system that includes the:

- Election management system election (EMS) preparation software: Election Data Manager, ES&S Ballot Image Manager, Hardware Programming Manager, AutoMARK Information Management System
- EMS audit software: Audit Manager
- Pre-vote hardware: Ballot on Demand COTs printer
- Polling place optical scanner hardware and firmware: Model DS200
- Polling place ballot marker hardware and firmware: AutoMARK Voter Assist Terminal A100, AutoMARK Voter Assist Terminal Model A200
- Central count hardware and firmware: Model 650
- Central count EMS software: Election Reporting Manager

Due to the suspension of SysTest Labs (SysTest) in the middle of various Unity certification efforts, ES&S was authorized by the U.S. Election Assistance Commission to transfer their application for certification of the Unity 3.2.0.0 to iBeta. Unity 3.2.0.0 is a subset of paper ballot voting systems contained in the Unity v.4.0.0.0 voting system. At the time of the suspension EAC approval of the Unity v.4.0.0.0 test plan was approved and a substantial amount of relevant testing had been successfully completed. ES&S petitioned the EAC to assess the testing performed by SysTest for consideration of reuse. The EAC approved the following assessment process:

- The EAC has authorized the reuse of the hardware testing conducted by SysTest sub-contractors. iBeta will review the reports to confirm any failures resulting in engineering changes are documented and the reports document that all hardware ultimately passed.
- iBeta will audit a sample of the Technical Data Package (TDP) submitted to and reviewed by SysTest and provide a recommendation to the EAC regarding the need to conduct a more comprehensive review of the TDP. The EAC shall issue a decision regarding reuse of the PCA Document Review.
- iBeta will conduct a 3% review of the ES&S source code. This review will focus on important functional sections of the code in order to determine the depth and focus of source review conducted by SysTest. iBeta will provide a recommendation to the EAC regarding the reuse of the source code review conducted by SysTest. The EAC will then issue a decision regarding the reuse of the source code review conducted by SysTest.
- The EAC Technical Reviewers will review and assess the Functional, Accessibility, Maintainability, Accuracy, and Reliability test summary reports provided by SysTest on the DS200, M650, AutoMARK VATs, Ballot-on-Demand printer, and Unity EMS software. The EAC will issue a decision regarding the reuse of this testing.
- SysTest did not complete Volume, Stress, Error Recovery and Security testing. iBeta will perform this testing on the DS200, M650, AutoMARK VATs, and Unity EMS software.
- While applicable areas from the Unity v.4.0.0.0 Test Plan may be used, iBeta must issue a Unity 3.2.0.0 test plan. The EAC will review and approve a full test plan provided by iBeta.
- SysTest shall provide the appropriate test summaries for all items that are accepted for reuse.

In a letter issued February 12, 2009 the EAC authorized the reuse of the functional, accessibility, maintainability, accuracy, and reliability testing conducted for Unity 3.2.0.0 base upon the EAC technical reviewer's audit of all test plans, test methods, test cases, and test results related to the scope of the Unity 3.2.0.0 test campaign. This included a review of a document created by SysTest Labs that

summarized all related testing conducted for the scope of the Unity 3.2.0.0 with the test results. The EAC concluded:

- All functional, accessibility, maintainability, accuracy, and reliability testing outlined in the approved SysTest Unity 4.0 test plan is approved for reuse in the Unity 3.2.0.0 test campaign.
- As part of the remaining testing the EAC is tasking iBeta with testing and verifying that the Unity 3.2.0.0 system is in compliance with EAC RFI 2008-07 "'0' count to start the election". This testing should be reflected in the test plan being developed by iBeta for the Unity 3.2.0.0 system. iBeta is also tasked with testing and resolving the discrepancies listed by SysTest under the following tests: GEN 02 – Straight Party, GEN 03 – Add Languages, and PR101 – Pick-a-Party tests.

In a subsequent conversation with the EAC this last bullet was clarified to the open functional discrepancies identified in Table 5.

Non-core hardware environmental testing is outside SysTest's test accreditation scope as a VSTL. SysTest's methods for validating the qualifications of the subcontractor laboratories was provided to the EAC and considered in their decision to permit reuse of the non-core environmental testing. SysTest conducted the non-core safety and hardware environmental assessments and testing with the following subcontractors:

- Compliance Technology Services 1820 Skyway Drive Unit J, Longmont, Colorado 80504
- Components Reliability & Safety 1955 West 153rd Place, Broomfield, CO 80020
- Criterion Technology 1350 Tolland Road, P.O. Box 489, Rollinsville, CO 80474
- Nebraska Center for Excellence in Electronics (NCEE) 4740 Discovery Dr., Lincoln, NE 68521
- Percept Technology Labs 4735 Walnut St. #E, Boulder, CO 80301
- Sun Advanced Product Testing (APT) 1601 Dry Creek Drive Suite 2000, Longmont, CO 80503
- Wyle Laboratories, 7800 Highway 20 West, Huntsville, AL, 35806

The Physical Configuration Audit (PCA) of the ES&S Unity 3.2.0.0 shall incorporate a PCA Document Review Assessment of the Unity v.4.0.0.0 Technical Data Package (TDP) and a 3% PCA Source Code Review Assessment. The results of these assessments with a recommendation shall be submitted to the EAC. The EAC will direct iBeta if the SysTest Labs PCA Document Review and PCA Source Code Review may be accepted for reuse.

A Functional Configuration Audit (FCA) of the Unity 3.2.0.0 shall include an EAC review of the Unity v.4.0.0.0 testing performed by SysTest to:

- The requirements of Voting System Standards 2002;
- The Unity v.4.0.0.0 specifications of the ES&S TDP; and
- The voting system requirements of section 301 of the Help American Vote Act (HAVA).

iBeta shall identify the scope of the Unity 3.2.0.0 volume, stress, error recovery, security testing and a single end-to-end system level functional test. We shall develop a test plan, customize test cases, management of system configurations, 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.

1.1 *Unity 3.2.0.0 Exclusions*

The following are excluded from the Unity 3.2.0.0 voting system.

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.

1.1.1 Unity v.4.0.0.0 Scope Excluded from Unity 3.2.0.0

The items identified as exclusions are not contained in the Unity 3.2.0.0 system submitted for Certification under EAC Application # ESS0701.

- Hardware including related software/firmware and peripherals: Automated Bar Code Reader (ABCR), iVotronic DRE Precinct Tabulator, Model 100 Precinct Ballot Counter, the DS200 modem kit, and the M650 configured with a network card;
- EMS Software: Data Acquisition Manager and iVotronic Ballot Image Manager; and
- System functionality and maintenance: DRE, VVPAT
- Network functionality: Network data transmission for remote transmission of votes or consolidated results
- Language accessibility other than English and Spanish.

In an email dated October 15, 2008 the EAC granted permission for ES&S to reuse the Unity v.4.0.0.0 TDP if the documents bore a disclaimer outlining the uncertified functionality that was not part of the Unity 3.2.0.0 certification. As such the review of the document content related to the uncertified Unity v.4.0.0.0 functionality was excluded from this review.

In receiving the source code, documents and test artifacts from SysTest, iBeta determined if the material was in or out of the Unity 3.2.0.0 test scope. Items determined to be out of scope were stored without further examination. No out of scope hardware was received.

1.1.2 Unity 3.2.0.0 Other Exclusions

The following functions are excluded from Unity 3.2.0.0 voting system and are not tested in this certification effort.

- Provisional ballots: The handling of provisional ballots is procedural. There is no provisional ballot functionality.
- Transmission via Public Telecommunications: There is no transmission via public telecommunications. The DS200 modem is removed from this certification.
- Use of Wireless Communications : There is no use of wireless communications
- Shared Operating Environment: Unity 3.2.0.0 does not share an environment with other data processing functions.

1.2 *Internal Documentation*

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

Table 1 Internal Documents

Version #	Title	Abbv.	Date	Author
v.07	Voting Certification Master Services Agreement- Election Systems & Software	MSA contract	11/15/08	iBeta Quality Assurance
Rev 02	Statement of Work No. 02 Commencement Phase: Assessment for Reuse and Reporting	SOW 2-02		iBeta Quality Assurance
Rev 01	Statement of Work No. 03 Maximum Reuse Project Estimate	SOW 3-01		iBeta Quality Assurance
v.4.0	C and C++ Review Criteria		11/17/08	iBeta Quality Assurance
v.1.0	Z80 Assembler Review Criteria		10/19/07	iBeta Quality Assurance
v.2.0	SQL Server Review Criteria		6/19/07	iBeta Quality Assurance
v.0.1	COBOL Review Criteria		12/4/08	iBeta Quality Assurance
v.2.0	Visual Basic Review Criteria		6/19/2007	iBeta Quality Assurance
	ESS Source Code Review Letter	3% Source Code Review Assessment	1/16/09	iBeta Quality Assurance
	Unity 3.2 PCA Document Review Assessment	PCA Document Review Assessment	1/14/09	iBeta Quality Assurance
	ESS Unity 3.2 Code & Equipment Receipt		2/18/09	iBeta Quality

Version #	Title	Abbv.	Date	Author
				Assurance
	E001 through E039 Equipment Photos	Equipment Images	various	iBeta Quality Assurance
	Test Methods Unity 3.2.0.0		3/2/09	iBeta Quality Assurance
	Reuse Environmental Test Case -Unity 3.2		2/15/09	iBeta Quality Assurance
	Reuse Characteristics Test Case -Unity 3.2		2/15/09	iBeta Quality Assurance
	FCA Security Review Unity 3.2		3/6/09	iBeta Quality Assurance
	FCA Security Test - Unity 3.2 Windows Configuration Test steps		3/10/09	iBeta Quality Assurance
	FCA Test Documents Review Unity 3.2		1/16/09	iBeta Quality Assurance
	FCA Volume 1		3/10/09	iBeta Quality Assurance
	FCA Volume 2		3/10/09	iBeta Quality Assurance
	FCA Volume 3		3/10/09	iBeta Quality Assurance
	FCA Volume 4		3/10/09	iBeta Quality Assurance
	FCA Volume 5		3/10/09	iBeta Quality Assurance
	FCA Volume 6		3/10/09	iBeta Quality Assurance
	FCA Volume 7		3/10/09	iBeta Quality Assurance
	FCA Volume 8		3/10/09	iBeta Quality Assurance
	FCA Volume 9		3/10/09	iBeta Quality Assurance
	FCA Volume 10		3/10/09	iBeta Quality Assurance
v.2.0	Trusted Build Procedure		1/23/09	iBeta Quality Assurance
	ES&S Unity 3.2.0.0 EAC Matrix		3/6/09	iBeta Quality Assurance

1.3 *External Documentation*

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

Table 2 External Documents

Ver. #	Title	Abbv.	Date	Author	Test Plan Attachment
	Help America Vote Act	HAVA	10/19/02	107th Congress	
2006 Ed.	NVLAP Voting System Testing NIST Handbook 150	NIST 150	Feb. 2006	NVLAP	
	NVLAP Voting System Testing NIST Handbook 150-22	NIST 150-22	Dec. 2005	NVLAP	
	Federal Election Commission Voting System Standards	VSS	Apr. 2002	FEC	
	Testing and Certification Program Manual	Certification Program Manual	1/1/07	EAC	
v.1.0	Voting System Test Laboratory Program Manual	VSTL Program Manual	July 2008	EAC	
v.5.2	EAC Test Matrix template			EAC	
	EAC Decision on Request for Interpretation 2007-02, 2002 Voting Systems Standards, Vol. 1, Section 4.2.5	Interpretation 2007-02	5/14/07	EAC	
	EAC Decision on Request for Interpretation 2007-04, 2005 VVSG Vol. 1 Section 3.1.3	Interpretation 2007-04	10/29/07	EAC	
	EAC Decision on Request for Interpretation 2007-05, 2005 VVSG Vol. 1 Section 4.2.1 (Testing Focus and	Interpretation 2007-05	11/6/07	EAC	

Ver. #	Title	Abbv.	Date	Author	Test Plan Attachment
	Applicability)				
	EAC Decision on Request for Interpretation 2007-06, 2005 VVSG Vol. 1 Section 4.1.1, 2.1.2c &f, 2.3.3.3o & 2.4.3c&d. (Recording and reporting undervotes)	Interpretation 2007-06	11/7/07	EAC	
	EAC Decision on Request for Interpretation 2008-01, 2002 VSS Vol. II, 2005 VVSG Vol. II, Section 4.7.1 & Appendix C	Interpretation 2008-01	2/6/08	EAC	
	EAC Decision on Request for Interpretation 2008-02, Battery Backup for Optical Scan Voting machines	Interpretation 2008-02	2/19/08	EAC	
	EAC Decision on Request for Interpretation 2008-03 (Operating System Configuration) 2002 VSS Vol. 1: 2.2.5.3, 4.1.1, 6.2.1.1, Vol. 2: 3.5; 2005 VVSG Vol. 1: 2.1.5.2, 5.1.1, 7.2.1, Vol. 2: 3.5	Interpretation 2008-03	10/3/08	EAC	
	EAC Decision on Request for Interpretation 2008-04, 2002 VSS Vol. I, Section 2.3.1.3.1a 2005 VVSG Vol. II, Section 2.2.1.3a Ballot Production	Interpretation 2008-04	5/19/08	EAC	
	EAC Decision on Request for Interpretation 2008-05 2002 VSS Vol. I, Section 3.4.2 2005 VVSG Vol. I, Section 4.3.2, Durability	Interpretation 2008-05	5/19/08	EAC	
	EAC Decision on Request for Interpretation 2008-06, 2002 VSS Vol. I, Sections 3.2.2.4c, 3.2.2.5 2005 VVSG Vol. I, V. 1.0, Sections 4.1.2.4c (Electrical Supply), 4.1.2.5 (Electrical Power Disturbance)	Interpretation 2008-06	8/29/08	EAC	
	EAC Decision on Request for Interpretation 2008-07; 2002 VSS Vol. I, Sections, 2.3.4, 2.3.5, 2.3.6, 2.4.1, 4.4.3, 9.4; 2002 VSS Vol. II, Sections, 3.3.1, 3.3.2; 2005 VVSG Vol. I, Sections, 2.2.4, 2.2.5, 2.2.6, 2.3.1, 5.4.3; 2005 VVSG Vol. II, Sections, 1.3, 3.3.1, 3.3.2	Interpretation 2008-07	8/27/08	EAC	
	EAC Decision on Request for Interpretation 2008-09 (Safety Testing) 2002 VSS Vol. I, Section, 3.4.8 2005 VVSG Vol. I, Section 4.3.8	Interpretation 2008-09	8/25/08	EAC	
	EAC Decision on Request for Interpretation 2008-10 (Electrical Fast Transient) 2005 VVSG Vol. I, Section 4.1.2.6 2005 VVSG Vol. II, Section 4.8	Interpretation 2008-10	8/28/08	EAC	
	EAC Decision on Request for Interpretation 2008-12 (Ballot marking Device/ Scope of Testing) 2005 VVSG Vol. 1: 2.1.5. System Audit 2005 VVSG Vol. 1: 2.1.5.2 Shared Computing Platform	Interpretation 2008-12	12/19/08	EAC	
Unity	3.2.0.0 EAC Correspondence				
	2002 VSS Supported Functionality Declaration Unity 3.2.0.0		10/29/08	ES&S	
	Unity 3.2.0.0 Implementation Statement		10/29/08	ES&S	
	Unity 3.2.0.0 Modules		No date	ES&S	
	ESS Request to Change VSTL Unity 3.2 10.31.08		10/31/08	ES&S	
	SysTest iBeta Notice Ltr 11_21_08		11/21/08	ES&S	
	EAC Permission to Change VSTL Letter 11.18.08		11/18/08	EAC	
Unity	v.4.0.0.0 Reuse Correspondence				
	Email: Reuse of Previous Testing for Unity 3.2.0.0		11/21/08	EAC	
	2-3-2009 Letter to ESS Reuse of Testing Final		2/3/09	EAC	
	2-3-2009 Approval Reuse of Testing Final		2/3/09	EAC	
	2-12- 09 Approval Reuse of Testing Functional FINAL		2/12/09	EAC	
Unity	v.4.0.0.0 Test Documents				
Rev.10.0	ES&S Unity 4.0 Certification Test Plan Document Number 07-V-ESS-035-CTP-01		12/9/08	SysTest Labs	
Rev.0.2	Voting System Test Summary Report, Test Report for testing through 10/22/08 for ES&S Unity 4.0 Voting System, Report Number 01-V-ESS-035-CTP-01		12/19/08	SysTest Labs	
	Unity 4.0 Disc Rpt 10-28-08		10/28/08	SysTest Labs	
v.1.16	Retest Matrix v1.16		11/24/08	ES&S	
	Test Report No.- 080521-1251A		6/11/08	Criterion	

Ver. #	Title	Abbv.	Date	Author	Test Plan Attachment
	EMC Qualification Test Report ES&S AUTOMARK, VAT A200			Technology	
v.1.3	AutoMARK Voter Assist Terminal Test Report		6/19/05	Percept Technology Labs	Rev 6G: Other Lab Reports
	Test Report No.- 041223-857 EMC Qualification Test Report AutoMARK Technical Systems, LLC VAT		1/31/05	Criterion Technology	
	Test Report No. - 04-00542 Testing Services Report AutoMARK VAT SN:002		1/14/05	APT	
	Test Report No. 48489-08 Hardware Qualification Report of the ES&S M650 Central Ballot Counter Firmware Release 2.0.1.0		1/7/05		
Rev. 1	*Test Report No.- ATS-0501-R01-Rev.1* Electrical Safety Testing to UL 60950-1 (Replaces #ATS-0501-R01, dated 4/30, 2005)		4/10/06	AutoMARK Technical Systems	
v.1.4	Operational Status Check Test Case (ATS VAT)		1/11/2005	SysTest Labs	
	Test Report No.- 080327-1225 EMC Qualification Test Report AutoMARK, VAT A100		4/21/08	Criterion Technology	
	Test Report No.- 070730-1165 EMC Qualification Test Report AutoMARK Technical Systems, LLC. Ballot Marking Device, VAT A300		8/9/07	Criterion Technology	
v.1.0	AutoMARK Voter Assist Terminal 1.1 Test Report		1/4/06	Percept Technology Labs	
Rev. 2	VAT Accuracy Test Case Status Report			SysTest Labs	
	Test Report No.- 070730-1165 DS200 Scanner EMC Test Report		7/31/07	NCEE	
	Test Report No.- R071107-30-01B DS200 Scanner EMC Test Report (Amended with Original)		5/27/08	NCEE	
	Test Report No.- 070314-1134A EMC Qualification Test Report ES&S DS200 Ballot Scanner with Optional 76246 Ballot Box		5/15/07	Criterion Technology	
	Test Report No.- 080521-1244 EMC Qualification Test Report ES&S Precinct Count Ballot Scanner, DS200		6/18/08	Criterion Technology	
	*Test Report No.- 07-00231*Testing Services Report DS200 Scanner and Ballot Box (Temp and Humidity)		4/16/07	APT	
	*Test Report No.- 07-00207*Testing Services Report DS200 Scanner and Ballot Box (Vibration)		4/25/07	APT	
v.1.0	DS200 Op Stat Check v1.0		11/21/08	SysTest Labs	
v.1.0	ES&S Unity 3.2.0.0 DS200 and Ballot Box and Voting System Test Report		5/1/07	Percept Technology Labs	
v.1.0	DS200 with Optional Ballot Box ESD Test Report		4/25/07	Percept Technology Labs	
	Test Report No.- ESS-0802-R04 Summary Test Report Physical Stability Testing to UL 60950-1		2/ 12/08	Components Reliability & Safety, Inc.	
	Test Report No.- 07-1001-A Product Safety Testing and Evaluation for Ballot Reader Model number DS200 with or w/o ballot box		4/27/07	Components Reliability & Safety, Inc.	
	DS200 Accuracy Test Summary		4/21/08	SysTest Labs	
	Test Report No.- 0806-R05 Electrical Safety Testing to UL 60950-1:2007		7/28/08	Compliance Integrity Services	
	Test Report No.- R071107-30-02 EMC Test Report (M650)		7/31/07	NCEE	
	Unity 4.0 Certification Test Plan Rev 6.0 Attachment E Test Case Matrix 10071228				Rev 6 -E: TC Matrix
	Test Report No.- 08-00654 Testing Services Report (M650)		5/2/08	APT	
v.1.1	M650 with Attached Printers Test Report		3/ 7/08	SysTest Labs	

Ver. #	Title	Abbv.	Date	Author	Test Plan Attachment
v.1.3	M650 with Epson Printer Test Plan		7/31/07	SysTest Labs	Rev 6- D: HW Test Plans
v.1.1	DS200 Scanner EMC Test Plan		7/30/07	SysTest Labs	Rev 6- D: HW Test Plans
Rev.01	Certification Test Plan ESS HW Test Matrix		2/1/08	SysTest Labs	Rev 6- D: HW Test Plans
Rev03	Rev03_Model650_TDP06202007			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev05	Rev05_AuditManager_TDP07312007			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev05	Rev05.DAM_TDP09262007_ESS			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev09	Rev09.HPM_TDP09122007_ESS			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev02	Rev.02_CF_Utility_TDP05072007			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev03	Rev03.ERM_TDP08082007_ESS			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev03	Rev03.EDM_BallotDataManager_TDP08012007_ESS			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev03	Rev03.DS200_TDP09072007_ESS			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev02	Rev02.ESSZIP_TDP07062007			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev02	Rev.02_GetAuditData_TDP04022007			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev02	Rev.02_MPRBOOT_TDP05162007			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev02	Rev.02_SHELL_TDP05072007			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev03	Rev.03_CB_EAGL_TDP05312007			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev03	Rev.03_MAKEIBIN_08072007_ESS			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev04	Rev.04_ESSEAGL_TDP07202007_ESS			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
Rev04	Rev.04_REGUTIL_TDP5312007			SysTest Labs	Rev6 F-2: Code Disc 12/27/07
	Engineering Change Evaluation & Reviews for the DS200 ECOs 690 to 693 & 702 to 706 (multiple documents)		Various dates	SysTest Labs	
	Non-conforming Work & Corrective Action Request SN008 (for VAT A100 ECO #0025)		1/18/05	Percept Technology Lab	
	Engineering Change Evaluation & Review for the VAT		Various	SysTest Labs	

Ver. #	Title	Abbv.	Date	Author	Test Plan Attachment
	A200 References 200-206,208, 2 10-247, 256-278, 324-346.		dates		
A	Engineering Specification -Model PW-080A2-1Y24AP (G) -(DS200 -ferrite molded power supply)		2/3/09	Wall Industries	

1.4 *Technical Data Package Documents*

The Technical Data Package Documents submitted for this certification test effort is listed below.

Table 3 Voting System Technical Data Package Documents

Document	Version	Date	Author
System Security Test Cases	4.0	09/02/08	ES&S
System Security Test Procedure	3.0	09/02/08	ES&S
Election Systems & Software, Inc. Indented Bill of Material	None	05/15/08	ES&S
Adobe Installation Reference Guide	None	05/28/08	ES&S
AIMS Requirements Trace Matrix	1.0	04/06/06	ATS
AutoMARK Information Management System AIMS Release Notes	9.0	08/16/07	ATS
AutoMARK Information Management System (AIMS) System Overview	4.0	05/14/07	ATS
AutoMARK Information Management System (AIMS) System Functionality	4.0	01/11/08	ATS
AIMS Hardware Specifications	3.0	04/20/07	ATS
Compact Flash Memory Card Design Specifications	3.0	05/01/07	ATS
AutoMARK Information Management System (AIMS) Programming Specifications Details	2.0	04/23/07	ATS
AutoMARK Information Management System (AIMS) Software Design Specifications	4.0	01/11/08	ATS
AutoMARK Information Management System Election Official's Guide	12.0	03/21/08	ATS
AutoMARK INFORMATION MANAGEMENT SYSTEM SYSTEM OPERATIONS PROCEDURES	4.0	04/23/07	ATS
AutoMARK Information Management System (AIMS) System Security Specifications	3.0	05/01/07	ATS
AutoMARK Information Management System Quality Assurance Policy & Procedures	4.0	01/11/08	ATS
AIMS Quality Assurance Test Cases	5.0	03/07/08	ATS
AIMS Quality Assurance Test Procedures	3.0	04/25/07	ATS
AIMS Configuration Management Plan	3.0	04/25/07	ATS
AIMS System Change Notes	17.0	06/08/07	ATS
Audit Manager Test Case Specifications	None	08/26/08	ES&S
Audit Manager 7.5.0.0 Relational Model	None	None	ES&S
Setting the Date and Time on an AutoMARK	None	05/13/08	ES&S
ATS Component Storage and Handling Procedure	3.0	09/02/08	ES&S
ATS Configuration Management Policy	3.0	09/02/08	ES&S
Corrective Action Control Log	1.0	None	ES&S
Design Review Attendance Sheet	1.0	None	ES&S
Design Review Minutes	1.0	None	ES&S
Automark Design Review Policy	3.0	09/02/08	ES&S
ATS Document Change Order	1.0	None	ES&S
ATS Document Change & Issue Procedure	4.0	09/02/08	ES&S
Document Change Pending Re-Release	1.0	None	ES&S
ATS Document Control Policy	3.0	09/02/08	ES&S
ATS Employee Training Procedure	3.0	09/02/08	ES&S
Engineering Change Order/Change Request Form	1.0	None	ES&S
ATS Engineering Change Request/Change Order Process	4.0	09/02/08	ES&S
ATS Engineering Development Policy	3.0	09/02/08	ES&S
ATS Purchasing Procedure	3.0	09/02/08	ES&S
ATS Quality Assurance Policy	3.0	09/02/08	ES&S
ATS Quality System Audit Process	3.0	09/02/08	ES&S
ATS Receiving Procedure	3.0	09/02/08	ES&S
ATS Software and Hardware Release Process	8.0	09/02/08	ES&S
System Bug Report Form	1.0	None	ES&S

Document	Version	Date	Author
ATS System Report (Bug Reporting) Procedure	3.0	09/02/08	ES&S
Audit Manager Checklist-Election Day Training Manual	None	08/2007	ES&S
ATS Quality System Master Audit Schedule	1.0	09/02/08	ES&S
Ballot Image Processing Specifications	4.0	09/02/08	ES&S
AutoMARK™ Ballot Scanning and Printing Specification	3.0	09/02/08	ES&S
AutoMARK Configuration Management Plan (AQS) -13-5020-000-F	4.0	09/02/08	ES&S
AutoMARK Driver API Specification	3.0	09/02/08	ES&S
Automark Environmental Test Cases	5.0	09/02/08	ES&S
AutoMARK Environmental Test Plan	5.0	09/02/08	ES&S
AutoMARK Environmental Test Procedures	5.0	09/02/08	ES&S
AutoMARK Graphical User Interface Design Specifications	3.0	09/02/08	ES&S
Initial Software Installation Procedure	3.0	09/02/08	ES&S
ES&S AutoMARK Jurisdiction Guide	7.0	03/20/08	ES&S
AutoMARK Operating Software (AMOS) Design Specifications	3.0	09/02/08	ES&S
AutoMARK Operations and Diagnostic Log Specifications	4.0	09/02/08	ES&S
Operations and Diagnostic Log Test Cases	4.0	09/02/08	ES&S
Operations & Diagnostic Log Test Procedures	4.0	09/02/08	ES&S
Personnel Deployment and Training Requirements	4.0	09/02/08	ES&S
ES&S AutoMARK Pollworker's Guide	8.0	03/20/08	ES&S
AutoMARK Programming Specifications Details	5.0	09/02/08	ES&S
ATS Quality System Procedures (QSP) Master List	1.0	09/02/08	ES&S
AutoMARK Rapid Application Development Methodology (RAD)	4.0	09/02/08	ES&S
AutoMARK 3010 VAT Release Notes	12.0	09/02/08	ES&S
AutoMARK Requirements Trace Matrix	2.0	09/02/08	ES&S
AutoMARK Software Design Specifications	4.0	09/02/08	ES&S
AutoMARK Software Development Environment Specifications	4.0	09/02/08	ES&S
AutoMARK Software Diagnostics Specification	4.0	09/02/08	ES&S
Software Standards Specification	4.0	09/02/08	ES&S
AutoMARK Software Quality Assurance Test Plan	4.0	09/02/08	ES&S
Software Quality Assurance Test Cases	6.0	09/02/08	ES&S
Software Quality Assurance Test Procedures	4.0	09/02/08	ES&S
AutoMARK System Change Notes	90.0	09/02/08	ES&S
AutoMARK System Functionality	4.0	09/02/08	ES&S
ES&S AutoMARK System Installation and Maintenance Guide	9.0	03/24/08	ES&S
AutoMARK System Introduction	3.0	09/02/08	ES&S
System Level Test Cases	5.0	09/02/08	ES&S
AutoMARK System Level Test Plan	5.0	09/02/08	ES&S
AutoMARK System Level Test Procedures	4.0	09/02/08	ES&S
AutoMARK System Security Specifications	4.0	09/02/08	ES&S
AutoMARK System Overview	4.0	09/02/08	ES&S
AutoMARK™ TECHNICAL DATA PACKAGE TABLE OF CONTENTS	None	09/02/08	ES&S
ES&S AutoMARK Voter's Guide	8.0	03/20/08	ES&S
AUTOMARK™ EMBEDDED DATABASE INTERFACE SPECIFICATION	5.0	09/02/08	ES&S
AutoMARK System Hardware Specification	3.0	09/02/08	ES&S
AutoMARK VAT Software and Firmware Compilation Instructions	12.0	05/27/08	ES&S
ES&S Ballot Production Handbook	None	07/17/07	ES&S
Ballot Data File Specification Unity Version 4.0.0.0	1.0	04/30/07	ES&S
ES&S Ballot On Demand Printer Setup and Printing Procedures Version Release 7.7.0.0 Okidata part number 58273508	None	08/22/08	ES&S
Ballot Set Collection File Specification Unity Version 4.0.0.0	1.0	04/30/07	ES&S
Automark Technical Systems Integration & Testing Bug Report	1.0	None	ES&S
Development Practices and Coding Standards Election Systems and Software Version Number 2.3.0.0	2.3	07/11/08	ES&S
DS 200 Part list	None	05/12/08	ES&S
DS200 Election Day Checklist Version Number 1.3.7.0	None	05/09/08	ES&S
ES&S DS200 Power Management Board Validation	None	08/01/08	ES&S
DS200 Pre-Election Day Checklist Version Number 1.3.7.0	None	07/02/08	ES&S
ES&S DS200 Scanner Board Dump Compare Hardware Version 1.2.1.0 Firmware Version 2.0.0.0	None	09/26/08	ES&S
DS200 Test Cases Unity 4.0 Version 1.3.7.0	None	06/13/08	ES&S
Engineering Change of Order documentation	None	None	ES&S

Document	Version	Date	Author
Election Data Manager (EDM) Checklist-Election Day Training Manual	None	08/2007	ES&S
Election Data Manager Test Case Specifications Software Version 7.8.0.0	None	10/27/08	ES&S
Election Data Manager 7.8.0.0 County Tables Relational Model	None	None	ES&S
Election Data Manager 7.8.0.0 Election Tables Relational Model	None	None	ES&S
EDMXML File Specification	None	06/15/07	ES&S
EL80 File Specification	None	None	ES&S
Election Reporting Manager Pre-Election Day Training Manual (Old version)	1.0	02/29/08	ES&S
Election Reporting Manager Pre-Election Day Training Manual Version Number 7.5.0.0	None	05/09/08	ES&S
Election Reporting Manager / ERM Product Test Cases Unity 4.0 Version 7.5.2.0	None	10/23/08	ES&S
ESS Hardware Acceptance Checklists	None	None	ES&S
ES&S License Agreements Software Development	None	06/10/05	ES&S
ESS Sample Deliverable Timeline	None	None	ES&S
ES&S Software/Firmware Acceptance	1.0	02/25/08	ES&S
ESSCRYPT Functional Specification Version 1.8.1.0	None	11/16/07	ES&S
ESSDECPT Functional Specification Version 1.8.1.0	None	11/16/07	ES&S
ESSHardware Revision History	None	11/02/07	ES&S
ESS Image Manager (ESSIM) Checklist-Election Day Training Manual	None	08/2007	ES&S
ESS Image Manager Test Case Specification Software Version 7.7.0.0 Test Case 2.0	None	10/17/08	ES&S
ESSXML File Specification	None	04/30/07	ES&S
Hardware Revision Description	1.0	08/27/07	ES&S
Hardware Programming Manager (HPM) Checklist-Election Day Training Manual	None	08/2007	ES&S
Hardware Programming Manager Test Case 1.0 Unity Version 4.0	None	06/06/08	ES&S
Interface (IFC) File Specification	None	None	ES&S
ISO Certification Pivot	None	None	ES&S
Ricoh Electronics Quality Manual	4.0	07/06/06	ES&S
Jurisdiction Security Procedures Version 1.0.0.1	None	05/09/08	ES&S
Language Data File Specification	None	04/30/07	ES&S
Setting the Date and Time on a Model 100 Scanner	None	05/13/08	ES&S
Setting the Date and Time on a Model 650 Scanner	None	05/13/08	ES&S
Model 650 Output File Specification	None	None	ES&S
Setting the Machine ID on a Model 650 Scanner	None	05/13/08	ES&S
Model 650 Test Case Specification Firmware Version 2.2.1.0 Hardware Version 1.1 Test Case 1.0	None	10/17/08	ES&S
OmniDrive USB/USB2 Installation Guide	1.0	05/20/08	ES&S
Open Source & 3rd Party Code Management Procedure	None	01/03/06	ES&S
Election Data Manager Training Manual Version Number 4.0.0.0	1.0	02/29/08	ES&S
ESSIM Training Manual Version Number 4.0.0.0	1.0	02/29/08	ES&S
Election Results Export (EXP) Election Day Checklist	None	02/29/08	ES&S
Hardware Program Manager Training Manual Version Number 5.7.0.0	None	05/09/08	ES&S
Model 650 Election Day Checklist Version Number 2.2.1.0	1.0	02/29/08	ES&S
Model 650 Pre-Election Day Checklist Version Number 2.2.1.0	1.0	02/29/08	ES&S
Model 650 Handout A: Setting the Date & Time	None	02/29/08	ES&S
Product Release Request	None	None	ES&S
Quality Assurance Manual	K	03/17/05	ES&S
Trace to Vendor Testing and Technical Data Package	05-01	12/01/08	ES&S
QMI Management Systems Registration Certificate of Registration	None	None	ES&S
QMI Certificate of Registration	None	None	ES&S
RM/COBOL® Installation Guide	1.1	05/20/08	ES&S
ES&S Software Validation Phase I Create ES&S Preliminary Definition File	1.1	04/10/08	ES&S
ES&S Software Validation Phase II-Create ES&S Package Definition File-Using the ES&S Software Validation Utility	1.2	04/10/08	ES&S
ES&S Software Validation Phase III-ES&S Software Validation Procedure-Using the ES&S Software Validation Utility	1.1	04/10/08	ES&S
ES&S System Security Specification Version Release 4.0.0.0	None	07/08/08	ES&S
TDP Table of Contents and Abstracts	None	05/28/08	ES&S
ES&S DS200 System Maintenance Manual	1.2.0	10/17/08	ES&S
ES&S Configuration Management Plan	1.0	10/28/08	ES&S

Document	Version	Date	Author
System Change Notes	1.0	11/25/08	ES&S
System Limitations Election Systems and Software	None	12/01/08	ES&S
ES&S Quality Assurance Program Manufacturing	1.0	11/21/08	ES&S
ES&S Quality Assurance Program Software and Firmware	1.0	11/25/08	ES&S
ES&S Software Design Specifications Audit Manager	1.0	11/14/08	ES&S
ES&S Software Design Specifications DS200	1.0	11/14/08	ES&S
ES&S Software Design Specifications Election Data Manager (EDM)	1.0	11/17/08	ES&S
ES&S Software Design Specifications v	1.0	11/14/08	ES&S
ES&S Software Design and Specification ES&S Ballot Image Manager (ESSIM)	1.0	11/14/08	ES&S
ES&S Software Design and Specification Hardware Programming Manager (HPM)	1.0	11/14/08	ES&S
ES&S Software Design Specifications Model 650	1.0	11/14/08	ES&S
ES&S System Functionality Description Model 650	1.0	11/17/08	ES&S
ES&S System Functionality Description Audit Manager	1.0	11/17/08	ES&S
ES&S System Functionality Description DS200	1.0	11/17/08	ES&S
ES&S System Functionality Description EDM	1.0	11/17/08	ES&S
ES&S System Functionality Description ERM	1.0	11/17/08	ES&S
ES&S System Functionality Description ES&S Ballot Image Manager (ESSIM)	1.0	11/17/08	ES&S
ES&S System Functionality Description Hardware Programming Manager (HPM)	1.0	11/17/08	ES&S
ES&S System Hardware Specification DS200	1.0	11/17/08	ES&S
ES&S System Hardware Specification Model 650	1.0	11/1742008	ES&S
ES&S Model 650 System Maintenance Manual Firmware Version 2.2.1.0 Hardware Version 1.1 and 1.2	None	10/17/08	ES&S
ES&S Audit Manager System Operations Procedures Version Release 7.5.0.0	None	10/17/08	ES&S
ES&S DS200 System Operations Procedures Hardware Version 1.2.1 Firmware Version 1.3.7.0	None	10/17/08	ES&S
ES&S Election Data Manager System Operations Procedures Version Release 7.8.0.0	None	10/17/08	ES&S
ES&S Election Reporting Manager System Operations Procedures Version Release 7.5.2.0	None	10/17/08	ES&S
ES&S Image Manager System Operations Procedures Version Release 7.7.0.0	None	10/17/08	ES&S
ES&S Hardware Programming Manager System Operations Procedures Version Release 5.7.0.0	None	10/17/08	ES&S
ES&S Model 650 System Operations Procedures Firmware Version 2.2.1.0 Hardware Version 1.1 and 1.2	None	10/17/08	ES&S
System Overview	1.0	11/12/08	ES&S
Unity System Test Plan	1.0	11/20/08	ES&S
ES&S Personnel Deployment and Traiing Recomendations	1.0	11/21/08	ES&S
Installation Guide Windows XP On Dell Optiplex GX520	1.2	05/21/08	ES&S
Verify DS200 Operating System Using Open SSL	None	09/19/08	ES&S
VSTL Source Code Status Report	None	None	ES&S
Audit Manager Build Environment Compile-Install Guide	1.0	None	ES&S
Build Procedure ESS Linux 6.2 Beyond Linux From Scratch (BLFS)	2.0	04/25/08	ES&S
CB_650 Build Environment Compile-Install Guide	1.0	None	ES&S
CB_EAGL Build Environment Compile-Install Guide	1.0	None	ES&S
CB_M100 Build Environment Compile-Install Guide	1.0	None	ES&S
Build Procedure CB_PEB.DLL	1.0	05/22/08	ES&S
CB_RAND Build Environment Compile-Install Guide	1.0	None	ES&S
Compact Flash Utility Build Environment Compile-Install Guide	1.0	None	ES&S
Build Procedure PCCARD30.EXE	2.0	05/21/08	ES&S
CRCDLL Build Environment Compile-Install Guide	1.0	None	ES&S
DS200 Firmware Backup to CompactFlash®	1.0	None	ES&S
DS200 Update Device Creation Procedure	1.0	None	ES&S
DS200 Update Device File Copy Procedure	1.0	None	ES&S
DS200 Operating System Installing/Replacing CompactFlash® Procedure	1.0	None	ES&S
DS200 Touch Screen Calibration	1.0	None	ES&S
DS200 Firmware to USB Update Media File Copy Procedure	1.0	None	ES&S
Build Procedure DS200 Ancillary Devices	1.2	04/28/08	ES&S

Document	Version	Date	Author
Build Procedure DS200 Firmware	2.0	04/28/08	ES&S
ESS Linux 6.2 BLFS Target Operating System Build and Install Procedure Document Version 1.3.0.0	None	04/25/08	ES&S
Election Data Manager Build Environment Compile-Install Guide	1.0	None	ES&S
Election Packager Build Environment Compile-Install Guide	1.0	None	ES&S
Build Procedure Election Reporting Manager Version 7.5.2.0	None	11/11/08	ES&S
ERMDLL Build Environment Compile-Install Guide	1.0	None	ES&S
ESSCrpt1 Build Environment Compile-Install Guide	1.0	None	ES&S
ESSCRYPT Build Environment Compile-Install Guide	1.0	None	ES&S
ESS Decrypt Build Environment Compile-Install Guide	1.0	None	ES&S
ESS Eagle Build Environment Compile-Install Guide	1.0	None	ES&S
ESS Image Manager Build Environment Compile-Install Guide	1.0	None	ES&S
Build Procedure ESSM100.DLL	2.0	05/22/08	ES&S
ESSPCMIO Build Environment Compile-Install Guide	1.0	None	ES&S
Build Procedure ESSPEB.DLL	1.0	05/22/08	ES&S
ESSXML Build Environment Compile-Install Guide	1.0	None	ES&S
ESSZIP Build Environment Compile-Install Guide	1.0	None	ES&S
Events Build Environment Compile-Install Guide	1.0	None	ES&S
ExitWin Build Environment Compile-Install Guide	1.0	None	ES&S
Get Audit Data Utility Build Environment Compile-Install Guide	1.0	None	ES&S
Build Procedure Hardware Programming Manager Version 5.7.0.0	None	05/06/08	ES&S
HPMDLL Build Environment Compile-Install Guide	1.0	None	ES&S
Images Build Environment Compile-Install Guide	1.0	None	ES&S
InstallShield® Professional Installation Guide	1.0	None	ES&S
Installation Guide InstallShield® Express 2.1	1.0	None	ES&S
InstallShield Professional Installation Guide	1.0	None	ES&S
RM/COBOL® Version 11.01 Development System and WOW Designer TM Version 11.01	2.0	None	ES&S
Build Procedure ESS Linux 6.2 Linux From Scratch (LFS)	2.0	04/24/08	ES&S
ES&S Model 650 QNX Build Environment Compile-Install Guide	1.0	None	ES&S
MakeIbin Build Environment Compile-Install Guide	1.0	None	ES&S
MFC SHARED Source Installation Guide	1.1	None	ES&S
MPRBOOT.HEX Build Environment Compile-Install Guide	1.0	None	ES&S
MYDLL Build Environment Compile-Install Guide	1.0	None	ES&S
Build Procedure PBMtoBMP.EXE	2.0	05/20/08	ES&S
RegUtil Build Environment Compile-Install Guide	1.0	None	ES&S
Shell Build Environment Compile-Install Guide	1.0	None	ES&S
ShellSetup Build Environment Compile-Install Guide	1.0	None	ES&S
UndrVote Build Environment Compile-Install Guide	1.0	None	ES&S
Build Procedure VioDialog.EXE	2.0	05/21/08	ES&S
VioWin Build Environment Compile-Install Guide	1.0	None	ES&S
Visual Studio Professional Edition Installation Guide	1.0	None	ES&S
Installation Guide Visual Studio 2005, Professional Edition with Service Pack 1	1.1	None	ES&S
Installation Guide Visual Studio 6.0, Enterprise Edition with Service Pack 5	1.2	None	ES&S
Installation Guide Visual Studio 2005, Professional Edition without Service Pack 1	1.0	None	ES&S
Win650 Build Environment Compile-Install Guide	1.0	None	ES&S
Installation Guide Windows XP On Corsair Orbit	1.2	03/20/08	ES&S
Installation Guide Windows XP On Corsair Orbit (no VGA Driver)	1.2	05/22/08	ES&S
Installation Guide Windows XP On Dell Optiplex GX520	1.2	04/24/08	ES&S

1.5 *Terms and Definitions*

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

Table 4 Terms and Definitions

Term	Abbreviation	Definition
Absentee Ballot		A paper ballot cast outside of an early voting center or election day polling place
Audit Manager	AM	A Unity election management system audit logging software application for the Election Data Manager and Ballot Image Manager

Term	Abbreviation	Definition
Ballot Control - Accepts		HPM option that instructs the DS200 to accept and tabulate overvoted, blank, primary crossovers or ballots with unreadable marks without alerting the voter.
Ballot Control- Query		HPM option that instructs the DS200 to return and query the voter when encountering an overvoted, blank, primary crossovers or ballots with unreadable marks. Voter has the option to request a new ballot or instruct he system to accept the ballot as is.
Ballot Control - Reject		HPM option that instructs the DS200 to automatically reject crossover, overvoted or blank ballots. Ballots will not be accepted.
Ballot Marking Device	BMD	A device that marks a paper ballot for a voter
Ballot On Demand	BOD	An optional operating mode in ESSIM that is used to print a small quantity of election quality ES&S paper ballots on a COTS OKI 9600 HDN color laser printer.
Certified Information System Security Profession	CISSP	A certification for information system security practitioners, indicating successful completion of the CISSP examination administered by the International Information Systems Security Certification Consortium
Central counter		A type of voting system that records and reports paper ballots at the central count
Double Spit and Wipe		Functionality on the VAT to support older ES&S optical scanners outside the scope of Unity 3.2.0.0
Early voting mode -		A mode on the DS200 that permits ballots to be cast prior to election day. A flag is set in HPM to include all precincts for the election. The poll-worker can select a voter's precinct and ballot style when used in Early Voting or an Absentee configuration.
Election Data Manager	EDM	A Unity election management system software application to define and store jurisdiction election data
Election Systems and Software	ES&S	Manufacturer of the Unity Voting System
Election management system	EMS	The ballot preparation and central count portions of a voting system.
Election Reporting Manager	ERM	A Unity central count software application to compile and report election results from Unity voting devices
Enhanced AutoCast		Functionality for automatically dropping AutoMARK ballots into a ballot box
Escrow Agency		EAC identified repository that retains the file signature of the trusted build
ES&S AutoMARK Information Management System	AIMS	A windows-based election management system software application to define election parameters for the VAT, including functionality to import election definition files produced by the Unity EMS and create VAT flash memory cards
ES&S Ballot Image Manager	ESSIM	A Unity election management system desktop publishing tool to layout and format paper ballots
Executable Lines of Code	eLOC	Lines of code that execute functionality. Comments and blank lines are excluded from counts of executable lines of code.
Flash Memory Card	FMC	Portable memory that contains the election definition to display the ballot content on a VAT.
Full or New Code Review		First time submission submitted for certification review or previously certified code with changes to the code so significant that a full review is warranted.
Graphical User Interface	GUI	A method of interaction with a computer which uses pictorial buttons (icons) and command lists controlled by a mouse
Hardware Programming Manager	HPM	A Unity election management system software application to import, format, and convert an election file and create election definitions for ballot scanning equipment
Help America Vote Act	HAVA	Legislation enacted in 2002 which includes creation of the EAC, federal voting standards and accreditation of

Term	Abbreviation	Definition
		test labs
intElect DS200	DS200	A Unity Voting System precinct count optical scanner paper ballot tabulator including a 12-inch touch screen display providing clear voter feedback and poll worker messaging.
Model 650	M650	A Unity Voting System central count high-speed optical scanner paper ballot tabulator The M650 prints results reports to an external printer and saves results to a zip disk.
National Standard Reference Library	NSRL	Part of NIST that provides software escrow.
National Voluntary Laboratory Accreditation Program	NVLAP	Part of NIST that provides third-party accreditation to testing and calibration laboratories.
Open Primary Pick a Party (Party Preference)		Ballot contains all contests that the voter is eligible to vote for in addition to any nonpartisan contests. Voter only votes the partisan contests for one party but chooses which party in the privacy of the voting booth by only voting for candidates from the desired party. Pick a Party is where a party selection contest appears before the partisan section of the ballot. If the voter chooses a party from the party selection contest, votes for candidates that represent any other party are ignored so that the voter cannot spoil the ballot.
Precinct counter		A type of voting system that records paper or electronic ballots at the polling place
Printer Engine Board version	PEB v.	Version of the firmware on the Printer Engine Board identifies support or non-support of Enhanced AutoCast and Double Spit & Wipe (v.1.70 supports)
Single Board Computer version	SBC v.	Version of the Single Board Computer identifying board connections and chips
Trusted Build		A compile and build of the source code reviewed by iBeta into executable code. Construction of the build platform and compile is performed by iBeta following the documented instructions of the manufacturer. A manufacturer's representative is present to witness the build.
Technical Data Package	TDP	The documentation and code relating to the voting system, submitted by the manufacturer for review.
Universal Power Supply	UPS	Uninterrupted power supply
U.S. Election Assistance Commission	EAC	U.S. agency established by the Help America Vote Act of 2002 to administer Federal elections.
Voluntary Voting System Guidelines	VVSG	Federal voting system test standards created by the EAC. Eventually these will replace the VSS.
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 Assist Terminal	VAT	A ballot marking device to assist multilingual voters and voters with visual, aural or dexterity disabilities to vote a paper ballots in a private manner
Unity x.x.x.x		A voting system produced by ES&S configured with various election software applications, DREs, optical scanners and ballot marking devices. The configuration varies for each version of Unity.
Witness Build for Unity 3.2.0.0		The Unity 4.0.0.0 Trusted Build performed by SysTest Labs. iBeta shall initiate testing with this build. Following iBeta's performance of the Trusted Build a regression test will be run.

2 Pre-certification Tests

2.1 *Pre-certification Test Activity & Test Results*

The scope of the ES&S Unity 3.2.0.0 certification test effort resulted from the transfer of two EAC certification test efforts previously submitted for testing to SysTest Labs. ES&S' petition for consideration of reuse of SysTest Labs reviews and testing resulted in the identification of a unique set of pre-certification test activities. As noted in the section 1 Introduction responsibility for these activities was designated to either iBeta or the EAC. iBeta conducted a review of the test documentation provided by ES&S and SysTest Labs to assess the scope of testing for conformance to the 2002 VSS Environmental Hardware, Volume, Stress, Error Recovery, Telecommunication and Security requirements. Assessment and determination of the reuse of the Functional, Usability, Accessibility, Maintainability, Accuracy and Reliability testing was to be provided by the EAC.

iBeta's evaluation of prior Non-VSTL and VSTL testing and test results is listed below.

2.1.1 FCA Document Review & Results

iBeta initiated an assessment to identify and separate Unity v.4.0.0.0 hardware and software excluded from Unity 3.2, SysTest test results petitioned for reuse by ES&S, and items in scope of additional testing required in the Unity 3.2.0.0 certification test effort. Following the assessment a process for review was identified. This process and the results of the FCA Document Review are described below.

2.1.1.1 *Identification of Out of Scope Unity v.4.0.0.0 Hardware & Software*

Unity v.4.0.0.0 hardware and software excluded from the application for Unity 3.2.0.0 filed with the EAC was identified as out of scope for Unity 3.2.0.0 certification. This included: iVotronic Ballot Image Manager (iVIM); Data Acquisition Manager (DAM); iVotronic DRE precinct tabulator including the associated peripherals; Automatic Bar Code Scanner (ABCR); Model 100 precinct scanner (M100); and network data transmission, including remote transmission of vote data and/or consolidated results data.

FCA Document Review Result: All documentation of testing and review for these Unity v.4.0.0.0 hardware and software was excluded from examination in Unity 3.2.0.0 (see Table 6 Out of Scope & Non Issues).

2.1.1.2 *Identification of Unity v.4.0.0.0 Hardware & Software Test Results Petitioned for Reuse*

The components transferred for certification under Unity 3.2.0.0 included:

- Audit Manager (AM), v. 7.5.0.0;
- Election Data Manager (EDM), v. 7.8.0.0;
- ES&S Ballot Image Manager (ESSIM), v. 7.7.0.0;
- Ballot On Demand (BOD), v. 7.7.0.0;
- Hardware Programming Manager (HPM), v. 5.7.0.0;
- Election Reporting Manager (ERM), v. 7.5.2.0;
- ES&S AutoMARK Information Management System (AIMS), v. 1.3.57;
- AutoMARK Voter Assist Terminal (VAT), Model A100, HW v. 1.0 and A200, HW v. 1.0 and 1.1, Firmware v. 1.3.2904;
- intElect DS200 precinct count scanner (DS200), HW v. 1.2.0 and v. 1.2.1, FW v. 1.3.7.0, Power Management FW v. 1.2.0.0, Scanner FW v. 2.11.0.0;
- Model 650 central count scanner (M650), HW v. 1.1 and 1.2, FW v. 2.2.1.0.

ES&S petitioned the EAC for reuse of the application Unity v.4.0.0.0 test results. SysTest documented these results and provided them in their report *Voting System Test Summary Report, Test Report for testing through 10/22/08 for ES&S Unity 4.0 Voting System, Report Number 01-V-ESS-035-CTP-01, Rev 0.2, December 19, 2008*. This report documented their certification processes and testing performed including: " documentation review of the Technical Data Package, source code review, and testing... executing functional test cases based on the project test requirements, system level tests prepared by SysTest Labs and analysis of results." For the hardware and software identified above as in scope for Unity 3.2.0.0 iBeta reviewed the open discrepancies related to system functionality and

system changes submitted during the Unity v.4.0.0.0 test effort. A comparison of the versions submitted in the SysTest report and those identified discrepancies for Unity 3.2.0.0 was conducted to confirm if the versions being submitted for Unity 3.2.0.0 matched the versions that were tested in the Unity v.4.0.0.0 certification.

If the Unity version number of the submitted system changes was equal to or less than the version identified in the report it was excluded due to the petition for reuse of the SysTest results.
If the open functional discrepancy was equal to the version or greater than the identified in the report it was included in the iBeta testing of Unity 3.2

FCA Document Review Result: It was found that SysTest Labs tested the versions identified in the System Changes. This resulted in the exclusion of the following discrepancies from the iBeta test scope: 499, 500, 501, 502, 504, 505, 506, 507, 508, 509, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 539, 540, 541, 542, 543, 544, and 546. Functional issues encountered in the versions identified in the report. This resulted in the inclusion of 411, 434, 453, 454, and 475 in the iBeta testing of Unity 3.2.0.0 (see Table 5 Unity 3.2.0.0 Applicable Discrepancies and Table 6 Out of Scope & Non Issues).

2.1.1.3 *Identification of Unity 3.2.0.0 Additional Testing*

The EAC approved a Unity v.4.0.0.0 Test Plan. At the time of the suspension of SysTest Labs they had completed System Level Functional, Usability, Accessibility, Maintenance, Data Accuracy, and Reliability. The Volume, Stress, Error Recovery and Security testing had not been completed. An FCA test documentation review was completed to determine the VSS requirements applicable to security, volume, stress, performance and recovery testing, as well as incorporation of the open in-scope functional discrepancies identified above. Following identification of the applicable requirements a review of the approved Unity v.4.0.0.0 was performed to identify the approved test methodology. This has been combined with an examination of the system limitations and security documentation provided to determine the required content of the Volume, Stress, Error Recovery and Security testing. External reports from the EAC of issues encountered by jurisdictions in Unity 3.2.0.0 were incorporated into the security review. These included attempting a malicious attack on an M650 zip disk and attempting to manipulate audit logs.

FCA Document Review Result: iBeta shall initiate Volume, Stress, Error Recovery and Security testing of the Unity 3.2.0.0. In *2-12- 09 Approval Reuse of Testing Functional FINAL* the EAC approved the reuse of the SysTest Labs System Level Functional, Usability, Accessibility, Maintenance, Data Accuracy, and Reliability testing..

2.1.2 PCA Document Review Assessment & Recommendation for Reuse

The audit of the ES&S Unity 3.2.0.0 Technical Data Package (TDP) was in accordance with the EAC instructions (see section 1 Introduction) for assessment and recommendation for reuse of the PCA Document Review (VSS vol. 2 section 2) conducted by SysTest Labs for Unity v.4.0.0.0 test effort.

iBeta sampled the ES&S Unity 3.2.0.0 documents. The sample selection included the documents identified in the SysTest Labs issued discrepancies and documents needed to complete the Unity 3.2.0.0 trusted builds, a sample 3% source code review, test planning and test execution. Criteria for the review included confirmation that the Unity 3.2.0.0 documents addressed any document discrepancies within the scope of the Unity 3.2.0.0 test effort and the content provided sufficient information in order to complete the test tasks list above.

2.1.2.1 *Documentation of the Audit of the TDP*

Due to the change of scope, many discrepancies issued by SysTest Labs were outside the scope of Unity 3.2.0.0. iBeta reviewed every open discrepancy. Issues, which were identified as all or partially relevant to the Unity 3.2.0.0 scope, were transferred to iBeta's *Unity 3.2.0.0 Discrepancy Report*. Issues or parts of issues, outside this scope were excluded. Scope assessment was recorded in a review disposition document. The transferred discrepancies identified location of the issue, SysTest Labs discrepancy number, and detail of the initial description from the SysTest Labs discrepancy report. iBeta confirmed the issues were valid and traced to an appropriate 2002 VSS requirement. iBeta

reviewed the SysTest Labs description history from the original SysTest Labs discrepancy report and the Unity 3.2.0.0 documents submitted by ES&S to validate resolution of the issue. In some instances discrepancies were incorporated into Unity 3.2.0.0 FCA.

The review of documents necessary to complete Unity 3.2.0.0 trusted builds, sample code review; test planning and test execution was incorporated into these tasks and recorded in the daily status. Missing content or discrepancies were reported in iBeta's *Unity 3.2.0.0 Discrepancy Report*. This report will be included as an appendix in the final VSTL Certification Test Report. Issues must be resolved and validated prior to the completion of certification testing.

Review of ES&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 ES&S' 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 as on the discrepancy report as informational. iBeta shall deem that ES&S follows their policies if no inconsistencies are identified during the test effort.

2.1.2.2 *TDP Audit Results*

The Unity 3.2.0.0 TDP submitted by ES&S was sufficient to close the majority of the document discrepancies deemed inside the scope of Unity 3.2.0.0. The

- One document issue remained open for additional clarification of the ES&S response;
- One document issue remained open for incorporation into the iBeta Security Review; and
- Four issues did not have a response from ES&S. As these were the last items on the list SysTest may not have submitted them to ES&S.

Review of documents necessary to perform Unity 3.2.0.0 trusted builds, sample 3% code review and test planning were generally found to contain the information needed to perform these task. Four issues were noted in the review were added to iBeta's *Unity 3.2.0.0 Discrepancy Report*.

- Document discrepancy #10 identified a gap in the Win650 build procedure;
- Document discrepancy #50 identified the System Overview and System Limitations do not reflect the language scope of Unity 3.2.0.0;
- Document discrepancy #52 identified System Overview contained a typo with an incorrect hardware version for the DS200; and
- Document discrepancy #53 identified the absence of the VATs and AIMS from the System Limitations.

The results and disposition of all SysTest Labs Unity v.4.0.0.0 issued discrepancies are provided below. Note: Functional discrepancies, which remain open for validation in the FCA, are also listed in the following table.

Table 5 Unity 3.2.0.0 Applicable Discrepancies

Sys Test #	DS 200	M 650	VAT	EMS	Oth-er	iBeta #	Dispo-sition	Portion Excluded from Unity 3.2.0.0	Out of Scope: Remains Open in Unity v.4.0.0.0
6	X	X				12	Closed	M100	Not reviewed
23					X	13	Closed	ABCR, Test Plan	Not reviewed
24					X	14	Closed	ABCR, Test Plan	Not reviewed
26		X		X		15	Closed	M100, IVIM, IVO, ABCR	Not reviewed
27	X	X		X		16	Closed	IVIM, DAM, IVO, M100	Not reviewed
43					X	17	Closed	ABCR	Not reviewed
284				X	X	18	Closed	PEB Reader/ Writer, DAM, IVIM	Not reviewed
297				X		19	Closed		
317					X	20	Closed		
318				X	X	21	Closed	IVIM, M100	Not reviewed
339					X	22	Closed		
348		X		X		23	Closed	ABCR, IVIM, DAM, M100	Not reviewed
355					X	24	Closed	ABCR , Voyager hand scanner, 4.0 Test Plan	Not reviewed

Sys Test #	DS 200	M 650	VAT	EMS	Oth-er	iBeta #	Dispo-sition	Portion Excluded from Unity 3.2.0.0	Out of Scope: Remains Open in Unity v.4.0.0.0
359					X	25	Closed	ABCR , Voyager hand scanner, Test Plan	Not reviewed
361					X	26	Closed	Test Plan	Not reviewed
372	X	X		X		27	Closed	M100	Not reviewed
411		X				28	Open FCA		
429				X		30	Open		
435					X	31	Open FCA		
453	X					32	Open FCA		
454	X					33	Open FCA		
473				X		34	Closed		
475				X		35	Open FCA		
479					X	36	Closed		
480					X	37	Closed		
492				X		38	Closed		
493					X	39	Closed		
495				X		40	Closed		
496		X				41	Closed		
497					X	42	Closed		
549					X	43	Closed		
550					X	44	Closed		
553				X		45	Open		
554				X		46	Open		
555				X		47	Open		
556				X		48	Open		
557				X		49	Closed		

Table 6 Out of Scope & Non Issues

SysTest #	Finding	Disposition
190, 191, 196, 198, 235, 238, 245, 369, 382, 388, 390, 401, 428, 434, 437, 441, 442, 445, 446, 450, 451, 452, 458, 461, 463, 464, 466, 467, 468, 469, 474, 478, 483, 485, 486, 487, 488, 490, 491, 494, 498, 503, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 545, 547, 548, 551, 552	**The following are excluded from Unity 3.2.0.0 :** **System Hardware** Automated Bar Code Reader iVotronic DRE Precinct Tabulator Model 100 Precinct Ballot Counter Voyager Hand Scanner (COTS) **System Software** Unity Data Acquisition Manager Unity iVotronic Ballot Image Manager **Uncertified System Features** Network Data Transmission Including remote transmission of vote data and/or consolidated results data	Not reviewed, remains open in Unity v.4.0.0.0
459, 510, 538	**Closed or Informational Issues** Comments in the report identified these issues as closed or informational typographic errors	Not reviewed, non-significant issue
499, 500, 501, 502, 504, 505, 506, 507, 508, 509, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 539, 540, 541, 542, 543, 544, 546	**Issues Written Against System Change Notes** Changes occurring during the Unity v.4.0.0.0 testing were reported in the System Change Notes. The role of the VSTL in the FCA process is to determine if the changes were tested appropriately and determine how they should be incorporated into functional testing. These discrepancies identify test or other documentation as lacking. The VSS instructs the VSTL to test if testing is inadequate. In iBeta's opinion, as written, these are not documentation discrepancies, but findings applicable to the FCA.	As these are findings for functional test scope they remain open in Unity v.4.0.0.0 ; iBeta shall examine the change notes as part of the FCA Document Review for relevance to the Unity 3.2.0.0 test scope

2.1.2.3 *Recommendation on Reuse of the SysTest Labs PCA Document Review*

Based upon the audit and review documented herein iBeta deems that the results of the SysTest PCA Document Review are adequate for reuse in the Unity 3.2.0.0 Certification test effort. Use of the TDP in development of the Volume, Stress, Error Recovery and Security testing shall incorporate additional

review. Any documentation issues encountered shall be reported in the Unity 3.2.0.0 discrepancy report. We do not recommend a more comprehensive review of the TDP. In*2-3-2009 Approval Reuse of Testing Final* the EAC approved the reuse of the SysTest Labs PCA Document Review.

2.1.3 PCA Source Code Review

The audit of the 3% review of the ES&S Unity 3.2.0.0 source code in accordance the EAC instructions (see section 1 Introduction) for assessment and recommendation for reuse of the applicable Unity v.4.0.0.0 PCA Source Code Review conducted by SysTest.

2.1.3.1 *Documentation of the 3% Source Code Review Process*

The 3% source code review was conducted using iBeta's PCA Source Code Review Procedure. The source code was delivered from SysTest Labs and configuration managed in the iBeta Source Code Repository. iBeta had previously reviewed source code written in VB, C, C++, SQL and Z80 Assembler for other certification test efforts. These language specific interpretations of the generic VSS 2002 requirements were used. For the COBOL review, iBeta provided the interpretation of each VSS 2002 requirement to ES&S prior to initiating the source code review task. EAC Technical Review staff have been provided access to these interpretations in conjunction with the delivery of this test plan. The VSS 2002 requirements applicable to the source code review included: volume 1 sections 4.2.2 through 4.2.7, 6.2 and 6.4.2; and volume 2 sections 2.4.5.d and 5.4.2.

To select the 3% for review iBeta used a library of static analysis tools to parse each application source code base and obtain a list of the files and functions in addition to the Lines of Code (LOC) count. iBeta used executable LOCs only, excluding comment, blank, or continued lines in the metrics. As our library of static analysis tools did not address COBOL, an alternative method of selection was used. For these two applications, the number of files and files sizes were used to determine the 3% of code to review. Spreadsheets were populated for each application. The selection of files/functions was based upon the file header information documenting the file purpose. iBeta focused the review by selecting source code files and functions that process vote data, audit logs, and reporting.

Another manufacturer (Premier Election Solutions) has submitted a certification effort using the ES&S AutoMARK. The ES&S AutoMARK source code submitted was compared against previously reviewed source code submitted with the Premier certification effort because the code is similar. The differences between the two source code bases were reviewed as part of the ES&S 3% source code review. Unique as well as the shared application discrepancies were reported.

Experienced reviewers who had reviewed source code to the VSS 2002 requirements on a minimum of two VSTL test efforts conducted the peer review of each Source Code Review. In their instructions the EAC stipulated "*This review will focus on important functional sections of the code in order to determine the depth and focus of source review conducted by SysTest*". Following a review of the software design documentation to understand the ES&S coding conventions, architecture and design a peer review analyzed each instance of non-compliance with the VSS 2002 requirements and assessed if the issue impacted source code logic. Discrepancies flagged green dealt with comments, headers, formatting, and style. iBeta identified these as non-logic issues. Potential logic issues, flagged as yellow, needed an EAC decision. There were no confirmed logic issues, which otherwise would have been flagged red. These were submitted to the EAC as individual discrepancy spreadsheets provided as separate confidential compressed files delivered on CD.

Table 7 Matrix of ES&S Unity 3.2.0.0 Source Code Reviewed

Product	Language	Submitted Version	Review Spreadsheet	Review-ed Lines	Total Lines	Total Issues	EAC Issues
Unity 3.2.0.0 Software							
AutoMARK Information System (AIMS)	Various	1.3.57	Shared application	887	26539	9	2
	SQL		SQL AIMS 1.3.54 08062007			2	2
	CS		Too few lines to review	0	38	0	0
	C++		CPP AIMSCrypt 1.0.0.1 10152008	16	400	2	0

Product	Language	Submitted Version	Review Spreadsheet	Review-ed Lines	Total Lines	Total Issues	EAC Issues
Audit Manager	VB	7.5.0.0g	VB AuditManager 7.5.0.0g 07312007	138	3556	0	0
EDM	C++	7.8.0.0j	CPP EDM 7.8.0.0j 073107	2539	72879	6	1
ESSXML.DLL	C++	2.1.0.0b	CPP EDM ESSXML 2.1.0.0b MFC Shared 1.1.0.0a 06042007	111	2870	1	0
MFC Shared Source	C++	1.1.0.0a	CPP EDM ESSXML 2.1.0.0b MFC Shared 1.1.0.0a 06042007				
ESSIM	C++	7.7.0.0f	CPP ESSIM 7.7.0.0f 07182007	1196	30546	26	1
HPM	Cobol	5.7.0.0f	Cobol HPM 5.7.0.0f 05182008			178	0
HPMDLL	C++	1.0.0.0a	CPP HPM-ERM DLLs 1.0.0.0a 06112007	0	108	0	0
ERM	Cobol	7.5.2.0c	Cobol ERM 7.5.2.0c			53	4
ERMDLL	C++	1.0.0.0a	CPP HPM-ERM DLLs 1.0.0.0a 06112007	0	0	0	0
Shared Utilities							
MAKEIBIN.EXE	C++	9.2.0.0t	CPP Shared Utilities 9.2.2.0 05142008	642	20804	7	2
UNDRVOTE.EXE	C++	9.2.1.0b	CPP Shared Utilities 9.2.2.0 05142008				
VIOWIN.EXE	C/C++	9.2.0.0b	CPP Shared Utilities vol3 05072007	28	554	3	0
VIODIALOG.EXE	C/C++	9.2.1.0c	CPP Shared Utilities 9.2.2.0 05142008				
EVENTS.EXE	C/C++	9.2.0.0h					
IMAGES.EXE	C/C++	9.2.0.0f					
CF_Utility.EXE	VB	9.2.0.0i	VB CF_Utility 9.2.0.0 05072007	261	8004	0	0
GetAuditData.EXE	VB	9.2.0.0b	VB GetAuditData 9.2.0.0b 05072007	46	1264	1	0
ESSPEB.DLL	C++	1.0.1.0c	CPP Shared Utilities vol2 1.0.1.0 05142008	478	24872	16	7
CB_PEB.DLL	C++	1.0.1.0b	CPP Shared Utilities vol2 1.0.1.0 05142008				
CRCDLL.DLL	C++	1.4.1.0b	CPP Shared Utilities vol3 05072007				
ESSM100.DLL	C/C++	1.7.1.0c	CPP Shared Utilities vol2 1.0.1.0 05142008				
ESSPCMIO.DLL	C++	1.1.0.0a					
CB_M100.DLL	C++	1.4.0.0a					
ESSEAGL.DLL	C++	1.3.1.0e					
CB_EAGL.DLL	C++	1.3.1.0c					
CB_RAND.DLL	C++	1.1.0.0a					
MYDLL.DLL	C	1.1.0.0a	C ESS all Unity 3.2 04282008	538	17750	12	1
MPRBOOT.HEX	Assembler	2.6.1.0b	ASM MPRBOOT 2.6.1.0b 05162007.xls	56	1340	0	0
ESSCRYPT.DLL	C/C++	1.9.0.0a	CPP Shared Utilities vol2 1.0.1.0 05142008				
ESSDECPT.EXE	C++	1.9.0.0a					
ESSCRPT1.DLL	C++	1.1.0.0b					
ElectionPackager	C++	1.0.0.0e					
ESSZIP	C++	2.0.0.0f					
PCCARD30.EXE	C++	3.5.0.0h					
PBMtoBMP	C++	1.1.0.0c					
WIN650	C++	2.2.1.0.4					
INIT650.EXE	C/C++	2.2.1.0.4					
SERVE650.EXE (Newserve650)	C++	2.2.1.0.4					

Product	Language	Submitted Version	Review Spreadsheet	Review-ed Lines	Total Lines	Total Issues	EAC Issues
CB_650.DLL	C	1.2.0.0a	C ESS all Unity 3.2 04282008				
REGUTIL.DLL	C++	1.1.0.0d	CPP Shared Utilities vol2 1.0.1.0 05142008				
SHELLSETUP.EXE	C++	1.1.0.0a					
SHELL.EXE	C++	1.1.0.0b	CPP Shared Utilities vol3 05072007				
EXITWIN.EXE	VB	1.1.0.0a	VB ExitWin 1.1.0.0a 04122007	33	469	0	0
Firmware							
****Model 200****							
TOS /wo JVM		N/A					
DS200	C/C++	1.3.7.0g	CPP DS200 1.3.7.0g 04282008	386	12552	2	1
Power Management_MSP430	C	1.2.0.0a	C DS200 all 1.2.0.0a 04282008	741	20930	3	0
Scanner_C8051	C	2.11.0.0a	C DS200 all 1.2.0.0a 04282008				
****Model 650****							
M-650	C	2.2.1.0.5	C ESS all Unity 3.2 04282008				
****AutoMARK****							
AutoMARK-Voter Assist Terminal (VAT)	Various	1.3.2816	CPP VAT (ESS ScannerPrinterLibrary 1.8.31-GetMarks 1.4.9) 10152008	679	21026	9	2
Totals				**8775**	**266501**	**330**	**23**
Percentages				**%**	**3.3**	**%**	**7**

2.1.3.2 *Summary of 3% Source Code Review Results*

A total of 330 discrepancies were identified. The majority, 307 or 93%, were categorized as non-logic issues. The summary of the 23 discrepancies categorized as EAC Decision Discrepancies and ES&S responses are listed in the table.

For 21 discrepancies ES&S provided justification for non-compliance or their disagreement with the iBeta interpretation of the VSS 2002 requirements. Precedence for the iBeta interpretation has been established with testing for other clients and these established interpretations must be applied consistently to all manufacturers under test with iBeta. iBeta acknowledges that in some instances other interpretations may be possible and the EAC Reviewers may deem these alternative interpretations acceptable.

Table 8 Potential Logic Issues

Language	Component	Disc #	Description	VSS Ref.	iBeta Classification	ES&S Response
C	WIN650: folder 07-0531 Shared Utilities\ WIN650 2.2.1.0.4\ Source	10	line 329 hard-coded key.	v1: 6.4.2	Hard-coded key	The hard coded table cited is used in an old scheme to "scramble" or obfuscate the M650 audit log file before it is written to the M650 internal file on the M650 internal RAM drive. The audit log file is printed in real-time on a continuous form matrix printer and becomes the audit log of record. This table and its contents are well commented so it passes the test for hard constants. This function is not used in any way to validate or protect the firmware.
COBOL	HPM	23	Series of ELSE IF clauses is missing the final ELSE clause	v.1: 4.2.4.a	iBeta interpretation for the control constructs requirement is violated.	V.1: 4.2.4.a specifies the acceptable control constructs to be used. One of the listed acceptable control constructs is If-Then-Else. This section does not

Language	Component	Disc #	Description	VSS Ref.	iBeta Classification	ES&S Response
						elaborate any further on the acceptable different forms of syntax for If-Then-Else statements. It is our belief that the sections of code cited in this discrepancy are structured, sound, easily understood and accepted syntax forms of IF-Then-Else statements.
COBOL	HPM	24	Procedure header contains ONLY description no other required info for procedure over 10 lines of code Series of ELSE IF clauses is missing the final ELSE clause Lines 399,402 & 405 contain non-enumerated constants	v.1: 4.2.3.b 4.2.7 (a, a.1-a.6) 4.2.4.a v.2: 5.4.2.u	1. iBeta interpretation for the Exit Point requirement is violated. 2. iBeta interpretation for the control constructs requirement is violated. 3. Non-enum constants are acceptable per discrepancy 20 explanation.	V.1: 4.2.4.a specifies the acceptable control constructs to be used. One of the listed acceptable control constructs is If-Then-Else. This section does not elaborate any further on the acceptable different forms of syntax for If-Then-Else statements. It is our belief that the sections of code cited in this discrepancy are structured, sound, easily understood and accepted syntax forms of IF-Then-Else statements.
COBOL	HPM	25	Procedure header con-tains ONLY description no other required info for proc-edure over 10 lines of code Series of ELSE IF clauses is missing the final ELSE clause Lines 415, 417, 422, 425, 428, 431, 436, 439, 442, 445,449, 452, 455 & 458 contain non-enumerated constants	v.1: 4.2.3.b 4.2.7 (a, a.1-a.6) 4.2.4.a v.2: 5.4.2.u	1. iBeta interpretation for the control constructs requirement is violated. 2. Non-enum constants are acceptable per discrepancy 20 explanation.	V.1: 4.2.4.a specifies the acceptable control constructs to be used. One of the listed acceptable control constructs is If-Then-Else. This section does not elaborate any further on the acceptable different forms of syntax for If-Then-Else statements. It is our belief that the sections of code cited in this discrepancy are structured, sound, easily understood and accepted syntax forms of IF-Then-Else statements.
COBOL	HPM	26	Procedure header contains ONLY description no other required info for procedure over 10 lines of code Series of ELSE IF clauses is missing the final ELSE clause Lines 467, 470 and 473 contain non-enumerated constants	v.1: 4.2.3.b 4.2.7 (a, a.1-a.6) 4.2.4.a v.2: 5.4.2.u	1. iBeta interpretation for the control constructs requirement is violated. 2. Non-enum constants are acceptable per discrepancy 20 explanation.	V.1: 4.2.4.a specifies the acceptable control constructs to be used. One of the listed acceptable control constructs is If-Then-Else. This section does not elaborate any further on the acceptable different forms of syntax for If-Then-Else statements. It is our belief that the sections of code cited in this discrepancy are structured, sound, easily understood and accepted syntax forms of IF-Then-Else statements.
CPP	EDM	5	1) multiple embedded calls in logical statement at lines 856, 871 2) Illegal breaks at lines 847, 859, 874, line 880 changes the state of the system and therefore break statements are not allowed. If code deletes one it must delete all in order to complete unit operation described.	v.1: 4.2.3.e v.2: 5.4.2.m	Multiple exits	This noted discrepancy is an IF statement that tests the result of several Boolean returning functions. ES&S does not consider these to be embedded statements; the functions aren't doing processing in the sense that they change the state of the system or change any value. Rather they are functions that fetch or otherwise determine a value and return the value. This may be something difficult for a reviewer to discern so they would just flag it because it is a function within a conditional expression. As for the second part of item #5 ES&S would disagree with the reviewer. No state changes (precinct deleted) are made until after the conditions that can trigger those breaks are passed. It is not necessary that all precincts be deleted from the list in this code.

Two potential logic discrepancies are related to the AutoMARK and are under investigation by both Premier Election Solutions and ES&S. These shall be addressed in a subsequent letter provided to the EAC.

2.1.3.3 *Recommendation Regarding the Reuse of the SysTest Source Code Review*

In order to provide a recommendation, iBeta evaluated the results of the 3% source code review. Whereas the results would be recommended for acceptance if only non-significant discrepancies were found (i.e. less critical requirement or interpretations inconsistent with documented industry accepted practices), there were discrepancies written that potentially impact the source code. Thus iBeta initiated two additional analyses:

1. iBeta confirmed that the results of the 3% source code review were consistent with the previous results (not identical but consistent). This confirmation was reached by reviewing the types of discrepancies generated by SysTest in the 100% review against those generated by iBeta.
2. iBeta reviewed the severity of the discrepancies identified and assessed that the number of discrepancies potentially impacting the source code is considered very low versus the overall number of discrepancies consistent with a 100% review. The severity of the discrepancies and the manufacturer responses further indicate that the majority of the 21 potential logic discrepancies would be resolved without source code modifications.

Based on the limited or perhaps non-impact on the source code as a result of these discrepancies, iBeta recommended reuse of the results of the SysTest source code review. In*2-3-2009 Approval Reuse of Testing Final* the EAC approved the reuse of the source code review conducted by SysTest Labs.

2.1.4 Reused Environmental Hardware Assessment

In *2-3-2009 Letter to ESS Reuse of Testing Final* the EAC has authorized the reuse of the hardware testing conducted by SysTest Labs' sub-contractors. In order to ensure that these test results provided sufficient documentation of the Environmental Hardware test assessment and results iBeta reviewed the reports to confirm any failures resulting in engineering changes were documented and the reports document that all hardware submitted under Unity 3.2.0.0 passed.

The result of the review generated requests for additional documentation. These requests were documented in issues 1, 2, 3, 6, 7, 8, and 9 of iBeta's *Unity 3.2.0.0 Discrepancy Report*. Responses to all issues were accepted. It should be noted that issues 6 and 7 are accepted by iBeta but are deferred to the EAC for determination of sufficient documentation for test result reuse. These issues are traced to the Test Report and Tested Configuration Matrixes in Appendix B.

Table 9 Environmental Hardware Test Report Review Issues

No.	Location	Issue Description	Standard- Requirement	ES&S Response	Resolution Validation
1	Unity 4.0 Discrepancy Report 10/28/08 (SysTest) DS200 with Optional Ballot Box ESD Test Report 1.0 (Percept)	Potentially reusable Unity 4.0 hardware test results do not document validation of the ES&S' resolution of an ESD failure On page 2 of the ESD report a failure and mitigation is identified, however the failure and validation resolution is not documented in the Discrepancy Report or the sub-contractor report. There is no documentation that an ES&S associated engineering change was issued to address the "Modifications Required: The poll close button failed at +15kV in stand alone mode. Copper tape on backside of switch cover was applied to pass at +15kV. The previous VSTL did not provide detail that evidences their valid-ation that an engineering change was initiated by ES&S as a result of the mitigation performed by the subcontractor lab in ESD testing.	v.1: 9.6.2.6.e The ITA shall evaluate data resulting from examinations and tests employing the following practices: Any and all failures that occurred as a result of a deficiency shall be classified as purged, and test results shall be evaluated ...if the 1) manufacturer submits a design, manufacturing ... change notice... 2) examiner of the equipment agrees that the proposed change will correct the deficiency; and 3) manufacturer certifies that the change will be incorporated... EAC NOC 07-005 it is the lead VSTL's responsibility to properly test the voting system and accurately report those tests to the EAC.	ES&S referred this issue to SysTest; SysTest responded 1/8/09: The failure and validation resolution is documented on page 4 and 19 of the sub-contractor report. ES&S submitted ECO 693 to address the "Modifications Required" and Systest' hardware subcontractor Percept completed the Engineering Change Evaluation & Review form. Systest will provide both documents to iBeta.	Accepted, 1/13/08 KS Verified doc Optional Ballot Box ESD, v. 1.0, 4/25/07; pg. 4 shows the failure, and resolution retested and passing. Pg. 19 is a photo showing the part with the copper tape. ECO693 reflected the identified changes.
2	Unity 4.0 Discrepancy Report 10/28/08 (SysTest) Percept Hardware Test Report 1.0 (DS200 5/1/07)	Potentially reusable Unity 4.0 hardware test results contain no description of two test failures and the validation of their resolution by the VSTL. On page 29 of the sub-contractor (Percept) report two failures (CAR-001_DS200-Radiated Emissions, CAR-002_DS200 - Radiated Immunity) and mitigation with 4 ECOs 690 to 693 are identified. Neither the subcontractor report nor the Discrepancy Report provide a description of how, what, when and where the failures occurred or who, how, when and where the mitigations were performed that resulted in the ECO. There is no identification of the validation of the resolution. 1/14/09 KS - Accepted: Verified that "DS200 EMC Test Report 070314-1134A.pdf" Section 6.5 Appx. A, pg. 80 describes 4 modifications made to the DS200 & these modifications match CAR-001 & CAR-002 - Rejected: The ECOs 690 to 693 were not provided. (Note: ECO693 was provided for #1. It does not match the description in the submitted CARs.)	v.1: 9.6.2.6 The ITA shall evaluate data resulting from examinations and tests employing the following practices: a: If any malfunction ... is detected that would be classified as a relevant failure using the criteria in Vol.2, its occurrence ... shall be recorded for inclusion in the analysis of data obtained from the test... e: Any and all failures that occurred as a result of a deficiency shall be classified as purged, and test results shall be evaluated ...if the 2) examiner of the equipment agrees that the proposed change will correct the deficiency EAC NOC 07-005 it is the lead VSTL's responsibility to properly test the voting system and accurately report those tests to the EAC.	ES&S referred this issue to SysTest; SysTest responded 1/8/09: EMC test report "DS200 EMC Test Report 070314-1134A.pdf" Appendix A page 80 of 84 issued by Criterion and Percept CAR-001_DS200-Radiated Emissions, and CAR-002_DS200-Radiated Immunity provide a description of modifications. Systest will provide these documents to iBeta.	Reject 1/14/09 KS ECOs are not provided Accepted 2/6/09 CEC ECO 692 and COTS power supply specification were provided documenting the mitigation changes.
3	ES&S Retest Matrix v.1.16 -	Potentially reusable Unity 4.0 hardware test results do not contain an assessment of the	v.1: 9.6.1.1 As described in 9.5.2, the nature and scope of testing for system changes or	ES&S referred this issue to SysTest; SysTest responded	Accept 1/14/09 KS Verified that ES&S ECO's

No.	Location	Issue Description	Standard- Requirement	ES&S Response	Resolution Validation
	DS200 testing (SysTest) DS200 EMC Report R071107-30-01 (NCEE original) DS200 EMC Report R071107-30-01B (NCEE amended) DS200 EMS Test Report 070214-134A 5/15/07 (Criterion) Percept Hardware Test Report 1.0 (DS200 5/1/07)	scope of testing. The HW test matrix lists three EMC reports from two labs for the DS200. Testing performed at Criterion in March 2007 included a ballot box. Testing a few months later at NCEE excluded the ballot box, Power Disturb-ance and Lightening Surge. An original and amended report was issued by NCEE. The HW test matrix indicates that the ESD & FCC Part 15B applicable test results are in the amended NCEE report. Four additional tests run by NCEE are traced to the original NCEE report. All reports identify the DS200 as passing. No report or test plan provides an assessment addressing the NCEE testing or why: 1) The EMC testing needed to be repeated by NCEE for six tests when the Percept and Criterion report indicate the system passed. 2) Power Disturbance and Lightening Surge weren't repeated. 3) Only ESD and FCC Part 15B results use the amended NCEE report when updates were made to all tests. 4) The NCEE testing excluded the ballot box.	new versions shall be determined by the ITA based upon the nature and scope of the modifications to the system and on the quality of system documentation and configuration management records submitted by the manufacturer.	1/8/09: ES&S changed components on PMB, USB, PEB, ASB, and PSB to be RoHS compliant as detailed in ECOs 702-706. These changes have no impact on the power supply, therefore Power Disturbance, and Lightening Surge tests weren't repeated. Note both original and amended NCEE reports are identical except the amended report now references the correct FEC document (see sec. 1.3 Reason for Amendments pg 3 of 43 for details in the amended report). Also the changes have no impact on ballot box, therefore the NCEE testing excluded the ballot box. Systest will provide these documents to iBeta.	702-706 addressing the changes to DS200 for Restriction of Hazardous Sub-stances (Lead) were provide. In addition the corresponding SysTest ECO assessment and the comments submitted with these documents address the SysTest rationale for testing.
4	Unity 4.0 Test Plan rev. 9.1 Attachments	The appendices identified in the rev.9.1 of the Test Plan were not provided in the package from SysTest. The EAC has instructed that testing of Unity 3.2 shall incorporate system limitation testing per the approved Unity 4.0 Test Plan. The appendices referenced in the Section 1.1 were not provided with the Test Plan.	v.1: 8.7.2.b.1 The FCA s conducted by the ITA to verify that the system performs all the functions described in the system documentation. The manufacturer shall: provide the following information to support his audit: copies of all procedures used for … integration testing and system testing		Accept 1/14/09 KS The EAC provided a chain of evidence copy - Unity 4.0 T.P.v.6 Attachments A -H
5	Unity 4.0 Test Plan rev. 9.1 spreadsheet of system limitations	A spreadsheet containing information regarding the testing of system limitations for the approved EAC Unity 4.0 Test Plan was not provided. The EAC has instructed that testing of Unity 3.2 shall incorporate system limitation testing per the approved Unity 4.0 Test Plan. "The attached spreadsheet" that provides a matrix of limitation is identified in section 4.3.10.2 but was not provided with the Test Plan.	v.1: 8.7.2.b.3 The FCA s conducted by the ITA to verify that the system performs all the functions described in the system documentation. The manufacturer shall: provide the following information to support his audit: records of all tests performed … including error corrections and retests	ES&S referred this issue to SysTest; SysTest responded 1/8/09: Systest will provide a spread-sheet containing information regarding the testing of system limitations to iBeta.	Accepted: 1/14/09 KS Verified the limitations spreadsheet was received
6	ES&S Retest	The Temperature, Power Variation and	v.2: B.5 The test report shall be organized	ES&S referred this issue to	Accepted: 1/15/09 KS -

No.	Location	Issue Description	Standard- Requirement	ES&S Response	Resolution Validation
	Matrix v.1.16 - DS200 testing (SysTest) APT Labs Testing Services Report M650 Job no.08-00654 (5/2/08)	Reliability report does not identify whether the M650 passed or failed. The matrix indicates the APT report contains the results of M650 Testing for Temperature, Power Variations and Reliability. Section 5.1 indicates that the operational tests are performed by SysTest and they will determine the pass/fail of the test. No SysTest report identifying the pass/fail report has been provided.	so as to facilitate the presentation of conclusions …a summary of test results …	SysTest; SysTest responded 1/8/09: The APT policy is not to state the results of testing in their test report as they do not perform operational status check. Systest performed the operational status check prior to and after each test so they left it up to Systest to state whether a product passed or failed. Systest stated that the product passed in their Environmental Test Case Summary. A copy of Environ-mental Test Case Summary will be provided to iBeta.	Verified the SysTest Test Summary Report references SUN APT lab as performing environmental testing and "All tested equipment successfully passed each of the environmental tests to which the equipment was subjected." Defer to EAC for determination of reuse.
7	AutoMARK Voter Assist Terminal Test Report rev.1.3 (Percept 5/19/05)	Potentially reusable Unity 4.0 hardware test results (A100) contain no description of the engineering changes initiated during testing. Section 2.1 of the sub-contractor report identifies S/N-008 returned for a calibration error; it does not identify if it was associated with the test failure identified in section 3.4.1 & 3.4.1.1.1. The VAT failure identifies mechanical changes but does not identify the engineering change. As neither the original ITA report nor supporting documentation of the failure was submitted it could not be validated if the discrepancy and resolution was documented in the test record.	v.1: 9.6.2.6 The ITA shall evaluate data resulting from examinations and tests employing the following practices: a: If any malfunction ... is detected that would be classified as a relevant failure using the criteria in Vol.2, its occurrence ... shall be recorded for inclusion in the analysis of data obtained from the test... e: Any and all failures that occurred as a result of a deficiency shall be classified as purged, and test results shall be evaluated ...if the 2) examiner of the equipment agrees that the proposed change will correct the deficiency EAC NOC 07-005 it is the lead VSTL's responsibility to properly test the voting system and accurately report those tests to the EAC.	ES&S referred this issue to SysTest; SysTest responded 1/8/09: Per Humidity Test Nonconforming Work and Corrective Action Request S/N-008 returned for a calibration error was not associated with the test failure identified in section 3.4.1 & 3.4.1.1.1 S/N:-008 was associated with 120 hrs humidity test Sec. 3.3.5 of the test report. Automark submitted ECO 0025 to address mechanical change. Systest will provide these documents to iBeta.	Accepted: 1/14/09 KS Verified that ECN-025 matches the failure identified in sections 3.4.1 & 3.4.1.1.1. CAR SN-008 identifies "humidity test was restarted after installing a new touch screen panel with adequate clearance for the wires". The CAR identifies how the system was restored but does not clearly identify the reason for the failure. It is unclear if "clearance for the wires" was an Engineering Change or replacement of a failed part. iBeta accepts the response but refers these findings to the EAC for determination of reuse.
8	ES&S AutoMARK VAT A200 (Report No. 080521-1215R 6/11/08)	Potentially reusable Unity 4.0 hardware test results for the AutoMARK VAT A100 do not contain an assessment of the changes in the VAT models that permit the use of A100 and A200 reports. An EMC report for the A200 was submitted with the A100 reports. Reuse of prior hardware environmental testing is permitted by the EAC if an ESD test is performed. A 2008 ESD for the A200 was submitted to support reuse of the 2005 A100 testing. There is no assessment of the hardware that identifies the impact on testing of the	v.1: 9.5.2.1 The ITA will determine the test necessary for to qualify the modified system based on a review of the nature and scope of changes… EAC Voting System Test and Certification Program Manual v.1.0 2.10.5.2 Use of valid prior testing is authorized only when: 2.10.5.2.1. The discrete software or hardware component previously tested is demonstrably identical to that presently offered for testing. VSTLs must examine the components to ensure no change has taken	ES&S referred this issue to SysTest; SysTest responded 1/8/09: Phase 2 Change Summary. pdf document describes the differences between the model A100 and A200. 5K50-30 vs 5K50-20 Differential items_G.pdf document describes the differences between the model A200 and A300. Please note there are no hardware differences between the model A200 and A300. AutoMARK	Reject: 1/15/09 KS Phase 2 Change Summary.pdf references ECO324 - 346 which were not provided. 1/15/09 KS Accept: Verified that Phase 2 Change Summary.pdf and submitted SysTest ECO 200-206, 208, 210-247, 256-278 assessments identify changes between A100 & A200. Confirmed that all required testing identified in these

No.	Location	Issue Description	Standard- Requirement	ES&S Response	Resolution Validation
		changes between the A100 and A200 so that the A200 ESD testing is sufficient to support reuse of the A100 2005 reports. The A200 report indicates that Electric Fast Transit was repeated but there is no assessment identifying why this test was required but the other tests were not required. 1/15/09 KS Accept: Verified that Phase 2 Change Summary.pdf and submitted SysTest ECO 200-206, 208, 210-247, 256-278 assessments identify changes between A100 & A200. Confirmed that all required testing identified in these assessments was performed in AutoMARK VAT1.1 EMC Test Report 051214-995R.pdf; Document 5K50-30 vs 5K50-20 Differential items_G.pdf reviewed for changes between A200 & A300. **Reject:** The Phase 2 Change Summary.pdf identifies ECO324-346. SysTest did not provide these assessments	place consistent with all documentation. When valid prior testing is used, the system presented must be subject to regression testing, functional testing and system integration testing; 2.10.5.2.2. The voting system standards applicable to the prior and current testing are identical; 2.10.5.2.3. The test methods used are substantially identical to current test methods approved by the EAC; and 2.10.5.2.4. The adoption and use of valid prior testing is noted in the test plan and test report.	Voter Assist Terminal Test Report rev 1.3.pdf is the test report for model A200. Systest will provide these documents to iBeta.	assessments was performed in AutoMARK VAT1.1 EMC Test Report 051214-995R.pdf; Document 5K50-30 vs 5K50-20 Differential items_G.pdf reviewed for changes between A200 & A300. Accept: 2/6/09 CEC Verified receipt of the ESO324 - 346
9	VAT A300 EMC report 070730-1165 Criterion	Potentially reusable Unity 4.0 hardware test results for the AutoMARK VAT A200 do not contain an assessment of the changes that permits use of the A300 reports. An EMC report for the A300 was submitted for the A200 report. There is no assessment of scope that identifies the differences between the A200 and A300.	v.1: 9.5.2.1 The ITA will determine the test necessary for to qualify the modified system based on a review of the nature and scope of changes…	ES&S referred this issue to SysTest; SysTest responded 1/8/09: Premier Election Systems is listed as the client in the test report but the model number that was tested is VAT A100 which is common to both companies. Both Al Backlund and Darrick Forester believe that there was discussion of joint testing between ES&S and Premier but Systest was not involved in it.	Accept 1/14/09 KS Accepted based upon the response in discrepancy #8 that there are no differences between the A200 and A300.

3 Materials Required for Testing

The System Identification stipulates the following materials required for testing of ES&S Unity 3.2.0.0 voting system.

3.1 *Voting System Software*

The software listed in below is the documented configuration of the ES&S Unity 3.2.0.0 voting system.

Table 10 Voting System Software

Application	Manufactuer	Version	Description (identify COTS)
Audit Manager (AM)	ES&S	7.5.0.0	A Unity election management system audit logging software application including security and user tracking for the Election Data Manager and Ballot Image Manager
Election Data Manager (EDM)	ES&S	7.8.0.0	A Unity election management system software application to define and store jurisdiction election data in a single-entry database
Ballot Image Manager (ESSIM) with Ballot On Demand (BOD)	ES&S	7.7.0.0	A Unity election management system desktop publishing tool to layout and format paper ballots BOD is an optional operating mode in ESSIM used to print election quality ES&S paper ballots on a COTS OKI 9600 HDN color laser printer.
AutoMARK Information Management System (AIMS)	ES&S AutoMARK	1.3.57	A windows-based election management system software application to define election parameters for the VAT, including functionality to import election definition files produced by the Unity EMS and create VAT flash memory cards
Hardware Programming Manager (HPM)	ES&S	5.7.0.0	A Unity election management system software application to import, format, and convert an election file and create election definitions for ballot scanning equipment
Election Reporting Manager (ERM)	ES&S	7.5.2.0	A Unity central count software application to compile and report election results
Voter Assist Terminal (VAT)	ES&S AutoMARK	1.3.2904	A software application to assist multilingual voters and voters with visual, aural or dexterity disabilities to vote a paper ballots in a private manner
intElect DS200	ES&S	1.3.7.0, Power Management FW v. 1.2.0.0, Scanner FW v. 2.11.0.0	A Unity Voting System precinct count optical scanner paper ballot tabulator including a 12-inch touch screen display providing voter feedback and poll worker messaging.
Model 650 (M650)	ES&S	2.2.1.0	A Unity Voting System central count high-speed optical scanner paper ballot tabulator. The M650 prints results reports to an external printer and saves results to a zip disk.
Microsoft Windows XP Professional	Microsoft	Service Pack 2	COTS personal computer operating system
Excel (Microsoft Office)	Microsoft		COTS software used by AIMS to import audio scripts
Acrobat Standard	Adobe	v.8	COTs software used with ESSIM to create ballot files for printing
Adobe Types Basic	Adove		COTs software used with ESSIM to create ballot files for printing
RM/COBOL		v.11.01	COTs interpreter software used in HPM & ERM

3.2 *Voting System Hardware & Equipment*

The equipment listed below is the documented configuration of the ES&S Unity 3.2.0.0 voting system

Table 11 Voting System Hardware & other Equipment

Hardware or Equipment	Manufacturer	Version	Description (identify COTS)
M650			
M650 Tabulators SN: 7003- red, left oval SN: 1102 7011- green, left oval	ES&S	HW 1.2 FW 2.2.1.0	Central count optical scanners, each scanners has color specific optical light and reads either a left or right ballot oval
M650 Tabulator SN: 2406 8013- green, right oval	ES&S	HW 1.1 FW 2.2.1.0	Central count optical scanners, each scanners has color specific optical light and reads either a left or right ballot oval
Microline 520 9pin Printers Configured w/ SN:7003: • SN: 204A2005641 • SN: 407D4011099 Configured w/ SN:1102 7011 • SN: 407D4010960 • SN: 407D4010894	Okidata	Model: GE5258A	M650 Results Report & Audit Log Printers (COTS)
LQ-590 Printers Configured w/ SN: 2406 8013 SN: FSQY094255 SN: FSQY093447	Epson	Model: #P363A	M650 Results Report & Audit Log Printers (COTS)
Universal Power Supply SN: 20V06516228WE SN: 20V06516249WE SN: 20V06516248WE	Belkin	N/A	M650 UPS (COTS)
DS200			
intElect DS200 SN: ES0107360007 SN: ES0107370002 (Received modem equipped, modem must be removed prior to test execution)	ES&S	HW 1.2.0 FW 1.3.7.0 Power Mgmt FW v. 1.2.0.0, Scanner FW v.2.11.0.0	Precinct count optical scanner
intElect DS200 SN: ES0107370025 (Received modem equipped, modem must be removed prior to test execution)	ES&S	HW 1.2.1 FW 1.3.7.0 Power Mgmt FW v. 1.2.0.0, Scanner FW v.2.11.0.0	Precinct count optical scanner -
DS200 Plastic Ballot Box P/N 94098	ES&S	N/A	Precinct Plastic Ballot Box, No Diverter
Steel Ballot Box P/N 76246, SN: C4243	ES&S	N/A	Precinct Steel Ballot Box, with Diverter
Steel Ballot Box P/N 76245-10, SN: 1573	ES&S	N/A	Precinct Steel Ballot Box, No Diverter
AutoMARK VAT			
AutoMARK Voter Assist Terminal SN: AM0106430376	ES&S	Model A100, HW Rev 1.0 FW 1.3.2904 OS 5.00.14 PEB v.1.65 SBC v. 1.0	Accessible paper ballot marking device original release - multiple cable connector and printed circuit boards are mount in the lower portion of the VAT
AutoMARK Voter Assist Terminal SN: AM0206443384	ES&S	Model A200 HW Rev 1.1 FW 1.3.2904 OS 5.00.14 PEB v.1.65 SBC v. 2.0	Accessible paper ballot marking device Change: Consolidate PCB, relocate PCB and cables to upper portion for easier maintenance
AutoMARK Voter Assist Terminal SN: AM0208470767	ES&S	Model A200 HW Rev 1.3.1 FW 1.3.2904 OS 5.00.19 PEB v.1.65 SBC v. 2.5	Accessible paper ballot marking device Change: LCD replacement, ROHS board components, change CPU and Flash Chips on the SBC board FW, Win CE OS Bootloader for P30 flash, OS update to support DST and Hash check
AutoMARK Voter Assist Terminal SN: AM0206462702	ES&S	Model A200 HW Rev 1.3.1 FW 1.3.2904	Accessible paper ballot marking device Change: PEB FW to support Enhanced AutoCast and Double Spit & Wipe

Hardware or Equipment	Manufacturer	Version	Description (identify COTS)
		OS 5.00.19 PEB v.1.70 SBC v. 2.5	
Ballot-on-Demand			
COTS - HDN color laser printer			Note: All testing of this product was completed by SysTest Labs; iBeta did not receive this hardware

3.3 *Testing Software, Hardware & Materials*

The software, hardware and materials listed below are needed to support testing and in test simulations of elections of the ES&S Unity 3.2.0.0 voting system.

Table 12 Testing Software, Hardware & Materials

Software, Hardware or Material	Description	Description of use in testing
Ballot Marker Pens	Marking Device	Supplied by ES&S: VL Ballot Pen to mark paper ballots
Beyond Compare 2 v.2.4.3 (Scooter Software)	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
Thumb Drive 512MB & 8GB	Storage media for the DS200	Media for installing elections
Iomega Zip Disk 100MB	Storage Media	COTS: Media with election definition and results totals for M650
SanDisk CompactFlash Card 256MB	Storage media for the VAT	Media for installing elections, recording and reporting votes
Paper Ballots	Paper Ballots - 11", 14", 17" & 19", 3 and 4 ovals per inch	Supplied by ES&S: Miscellaneous ballots for VAT, DS200, M650 with preprinted election content, and blank ballot stock for VAT audit log
Paper	Paper - Continuous feed	COTS: for Central count (M650) audit log and reports
Paper (81/2 x 11)	Paper, Inkjet Printer	COTS: for reports from AM, EDM, ESSIM, HPM, ERM reports
Paper rolls	Paper, Thermal Printer	COTS: DS200 reports
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
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 2003	Excel and Word software and document templates	Supplied by iBeta: The software used to create and record test plans, test cases, reviews and results
SharePoint 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
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.6.92 (M Squared Technologies)	C, C++, Java & C# static analysis tool	Supplied by iBeta: identify line counts and cyclomatic complexity
Beyond Compare 2 v.2.4.3 (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
Symantec Ghost v.11 & (14) v.2.5	Image capture tool	Supplied by iBeta: used to capture build and test environments
Automation Anywhere	Functional automated scripting tool	Supplied by iBeta: automate a script to write to write to Audit Manager

3.4 *Deliverable Materials*

The materials listed in below are to be delivered as part of the ES&S Unity 3.2.0.0 voting system.

Table 13 Delivered Voting System Materials

Material	Material Description	Use in the Voting System
Audit Manager (AM)	A Unity election management system audit logging software application including security and user tracking for the Election Data Manager and Ballot Image Manager	EMS audit log software for election definition and ballot preparation applications
Election Data Manager (EDM)	A Unity election management system software application to define and store jurisdiction and election data	EMS software for election definition and ballot preparation of the M650 and DS200
Ballot Image Manager (ESSIM) with Ballot On Demand (BOD)	A Unity election management system desktop publishing tool to layout and format paper ballots BOD is an optional operating mode in ESSIM to print election quality ES&S paper ballots on a COTS OKI 9600 HDN color laser printer.	EMS software for paper ballot preparation
AutoMARK Information Management System (AIMS)	A windows-based election management system software application to define election parameters for the VAT and create VAT flash memory cards. AIMS includes functionality to import election definition files from Unity EMS.	EMS software to program the election definition for the VAT
Hardware Programming Manager (HPM)	A Unity election management system software application to import, format, and convert an election file and create election definitions for ballot scanning equipment	EMS software to program the election definition on the optical scanners
Election Reporting Manager (ERM)	A Unity central count election management system software application to consolidate, tally and report election results	EMS software for importation and consolidation of election results from the M650 and DS200
AutoMARK Voter Assist Terminal (VAT)	An accessible paper ballot marking device for the Unity voting system	Audio and non-manual input device to record votes on Unity paper ballots
intElect DS200 (DS200)	A Unity precinct count optical scanner	Precinct count vote tabulator
Model 650 (M650)	A Unity central count optical scanner	Central count vote tabulator, configured for use with left or right ovals and green or red optical read light
Microline 520 9pin and LQ-590 Printers	COTS printers used for M650 reporting	Central count vote tabulator report and audit log printers
HDN color laser printer	A high quality COTS printer for printing a Ballots on Demand	Print a limited number of ballots at the election office
Thumb Drive 512MB, 1, 4, or 8GB	Storage media for the DS200	Media for installing elections
SanDisk CompactFlash Card 256MB	Storage media for the VAT	Media for installing elections, recording and reporting votes
Ballot Marker Pen	Paper ballot hand marking device	Device to hand mark votes on paper
Iomega Zip Disk 100MB	Storage media for the M650	Media for installing elections, recording and reporting votes
Paper Ballots	Paper ballots	Record votes on paper

3.5 *Proprietary Data*

All software, hardware, documentation and materials shall be considered by iBeta as proprietary to ES&S. 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 ES&S. Authorization for iBeta's release of information to the EAC is contained in the MSA contract.

No information submitted to the EAC with this test plan has been identified by ES&S 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 and test case detail. 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 the 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

Certification testing of the Unity 3.2.0.0 is to the configuration submitted in the EAC application #ESS0701 to the requirements of the VSS 2002. To ensure that Unity 3.2.0.0 conforms to the requirements of the VSS 2002 and *EAC Testing and Certification Program Manual,* in addition to a validation of test coverage, iBeta has traced the test plan to the *ES&S Unity 3.2.0.0 EAC Matrix*. The test methods in Appendix A of this test plan identify how testing to the VSS 2002 will be implemented and the organizations responsible for the testing. This implementation is then documented in a corresponding test case.

Testing for the system level (functional and integration), environmental, accuracy, reliability, availability and characteristics (recovery, usability, accessibility, and maintainability) test cases were performed by SysTest Labs and assessed for reuse by the EAC. The results are identified in Section 1. Appendix A identifies the certification test scope covered by this testing.

Volume, stress, security, telephony and cryptographic test methods were developed by iBeta following a review of the EAC approved *Unity 4.0.0.0 Test Plan*, system limitations documentation, and security documentation for the components of the Unity 3.2.0.0 voting system. The test methods are contained in Appendix A. A test case is developed for each test method. Documentation of all test iterations shall be maintained in the test case with a separate record of the configuration and results of each test execution.

The analysis and assessments performed for source code review, PCA document review, and FCA Document Review is included in section 2.

4.1 *Hardware Configuration & Design*

The baseline hardware configuration of the ES&S Unity 3.2.0.0 submitted for testing is identified in Table 11 Voting System Hardware & other Equipment. 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 Table 14 iBeta Sampling of System Function & Test Cases and Table 15 System- Level Test Cases will include verification and documentation of the test environment against the applicable PCA Configuration tab.

In a preliminary configuration examination of three units transferred from SysTest Labs the DS200 failed to boot up. This issue was reported (discrepancy #87). The compact flash cards were returned to ES&S for examination. It was determined that a file system error that performed a check was incorrectly set to 6 months. In order to resolve the issue, ES&S provided a script file to change the setting of Max_amount to equal 1 and remove W-TEMP. iBeta reviewed the script and restored the compact flash using the build provided by SysTest Labs and ran the script.

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 ES&S Unity 3.2.0.0 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 the manufacturer intends to sell and deliver 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 Tests including those listed in the Reuse System Level Test Method and the Regression System Level Test Case (Vol. 2, Sect. 6)
- Testing of the performance and sequence of system software functions identified in System Operations, Maintenance and Diagnostic Testing Manuals, including those listed in the Reuse System Level Test Methods, Reuse Accuracy Test Method, Reuse Characteristics Test Method and the Volume, Stress, Security, Telephony and Cryptographic Test Cases. (Vol. 2. Sec. 6.8)

- Verification of COTs software and completion of a trusted build by iBeta with the source code provided by SysTest Labs and any changes to source code resulting from testing. iBeta shall construct the build and record the file signature of the build environment and final build. The process follows. All section 5.7 of the Certification Program Manual specified deliverables shall be provided to the EAC stipulated escrow agency upon certification. iBeta staff shall follow the steps outlined in the iBeta *Trusted Build Procedure* to ensure compliance with the section 5.6 of the Certification Program Manual.

4.3 *Test Case Design*

4.3.1 Hardware Qualitative Examination Design

iBeta conducted a review of Unity v.4.0.0.0 EAC approved test plan for Volume, Stress, Recovery and Security and the performance characteristics identified in the Unity 3.2.0.0 submitted TDP. 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 all applicable iBeta test cases. As a result of this review it was determined that iBeta will conduct Volume, Stress, Security and Error Recovery testing to determine the quality of the hardware design. iBeta will also conduct a System Level Regression Test to determine the quality of the overall voting capabilities, pre-voting, voting and post voting functions of the ES&S Unity 3.2.0.0 voting system. The EAC shall assess in the SysTest Labs test results for the Reuse Characteristic (Usability, Accessibility and Maintenance), Reuse Functional System Level, Reuse Accuracy and Reliability testing identified in the applicable test method.

An examination of the ES&S Unity 3.2.0.0 voting system was conducted to confirm that it does not contain: wireless technology, modems, or use of the public networks. The results of this review were recorded in the FCA Test Document Review and mapped to the applicable iBeta test method. As a result of this review it was determined that the voting system:

- Is exempted from wireless, modem and testing associated with use of the public networks.

SysTest Labs and their subcontractors (see Section 1 Introduction) examined the Unity v.4.0.0.0 and determined the scope of hardware environmental testing required by the VSS 2002. The EAC conducted a review of the SysTest Labs environmental testing for Unity v.4.0.0.0 and approved its reuse. iBeta compiled the test reports applicable to the scope of Unity 3.2.0.0 and confirmed the reports identified the hardware had passed and that any failures identified in the reports had documentation of a matching engineering change. A trace matrix of the test reports and the tested equipment configuration is contained in Appendix B.

4.3.2 Hardware Environmental Test Case Design

The SysTest Labs' subcontractors listed in section 1 performed hardware testing of the Unity v.4.0.0.0 voting system. The review, analysis, testing and test results are contained in the test reports and engineering change assessments listed in the Table 2 External Documents - Unity v.4.0.0.0 Test Documents. The EAC issued their approval for reuse of the results of the SysTest Labs Environmental Hardware testing in *2-3-2009 Letter to ESS Reuse of Testing Final.* In order to ensure that iBeta had all documentation of the Environmental Hardware test assessment and results for the Unity 3.2.0.0 voting system. iBeta reviewed the reports to confirm they included documentation that the Unity 3.2.0.0 submitted hardware passed the required tests and that any failures resulting in engineering changes were documented. This work was performed as part of the Pre-Certification Test Activities. The results are identified in section 2.1.4

4.3.3 Software Module Test Case Design & Data

ES&S has petitioned for reuse of the functional testing performed by SysTest in the certification effort of Unity v.4.0.0.0. Included in this petition is reuse of the Unity 3.2.0.0 applicable portions of the EAC approved *ES&S Unity 4.0 Certification Test Plan Document Number 07-V-ESS-035-CTP-01* Rev. 10.0. This approved test plan has been attached as Appendix C.

Following the process outlined in Section 2.1.1 Document Review and Results Based upon the FCA Document Review of the ES&S tests the iBeta standard test cases were customized to cover the applicable requirements of the ES&S Unity 3.2.0.0 voting system.

A security documentation review in accordance with vol. 2 Section 6.4 was completed and documented in the *FCA Security Review*. Based upon the assessment of the security documents and the findings of this review specific security tests were identified and recorded in the same document to meet the requirements of vol. 1 section 6.
.
The customized test cases include the identification of the controls between the applications, user interfaces, and hardware interfaces with the capture of entry and exit data. (See Table 14 iBeta Sampling of System Function & Test Cases, Table 15 System- Level Test Cases, and Appendix A.)

4.3.4 Software Functional Test Case Design

Documentation of the SysTest test case design process will be examined by the EAC as part of the determination of reuse.

Following the process outlined in Section 2.1.1 Document Review and Results iBeta identified the scope of required functional testing outside the EAC petition for reuse. Testing identified as outside the petition for reuse included Volume, Stress, Error Handling and Security. As appropriate unique functional or integrated system level test cases were defined. Security testing also incorporated source code and document reviews as identified by iBeta's security review. (This review was conducted or overseen by a CSSIP.) The test cases or reviews identify Accept/Reject performance criteria for certification based upon the VSS 2002 and the Unity 3.2.0.0 voting system software, hardware, security and specifications

The ES&S Unity 3.2.0.0 voting system functions are identified in the SysTest Labs Test Plan (See Appendix C). A sampling of this functionality will be tested by iBeta, as identified in Table 14 iBeta Sampling of System Function & Test Cases. Greater description of each Test Case is found in the Test Methods. (See Appendix A Table 17) Detailed test steps and test data are found in the separate individual Test Case documents.

Table 14 iBeta Sampling of System Function & Test Cases

iBeta Sampling of System Function	Test Case
a. Ballot Preparation Subsystem	Regression System Level Volume 3
b. Test operations performed prior to , during and after processing of ballots, including:	
i. Logic Test – Interpretation of Ballot Styles & recognition of precincts	Regression System Level Volume 1, 2 & 7
ii. Accuracy Tests- Ballot reading accuracy	Regression System Level Volume 1, 2, 6 to 10
iii. Status Tests- Equipment statement &memory contents	Regression System Level Volume 1, 2, 6 to 10
iv. Report Generation – Produce test output data	Regression System Level Volume 1, 2, 6 to 10
v. Report Generation- Produce audit data	Regression System Level Volume 1, 2, 6 to 10
c. Procedures applicable to equipment used in a Polling Place for:	
i. Opening the polls, accepting & counting ballots	Regression System Level Volume 1, 2, 6, 7, 9 & 10
ii. Monitoring equipment status	Regression System Level Volume 1, 2, 6, 7, 9 & 10
iii. Equipment response to commands	Regression System Level Volume 1, 2, 6, 7, 9 & 10
iv. Generating real-time audit	Regression System Level Volume 1, 2, 6, 7, 9 & 10
v: Closing polls and disabling ballot acceptance	Regression System Level Volume 1, 2, 6, 7, 9 & 10

iBeta Sampling of System Function	Test Case
vi. Generating election data reports	Regression System Level Volume 1, 2, 6, 7, 9 & 10
vii Transfer ballot count to central counting location	Regression System Level Volume 1, 2, 6, 7, 9 & 10
viii Electronic transmission	Telephony & Cryptographic
d. Procedures applicable to equipment used in a Central Count Place	
i. Process ballot deck or PMD for >1	Regression System Level Volume 1 & 6
ii. Monitoring equipment status	Regression System Level Volume 1, 2, 6, 7, 9 & 10
iii. Equipment response to commands	Regression System Level Volume 1, 2, 6, 7, 9 & 10
iv. Integration with peripherals equipment or other data processing systems	Regression System Level Volume 1, 2, 6, 7, 9 & 10
v. Generating real-time audit messages	Volume 1, 2, 6, 7, 9 & 10
vi. Generating precinct-level election data reports	Regression System Level Volume 1, 2, 7, 9 & 10
vii. Generating summary election data reports	Regression System Level Volume 1, 2, 6, 7, 9 & 10

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 15 System- Level Test Cases

	Test Method (Method Detail)
a. Volume Test	
Using the ES&S defined Unity 3.2.0.0 system limitations and the estimated maximums of the largest ES&S customers, confirm that the system limit exceeds the customer maximums. Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) Using the ES&S defined system limit, verify that the maximum capacity is successfully prepared and processed without errors for: Vol. 1) The maximum number of precincts and ballot styles within an election. Vol. 2) The maximum number of ballot styles in a precinct Vol. 4) See g (Recovery Tests) Vol. 6) The maximum number of precincts in a single polling place Vol. 7) The maximum number of ballot styles in a precinct Vol. 8) The maximum number of candidates/contest in an election on an M650 9) The maximum number of candidates/counter in an election Vol. 10) The maximum number of ballot styles in an election Verify that during the expected hours of operation audit entries are successfully recorded without errors for: Vol. 3) Audit Manager listings generated during EDM and ESSIM ballot preparation	Volume 1 – 4 & 6-10 (Volume)
b. Stress Test	
Using the ES&S defined system limits, verify that the voting system provides an appropriate response to an overloading condition, exceeding: Vol. 1) The maximum number of precincts and ballot styles within an election. Vol. 2) The maximum number of ballot styles in a precinct Vol. 4) See g (Recovery Tests) Vol. 6) The maximum number of precincts in a single polling place Vol. 7) The maximum number of ballot styles in a precinct Vol. 8) The maximum number of candidates/contest in an election on an M650 9) The maximum number of candidates/counter in an election Vol. 10) The maximum number of ballot styles in an election	Volume 1 – 4 & 6-10 (Stress)

	Test Method (Method Detail)
Verify that higher than the expected level of operation is successfully processed without errors for: Vol. 3) Audit Manager listings generated during EDM and ESSIM ballot preparation Stress scenarios exceeding the maximum limitations will be executed to confirm any applicable error handling: If error messages are generated they are: - Stored & reported as they occur - Errors requiring intervention clearly display issues & 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.	
c. Usability Tests:	
Election database and 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.	Reuse System Level Reuse Characteristics Volume Tests 1-10 Error Recovery
d. Accessibility Tests:	
An audio Spanish and English ballot will be programmed. Votes will be marked on the VAT to confirm: • Ballots can be accessed visually, aurally or with non-electronic dexterity aids in Spanish and English • Ballots can be accessed with various screen contrast, ballot display settings, and required audio ballot controls • Physical aspect measurements of the voting system will comply with the VSS 2002	Reuse System Level Reuse Characteristics Regression System Level
e. Security Tests:	incomplete
During system level testing steps will be incorporated into the pre-vote, vote, and post vote election phases. These steps shall test: • Security access controls limit or detect access to critical systems (ballot preparation ballot installation, poll opening/closing, ballot activation, transfer of data, reporting of results and audit functions) • Loss of system integrity, availability, confidentiality and accountability are detectable • The effectiveness of the documented security polices and procedures	Regression System Level Security Review (iBeta)
Security specific test cases shall include: • Attempts to circumvent user sign in and insert media to circumvent • Methods to bypass or defeat the security • Denial of service attacks simulated using insert • Poll workers, and voters as threat agents to access the ability of the voting system to resist or detect attacks, log and/or report attempts • Effectiveness of the documented security polices and procedures (The details for these high level test objectives are found in Table 23 - Security & Telephony Test Methods)	Security Review (iBeta)
Telephony test cases shall include: • Confirmation that the system does not access the public telephone network	
After defining language specific review criteria, a software source code review will be executed to confirm that: • Modules contain single exit points • There are no unbound arrays • There are no vote counter overflows • Audit records log errors & events • There is separate and redundant ballot image, vote and audit recording	iBeta 3% Source Code Review Assessment and the SysTest Labs' Source Code Review

	Test Method (Method Detail)
• Voting systems halt execution at the loss of critical systems • There are no computer-generated passwords	
f. Performance Tests:	
During various functional and accuracy testing the elections will be programmed, voted and tallied to ensure ballot formats are accurately displayed, votes are accurately and reliably cast for the voting variations and functionality supported by the voting system. High or overloaded volume processing, storing and reporting shall occur without system degradation.	Reuse System Level Regression System Level Volume 1-10 - Performance
g. Recovery Tests:	
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. Test will be conducted to determine the system is 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. Volume 4) The maximum media, DS200 & M650, capacity If during Volume and Stress testing (listed in a & b above) there are system errors that cause a crash the system shall recover without any loss of data.	Source code review- v.1: 4.2.3.e Volume 5 (Reuse Electrical Supply) Regression System Level Volume 1-10 Error Recovery

5 Test Data

5.1 *Test Data Recording*

Test data recording by SysTest Labs and their subcontractors is identified by SysTest Labs and reviewed by the EAC in Unity v.4.0.0.0 test effort determination of reuse for Unity 3.2.0.0. SysTest Lab's environmental subcontractors recorded environmental test data in a manner appropriate to the test equipment with output reports detailing the results and analysis.

The results of testing and review performed by iBeta on the ES&S Unity 3.2.0.0 voting system to the VSS 2002 are recorded in the test case and review forms prepared by iBeta. Electronic copies of all testing and reviews will be maintained.

5.2 *Test Data Criteria*

Evaluation of the results of the voting system tests and reviews by SysTest Labs and their subcontractors is identified by SysTest Labs and reviewed by the EAC in Unity v.4.0.0.0 test effort determination of reuse for Unity 3.2.0.0.

The results of the voting system tests and review results shall be evaluated against the documentation of the Unity 3.2.0.0 voting system, and the requirements of the VSS 2002. The Unity 3.2.0.0 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*

SysTest Labs' test data reduction is reviewed by the EAC in the Unity v.4.0.0.0 test effort determination of reuse for Unity 3.2.0.0.

iBeta will process the test data manually.

6 Test Procedures & Conditions

6.1 *Facility Requirements*

The test location of the Functional, System Level, Accessibility, Usability and Environmental testing is identified in the SysTest Labs Unity v.4.0.0.0 Test Plan. All software testing and review performed by iBeta will be performed at iBeta's laboratory in Aurora, Colorado.

ES&S Unity v.4.0.0.0 test documentation will be maintained by SysTest Labs, as directed by the EAC. The ES&S Unity 3.2.0.0 documentation, test documentation and results will be maintained in the ES&S Unity 3.2.0.0 voting system project folder on the SharePoint server in the Voting business vertical repository. Only project assigned test personnel will have access to the ES&S repository. ES&S 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*

Documentation of the ES&S Unity v.4.0.0.0 test set-up performed by SysTest Labs is to be reviewed by the EAC for determination of reuse. This testing incorporated the printing of a Ballot-on-Demand feature using the specified COTS printer.

As part of the PCA iBeta will set-up, the ES&S Unity 3.2.0.0 voting system test platform in the manner identified in the system configuration identified in the Unity 3.2.0.0 system overview, excluding the Ballot-on-Demand COTS printer. 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 16 –Sequence of Certification Test Tasks

Certification Test Task	Predecessor Task	iBeta Test Personnel
Identify scope of project for contract negotiation	Determination of voting system status (new or changed); EAC preliminary direction regarding determination of scope	Carolyn Coggins and Gail Audette
Set up Project and Repositories	Contract Authority	Carolyn Coggins and Gail Audette
Reporting of Discrepancies	Commencement of the project	All test staff
Review PCA TDP Documents for Assessment of Reuse	Project repository and Unity 3.2.0.0 TDP documents received	All test staff
Issue PCA TDP Document Review Assessment to the EAC	Sampling examination of Unity 3.2.0.0 TDP documents	Carolyn Coggins
Review PCA Source Code Review 3% Assessment	Project repository and Unity 3.2.0.0 TDP Documents & Unity v.4.0.0.0 Source Code received from SysTest	Kevin Wilson, Sridevi Jakileti, Lauren Laboe, & Gail Audette
Issue PCA Source Code Review 3% Assessment to the EAC	Sampling identification and examination of 3% of previously reviewed source code	Gail Audette
FCA Testing Review and Test Scope/ requirements identification	Unity 3.2.0.0 TDP documents received; Unity v.4.0.0.0 test artifacts from SysTest; EAC preliminary direction regarding determination of reuse	Kelly Swift, Carolyn Coggins, Jenn Garcia, & Kevin Wilson
Certification Test Plan	PCA TDP Document and PCA Source Code Review 3 % Assessments, FCA Testing Review	All test staff
FCA Test Case preparation	EAC preliminary direction regarding determination of reuse; FCA Testing Review, Identification of Test Scope and Requirements	Jenn Garcia, Kelly Swift, Kevin Wilson, Sridevi Jakileti, Stephanie Eaton & Carolyn Coggins
PCA System Configuration	v. 3.2.0.0 TDP, hardware and software received and checked-in	Stephanie Eaton, Jenn Garcia, Kelly Swift & Carolyn Coggins

Certification Test Task	Predecessor Task	iBeta Test Personnel
PCA Witness Build	EAC determination of reuse; Unity v.4.0.0.0 Trusted Builds received from SysTest	Kevin Wilson & Sridevi Jakileti
Test Method validation	Completion of test method	Carolyn Coggins, Jenn Garcia & Stephanie Eaton
Test tool validation	Identification of tools; verify validations performed on earlier projects for standard tools	Kevin Wilson, Gail Audette, Lich Le, Jenn Garcia, & Stephanie Eaton
Installation of Witnessed Build	Review and validation of installation procedure including user selections and configuration changes	Kevin Wilson & Sridevi Jakileti
Unity 3.2.0.0 FCA Environmental Hardware Test Report identification and examination	EAC letter with determination of reuse; Unity v.4.0.0.0 test artifacts from SysTest	Carolyn Coggins & Kelly Swift
FCA Accuracy Test Case Reuse	Test method identification in the Unity 3.2.0.0 test plan; EAC determination of reuse	Carolyn Coggins
FCA Functional/System Level Test Case Reuse	Test method identification in the Unity 3.2.0.0 test plan; EAC determination of reuse	Kelly Swift & Carolyn Coggins
FCA Functional/System Level Regression Test Case Execution	Unity 3.2.0.0 test plan completion & EAC approval; test case completion; and Trusted Build completion	Stephanie Eaton, Jenn Garcia, Kelly Swift & TBD
FCA Characteristic Test Case Reuse	Test method identification in the Unity 3.2.0.0 test plan; EAC determination of reuse	Carolyn Coggins
FCA Security Review & Testing	Unity 3.2.0.0 test plan completion & EAC approval; test case completion; and Witnessed Build completion	Kevin Wilson & Sridevi Jakileti
FCA Telephony and Cryptography Review and Test Case	Unity 3.2.0.0 test plan completion & EAC approval; test case completion; and Witnessed Build completion	Kevin Wilson & Sridevi Jakileti
Validation of COTs for Trusted Build	Receipt of COTS SW and Unity 4.0.0.0 COTS validations from SysTest	Kevin Wilson & Sridevi Jakileti
Trusted Build	Receipt of all build software and hardware, clean build platform, and validation of COTS complete	Kevin Wilson & Sridevi Jakileti
Regression Testing of Discrepancy Fixes	Receipt of applicable fix or response from ES&S and PCA Witness Build of reviewed code, if applicable	TBD if applicable
Document receipt of the System Identification Tools from the manufacturer	Receipt of the System Identification Tools from the manufacturer	TBD
VSTL Certification Report	EAC documentation of the determination of reuse; successfully complete all FCA and PCA tasks;	All test staff
Deliver the Certification Report for EAC Review	Completion of VSTL Certification Report	Carolyn Coggins
Deposit Trusted Build and acknowledge delivery	Initial decision from the EAC and manufacturer letter	Carolyn Coggins
Re-issue the Certification Report with the EAC Certification Number	Acceptance of the Certification Report by the EAC	Carolyn Coggins
Archive all testing	Issuance of EAC certification number	Stephanie Eaton & TBD

6.4 *Test Operations Procedures*

SysTest Labs Test Operations Procedures are subject to review by the EAC.

iBeta 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 manufacturer 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 the table above.

7 Appendix A - Test Methods

7.1 *System Level Test Methods (Reuse & Regression)*

Table 17 - System Level Test Methods (Reuse & Regression)

Method Detail	Reuse System Level Test Method	Regression System Level Test Method
Test Case Name	Reuse System Level : SysTest Labs Unity v.4.0.0.0 Test Cases applicable to the scope of Unity 3.2.0.0: Readiness, Functional, Maintainability, GEN01, GEN02, GEN02 PA, GEN03, PRI01, PRI01 PP, PRI02, 40HTEST1, Ohio Test, 40HTEST3, 40HTEST4, 40HTEST5, 3000 Precincts, Error Recovery, and Electrical Supply	Regression System Level Test Case
Scope - identifies the type of test	ES&S has petitioned the EAC for reuse of the applicable components in scope for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort. Determination of reuse is based upon the EAC review of test results for functional, system level, usability, and accessibility testing performed by SysTest Labs validating the VSS 2002 required and ES&S identified functionality for the Unity 3.2.0.0 voting system.	A regression system level test incorporating validations of a substantial portion of the VSS 2002 required and vendor identified functionality for the Unity 3.2.0.0 voting system. Pre-vote: Create a Pick-a-Party Primary election; prepare election media and paper ballots in EDM, ESSIM and HPM; import into AIMS . Vote: Vote Election Day hand & machine marked paper ballots (VAT:A100 & A200); precinct scanning (DS200) Post Vote: Write election results (DS200); scan absentee hand marked and VAT marked ballots (M650 central scanner); consolidate absentee & Election Day votes into ERM for tallying and reporting. Testing includes validation of measurable performance including accuracy, processing rate, and ballot format handling capability, incorporating: testing - ENH14322 (zero totals in ERM- RFI-2008-07) - Discrepancy #35 (SysTest 475 ERM Number-Key District report BUG13966,) - Discrepancy 30 (SysTest 429 Election description, Vote for phrase when only 1, Vote for phrase) - Discrepancy #48 (SysTest 556 AM archive functionality) Functional aspects include error recovery, security, and usability of the hardware, software procedures in the pre-vote, voting, and post-voting operations with voter accessibility and multilingual ballots included.
Test Objective	Determination by the EAC of the reuse of SysTest Labs testing, test results and test reporting for Ballot-on-Demand (BOD), VAT and tabulators (DS200, M650), for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort.	Validation of the ability to: - Accurately and securely create paper English and Spanish visual and audio ballots for a pick-a-party primary election; - Create and install election specific media for the VAT and DS200 and M650; - Independently and securely vote audio and visual ballots with mobility and non-mobility restrictions; - Count and report the results; and Validate identified enhancements and discrepancies.
Test Variables: Voting Variations (as supported by the voting system)	The EAC to determine the reuse of SysTest Labs testing of the Supported Functionality Voting Variations as supported for Unity 3.2.0.0. Based upon the *2002 VSS Supported Functionality Declaration Unity 3.2.0.0*submitted by ES&S (10/29/08), the following voting variation functionality and languages are supported: <u>Accessibility</u>: Forward Approach <u>Primary Elections</u>: Closed; Open Standard <u>Partisan & Non-Partisan</u>: Vote for: 1; N of M <u>Write-In Voting</u>: default is a voting position identified; with 1 or no declared candidate and a write, identification for resolution at central count	In Scope for Unity 3.2.0.0: Open Pick-a-Party Primary comprising: - An 11 inch combined paper ballot containing Dem, Rep & Non-Partisan selections, with ovals on the right side - 1 Polling Place - 2 Ballot Styles comprising: - 3 Precincts (1000, 2000, 3000) splits (3000-01, 3000-02) - 2 Partisan, 1 Non-Partisan, 1 Referendum Contests & a Party Selection Election Day voting (VAT & DS200) Absentee Voting (M650)

Method Detail	Reuse System Level Test Method	Regression System Level Test Method
	Rotation: Precinct and state specific rotations Straight Party: Single selection for partisan races in a general election; vote for candidates individually; crossover votes; a race without a candidate for one party; N of M race where N>1; exclude a partisan contest from a straight party selection Cross-Party Endorsement: multiple parties endorse one candidate Split Precincts: multiple ballot styles; support splits with correct contests & ballot identification of each split; reporting of # of voters to the precinct split level and reporting of vote totals is to the precinct level Vote for N of M: Counts each selected candidate, if the maximum is not exceeded; invalidates all candidates in a paper overvote Provisional/Challenged: voted ballot is identified but not included in tabulation, but can be added in central count; ballot is included in tabulation, but is identified and can be subtracted in central count, ballots maintain secrecy of ballot Overvotes: Paper overvote invalidates the vote; if a system doesn't prevent overvotes, it must count them Undervotes: are counted for accounting purposes Blank Ballots: Any alert is tested; if not immediately processed, must be a provision to recognize and accept; if operator access, there must be a provision for resolution Display/Printing Multi-Lingual Ballots: Spanish Default Language: English	Write-in votes Vote for N of M Overvotes Undervotes Blank Ballots Assistive Devices (AT paddles, tactilely discernible keypad, Audio\Visual ballots) Multi-lingual Audio & Visual Ballots (English & Spanish) - Two audio preparation methods: conversion of election text file from Unity to synthesized speech in AIMS (Eloquence COTS SW) & WAV audio files recorded in AIMS - DS200 Ballot Control Options (HPM): Query: Overvotes & Crossover ballots; Reject: Blank ballots & unreadable marks; Accept: undervote. - AIMS Overvote and Undervote alerts selected for VAT. (Overvotes prevented) - DS200 is set to not permit reopening of the polls. (TC will be repeated with system set to permit reopening of the polls)
A description of the voting system type and the operational environment	The EAC to determine the reuse of SysTest Labs testing of the operational environment as applicable to Unity 3.2.0.0: EMS Ballot Preparation SW: Audit Manager (AM), Election Data Manager (EDM), ES&S Image Manager (ESSIM), Hardware Programming Manager (HPM), AutoMARK Information Management System (AIMS) Ballot Marking Device: Voter Assist Terminal (VAT), Models A100 & A200 Precinct Count scanner/tabulator: intElect DS200 (DS200) Central Count scanner/tabulator: Model 650 (M650) Central Count Tally : Election Reporting Manager (ERM)	The Unity 3.2.0.0 voting system includes: EMS Ballot Preparation SW: Audit Manager (AM), Election Data Manager (EDM), ES&S Image Manager (ESSIM), Hardware Programming Manager (HPM), AutoMARK Information Management System (AIMS) Ballot Marking Device: Voter Assist Terminal (VAT), Models A100 & A200 Precinct Count scanner/tabulator: intElect DS200 (DS200) Central Count scanner/tabulator: Model 650 (M650) Central Count Tally system: Election Reporting Manager (ERM)
VSS 2002 vol. 1	2.2.1 thru 2.2.9, 2.2.11 thru 2.5.3.2, 2.5.4, 3.2.4 thru 3.2.4.2.1, 3.2.4.2.3, 3.2.4.2.5, 3.2.4.2.6, 3.2.5 thru 3.2.6.1.2, 3.2.7 thru 3.2.8.2 HAVA a thru c2 RFI: 2007-02, 2007-04, 2007-06, 2008-04, 2008-07, 2008-12	2.2.1 thru 2.2.9, 2.3.1.1 thru 2.5.3.2 , (DRE requirements applicable to VAT excluding vote storage) 3.2.4.2.5, 3.2.4.2.6, 3.2.5.1.3 a thru d.4, 3.2.6.1.1, 3.2.8 thru 3.2.8.2 HAVA a thru c2 RFI: 2007-02, 2007-04, 2007-06, 2008-04, 2008-07, 2008-12
VSS 2002 vol. 2	6.2, 6.2.1, 6.2.2, 6.3, 6.4, 6.4.1, 6.5, 6.6, 6.7 RFI: 2007-06, 2008-07, 2008-12	6.2, 6.2.1, 6.2.2, 6.3, 6.4, 6.4.1 , 6.5, 6.6, 6.7 RFI: 2007-06, 2008-07, 2008-12
Hardware, Software voting system configuration and test location	Determination by the EAC of the reuse of SysTest Labs testing. Configuration of SysTest Labs applicable testing is to be verified by the EAC. Software: AM, EDM, ESSIM, AIMS, HPM, ERM Hardware/Firmware: To be verified by the EAC VAT Models, Firmware & Operating System DS200: HW Rev; FW Rev M650: HW Rev; FW Rev	EMS Software: AM v. 7.5.0.0 EDM v. 7.8.0.0 ESSIM v. 7.7.0.0 AIMS v. 1.3.57 HPM v. 5.7.0.0 ERM v. 7.5.2.0 Hardware/Firmware specific to this test case: VAT Model s including A100 & A200's

Method Detail	Reuse System Level Test Method	Regression System Level Test Method
	Test Location: To be verified by the EAC	Precinct count: DS200: HW: 1.2.0; FW: 1.3.7.0, SN: ES0107360007 Central count: M650: Green (Right) HW Rev. 1.1, FW: 2.2.1.0 SN: 2406 8013 Checklists: Election Day Training Manual Unity v 4.0, August 2007 Readiness Checklists: AM , EDM, ESSIM, HPM ERM Pre-Election Day Training Manual v.7.5.0.0 May 9, 2008 checklist DS200 Pre-Election Day Checklist v.1.3.7.0, July 2, 2008 M650: Pre-Election Day Checklist Version Number 2.2.1.0, February 29, 2008 Test Location: iBeta, 3131 S. Vaughn Way, Aurora, CO 80014
Pre-requisites and preparation for execution of the test case.	Determination by the EAC of the reuse of SysTest Labs testing. Pre-requisites and preparation for execution of SysTest Labs applicable testing is to be verified by the EAC. - Record the testers & date - Perform and install witness/trusted build of software/firmware components	Prior to execution of testing, the following prerequisites must be completed: - Record the testers & date - Perform and install witness/trusted build of software/firmware components utilizing ES&S documentation - System has been installed and set up as identified in the user manuals - Gather any necessary materials or manuals (A microphone, PC soundcard and speakers are available/installed to record audio, white and blue blank ballot stock paper) - Ensure customization of the test case template is complete
Getting Started Checks	Determination by the EAC of the reuse of SysTest Labs testing. Getting Started Checks made prior to the execution of SysTest Labs applicable testing are to be verified by the EAC.	Check the voting system to: - Verify the test environment and system configuration is documented in the PCA Configuration matches the configuration of the system used in the 48 hr. temp & power variation test and 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. -During testing an operational readiness test will be performed.
Documentation of Test Data & Test Results	Documentation of the reuse of SysTest Labs testing is provided by the EAC in a letter to ES&S and iBeta. These letters are posted to the EAC website and listed in the External Documents table of the Unity 3.2.0.0 test plan and test report. . Methods for documentation of SysTest Labs test data and results are to be verified by the EAC.	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
Pre-vote: Ballot Preparation procedures verifications	Determination by the EAC of the reuse of SysTest Labs testing. Pre-vote Ballot Preparation procedure verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.	Ballot Prep: Verify - Spanish/English, visual/audio ballots (contests, candidates , propositions and associated offices/labels) can be accurately/securely defined with multiple ballot styles, precincts and splits. - Ballots contain partisan races segregated by party and non-partisan races (Dem, Rep, Non-Partisan) - Ballots contain identifying marks (ballot style, precincts/splits) - Volume test elections and ballot styles are retained and can be accessed - Ballot & VAT: ovals properly align with candidate names/issues so voters can clearly mark selections; spacing and font size is consistent so there is no preferential voting position - VAT: maximum choices for a single contest are displayed on one page - The election can be accurately/securely imported from Unity 3.2.0.0 into AIMS. (Prerequisite: define and print ballot in Unity 3.2.0.0, before importing into AIMS.) - The AIMS database can be modified, as required, to support the election definition required for VAT operation; and using AIMS Preview function confirm data was

Method Detail	Reuse System Level Test Method	Regression System Level Test Method
		imported correctly and ballots are set up correctly. - Election media can be accurately/securely programmed in HPM and AIMS for installation in all voting & tabulating devices. (VAT, DS200, M650) - AM, EDM, ESSIM, HPM, ERM, VAT, M650 & DS200 Application & hardware readiness checklists are accurate and successfully completed Validate Discrepancy 30 (Election description, Vote for phrase when only 1, Vote for phrase) Installation of Election VAT: Setup & install election; perform maintenance checks: 1. ink cartridge. 2. battery charge 3. Install Flash Memory Card. 4. Test VAT operations (Jurisdiction Guide Ch. 5) 5. Set Admin password 6. Calibrate 7. Set 'Maint' password (Jurisdiction Guide Ch. 6) to confirm there are no hardware/software failures DS200: Setup & install election; perform readiness checklist M650: Setup & install election; set Date & Time; and perform readiness checklist
Pre-vote: Ballot Preparation Security	Determination by the EAC of the reuse of SysTest Labs testing. Pre-vote Ballot Preparation Security procedure verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.	Ballot Prep: -Security access controls limit or detect access to critical systems and the loss of system integrity, availability, confidentiality & accountability, including AM: A userid/password control access to EDM & ESSIM; confirm access is permitted and denied without proper credentials HPM: An administrator password; access the DS200 Admin menu on the DS200 Scanner Options screen; and a password to reopen polls ERM: An administrator password; prevent access to "Suspension Menu"; and confirm access is denied. DS200: A password is required to access Admin menu; a separate password is required to reopen polls M650: Back door is locked AIMS: NT password controls access to AIMS computer, password required to start AIMS VAT: Admin password controls the functions on the System Maint menu (password set on each VAT) -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 until termination of critical system processes (such as audit).
Readiness Testing and Poll Verification	Determination by the EAC of the reuse of SysTest Labs testing. Readiness testing and Poll verification procedures during the execution of SysTest Labs applicable testing are to be verified by the EAC.	Readiness Testing: Verification that: **VAT:** Proper election has been installed: all buttons, printers and screen function correctly; matching version is displayed ; and a ballot can be marked in test mode . - Review audit logs to confirm readiness for VAT

Method Detail	Reuse System Level Test Method	Regression System Level Test Method
		DS200: Readiness testing automatically incorporated into Opening the Polls; Election name, equipment identification, polling place & ballot format and matching version is displayed or printed on initial state report and/or zero count report; confirmation that there are no hardware/software failures ; and device is ready to be activated to accept votes. Perform" DS200 Election Day Checklist Version Number 1.3.7.0, May 9, 2008 - Obtain status, data reports, audit logs and other artifacts to confirm readiness for DS200 - Attempt to open polls with test totals. Verify a visual screen warning is provided if memory locations (including data on media) contains votes, and the reports/audit log contain a time-stamp record of the status of the votes/results memory and disk storage locations. If a unit or system contains a non-zero counter, a warning message is provided, along with corrective actions to resolve the votes. The unit is disabled until type of resolution is selected. - Verify test data has been cleared
Pre- vote: Opening the Polls Verification	Determination by the EAC of the reuse of SysTest Labs testing. Pre-Vote procedures for Opening the Polls during the execution of SysTest Labs applicable testing are to be verified by the EAC.	Precinct Count: Internal testing: - DS200 select 'Open Polls". Zero report will automatically print, an internal test will be performed and results will display. If test is unsuccessful, DS200 will automatically shut down; If successful will display "Please Insert Your Ballot" message - Insert election FMC. VAT will boot up when key switch is turned to 'On' flashing displays of the boot procedure will appear on the screen. If the self-test fails the VAT will shutdown. If successful the VAT will give the "Please Insert Your Ballot" message. (Insert a blank CF card to ensure VAT will NOT boot up) Paper based: Verify VAT & DS200 are ready for use: - VAT & DS200 display "Please Insert Your Ballot" message. - Any failures provide a message for resolution - VAT holds the ballot securely - DS200 does not contain a frame or fixture for ballot marking - DS200 is attached to a custom DS200 ballot box; with locks and separate compartments; slots prevent unauthorized ballot insertion. Write-ins will be marked with a red circle to indicate review is necessary - VAT security seals are checked: compact flash compartment, top cover & ink compartment
Voting: Ballot Activation and Casting Verifications	Determination by the EAC of the reuse of SysTest Labs testing. Ballot Activation and Casting verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.	**VAT & DS200** Protects secrecy of ballot/vote - Voter can make selections based on ballot programming & indicate selection, cancellation, & non-selection (undervotes) - Gives feedback & an opportunity to correct or accept, before the ballot is counted **VAT BMD** - Control of ballot (single ballot cast per vote session) and content of ballot is restricted to the eligible voter - Correct ballot is presented (language, audio/visual, precinct/split) - Party affiliation content is controlled/activated via the "Party Preference" - Touching an area outside the identified selection box does not mark the ballot or display external information - Provides all displays, instructions, messages, alerts and status in multilingual audio & visual displays - Voters are able to edit and review write-ins. # of write-ins match Vote For. - Audio voting provides repeat functionality & volume control - Voter is allowed to mark the ballot, in any combination, or return it without marking (blank)

Method Detail	Reuse System Level Test Method	Regression System Level Test Method
		- Overvote and Undervote provides alerts, with overvotes prevented - Summary screen is provided to signify end of candidate/measures and provides instructions to review/change selections prior to ballot marking - Verify alert of selection's complete, ballot is being marked, and to take completed ballot to tabulator **DS200** - Alert successful/unsuccessful storage of cast ballot; provide review & instruction to resolve unsuccessful casting (Query: Overvotes & Crossover ballots; Reject: Blank ballots and unreadable marks; Accept: undervote s) - Increments the ballot counter for successfully cast ballots - Print Precinct and Status reports to compare to vote data to verify actual votes cast is correct & undervotes/overvotes are counted separately - Access to voted ballot is prevented until after polls close (locked ballot box)
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	Determination by the EAC of the reuse of SysTest Labs testing. Voting System Integrity, System Audit, Errors & Status Indicator verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.	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. - Maintain accurate and complete audit records; verify at various points (After poll open; vote query, reject & accept: any abnormal event encountered in testing; poll close) - Self-tests and diagnostic messages for the hardware will be verified at polll open/close points in the test case Status messages are part of the real time audit record. - Critical status messages requiring operator intervention shall use clear indicators or text Error messages 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
Post-vote: Closing the Polls	Determination by the EAC of the reuse of SysTest Labs testing. Post-vote closing polls verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.	**VAT:** - Turn VAT to 'Off' position & remove FMC to prevent further casting of ballots; verify a voting session cannot be activated. - Review the audit logs (only available report) to verify entries are in the proper sequence for operational tests, switching from test to vote modes, ballot printing, audit report access during voting , including complete & accurate error and status messages **DS200:** - Attempt to print reports while polls are open; verify this is prohibited. - Press 'Close Poll' button, a results report will print preventing further casting of ballots (attempt to scan a ballot without reopening the polls) - Visibly displays the status "Polls Closed" - Internally tests and verifies that the closing procedures have been followed and the device status is normal by preventing report printing or processing vote totals unless polls were properly closed. - Confirm polls cannot be reopened

Method Detail	Reuse System Level Test Method	Regression System Level Test Method
		- Review the audit log to verify test records exists that verify entries for the proper sequence for operational tests, poll open; vote query, reject & accept: any abnormal event encountered in testing; poll close, including complete & accurate error and status messages - Print Status report, Race Results report, Certification report, Precinct Report Summary, Poll Report Summary and Audit Log report once polls are closed. Ensure undervote & overvote is counted. - Validate data from USB is extractable by transmitting results into ERM Reopen the polls testing: (Copy election & test with settings for reopening the polls) - Reopen of polls, enter an incorrect and then a correct password - Alert to resume voting or clear votes: select 'resume voting', do not clear votes - Status message "Please insert your ballot" is displayed -Cast a vote and close the polls. - Check audit for proper sequence for operational tests, poll open, vote accept, poll close, reopen, password entry - Verify correct vote totals.
Post-vote: Central Count	Determination by the EAC of the reuse of SysTest Labs testing. Post-vote Central count verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.	Readiness Test: - Obtain status, data reports, audit logs and other artifacts to confirm readiness - Verify test data has been cleared **M650:** Readiness: Proper election is installed; all buttons, printers and screen function correctly; verify election name, equipment identification, polling place, ballot format and matching versions is printed on Machine Readiness and/or Zero count reports; confirmation that there are no hardware/software failures; and device is ready to be activated to accept votes. Perform: "Model 650 Election Day Checklist Version Numbers 2.2.1.0, February 29, 2008." - Attempt to start the M650 with test totals. Verify a visual screen warning is provided if memory locations (including data on media) contains votes, and the reports/audit log contain a time-stamp record of the status of the votes/results memory and disk storage locations. If a unit or system contains a non-zero counter, a warning message is provided, along with corrective actions to resolve the votes. The unit is disabled until type of resolution is selected. **ERM:** Readiness: confirm proper election is installed - Attempt to read in vote totals with test totals present. Verify a visual screen warning is provided if memory locations contain votes, and the reports/audit log contain a time-stamped record of the status of the votes/results in the memory locations. If this is not provided, a corrective action message is provided along with a message indicating the attempt to read in vote totals, while there are totals present. **Vote Consolidation for M650:** - Votes match predicted votes (absentee) - Geographic reports of votes; each contest by precinct & other jurisdictional levels. Reports include: Zero, Grand Totals (long format), Precincts Processed, Totals by Precinct (long format) Machine Readiness, Audit log. Ensure audit logs are accurate & complete and contain error and status messages. **Vote Consolidation for ERM:** Consolidated reported votes match predicted votes from polling places, & optionally other sources (absentee) - Geographic reports of votes; each contest by precinct & other jurisdictional levels. Reports include: - Zero - Validate ERM Enhancement: RFI2008-07/ ENH14322 to ensure ERM is zeroed out before processing election results. - EL30A - Prec Report–Group Detail individual precincts & contest results.

Method Detail	Reuse System Level Test Method	Regression System Level Test Method
		- EL45- Election Summary - total number of votes for each candidate/question & % of total vote for y each candidate/question - EL52D - Numbered Key–Districts only- summary report, by district, of each office - EL111 - Name Heading Canvass - statistics of total number of precincts counted, total number of votes cast for each candidate and % of total vote received by each candidate - EL50D - DS200 Precincts Processed Listing - DS200 machine IDs imported from the USB flash drive into ERM - Audit log. - Verify data from M650, DS200 is prevented from being altered or destroyed by report generation, or extraction from media - Verify DS200 SN is displayed in ERM, once the USB flash drive is read into ERM Validate ERM Discrepancy #35, identified issue with the Canvass Numbered Key-District Report showing incorrect group descriptions. (Group 3 name/totals was being populated in Group 4 column)
Post-vote: Security	Determination by the EAC of the reuse of SysTest Labs testing. Post-vote security verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.	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 execute the intended and necessary processes during the execution of the election software. Election software process are halted until the termination of any critical system process, such as system audit.
Post-vote: System Audit	Determination by the EAC of the reuse of SysTest Labs testing. Post-vote system audit verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.	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. <u>Audit Messages to be validated:</u> AM: Archive functionality EDM: Precinct set up ESSIM: 2 ballot styles created HPM: media is created for M650 & DS200 VAT: date/time set DS200 & M650: Election id ERM: DS200 SN is recorded AIMS: IUImport - Performed full Unity election import DS200, M650 & ERM: Message of vote totals present, Corrective action messages to resolve residual vote totals <u>Status/Error messages to be validated:</u> **AM:** 1. Cannot delete 'Admin' user! **EDM:** 1. Minimum password length is 6 characters. 2. District Type Name can not be

Method Detail	Reuse System Level Test Method	Regression System Level Test Method
		blank **ESSIM:** 1. Please Select a Ballot Style to Edit, 2. Please Enter a Style Sheet Name **HPM:** 1. Admin password is required V**AT**: 1. System Maintenance (requires password), 2. The Flash Card has been removed. Turn OFF the machine and insert a valid Flash Card. **AIMS:** Missing Translations **DS200:** 1. Blank Ballot Rejected, 2. More than one party has votes. Votes In Party Contests Will Be Ignored, 3. Ballot Jammed, 4. 119 – MULTIPLE BALLOTS DETECTED/Please Re-insert One Ballot After Beeps **M650:** 1. Back Door Open, 2. Ballot BACKWARDS or UPSIDE-DOWN! **ERM:** 1. ####-Not a valid precinct, 2. Canvass Left Edge Heading exceeds the maximum length of 20 for 1UP format report. **DS200, M650 & ERM:** Warning message of vote totals present, Corrective action messages to resolve residual vote totals Validate AM archive functionality as identified in discrepancy #48. (Data from the day selected does not archive.)
Expected Results are observed	EAC shall review and determine the criteria for approval submitted by SysTest Labs in their testing, test records and test report is acceptable for reuse. SysTest Labs Unity 4.0.0.0 Test Plan identifies results validation: • Accept: expected results is observed • Reject: expected result is NOT observed • Not Testable (NT): rejection of a previous test step prevents validation of this step or this was tested in another test case • Not Applicable (NA): not applicable to the current test scope or to the component under review • Not Supported (NS): not supported in the current test scope	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;	EAC shall review and determine the data to be recorded and the method of analysis submitted by SysTest Labs in their testing, test records and test report is acceptable for reuse.	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.

7.2 *Volume (Volume, Stress, Performance and Error Recovery*

Table 18 - Volume, Stress, Performance & Error Recovery Test Methods 1 & 2

Method Detail	Volume 1 Test Method	Volume 2 Test Method
Test Case Name	Volume 1 - Maximum Precincts and Ballot Styles for paper	Volume 2 - Maximum Ballot Styles in a Single Precinct
Scope - identifies the type of	The scope of this test 2900 precinct,1639 ballot styles:	The scope is to test:

Method Detail	Volume 1 Test Method	Volume 2 Test Method
test	**Scenario 1)** The maximum allowed number of precincts with the maximum number ballot styles allowed for paper based systems. To verify that errors are generated in scenarios 2: **Scenario 2)** Exceeding the maximum number of Precincts and the maximum number of ballot styles.	**Scenario 1)** The maximum allowed number of 40 ballot styles on the DS200 within a single precinct. To verify that errors are generated in scenarios 2: **Scenario 2)** Exceeding the maximum allowed number of 40 ballot styles on the DS200 within a single precinct. **Scenario 3)** The maximum allowed number of 100 ballot styles on the M650 within a single precinct. To verify that errors are generated in scenarios 4: **Scenario 4)** Exceeding the maximum allowed: number of ballot styles within a single precinct.
Test Objective	The objective is to validate the ability to process, store and report data using the allowed maximum number of precincts and ballot styles within an election. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the maximum numbers of precincts and ballot styles. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data.	The objective is to validate the ability to process, store and report data using the allowed maximum number of ballot styles within a single precinct. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the maximum numbers of ballot styles within a single precinct. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data.
Test Variables: Volume Stress Performance	General election Local offices Vote for 1 4 Ovals per Inch ballot - (14 inch ballot, 48 ovals positions per Column, 6 columns per ballot, 288 total oval positions) 4 candidates per contest Election Day (DS200 and VAT) Absentee Voting (M650) one tabulator **Scenario 1)** 2900 precincts with 1639 ballot styles (Maximum precincts/Maximum ballot styles) - Contests 1 - 290 in Polling Places 1 -29 (10 precincts to a polling place, 1 contest to a precinct) total of 290 ballot styles - No contest/Precincts assigned to Polling Places 29 -290 - Contests 291 - 1638 in Polling Places 291- 1638 (1 precinct to a polling Place, 1 contest to a polling place) 1348 ballot styles - Contest 1639 in Polling Place 1639 - 2900 with Precincts 1639 - 2900 (1 contest in 1all precincts, and all polling places) 1 ballot style **TOTALS** **1639 Ballot Styles** **2900 Precincts** **1639 contest** **2639 Polling Places** **Scenario 2**) 2901 Precincts with 1639 ballot styles(over the Maximum precincts/Maximum ballot styles) Add a new contest 1640 to a new Precinct 2901 **TOTALS** **1640 Ballot Styles** **2901 Precincts** **1640 contest** **2640 Polling Places**	General election Partisan/non-partisan offices Vote for 1 (contest 1 & 2) Vote for N of M (contests 3, 4, & 5) one page ballot multi page ballot Certified Write-Ins 5 contest for each ballot style (M650 has a total of 500 contest, DS200 has a total of 200 contest) Election Day Voting (DS200 and VAT) Absentee Voting (M650) 4 candidates for each contest 4 Ovals per Inch ballot - (19 inch ballot, 68 ovals positions per Column, 6 columns per ballot, 408 total oval positions) **Scenario 1)** 1 precinct with 40 Ballot Styles on the DS200 & the VAT (DS200 Maximum ballot styles) **Scenario 2)** 1 precinct with 41 Ballot Styles on the DS200 & the VAT (Over the DS200 Maximum ballot styles) **Scenario 3)** 1 Precinct with 100 ballot styles on the M650 & the VAT (M650 Maximum ballot styles per precinct) **Scenario 4)** 1 Precinct with 101 ballot styles on the M650 & the VAT (M650 Maximum ballot styles per precinct) (Over the maximum ballot styles)
A description of the voting system type and the	The Unity 3.2.0.0 EMS Ballot Preparation includes:	• Same as Volume 1 - Maximum Precincts and Ballot Styles except: - 1 platform of each

Method Detail	Volume 1 Test Method	Volume 2 Test Method
operational environment		
VSS 2002 vol. 1	The Unity 3.2.0.0 EMS Ballot Preparation includes: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM), AutoMARK Information (AIMS) 2 @ Unity 3.2.0.0 marking device: Voter Terminal(VAT) 2 @ Unity 3.2.0.0 precinct count includes: DS200 Unity 3.2.0.0 central count tabulator: Model 650 (M650) Unity 3.2.0.0 central count tally: Election Reporting Manager (ERM)	• Same as Volume 1 - Maximum Precincts and Ballot Styles
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)	6.2.3 Volume (maximum number of ballot styles/precincts) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of ballot styles/precincts) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down (no crash) and recovery without loss of data) if the number of ballot styles/precincts is exceeded 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 Unity 3.2 Voting System consist of the following: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM), DS200, Model 650 (M650), Election Reporting Manager (ERM), AutoMARK Information (AIMS), Voter Terminal(VAT) All testing will be perform by iBeta LLC located at 3131 S. Vaughn Way, Aurora, CO 80014.	• Same as Volume 1 - Maximum Precincts and Ballot Styles
Pre-requisites and preparation for execution of the test case.	Complete the prerequisites; Test Method Validation: Technical review conducted by C. Coggins; Approved 3/4/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. - Condition of approval - iBeta validated the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases. Import Wizard method tested and validated: **is pending.** - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) - 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 - Order ballots - Set Election Date: 11/03/2009 - 8 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 1 - Precinct 2900 Spreadsheet 2 - District Types 1639 Spreadsheet 3 - Districts Names 1639 Spreadsheet 4 - District Relations 1639 Spreadsheet 5 - Master Office 1639 Spreadsheet 6 - Office Relations 1639 Spreadsheet 7 - Candidates 6556	Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved 1/26/09 For validation of test method as defined in ISO/IEC 17025 clause 5.4.5. - Condition of approval - iBeta validated the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases. Import Wizard method tested and validated: 1/23/09. - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) - **7** Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option for Scenario 1 & 2. Spreadsheet 1 - Precinct 1 Splits 1 - 40 & 1-41 Spreadsheet 2 - District Types 1-100 Spreadsheet 3 - Districts Names 1-100 Spreadsheet 4 - District Relations1-100 Spreadsheet 5 - Master Office 1-200 Spreadsheet 6 - Office Relations 1-200 Spreadsheet 7 - Candidates 1-800 - 7 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option for Scenario 3 & 4. Spreadsheet 1 - Precinct 1 Splits 1 - 100 & 1-101 Spreadsheet 2 - District Types 1-250 Spreadsheet 3 - Districts Names 1-250 Spreadsheet 4 - District Relations1-250

Method Detail	Volume 1 Test Method	Volume 2 Test Method
	Spreadsheet 8 - Polls 2639 Spreadsheet 9 - Poll Relations 2639	Spreadsheet 5 - Master Office 1-500 Spreadsheet 6 - Office Relations 1-500 Spreadsheet 7 - Candidates 1-2000
Getting Started Checks	Check the voting system to : - Verify the test environment and system configuration is documented in the PCA Configuration and matches the system used in the 48 hr. temp & power variation test and 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. -During testing an operational readiness test will be performed.	Check the voting system to: - Same as Volume 1 - Maximum Precincts and Ballot Styles
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.	Test Data: - Same as Volume 1 - Maximum Precincts and Ballot Styles
Volume: Paper-based voting systems Processing	Ballot Prep: **Scenario 1)** - 4 candidates per contest - 1639 Ballot Styles - 2900 Precincts - 1639 contest - 2639 Polling Places -An election database can be accurately/securely defined & formatted using the Import Wizard. - Set up election by Style -Ballots (candidates & propositions) can be accurately defined & generated. - Check EDM reports for election set up Election media can be installed - 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. **Scenario 2)** - 4 candidates per contest - 1640 Ballot Styles - 2901 Precincts - 1640 contest - 2640 Polling Places Test execution of Scenario 2 &3 stop at this point with errors generated prior to the creation of election media in ballot preparation) - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify 2901 precincts and 1640 ballot styles have been created and assigned to Early Voting Polling Places. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - 2901 Precincts in an election	Ballot Prep: **Scenarios 1 & 3** maximum limits: -An election database can be accurately/securely defined & formatted using the Import Wizard. and containing 1 Precinct Vote for 1 (contest 1 & 2) & Vote for N of M (contest 3,4, & 5) 19 inch ballot 5 contest for each ballot style 4 candidates for each contest - Check EDM reports for election set up **Scenario 1)** -Election day (DS200) -40 Ballot Styles on the (DS200 Maximum ballot styles) -Election set up for the DS200 & VAT devices **Senario3)** -Absentee voting (M650) -100 Ballot Styles on the (M650 Maximum ballot styles) -Election set up for the M650 & VAT devices - 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. **Scenarios 2 & 4** Exceeding limits: Test execution of Scenario 2 & 4 stop at this point with errors generated prior to the creation of election media in ballot preparation - Check audit logs for critical status messages. Test stops unless system does not error and creates media - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify the DS200 has 41 ballot styles and the M650 has 101 ballot styles have been created and assigned to Election Day Polling Places. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. Same as Scenario 1 except: **Scenario2)** -Election day (DS200) -41 Ballot Styles on the DS200

Method Detail	Volume 1 Test Method	Volume 2 Test Method
	-1640 ballot styles in an election - 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.	Same as Scenario 3 except: **Scenario 4)** -Absentee voting (M650) -101 Ballot Styles on the -Election set up for the M650 & VAT devices - 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 capacity is successfully processed without errors. System's capacity to process, store, and report data. - When importing the allowed precincts and/or ballot styles into the EDM using the Import Wizard errors are generated	Same as Volume 1 - Maximum Precincts and Ballot Styles; except - the system responds to processing more than the expected number of ballot styles in a single precinct
Stress	System responses to overloading conditions. Exceeding the maximum allow number precincts and ballot styles by sequence.	System provides a response to an overloading condition: Exceeding the maximum allow number of ballot styles in a single precinct.
Performance	No system degradation(Ballot format handling capability and Processing rates): -When importing large amount of data into the EDM using the Import Wizard. -When installing an election with 2900 precincts and 1639 ballot styles onto 1 device (DS200, M650, and VAT) -When uploading 2900 precinct results into ERM - The system will not slow down throughout the testing	There is no system degradation (ballot format handling capability and processing rates): -When importing large amount of data into the EDM using the Import Wizard. -When installing an election with 1 precinct and over the maximum number of ballot styles for a give device - The system will not slow down as more and more data is added
Error Recovery	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	Same as Volume 1 - Maximum Precincts and Ballot Styles; except - the errors are caused by overloading the number ballots styles per precinct.
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 10 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 Volume 1 - Maximum Precincts and Ballot Styles; except - The device is ready to be activated to accept votes with the maximum ballot styles per a single precinct (No Identification of any failures & corrective action)
Pre- vote: Opening the Polls Verification	Precinct Count/ Paper based: - Zero count report	Precinct Count/ Paper based: - Zero count report (verify no votes are on the DS200 prior to starting Election Day voting)
Voting: Ballot Activation and Casting Verifications	Protects secrecy of ballot/vote - Mark ballots using the VAT - The DS200 Election Day - Vote a 10% sample of the 2900 precincts - Vote using the from 290 precincts each with a different ballot style - Each precinct will contain 1 contest with 4 candidates **Scenario 2)** Errors should prevent the tests from reaching this point. If the test does get to this point: - Load election - No system failures that cause the DS200 and VAT to crash - If there are any system errors that cause the DS200 and VAT to crash then the DS200 and VAT shall recover without any loss of data.	Protects secrecy of ballot/vote **Scenario 1)** - 20 ballots will be test (a 50% sample of 40 ballot styles) - VAT -Generate the ballots for 20 different ballot styles within the deck. - DS200- scans the ballots generated by the VAT with different ballot styles within the deck. - Ballot styles 10 through 30 will be voted - The DS200 In Election Day mode with a single precinct and 40 ballot styles will not error will not error. If there are any system errors that cause the DS200 to shut down then the DS200 shall recover without any loss of data. - The VAT with a single precinct and 40 ballot styles will not error. If there are any system errors that cause the VAT to shut down then the VAT shall recover without any loss of data. **Scenario 2)** Errors should prevent the test from reaching this point. If the test does get to

Method Detail	Volume 1 Test Method	Volume 2 Test Method
		this point: **DS200 and VAT** - Load election - No system failures that cause the DS200 and VAT to crash - If there are any system errors that cause the DS200 and VAT to crash then the DS200 and VAT shall recover without any loss of data.
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	The system audit provides a time stamped, always available, report of normal/abnormal events found within the 10% sampling tested. 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 Volume 1 - Maximum Precincts and Ballot Styles; except -report of normal/abnormal events is found within the 50% sample.
Post-vote: Closing the Polls	Once the polls are closed the voting system - Printed reports of ballots counted by tabulator - Reported votes match predicted votes from tabulator with votes and undervotes.	Once the polls are closed the voting system - Printed reports of ballots counted on the DS200 - Reported votes match predicted votes from tabulator with votes and undervotes - DS200 Prints a single precinct totals report totaling all ballot styles within the precinct (Election Day voting ends)
Post-vote: Central Count	Paper Based: When loading results mix the input of results such that media is read out of precinct order and where possible mix the reading of DS200 and M650 results. Record the order at test execution. **Scenario 1)** The central count voting system includes: - Election identification - M650 is used for absentee ballots - Zero count report (to verify no votes are on the M650 prior to starting absentee voting) - If there are any system errors that cause the M650 to shut down or crash then the M650 shall recover without any loss of data. -M650s scan the ballots generated by the VAT with different precincts/ballots styles within the deck. Reports include: - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report (containing all precincts) - View (save to disk) Precinct by Precinct Reports but do not print **Scenario 2**) Errors should prevent the test from reaching this point. If the test does get to this point: - Load election - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data.	Paper Based: **Scenario 2)** - Election identification - Zero count report (to verify no votes are on the M650 prior to starting absentee voting) - 20 ballots will be test (a 20% sample of 100 ballot styles) - VAT -Generate the ballots for 20 different ballot styles within the deck. - M650- scans the ballots generated by the VAT with different ballot styles within the deck. - Ballot styles 10 through 30 will be voted - The M650 is used for Absentee ballots with a single precinct and 100 ballot styles will not error will not error. If there are any system errors that cause the M650 to shut down then the M650 shall recover without any loss of data. **Scenario 1 & 3)** Vote Consolidation: ERM consolidated reports match the predicted votes from the polling places Reports include: - Printed reports of ballots counted by tabulator, with votes and undervotes - Print Summary Report (containing all a single precinct) - View and Print Precinct by Precinct Reports **Scenario 4)** Errors should prevent the test from reaching this point. If the test does get to this point: **M650** - Load election - No system failures that cause the M650 to crash - If there are any system errors that cause the M650 to crash then the M650 shall recover without any loss of data. **Scenario 2& 4)** Errors should prevent the test from reaching this point. If the test does get to this point: **ERM** - Load election - No system failures that cause the ERM application to crash - If there are any system errors that cause the ERM to crash then the ERM application shall recover without any loss of data.
Expected Results are observed	Review the test result against the expected result: • Accept: the expected result is observed	Review the test result against the expected result: Same as Volume 1 - Maximum Precincts and Ballot Styles

Method Detail	Volume 1 Test Method	Volume 2 Test Method
	• 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.	All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts and Ballot Styles

Table 19 - Volume, Stress, Performance & Error Recovery Test Methods 3 & 4

Method Detail	Volume 3 Test Method	Volume 4 Test Method
Test Case Name	Volume 3 - Audit Manager database test	Volume 4 - Storage Error Generation
Scope - identifies the type of test	The scope is to test is to confirm that 2GB JET database can record and store audit inputs generated in the Election Data Manger for a period of 72 consecutive hours (150% of the ES&S predicted maximum).	The Test Scope is to test: The M650 and DS200 component media generate an error messages when capacity is reached
Test Objective	The objective is to validate that the Audit Manager capacity can record and retain data inputs (150%) of the ES&S predicted maximum time of use in an election. (48 hours estimated maximum run for 72 consecutive hours). Throughout the 72 hours of testing the application should not have any system crashes, loss of data and/or loss of degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data.	The objective is to validate that error messages are generated when media capacity has been reached.
Test Variables:	General election - • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper except: - only using Scenario 1	Same as Volume 7 - Maximum ballot limitations except: 512MB USB (491 free space) for the DS200 with over 488MB of storage used. 100MB for the M650 with over 85MB of storage used.
A description of the voting system type and the operational environment	The Unity 3.2.0.0 EMS Ballot Preparation includes: Audit Manger (AM) and Election Data Manger (EDM)	The Unity 3.2.0.0 precinct count includes: DS200 The Unity 3.2.0.0 central count tabulator: Model 650 (M650)

Method Detail	Volume 3 Test Method	Volume 4 Test Method
VSS 2002 vol. 1	2.1.5.1b Audit/Error message 2.2.5.2.3 Status message 5.4.1 Audit/description of modifications with time stamp 2.2.3 Error Recovery	2.2.5.2.2 System Audit Error Messages 2.2.5.2.3 System Audit Status Messages
VSS 2002 vol. 2	A4.3.5 Volume (Processing, storing and reporting data when overloading the systems capacity) 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-system does not slow down as more data is being added, no loss of data, and no system crashes) Stress - overloading conditions over a consecutive period of 72 hours.	A4.3.5 Performance/Recovery (Processing rates-graceful shut down "no system crash" and recovery without loss of data) A4.3.5 Stress (system response to overloading data on hardware media)
Hardware, Software voting system configuration and test location	The Unity 3.2 Voting System consist of the following: Audit Manger (AM) and Election Data Manger (EDM) All testing will be perform by iBeta LLC located at 3131 S. Vaughn Way, Aurora, CO 80014.	The Unity 3.2 Voting System consist of the following: DS200, Model 650 (M650) All testing will be perform by iBeta LLC located at 3131 S. Vaughn Way, Aurora, CO 80014.
Pre-requisites and preparation for execution of the test case.	Complete the prerequisite • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper Test Method Validation: Technical review conducted by C. Coggins; Approved *2-15-09*. for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper except - only using Scenario 1	Complete the prerequisites; Test Method Validation: Technical review conducted by C. Coggins; Approved 2/23/09. for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. - Condition of approval - iBeta validates component media can be populated to near capacity prior to test execution.
Getting Started Checks	Check the voting system to : • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper	Check the voting system to : • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
Documentation of Test Data & Test Results	Test Data: • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper	Test Data: - Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
Volume: Paper-based voting systems Processing	Ballot Prep: Using an automation tool run the EDM and AM application for 72 hours consecutively importing election data. - Automation Anywhere - EDM Import Wizard options - Same spreadsheets as Volume 1 - Maximum Precincts Limitations and ballot styles for paper	Same as Volume 7 - Maximum ballot limitations
Volume:	System responses when attempting to overload the systems capacity: - Successfully processed without errors. - Process, store, and report data.	Not Applicable (only testing for error generation of full media on hardware)
Stress	System responses when attempting to overload conditions within 72 hours.	Not Applicable (only testing for error generation of full media on hardware)
Performance	No noticeable system degradation (Processing rates): -during the 72 consecutive hours of operation and accessing the Audit Manager logs.	No system degradation (Ballot Processing rate): - On the M650 and DS200 with a large amount of data filling up the media storage the system will not be observed to slow down throughout the testing
Error Recovery	The Audit Manager application should not error or crash within the 72 consecutive hours. - If the application does error the system shall provide a clear description of the problem. - If there are any system errors that cause the Audit Manager application to crash then the application shall recover without any loss of data.	The systems should not error or crash. - If the application does error the system shall provide a clear description of the problem.
Readiness Testing and Poll Verification	Not Applicable (Audit Manager is not located at the polls)	Not Applicable (only testing for error generation of full media on hardware)

Method Detail	Volume 3 Test Method	Volume 4 Test Method
Pre- vote: Opening the Polls Verification	Not Applicable (Audit Manager is not located at the polls)	Pre-Vote: -Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
Voting: Ballot Activation and Casting Verifications	Not Applicable (Audit Manager is not located at the polls)	DS200 Only- Election Day Voting - in Polling Place 1 Precincts/Ballot Style 1. - Using media that is near capacity scan the marked 20 ballots from Volume 7 ballots until the error "Full memory" is generated. - error message must advise the official how to handle the error. - If there are any system errors that cause the DS200 to crash then verify the DS200 will recover without any loss of data.
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	Not Applicable (Audit Manager is not located at the polls)	The system audit provides a time stamped, report of normal/abnormal events found within the tested. Error messages are: - Are generated, stored & reported as they occur - Errors requiring intervention by the poll worker clearly display issues & action instructions in easily understood text language or with indicators - Incorrect responses will not lead to irreversible errors.
Post-vote: Closing the Polls	Not Applicable (Audit Manager is not located at the polls)	Not Applicable (only testing for error recovery of full media on hardware)
Post-vote: Central Count	Not Applicable (Audit Manager is not located at the Central Count)	M650 Paper Based: The central count voting system includes: - Zero count report (Absentee) - using media that is near capacity scan the marked 20 ballots from Volume 7 ballots until an error "Full memory" generated. - If there are any system errors that cause the M650 to crash then the M650 shall recover without any loss of data. ERM consolidated reports match the predicted votes. (only testing for error recovery of full media on hardware)
Expected Results are observed	Review the test result against the expected result: • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper	Review the test result against the expected result: • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
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. • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper	All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. • Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper

Table 20 - Volume, Stress, Performance & Error Recovery Test Methods 5 & 6

Method Detail	Volume 5 Test Method	Volume 6 Test Method
Test Case Name	Volume 5 - Electrical Supply Recovery	Volume 6 - Maximum number precincts and Maximum number of candidates per polling place.
Scope - identifies the type of test	Recovery tests verify the ability of the system to recover from hardware and data errors. Power recovery was tested by SysTest in the Electrical Supply Test Case. ES&S has petitioned the EAC for reuse of the applicable components in scope for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort. Determination of reuse is based upon the EAC review of SysTest Labs Electrical Supply test results. iBeta incorporates verification of audit logging of error recovery in the Volume test cases.	The scope is to: **Scenario** 1) Test the maximum allowed: number of precincts and Maximum number of candidates per polling place. To verify that errors are generated when: **Scenario** 2) Exceeding the HPM maximum allowed: number of precincts in a single polling place

Method Detail	Volume 5 Test Method	Volume 6 Test Method
Test Objective	The objective of the test case is to verify the ability of the system to recover from electrical supply errors.	The objective is to validate the ability to process, store and report data to the maximum and exceeding the maximum allowed number of precincts in a single polling place. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding maximum the allowed number of precincts in a single polling place. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors then the system shall recover without any loss of data.
Test Variables: Volume Stress Performance Error Recovery	The test variables for the SysTest Labs' Electric Supply test case is contained in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan and the associated test case. The test variables for the iBeta Volume Test Methods are identified in Volume Tests 1 through 10	General election **Scenario 1)** - DS200 set up for Early Voting - 19 inch ballot (4 Ovals per inch) - 1900 precincts (early voting) - 7 ballot styles - 7 Non-Partisan contest - Precincts 1 - 6 with each will a single contest containing 175 candidates per contest (6 ballot style) - Precincts 7 - 1900 with 150 candidates in a single contest (1 ballot style) - Vote for 1 - 1 Statistical Counters (Precincts Counted) - 1 Polling Place **Scenario 2)** Same as scenario 1 except: - 8 ballot styles - 8 Non-Partisan contest - Precincts 1901 with 2 candidates in a single new contest (1 new ballot style, 1 new precincts , 1 new contest, same polling place as in Scenario 1)
A description of the voting system type and the operational environment	The voting system type and operational environment for SysTest Labs' usability, accessibility and maintainability testing is identified in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan	• Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
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	• Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
VSS 2002 vol. 2	A4.3.5 Stress (high volume with interrupts and overloading the systems) A4.3.5 Recovery (system recovers from software and hardware errors without loss of data)	A4.3.5 Volume (maximum and exceeding more than the maximum number of precincts in a Polling Place) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of precincts in a Polling Place) 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 hardware, software voting system configuration and location of testing for SysTest Labs' Electrical Supply testing is identified in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan iBeta - Same as identified in Volume Tests 1 through 10	Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
Pre-requisites and preparation for execution of	Complete the prerequisites: - Document in the test case the percentage that the system limit exceeds the	Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved 1/27/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5.

Method Detail	Volume 5 Test Method	Volume 6 Test Method
the test case.	customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) Test Method Validation: Technical review conducted by C. Coggins; Approved 2/4/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. Determination by the EAC allowing the reuse of SysTest Labs Electrical Supply test. iBeta Volume test cases have been executed and passed	Condition of approval - iBeta validated the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases. - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) Import Wizard method tested and validated: - 6 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 1 - Precinct 1900 Spreadsheet 2 - District Types 7 Spreadsheet 3 - Districts Names 7 Spreadsheet 4 - District Relations 7 Spreadsheet 5 - Master Office 7 Spreadsheet 6 - Office Relations 7
Getting Started Checks	Same as identified in Volume Tests 1 through 10	Check the voting system to : Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
Documentation of Test Data & Test Results	Same as identified in Volume Tests 1 through 10	Test Data: Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
Volume: Paper-based voting systems Processing	Not applicable to Electrical Supply Recovery	Ballot Prep: -An election database can be accurately/securely defined & formatted using the Import Wizard. -Ballots (candidates) can be accurately defined & generated. **Scenario 1)** Election can be created and installed with 1900 Precincts in a single Polling Place. No error occurs - 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. - Review the EDM reports to verify election set up. **Scenario 2)** Same as scenario 1 except over the maximum allowed number of Precincts in a single Polling Place (1901) Test execution of Scenario 2 is expected to stop at this point with errors generated in the ballot preparation prior to the creation of election media - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify 1901 precincts have been created and assigned to a single early voting Polling Place. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - 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:	Not applicable to Electrical Supply Recovery	Systems capacity to process, store, and report data. - When importing over the allowed amount of data into the EDM using the Import Wizard
Stress	EAC to review the SysTest Labs test results and verifies: Software responds to power interrupts	System responses to overloading conditions. Exceeding the maximum allowed number of Early Voting precincts in a single Polling Place.

Method Detail	Volume 5 Test Method	Volume 6 Test Method
	iBeta to review the Volume test results and verifies the system responds to interrupts.	
Performance	EAC to review the SysTest Labs Cases and verifies: Voting system is able to recover gracefully from errors or crashes caused by power failures without loss of data iBeta to review the Volume test results and verifies the system recovers from errors or crashes without loss of data	There is no system degradation (Ballot format handling capability and Processing rates): - When importing large amount of data into the EDM using the Import Wizard. - The system does not slow down throughout the testing
Error Recovery	EAC to review the SysTest Labs Cases and verifies: Voting system is able to recover from errors or crashes caused by power failures. iBeta to review the Volume test results and verifies the system recovers from errors or crashes	Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
Readiness Testing and Poll Verification	Not applicable to Electrical Supply Recovery	Voting system is ready for the election: Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper except: - Run 10 precincts to validate the system is ready; confirm the test data is segregated from voting data, with no residual effect. Verify totals and audit logs.
Pre- vote: Opening the Polls Verification	Not applicable to Electrical Supply Recovery	Precinct Count/ Paper based: Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
Voting: Ballot Activation and Casting Verifications	Not applicable to Electrical Supply Recovery	**Scenario 1)** Election Day Voting - The VAT & DS200 are in Polling Place 1 with Precincts 1-1900. - Voting using 95 different precincts (5% of 1900 precincts), 2 ballots per precinct for a total of 190 ballots (10% sample voted). - Mark ballot using the VAT - Scan using the DS200 - No errors are expected. - If there are any system errors that cause the DS200 & the VAT to crash then verify the DS200 and the VAT recover without any loss of data. - Verify the counter (number of voters) on the DS200 and the VAT match the expect results. **Scenario 2)** Errors should prevent the test from reaching this point. If the test does get to this point: - Load election - No system failures that cause the DS200 and/or the VAT to crash - If there are any system errors that cause the DS200 and the VAT to crash then the DS200 and the VAT shall recover without any loss of data.
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	Not applicable to Electrical Supply Recovery	Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
Post-vote:	Not applicable to Electrical Supply Recovery	Once the polls are closed the voting system

Method Detail	Volume 5 Test Method	Volume 6 Test Method
Closing the Polls		- Printed reports of ballots counted by tabulator - Reported votes match predicted votes from tabulator with votes and undervotes. - In Polling Place 1 the DS200 prints precincts 1 - 1900 totals (early voting ends)
Post-vote: Central Count	Not applicable to Electrical Supply Recovery	Paper Based: When loading results mix the input of results such that media is read out of precinct order and where possible mix the reading of DS200 and M650 results. Record the order at test execution. **Scenario 1)** The central count voting system includes: - Election identification - Zero count report (to verify no votes are on the M650 prior to starting absentee voting) - Using the VAT marked ballots scan all 190 ballots. - No errors are expected. - If there are any system errors that cause the M650 to crash then the DS200 and the VAT shall recover without any loss of data. Vote Consolidation: - ERM consolidated reports match the predicted votes. - Verify no data was lost within the audit logs or results Reports include: - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report - View and Print Precinct by Precinct Reports **Scenario 2)** Errors should prevent the test from reaching this point. If the test does get to this point: - Load election - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data.
Expected Results are observed	Review the test result against the expected result: Same as Volume 1 - Maximum Precincts and Ballot Styles	Review the test result against the expected result: Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
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. Same as Volume 1 - Maximum Precincts and Ballot Styles	All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper

Table 21 - Volume, Stress, Performance & Error Recovery Test Methods 7 & 8

Method Detail	Volume 7 Test Method	Volume 8 Test Method
Test Case Name	Volume 7 - Maximum ballot limitations	Volume 8 - M650 maximum number of candidates/counter in an election.
Scope - identifies the type of test	The scope is to test: **Scenario 1)** The maximum allowed: number of contests in a ballot style; number of candidates in a contest; number of parties; number of " VOTE FOR" in a contest; and number of candidate counters in a precinct To verify that errors are generated in scenarios 2 through 5: **Scenario 2)** The maximum allowed number of candidates in a contest, number of parties, number of " VOTE FOR" in a contest, while **exceeding** the maximum:	The scope is to test: **Scenario 1)** The M650 maximum allowed: number of candidates/counter within an election. To verify that errors are generated scenario 2: **Scenario 2)** Exceeding the M650 maximum: allowed number of candidates/counter within an election.

Method Detail	Volume 7 Test Method	Volume 8 Test Method
	number of contest in a single ballot style. **Scenario 3)** The maximum allowed number of contests in a ballot style and candidate counters in a precinct while **exceeding** the maximum: candidates in a contest; "VOTE FOR" in a contest. **Scenario 4)**The maximum allowed number of contests in a ballot style, candidates in a contest, number of " VOTE FOR" in a contest, and number of candidate counters in a precinct while **exceeding** the maximum: number of parties. **Scenario 5)** The maximum allowed number of contests in a ballot style, candidates in a contest, number of parties, number of "VOTE FOR" in a contest, while **exceeding** the maximum: number of candidate counters in a precinct. - Discrepancy 30 (SysTest 429 Election description, Ballot Name/Full path to ballot definition file) - Discrepancy 32(SysTest 453 orientation ballot errors) - Discrepancy 33(SysTest 454 internal rollers)	
Test Objective	The objective is to validate the ability to process, store and report data to the maximum and exceed the maximum allowed number of contest in a ballot style, maximum number of candidates in a contest, maximum number of parties, maximum number of "VOTE FOR" in a contest, and the maximum number of candidate counters in a precinct. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding maximum allowed limits. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data.	The objective is to validate the ability to process, store and report data using the maximum and exceeding the maximum allowed number of candidates/counter. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the M650 maximum allowed number of candidates/counter. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data.
Test Variables: Volume Stress Performance Error Recovery	Primary Election **Scenario 1)** 2 Precincts (Precinct 1/ballot style 1& Precinct 2/ballot style 2) - 2 Statistical Counter (Precincts counted, Ballots counted) 1 Polling Place 19 inch ballot (4 ovals per inch, 68 oval positions per column, 408 total positions) **Precinct 1/ballot style 1** - 1 Partisan contest: - 18 parties (max allowed in an election) - Vote for 1 - 3 candidates per party - 1 Non-Partisan contest: - vote for 90 (max allowed in a contest) - 175 candidates (max allowed in a contest) **Precinct 2/ballot style 2** - 200 Non-Partisan contest (max number of contest allowed with a 19 inch ballot) - vote for 1 - 200 candidates (1 candidate per contest) **Scenario 2)** Same as scenario 1 except: - Precinct 2/ballot style 2: 201 contest and 201 candidates (exceeding contest in a single ballot style) **Scenario 3)** Same as scenario 1 except: - Precinct 1/ballot style 1Non-Partisan contest: 176 candidates, Vote For	General election M650 set to Absentee 10 Precincts on 1 M650 Each Precinct contains 75 contest General election Absentee **Scenario 1)** - 750 contest - 3 candidates per contest - 0 Statistical Counters **counters:** 2250 candidates (750 contest, 3 candidates no Write-ins) 750 undervotes 750 overvotes Total counters = 3750 **Scenario 2)** Same as scenario 1 except: - 751 contests **counters:** 2253 candidates (751 contest, 3 candidates no Write-ins) 751 undervotes 751 overvotes Total counters = 3755

Method Detail	Volume 7 Test Method	Volume 8 Test Method
	91(exceeding candidates and VOTE FOR in a contest) **Scenario 4)** Same as scenario 1 except: - Precinct 1/ballot style 1 Partisan contest: 19 parties **Scenario 5)** Same as scenario 1 except: - Precinct 2/ballot style 2: 3 Statistical Counters (exceeding candidate counters in a precinct) **Counters:** 200 candidates 200 undervotes 200 overvotes 400 Statistical Counter 1000 total counters in a precinct	
A description of the voting system type and the operational environment	Same as Volume 1 - Maximum Precincts and Ballot Styles	The Unity 3.2.0.0 EMS Ballot Preparation includes: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM) The Unity 3.2.0.0 central count tabulator: Model 650 (M650) The Unity 3.2.0.0 central count tally Election Reporting Manager (ERM)
VSS 2002 vol. 1	Same as Volume 1 - Maximum Precincts and Ballot Styles	• Same as Volume 1 - Maximum Precincts and Ballot Styles
VSS 2002 vol. 2	6.2.3 Volume (maximum number Parties, Vote for, Statistical Counters, candidates in a single contest, and contests) A4.3.5 Volume (maximum and exceeding more than the maximum number of Parties, Vote for, Statistical Counters, candidates in a single contest, and contests) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of Parties, Vote for, Statistical Counters, candidates in a single contest, and contests) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down (no crash) and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates- shut down (no crash)and a graceful recovery without loss of data)	6.2.3 Volume (maximum number of M650 Candidate Counters) A4.3.5 Volume (maximum and exceeding more than the maximum number of M650 Candidate Counters) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of M650 Candidate Counters) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down (no crash) and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates- shut down (no crash) and a graceful recovery without loss of data)
Hardware, Software voting system configuration and test location	Same as Volume 1 - Maximum Precincts and Ballot Styles	The Unity 3.2 Voting System consists of the following: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM), Model 650 (M650), Election Reporting Manager (ERM), All testing will be performing by iBeta LLC located at 3131 S. Vaughn Way, Aurora, CO 80014.
Pre-requisites and preparation for execution of the test case.	Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved 1/27/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. - - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) - 8 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 1 - Parties	Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved with the incorporation of review comments on 1/22/09 (validation of test method as defined in ISO/IEC 17025 clause 5.4.5) - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) Condition of approval - iBeta validates the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases.

Method Detail	Volume 7 Test Method	Volume 8 Test Method
	Spreadsheet 2 - Precinct 1 - 2 Spreadsheet 3 - District Types Spreadsheet 4 - Districts Names Spreadsheet 5 - District Relations Spreadsheet 6 - Master Office Spreadsheet 7 - Office Relations Spreadsheet 8 - Candidates	Import Wizard method tested and validated on 1/21/2009 by Stephanie Eaton. - 8 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 1 - Precinct 10 Spreadsheet 2 - District Type 750 Spreadsheet 3 - Districts Names750 Spreadsheet 4 - District Relations 750 Spreadsheet 5 - Master Office 750 Spreadsheet 6 - Office Relations 750 Spreadsheet 7 - Candidates 2250
Getting Started Checks	Check the voting system to : Same as Volume 1 - Maximum Precincts and Ballot Styles	Check the voting system to : Same as Volume 1 - Maximum Precincts and Ballot Styles
Documentation of Test Data & Test Results	Test Data: Same as Volume 1 - Maximum Precincts and Ballot Styles	Check the voting system to : Same as Volume 1 - Maximum Precincts and Ballot Styles
Volume: Paper-based voting systems Processing	Ballot Prep: -An election database can be accurately/securely defined & formatted using the Import Wizard. - Discrepancy 30 (SysTest 429 Election description, Ballot Name/Full path to ballot definition file) using the default file name. -Ballots (candidates & propositions) can be accurately defined & generated. **Scenario 1)** Election media can be installed with the maximum allowed number of contests in a ballot style, maximum number of candidates in a contest, maximum number of parties, maximum number of " VOTE FOR" in a contest, and the maximum number of candidate counters in a precinct without error. - 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. **Scenarios 2 - 5)** Test execution of Scenario 2 - 5 stop at this point with errors generated prior to the creation of election media in ballot preparation) - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify each of Scenarios listed below have been created exceeding the ballot limits. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - 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. **Scenario 2)** Same as scenario 1 except: - Precinct 2/ballot style 2 has 205 contest and 205 candidates **Scenario 3)** Same as scenario 1 except: - Precinct 1/ballot style 1 has 176 candidates, Vote For 91 **Scenario 4)** Same as scenario 1 except: - Precinct 1/ballot style 1 has 21 parties	Ballot Prep: General election **Scenario 1)** 10 Precincts , each Precinct contains 75 contest -An election database can be accurately being defined & formatted using the Import Wizard. -Ballots (candidates & propositions) can be accurately defined & generated. -19 inch ballot -0 Statistical Counters - Create media for the M650 only - all precincts assigned to 1 M650 The election can be created with 3800 candidate counters with in an election. - 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. **Scenario 2)** Test execution of Scenario 2 stops at this point with errors generated prior to the creation of election media in ballot preparation) - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify the election is set up. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - 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. **Scenario 2)** Same as Scenario 1 except: - 751 contests and 2255 candidates

Method Detail	Volume 7 Test Method	Volume 8 Test Method
	Scenario 5) Same as scenario 1 except: - Precinct 2/ballot style 2 has 3 Statistical Counters	
Volume:	400 active voting positions. Systems capacity to process, store, and report data. - When importing over the allowed amount of data into the EDM using the Import Wizard	Maximum capacity is successfully processed without errors. Systems capacity to process, store, and report data. - When installing an election on the M650 containing over the allowed candidate counters, errors are generated.
Stress	System provides a response to overloading conditions. Exceeding/overloading the maximum allow number of ballot limits identified in the scope.	System provides a response to overloading conditions. Exceeding/overloading the maximum allow number of Candidate Counters in the M650.
Performance	There is no system degradation (Ballot format handling capability and Processing rates): - When importing large amount of data into the EDM using the Import Wizard. - The system does not slow down throughout the testing	No system degradation (Ballot format handling capability and Processing rates) is observed: - When importing large amount of data into the EDM using the Import Wizard. -When importing 3750 candidate counters -When importing 3755 candidate counters - The system will not slow down throughout the testing
Error Recovery	Same as Volume 1 - Maximum Precincts and Ballot Styles	Precinct Count/ Paper based: Same as Volume 1 - Maximum Precincts and Ballot Styles
Readiness Testing and Poll Verification	Voting system is ready for the election: Same as Volume 1 - Maximum Precincts and Ballot Styles except: - Run 1 precinct to validate the system is ready; confirm the test data is segregated from voting data, with no residual effect. Verify totals and audit logs.	See below - Post Vote: Central Count
Pre- vote: Opening the Polls Verification	Precinct Count/ Paper based: Same as Volume 1 - Maximum Precincts and Ballot Styles	Not Applicable (M650 is not located at the polls)
Voting: Ballot Activation and Casting Verifications	- Discrepancy 32(SysTest 453 orientation ballot errors) no orientation ballot errors while scanning the ballots - Discrepancy 33(SysTest 454 internal rollers) internal rollers do not stop while scanning ballots **Scenario 1)** Election Day Voting - The VAT & DS200 are in Polling Place 1 Precincts 1 - 2. - Mark 20 ballots per ballot style using the VAT and scan on the DS200) - scanning in each of the 4 orientation. - No errors are expected. - If there are any system errors that cause the DS200 & the VAT to crash then verify the DS200 and the VAT recover without any loss of data. - Verify the counter on the DS200 and the VAT match the expect results. **Scenario 2-5)** Errors should prevent the test from reaching this point. If the test does get to this point: - Load election(s) - No system failures that cause the DS200 and/or the VAT to crash - If there are any system errors that cause the DS200 and the VAT to crash then the DS200 and the VAT shall recover without any loss of data.	Not Applicable (M650 is not located at the polls)

Method Detail	Volume 7 Test Method	Volume 8 Test Method
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	The system audit provides a time stamped, always available, report of normal/abnormal events found within the test. - Same as Volume 2 - Maximum Ballot Styles in a Single Precinct except:	Not Applicable (M650 is not located at the polls)
Post-vote: Closing the Polls	Once the polls are closed the voting system: Same as Volume 2 - Maximum Ballot Styles in a Single Precinct except: - In Polling Place 1 the DS200 prints precincts 1 & 2 totals	Not Applicable (M650 is not located at the polls)
Post-vote: Central Count	Paper Based: When loading results mix the input of results such that media is read out of precinct order and where possible mix the reading of DS200 and M650 results. Record the order at test execution. **Scenario 1)** The central count voting system includes: - Election identification - Zero count report (to verify no votes are on the M650 prior to starting absentee voting) - 20 ballots per ballot style will be marked using the VAT and scanned on the M650 - No errors are expected. - If there are any system errors that cause the M650 to crash then the M650 shall recover without any loss of data. - Verify the counter on the DS200 and the VAT match the expect results. Vote Consolidation: - ERM consolidated reports match the predicted votes. - Verify no data was lost within the audit logs or results Reports include: - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report - View and Print Precinct by Precinct Reports **Scenario 2 through 5)** Errors should prevent the test from reaching this point. If the test does get to this point: - Load election - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data.	Paper Based: **Scenario 1)** - Load election with 3750 Candidate Counters - Hand mark and scan ballots through the M650 - Verify the counter on the M650 match the expect results. - If there are any system errors that cause the M650 to shut down (crash) then the M650 shall recover without any loss of data. Vote Consolidation: - ERM consolidated reports match the predicted votes. - Verify no data was lost within the audit logs or results Reports include: - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report - View and Print Precinct by Precinct Reports for Precincts 1 - 10 : **Scenario 2)** Errors should prevent the test from reaching this point. If the test does get to this point: - Load election - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data.
Expected Results are observed	Review the test result against the expected result: Same as Volume 1 - Maximum Precincts and Ballot Styles	Review the test result against the expected result: Same as Volume 1 - Maximum Precincts and Ballot Styles
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. Same as Volume 1 - Maximum Precincts and Ballot Styles	All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts and Ballot Styles

Table 22 - Volume, Stress, Performance & Error Recovery Test Methods 9 & 10

Method Detail	Volume 9 Test Method	Volume 10 Test Method
Test Case Name	Volume 9 - ERM maximum number of candidates/counter in an election.	Volume 10 - maximum number of Ballot Styles in an election.
Scope - identifies the type of test	The scope is to test: **Scenario 1**) The ERM maximum allowed: number of candidates/counter within an election and the maximum number of Precincts in a single Polling Place in Election Day mode. To verify that errors are generated in scenario 2: **Scenario 2)** The maximum number of Precincts in a single Polling Place set to Election Day mode and **exceeding** the ERM maximum allowed: number of candidates/counter within an election. To verify that errors are generated in scenario 3: **Scenario 3)** The ERM maximum allowed: number of candidates/counter within an election and **exceeding** the maximum number of Precincts in a single Polling Place set to Election Day mode.	The scope is to test: **Scenario 1)** The HPM maximum allowed number of Ballot Styles within an election. To verify that errors are generated when: **Scenario 2)** Exceeding the HPM maximum allowed number of Ballot Style within an election.
Test Objective	The objective is to validate the ability to process, store and report data using the maximum and exceeding the maximum allowed number of candidates/counter and Election Day Precincts within a single Polling Place. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the ERM maximum allowed number of candidates/counter and Election Day Precincts within a single Polling Place. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data.	The objective is to validate the ability to process, store and report data using the maximum and exceeding the maximum number of Ballot Styles allowed in an Election. To validate that the system generates errors during EMS ballot preparation (ballot preparation including: EDM, ESSIM & HPM) when exceeding the maximum allowed number of Ballot Styles within an election. Validating the processing, storing and reporting shall occur without system degradation. If there are system errors that cause the system to crash the system shall recover without any loss of data.
Test Variables: Volume Stress Performance Error Recovery	General election - Election Day 10 precincts to a polling place (max limit on polling places for election day) 290 polling places **Scenario 1**) - 2900 Precincts (Volume 1"Precincts" spreadsheet) - 3500 contest - 4 candidates (3 candidates, 1 Write-in per contest) - 0 Statistical Counters Scenario 1 **counters:** -14000 candidates (3 candidates, 1 Write-in per contest) -3500 (undervotes) -3500 (overvotes) **Scenario 2**) Same as scenario 1 except: - 3501 contest Scenario 2 **counters:** -14004 candidates (3 candidates, 1 Write-in per contest) -3501 (undervotes) -3501 (overvotes) **Scenario 3**) Same as scenario 1 except: 10 precincts to a polling place except in Polling Place 290. Polling Place 290 has 11 Precincts	Primary Election - Closed by Precinct Style Election Day 1 Polling Places 10 Precincts to a polling Place 5 Parties **Scenario 1)** **-** 1000 Precincts - 10 contest - 2 contest per precinct - 2 district types each with 5 district names per 200 precincts -10 candidates (2 per contest by party) - 2 district types each with 5 district names per 200 precincts -5000 ballot styles (5 Parties each with a separate style) **Scenario 2)** Exceed the HPM maximum number of ballot styles - 1001 Precincts - 11 contest - 5001 ballot styles (5 Parties each with a separate style)
A description of the voting system type and the	The Unity 3.2.0.0 EMS Ballot Preparation includes: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program	Same as Volume 1 - Maximum Precincts and Ballot Styles

Method Detail	Volume 9 Test Method	Volume 10 Test Method
operational environment	Manger (HPM), AutoMARK Information (AIMS) The Unity 3.2.0.0 marking device: 2 @ Voter Terminal(VAT) The Unity 3.2.0.0 precinct count includes: 2 @ DS200 The Unity 3.2.0.0 central count tally Election Reporting Manager (ERM)	
VSS 2002 vol. 1	Same as Volume 1 - Maximum Precincts and Ballot Styles	Same as Volume 1 - Maximum Precincts and Ballot Styles
VSS 2002 vol. 2	6.2.3 Volume (maximum number of ERM Candidate Counters) A4.3.5 Volume (maximum and exceeding more than the maximum number of ERM Candidate Counters) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of ERM Candidate Counters) A4.3.5 Recovery (EMS capabilities to gracefully shut down (no crash) and recovery without loss of data) A4.3.5 Performance/Recovery (Processing rates- ballot formatting handling capabilities (no crash)and a graceful recovery without loss of data)	6.2.3 Volume (maximum number of ballot styles in an election) A4.3.5 Volume/Stress (Processing, storing and reporting data when overloading the number of ballot styles in an election) A4.3.5 Performance/Recovery (Ballot format handling capability-graceful shut down and recovery without loss of data) if the number of ballot styles/precincts is exceeded 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 Unity 3.2 Voting System consist of the following: Audit Manger (AM), Election Data Manger (EDM), (ESSIM), hardware Program Manger (HPM), DS200, Election Reporting Manager (ERM), AutoMARK Information (AIMS), Voter Terminal(VAT) All testing will be perform by iBeta located at 3131 S. Vaughn Way, Aurora, CO 80014.	Same as Volume 1 - Maximum Precincts and Ballot Styles
Pre-requisites and preparation for execution of the test case.	Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved 2/4/09 (validation of test method as defined in ISO/IEC 17025 clause 5.4.5) - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) - 6 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 3 - District Relations Spreadsheet 4 - Master Office Spreadsheet 5 - Office Relations Spreadsheet 6 - Candidates Spreadsheet 7 - Master Polling Place 290 Spreadsheet 8 - Poll Relations 290	Complete the prerequisites: Test Method Validation: Technical review conducted by C. Coggins; Approved 2/4/09 (validation of test method as defined in ISO/IEC 17025 clause 5.4.5) Condition of approval - iBeta validated the successful use of the Import Wizard to import large amounts of data into EDM. As configuration of the imported file can impact the success of the data importation, the import file structure must be validated as a prerequisite of all applicable test cases. Import Wizard method tested and validated: 2/2/09. - Document in the test case the percentage that the system limit exceeds the customer maximum. (System Limit * 100) /Customer Maximum =% System Limit) - 8 Excel spreadsheets saved as "Tab Delimited". Tab Delimited documents containing election creating information will be imported into EDM using the Import Wizard option. Spreadsheet 1 - Precinct 1000 Spreadsheet 2 - Districts Names 5 Spreadsheet 3 - District Relations Spreadsheet 4 - Master Office primary 10 Spreadsheet 5 - Office Relations primary 10 Spreadsheet 6 - Candidates w/party 100
Getting Started Checks	Check the voting system to :	Check the voting system to :

Method Detail	Volume 9 Test Method	Volume 10 Test Method
	Same as Volume 1 - Maximum Precincts and Ballot Styles	Same as Volume 1 - Maximum Precincts and Ballot Styles
Documentation of Test Data & Test Results	Test Data: Same as Volume 1 - Maximum Precincts and Ballot Styles	Test Data: Same as Volume 1 - Maximum Precincts and Ballot Styles
Volume: Paper-based voting systems Processing	Ballot Prep: **Scenario 1)** - General election -An election database can be accurately is defined & formatted using the Import Wizard. -Ballots (candidates & propositions) can be accurately defined & generated. -19 inch ballot -290 Polling Places -10 precincts to a Polling Place - 0 Statistical Counters -Polling Place 1 with Precincts 1 - 10 will have a total of 610 contest with 2440 total candidates (each precinct will have 61 contest, 3 candidates with 1 Write-In per contest) -Polling Place 2 - 290 with Precincts 11 - 2900 will have 1 contest per precinct. Each contest will have 3 candidates and 1 Write-In. - The election can be created with 21000 candidate counters. - Check EDM reports for election set up. - 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 **Scenarios 2 & 3)** (Test execution of Scenario 2 & 3 stop at this point with errors generated prior to the creation of election media in ballot preparation) - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify Scenario 2 has 3501 contest and Scenario 3 has 11 Precincts assigned to a single early voting Polling Place. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - 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. **Scenario 2)** Same as Scenario 1 except: - 3501 contest **Scenario 3)** Same as Scenario 1 except: - 11 Precincts in Polling Place 290.	Ballot Prep: - Closed Primary Election -An election database can be accurately defined & formatted using the Import Wizard. -Ballots (candidates & propositions) can be accurately defined & generated. -19 inch ballot **Scenario 1)** -1 Polling Places -10 Precincts to a Polling Place (total of 1000 precincts) - 2 contest per precinct - 2 district types each with 5 district names per 200 precincts -10 candidates (2 per contest by party) - 2 district types each with 5 district names per 200 precincts - 5 Parties (selecting Use Party Device Code- allowing each party to have a separate style) - Check EDM reports for election set up. - 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. **Scenario 2)** (Test execution of Scenario 2 stops at this point with errors generated prior to the creation of election media in ballot preparation) - Check audit logs for critical status messages. Test stops unless system does not error and creates media) - If EDM does not error during the "Ballot Sets Merge" then the EDM reports must be reviewed to verify Scenario 2 has been set up correctly. Continue to ESSIM and HPM. The system should display a critical status message prior to exiting the HPM. - 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. **Scenario 2)** Same as scenario 1 except for: 101 Polling Places: -10 Precincts to a Polling Place for the first 100 Polling Places - 1 Precinct is in Polling Place 101
Volume:	Maximum capacity is successfully processed without errors. Systems capacity to process, store, and report data. - When importing over the allowed candidate counters into the ERM errors are generated.	Maximum capacity is successfully processed without errors. HPMs maximum number of ballot styles. Systems capacity to process, store, and report data: - When importing over the allowed candidate counters into the HPM errors are generated.
Stress	System provides a response to overloading conditions. Exceeding the maximum allow number of Candidate Counters in the ERM.	System provides a response to overloading conditions. Exceeding the maximum allow number of 5000 ballot styles.
Performance	No system degradation (Ballot format handling capability and Processing rates) is observed: - When importing a large amount of data into the EDM using the Import Wizard. - When importing 21000 candidate counters (14000 candidates, 3500 contest)	No system degradation (Ballot format handling capability and Processing rates) is observed: - When importing large amount of data into the EDM using the Import Wizard. - When installing an election with over the maximum number of ballot styles for an election.

Method Detail	Volume 9 Test Method	Volume 10 Test Method
	- When importing 21006 candidate counters (14004 candidates, 3500 contest) - The system will not slow down throughout the testing	- The system will not slow down as more and more data is added
Error Recovery	Same as Volume 1 - Maximum Precincts and Ballot Styles	Same as Volume 1 - Maximum Precincts and Ballot Styles
Readiness Testing and Poll Verification	Voting system is ready for the election: Same as Volume 1 - Maximum Precincts and Ballot Styles	Voting system is ready for the election: Same as Volume 1 - Maximum Precincts and Ballot Styles
Pre- vote: Opening the Polls Verification	Precinct Count/ Paper based: Same as Volume 1 - Maximum Precincts and Ballot Styles	Precinct Count/ Paper based: Same as Volume 1 - Maximum Precincts and Ballot Styles
Voting: Ballot Activation and Casting Verifications	**Scenarios 1)** The DS200 is programmed for Election Day Voting. - The VAT and DS200 are in Polling Place 1 Precincts 1 - 10. - Each precinct will contain 61 contests with 4 candidates (3 candidates and 1 certified Write-In candidate). - A total of 100 ballots will be tested in Precincts 1 - 10. 10 ballots per Precinct in a single Polling Place. - Each ballot will be marked by the VAT and then scanned into the DS200. - If there are any system errors that cause the DS200 or the VAT to shut down (crash) then the DS200and the VAT shall recover without any loss of data. **Scenario 2 & 3**) Errors should prevent the test from reaching this point. If the test does get to this point: - Load election(s) - No system failures that cause the DS200 and/or the VAT to crash - If there are any system errors that cause the DS200 and the VAT to crash then the DS200 and the VAT shall recover without any loss of data.	**Scenario 1)** The DS200 is programmed for Election Day Voting. - All Polling Places will be activated but only Polling Place 1 will be used for voting. - The VAT and DS200 in Polling Place 1 Precincts 1 - 10. - Each ballot will be marked by the VAT and then scanned into the DS200. - Each precinct will contain 1 contest with 4 candidates.. - A total of 100 ballots will be tested in Precincts 1 - 10. 10 ballots per Precinct in a single Polling Place. - If there are any system errors that cause the DS200 or the VAT to shut down (crash) then the DS200and the VAT shall recover without any loss of data. **Scenario 2)** Errors should prevent the test from reaching this point. If the test does get to this point: - Load election(s) - No system failures that cause the DS200 and/or the VAT to crash - If there are any system errors that cause the DS200 and the VAT to crash then the DS200 and the VAT shall recover without any loss of data.
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	The system audit provides a time stamped, always available, report of normal/abnormal events found within the test. - Same as Volume 2 - Maximum Ballot Styles in a Single Precinct	"The system audit provides a time stamped, always available, report of normal/abnormal events found within the test. - Same as Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper "
Post-vote: Closing the Polls	Once the polls are closed the voting system - Prints reports of ballots counted by tabulator - Reported votes match predicted votes from tabulator with votes and undervotes. - In Polling Place 1 the DS200 prints precincts 1 - 10 totals (Election Day voting ends) - In Polling Place 2 - 290 and Precincts 11 - 2900 no reports will be run (all voting will be executed using Precincts 1 - 10)	Once the polls are closed the voting system - Printed reports of ballots counted by tabulator - Reported votes match predicted votes from tabulator with votes and undervotes. - In Polling Place 1 the DS200 Prints precincts 1 - 10 totals (Election Day voting ends) - In Polling Place 2 - precincts 11 -100 no reports will be run (all voting will be executed using Precincts 1 - 10)
Post-vote: Central Count	Vote Consolidation: **Scenario 1**) - M650 Not Applicable (M650 limit is 3800 and is tested in Volume 8) - ERM does not crash with 21000 candidate counters and 10 precincts within an Election. - ERM consolidated reports match the predicted votes. Vote Consolidation: ERM consolidated reports match the predicted votes from the polling places	Paper Based: When loading results mix the input of results such that media is read out of precinct order and where possible mix the reading of DS200 and M650 results. Record the order at test execution. **Scenario 1)** - Election identification - Zero count report (to verify no votes are on the M650 prior to starting voting) - 100 ballots will be test - VAT -Generate the ballots for 10 different ballot styles within the deck. - M650- scan the ballots generated by the VAT with different ballot styles within the deck.

Method Detail	Volume 9 Test Method	Volume 10 Test Method
	Reports include: - Printed reports of ballots counted by tabulator, with votes and undervotes - Printer Summary Report If there are any system errors that cause the ERM application to crash then the ERM application shall recover without any loss of data. **Scenario 2 & 3)** Errors should prevent the test from reaching this point. If the test does get to this point: - Load election in ERM - No system failures that cause the EMS ERM application to crash - If there are any system errors that cause the EMS ERM application to crash then the EMS ERM application shall recover without any loss of data.	- Ballot styles 1 through 10 will be voted - The M650 with a 1000 precinct and 5000 ballot styles will not error. If there are any system errors that cause the M650 to shut down then the M650 shall recover without any loss of data. Vote Consolidation: ERM consolidated reports match the predicted votes from the polling places Reports include: - Printed reports of ballots counted by tabulator, with votes and undervotes - Print Summary Report (containing all a single precinct) - View and Print Precinct by Precinct Reports - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data. Errors should prevent the test from reaching this point. If the test does get to this point: - Load election - No system failures that cause the M650 or in the EMS ERM application to crash - If there are any system errors that cause the M650 or in the EMS ERM application to crash then the M650 or in the EMS ERM application shall recover without any loss of data.
Expected Results are observed	Review the test result against the expected result: Same as Volume 1 - Maximum Precincts and Ballot Styles	Review the test result against the expected result: Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper
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. Same as Volume 1 - Maximum Precincts and Ballot Styles	All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results will be recorded in the test case. Same as Volume 1 - Maximum Precincts Limitations and ballot styles for paper

7.3 *Security, Telephony & Cryptographic Test Methods -*

Table 23 - Security & Telephony Test Methods

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
Test Case Name	Security	Telephony and Cryptographic
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. The Regression System Level test is 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.	Unity 3.2.0.0 is not loading or transmitting election data via telecommunications or network
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 objective of the telephony and cryptographic testing is to confirm that Unity 3.2.0.0 is not loading or transmitting election data via telecommunications or network
Test Variables: Voting Variations (as supported by the voting system)	In the Regression 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	Configured as the Regression System Level testing the DS200 does not contain a modem and M650 does not contain a network card for loading or transmitting election data via telecommunications or network

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	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.	
A description of the voting system type and the operational environment	The voting system types and operational environments Election Data Manager (EDM) to create the election data used for all ballot layout and tabulation for all equipment used in the election. -Super VGA (800x600) or higher -Keyboard and Mouse -512 MB RAM -48x CD-ROM or DVD drive -40-GB hard drive -PC with 1-GHz or faster processor ESSIM to format the ballots by using election database --partner printer -24x CD-ROM -Windows XP Professional with Service Pack 2(SP2) -40-GB hard drive -Laser Printer(recommends Okidata C9600HDN) -512 MB RAM -PC with 1-GHz or faster processor HPM import IFC to import the ballot interface (.ifc) file ,containing all contest, candidate, precinct, rotation, polling place, and ballot style information, from the Election Data Manager(EDM) and Image Manager ballot (ESSIM) -SanDisk Compact Flash Card Reader/Writer -CD-ROM or DVD drive -Keyboard and Mouse -3.5-inch disk drive - 40-GB hard drive -PCL capable Laser Printer -PC Card Manager(optional) -Windows XP Professional -PC with 1-GHz or faster processor AuditManager(AM) functions are Administer username and login for Unity modules and Administer audit log information -Pentium 266MHz -32 Meg RAM -3.5 Inch Floppy Disk Drive -24X CD Drive -printer(optional) Hardware Programming Manager (HPM) creates election definition for DS200 -DS200 scan paper ballot precinct tabulator	In the Regression System Level and Security testing vote results from the DS200's and M650's is handled externally (via compact flash card and zip disk) by the Unity Election Reporting Manager (ERM). - No election definition(from HPM) is loaded. - No results transmission via network or telecommunications.

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	-12-inch touch screen -thermal printer(internal) -USB flash drive(compact flash card) -external DC power -120-volt AC outlet, -internal memory(DRAM) HPM creates election definition for M650(central count tabulator) -External ZIp drive(FAT16 ZIP disk) -External Printer -internal memory -three-prong electrical outlet -128 MB solid-state hard drive -133 MHZ CPU VAT(Voter Assist Terminal (Ballot marking device) is used to mark the ballot selections of voters who are visually impaired, have a disability, or who are more comfortable using an alternative language) and AIMS(Database) -Printed Circuit Boards -Single Board Computer -Compact Flash Memory Cartridge -Liquid Crystal Display -Touch Panel -Audio Subsystem -Switch Interface Board -Keypad For Visually Impaired -Audible Feedback -AT Dual-Switch Access Port -Printer Engine Board -Operating System – Microsoft Windows XP, SP1 -MS Access, version XP -SQL Server (MSDE), version 2000, SP3	
VSS 2002 vol. 1	2.2.1, 2.2.4 thru 2.2.5.2.3, 6.2 thru 6.4	5.1 thru 5.2.7, 6.5.3, 6.6.1
VSS 2002 vol. 2	6.4 thru 6.4.2	6.4.2
Hardware, Software voting system configuration and test location	Same as Regression System Level test case	see Security
Pre-requisites and preparation for execution of the test case.	Test Method Validation: Technical review conducted by K Wilson; Approved 2/20/09 for validation of test method as defined in ISO/IEC 17025 clause 5.4.5. - Same as Regression System Level test case	see Security
Getting Started Checks	Same as Regression System Level test case Prior to testing Verify the following through Document Review: -DS200 and M650 Indentify procedural requirements for the usage of locks to prevent unauthorized access -DS200 provide adequate procedural requirements for polling place security. -DS200 procedures relating to the preparation and configuration of the tabulation. -DS200 and M650 procedures to identifying electronic media type. -DS200 and M650 maintenance of a secured location for storing the electronic media and voting machines -Manual identifies all required access control security measures. -M650 procedures for ballot security -Procedures for administration security(database security) -Operations manual indentifies specific instructions during a failure to input or	see Security

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	storage devices. -During witness and trusted build procedures verify source code, compilers or assemblers are not resident.	
Documentation of Test Data & Test Results	Same as Regression System Level test case Record the results of the security testing, document & source code reviews in the applicable Security Review Enter Accept/Reject against each review requirement. Log discrepancies on the appropriate Discrepancy Report	see Security
Pre-vote: Ballot Preparation procedures verifications	Same as Regression System Level test case	see Security
Pre-vote: Ballot Preparation Security	Same as Regression System Level test case -Attempt to modify the ballot layout files. --Power can be interrupted & restored without loss of election data. -- Attempt to halt the Audit Mgr before starting ESSIM. If it is not running, rename the file. Verify that ESSIM will not start. Restart Audit Mgr or if Audit Mgr (AuditManager.exe) was renamed, rename it back to the original name. Reboot and verify that ESSIM will run. --Attempt to modify the audit log. --Audit logs contain entries for failed attempts, normal & abnormal events. --Verify Computer-generated password keys are unpredictable and random (v1:6.2.2.e) --Verify that removing one of the RAID drives on the EDM system does not result in catastrophic data loss. System is operational without drive or system recovers when an empty drive is restored. --Unplug the system (EDM) during a save operation. Verify that the system is capable of resuming operation when power is restored or a backup copy restored. --Ghost the system prior to this test. For each of EDM, ESSIM, HPM and ERM, connect an iBeta computer to the network connected to the Audit Manager computer. Turn on Remote Access in the DUT computer. Access the audit manager database file as administrator and rename the file. Verify that the program halts further processing of election preparation, tabulation or reporting as necessary. (As an alternative, turn off the Audit Manager service and/or monitoring service or use task manager to kill the Audit Manager process and/or monitoring service/process). --Attempt to access the database (EDM) and modify ballot information --Default passwords are changeable after initial login --Verified detailed information of encryption messages. (?) --Attempt to load the software with unauthorized user on AIMS --Attempt to access AIMS database with invalid or blank password. --Verify AIMS not networked or does not telecommunicate with any other system	see Security
Readiness Testing and Poll Verification	Same as Regression System Level test case Before installing the election definition in tabulators, perform the following test --Attempt to bypass the locks --Attempt to access Administration mode with invalid password and blank password -Attempt to access administration Menu screen, when election definition is not installed. --Attempt to install the firmware or software with unauthorized user. --Attempt to load wrong election definition.	Security testing verifies that there is no network to install the election definition.

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	--Attempt to modify the election definition. --Verify the firmware versions --Verify there is no public network to install election definition. --Attempt to install virus or malicious software via compact flash card or zip disk --Audit logs contain entries for failed attempts, normal & abnormal events. --Minimal password strength constraints are imposed by the vendor or settable by the jurisdiction --Verify physically there is no modem or Ethernet card. After installing the election definition in tabulators, perform the following steps --Verify polls can not be opened after election data is installed into the system, validate this by attempting to open polls before election definition installed --Attempt to modify the audit log with admin password. --Attempt to change the election definition and overwrite the election definition after election definition is installed --Attempt to insert the ballot prior to opening the polls. No votes can be recorded prior to opening the polls --Attempt to insert invalid zip disk (FAT 32) or invalid compact flash card to verify only valid memory packs are accepted by tabulators. --Verify the zero totals report, to check vote count is "0" when the scanner is turned on. --Audit logs contain entries for failed attempts, normal & abnormal events.	
Pre- vote: Opening the Polls Verification	Same as Regression System Level test case Opening the polls, perform the following --System access controls are implemented for opening the polls; for the identified entity confirm access and use to only the permitted functions and data --Attempt to access administration menu when the polls are open to verify voter does not have the ability to count votes --Verify the locks --Verify the zero total report when opening the polls for voting zero report lists the date and time that the polls open followed by the vote count for all of your contests that is "0" and blank signature lines for poll worker certification --Verify the right version of firmware is installed on ballot marking device. --Verify VAT does not telecommunicate with any other system. --Opening the polls communication errors are reported to the user & require corrective action to continue operation	In Security testing verify the Unity 3.2.0.0 is not loading or transmitting election data via telecommunications or a LAN network.
Voting: Ballot Activation and Casting Verifications	Ballot casting, perform the test --Attempt to insert a blank, invalid ballot, torn ballots and multiple ballots --Attempt to stop the system or event log to verify election process halts --Attempt to remove the zip disk or USB flash drive in the middle of the process, verify that normal operation can be resumed --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; recovery is possible. Audit log record (time/date) of power interruption and restore. -- Attempt to Zero the totals on a scanner in middle of the processing, verify there is a possibility to reload the scanner with totals saved to disk. --Attempt to remove the USB flash drive during ballot scan to verify normal process resumes after reinserting it. --Attempt to remove the zip disk prior to saving election count data to check no	In Security testing verify the Unity 3.2.0.0 is not loading or transmitting election data via telecommunications or a network consolidated within the polling place prior to the voter casting a ballot

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	loss of votes. --View audit log to verify all attempts are recorded(success and fail) --Attempt to remove the compact flash card from VAT to check normal process resumes after reinserting it. --Vote errors & communication errors are displayed with action to resolve	
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	--Attempt to access the vote counts when the polls are open --Attempt to open admin menu with invalid password. --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. --Voting continues after a power interruption and restore, verify this by attempting to interrupt power and then restore. --Attempt to print results, when polls are open. Verify that the polls must be closed prior to viewing a results report. --Attempt to save results on FAT32 format zip disk in M650. --view audit log to verify all error messages are recorded.	N/A
Post-vote: Closing the Polls	Same as Regression System Level testing Central count Post vote -- Verify Zero totals report having vote count as "0" --Attempt to modify the results on zip disk. --Verify there is no public network or LAN to transfer election results. --Errors are displayed with action to resolve --Audit logs contain entries for failed attempts, normal & abnormal events.	In Security testing verify that the DS200 has no modem to transmit data.
Post-vote: Central Count	Close polls, perform following test --Verify authorized reopening of poll, once the poll closing has been completed for that election. --Attempt to modify the election results on memory pack, verify the election results cannot modify due to CRC written by DS200 --Verify there is no modem to transfer results to ERM. --Precinct counts cannot be printed or viewed prior to the close of the polls --Audit logs contain entries for failed attempts, normal & abnormal events. Document Review -- Verify there is no access to public network, no external access to incomplete returns, and no communication between locations and components before the polls close. --Verify environment do not share with non-election data processing functions.	In Security testing verify that central count has no public network to transmit data.
Post-vote: Security	Attempt to change the vote totals on memory packs before loading into ERM --Audit logs contain entries for failed attempts, normal & abnormal events. --verification of Authentication is required to access the ERM ----Errors are displayed with action to resolve ---Power can be interrupted & restored without loss of election data. -A technical administrator, attempt to modify vote total counts for a race in an election. -Attempt to modify vote counts after all vote counts are in. --Attempt to modify the audit log	N/A
Post-vote: System Audit	During system audit, verify the following validation --Review of Audit logs to verify all login success and failed attempts are recorded --Verify the Zero total reports --Compare vote totals on memory pack with printed vote totals are the same.	N/A
Additional Security	Source code review	

Method Detail	Security Test Method	Telephony and Cryptographic Test Method
	- Verify by source code review that user-generated passwords are not used directly as keys to an encryption algorithm. -- Verify by source code review that encryption algorithms utilized in documentation match the actual encryption utilized and that any known vulnerabilities are mitigated (in so far as encryption is utilized in the system). --Verify AIMS database is password protected. --Verify through the source code review, hash code is generated by AIMS for the data on the flash card and upon insertion of flash card VAT check the hash code against the database to ensure that data has not been modified. -- Verify the temporary memory is wiped out after a vote prints on the VAT	
Expected Results are observed	See System Level and Telephony and Cryptographic Test Cases. Security Review Criteria: - Accept meets the guideline - Reject does not meet the guideline - NA the guideline does not apply	see Security
"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 System Level Security Test Case. A separate statement will be prepared addressing the results of from the security perspective. It will provide the results of the testing and review required in vol. 1 section 6.	see Security

7.4 *Reuse Environmental Test Method*

Table 24 - Environmental Test Method

Method Detail	Environmental Test Method
Test Case Name	Environmental Test: list of SysTest Labs' subcontractor testing is identified in Appendix B
Scope - identifies the type of test	Document for reuse of the SysTest Labs' subcontractor the EAC accepted test results of the VSS 2002 hardware operating and non-operating environmental tests.
Test Objective	Examination of the SysTest Labs subcontractor Non-Operating/Operating Environmental testing of the Unity 3.2.0.0 hardware to the EAC VSS 2002 for documentation of a passing test results, for the applicable requirements, identification of any engineering changes resulting from testing, and the configuration.
Test Variables: Voting Variations (as supported by the voting system)	Tests conducted in compliance 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). 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	Unity 3.2.0.0 Tabulators and Ballot Marking Devices

	Ballot Marking Device: Voter Assist Terminal (VAT), Models A100 & A200 Precinct Count scanner/tabulator: intElect DS200 (DS200) Central Count scanner/tabulator: Model 650 (M650)
VSS 2002 vol. 1	3.2.2 thru 3.2.2.14, 3.4.8
VSS 2002 vol. 2	4.6.1.5 thru 4.7.1 & 4.8 RFI 2008-01, 2008-05, 2008-06, 2008-09, 2008-10
Hardware, Software voting system configuration and test location	See Appendix B
Pre-requisites and preparation for execution of the test case.	Determination of reuse from the EAC Receipt of the Unity v.4.0.0.0 test reports and engineering assessments from SysTest Labs
Getting Started Checks	Identify the appropriate report for each tested piece of equipment Create the *Environmental Hardware Test Reports & Tested Configuration Matrix*
Documentation of Test Data & Test Results	Trace the equipment configuration for the VSS 2002 Non-operating/Operating test requirement to the applicable SysTest Labs subcontractor report in the *Environmental Hardware Test Reports & Tested Configuration Matrix*
Standard Environmental Tests	Test reports from SysTest Labs include test results for all applicable Non-operating/operating environmental hardware VSS 2002 required tests
Expected Results are observed	Environmental test reports, SysTest Lab hardware assessments and engineering change documents identify: • Non-operating/operating environmental hardware VSS 2002 required tests with a passing result • Configuration of the tested hardware • Engineering changes addressing any hardware mitigations
Record observations and all input/outputs for each election;	All examination results will be documented in the *Environmental Hardware Test Reports & Tested Configuration Matrix* (Appendix B) • Missing documents or clarification requests will reported to the manufacturer as Document Defects in the *Unity 3.2.0.0 Discrepancy Report* • Delivery and verification of documents and clarifications will be noted in the *Unity 3.2.0.0 Discrepancy Report*

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

Table 25 - Characteristics (Recovery, Accessibility, Usability & Maintainability) Test Methods

iBeta Definition	Characteristics
Test Case Name	Characteristics (Recovery, Accessibility, Usability & Maintainability)
Scope - identifies the type of test	Accessibility, usability and maintainability are characteristics of the voting system. ES&S has petitioned the EAC for reuse of the SysTest Labs testing from the Unity v.4.0.0.0 certification test effort. Determination of reuse is based upon the EAC review of SysTest Labs test results.
Test Objective	The objective of characteristics testing is to verify the accessibility, usability and maintainability requirements of the standards and HAVA are met.
Test Variables: Voting Variations (as supported by the voting system)	The test variables for the SysTest Labs' accessibility, usability and maintainability tests are contained in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan and the associated test cases. iBeta's Regression System Level Test Method includes an audio and multilingual ballot. Test execution shall incorporate voting with the supported accessibility features of the VAT.
A description of the voting system type and the operational environment	The voting system type and operational environment for SysTest Labs' usability, accessibility and maintainability testing is identified in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan iBeta - Same as the Regression System Level Test Method
VSS 2002 vol. 1	2.2.7.1.a thru f, 2.2.7.2.a, 2.2.7.2.b.1 thru i, 2.4.3.1.a, e, &f, 2.2.5.2.1 f.& g, 3.3.1 thru 3.4.2, 3.4.4.1 thru 3.4.6 c, 3.4.9.a thru e HAVA 301a.3 & 4 RFI: 2008-04, 2008-05
VSS 2002 vol. 2	4.7.2, 6.5, 6.7
Hardware, Software voting system configuration and test location	The hardware, software voting system configuration and location of testing for SysTest Labs' usability, accessibility and maintainability testing is identified in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan iBeta - Same as the Regression System Level Test Method
Pre-requisites and preparation for execution of the test case.	Same as the EAC - Reuse System Level Test Method and iBeta Regression System Level Test Method
Getting Started Checks	Same as the EAC - Reuse System Level Test Method and iBeta Regression System Level Test Method

iBeta Definition	Characteristics
Documentation of Test Data & Test Results	Same as the EAC - Reuse System Level Test Method and iBeta Regression System Level Test Method
Polling Place Hardware & Recovery	EAC to verify that SysTest Labs validated VAT 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	EAC to verify that SysTest Labs validated on the VAT • 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	EAC to verify that SysTest Labs validated on the VAT • Voters are not required to bring their own assistive technology to the polling place
DRE Standards - Audio information and stimulus	EAC to verify that SysTest Labs validated the audio information on the VAT: • 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 • Enables the voter to review the voter's write-in input, edit that input and confirm that the edits meet the voter's intent • Enables 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	EAC to verify that SysTest Labs validated on the VAT: No telephone style handset is use to provide audio information to the voter
DRE Accessibility- Wireless	EAC to verify that SysTest Labs validated on the VAT: No wireless device is used to provide audio information to the voter
DRE Accessibility- Electronic image displays	EAC to verify that SysTest Labs validated on the VAT voters are permitted to: • Adjust the contract settings • 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	EAC to verify that SysTest Labs validated on the VAT 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	EAC to verify that SysTest Labs validated on the VAT 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	EAC to verify that SysTest Labs validated on the VAT sound cues used as an alert are accompanied by a visual cue
DRE Accessibility- Biometric measures	EAC to verify that SysTest Labs validated on the VAT that the system does not use biometric measures for primary voter authentication
Physical Characteristics	EAC to verify that SysTest Labs validated the DS200, M650 and VAT's 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. • The weight of each voting machine should be compatible with its intended use and the location at which the equipment is to be used

iBeta Definition	Characteristics
Transport, Storage, Materials, & Durability	EAC to verify that SysTest Labs validated the Transport & Storage of Precinct Systems - DS200 & VAT • 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 Document Review - Statement provide by the manufacturer as outlined in RFI2008-05
Maintainability	EAC to verify that SysTest Labs validated the DS200, VAT & M650 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	EAC to verify that SysTest Labs validated the DS200, VAT & M650 Availability: The manufacturer 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, manufacturer) of qualified maintenance personnel
Expected Results are observed	EAC shall determine the criteria for acceptance of reuse of the SysTest Labs test results iBeta - Same as the Regression System Level Test Method
Record observations and all input/outputs for each election;	The method of data recording by SysTest Labs is documented in Rev. 10 of the EAC approved Unity v.4.0.0.0 Test Plan iBeta - Same as the Regression System Level Test Method

7.6 *Reuse Data Accuracy (Data Accuracy, Reliability, & Availability) Test Method*

Table 26 - Data Accuracy (Data Accuracy, Reliability, & Availability) Test Method

iBeta Definition	Accuracy (Accuracy, Reliability, Availability, Volume, and Stress)
Test Case Name	SysTest Labs Unity v.4.0.0.0 Test Cases applicable to the scope of Unity 3.2.0.0: Accuracy Test Case M650, Accuracy Test Case DS200, Data Accuracy Part 1, 2 & 3 Test Case (AutoMARK VAT)
Scope - identifies the type of test	ES&S has petitioned the EAC for reuse of the applicable components in scope for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort. Determination of reuse is based upon the EAC review of test results for data accuracy testing performed by SysTest Labs validating the VSS 2002 required and ES&S identified functionality for the Unity 3.2.0.0 voting system.
Test Objective	Determination by the EAC of the reuse of SysTest Labs testing, test results and test reporting for the AutoMARK VAT (A100 and A200) and tabulators (DS200, M650), for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort.
Test Variables:	The EAC is to determine the reuse of SysTest Labs Unity v.4.0.0.0 testing of Data Accuracy for the Unity 3.2.0.0 voting system. This includes the abilities to reach

iBeta Definition	Accuracy (Accuracy, Reliability, Availability, Volume, and Stress)
Accuracy	the 26,997 minimum ballot positions (AutoMARK VAT) ballots marked or ballot reads (DS200 & M650) without error; the ability to reach 1,549,703 minimum ballot positions without error or 3,126,404 minimum ballot positions with one error.
A description of the voting system type and the operational environment	Determination by the EAC of the reuse of SysTest Labs testing, test results and test reporting for the AutoMARK VAT (A100 & A200) and tabulators (DS200, M650), for Unity 3.2.0.0 from the SysTest Labs testing of the Unity v.4.0.0.0 certification test effort.
VSS 2002 vol. 1	2.1.2, 2.1.5. 4.1.1 .a thru d.i, 4.1.5.2.a thru 4.1.6.1.a, 4.3.3, 4.3.5.a thru d
VSS 2002 vol. 2	1.7.1.1, 1.8.2.2, 4.7.1.1, 4.7.3 thru 4.7.4.d.i, 6.1, 6.2.3
Hardware, Software voting system configuration and test location	Determination by the EAC of the reuse of SysTest Labs testing. Configuration of SysTest Labs applicable testing is to be verified by the EAC. Software: AM, EDM, ESSIM, AIMS, HPM, ERM Hardware/Firmware: To be verified by the EAC VAT Models, Firmware & Operating System DS200: HW Rev; FW Rev M650: HW Rev; FW Rev Test Location: To be verified by the EAC
Pre-requisites and preparation for execution of the test case.	Determination by the EAC of the reuse of SysTest Labs testing. Pre-requisites and preparation for execution of SysTest Labs applicable testing is to be verified by the EAC. - Record the testers & date - Perform and install witness/trusted build of software/firmware components
Getting Started Checks	Determination by the EAC of the reuse of SysTest Labs testing. Getting Started Checks made prior to the execution of SysTest Labs applicable testing are to be verified by the EAC.
Documentation of Test Data & Test Results	Documentation of the reuse of SysTest Labs testing is provided by the EAC in a letter to ES&S and iBeta. These letters are posted to the EAC website and listed in the External Documents table of the Unity 3.2.0.0 test plan and test report. Methods for documentation of SysTest Labs test data and results are to be verified by the EAC.
Data Accuracy: Paper-based voting systems Processing	Determination by the EAC of the reuse of SysTest Labs testing. Paper-based voting system data accuracy processing verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.
Accuracy: Error Rate	Determination by the EAC of the reuse of SysTest Labs testing. Paper-based voting system data accuracy error rate verifications during the execution of SysTest Labs applicable testing are to be verified by the EAC.
Expected Results are observed	EAC shall review and determine the criteria for approval submitted by SysTest Labs in their testing, test records and test report is acceptable for reuse. SysTest Labs Unity v.4.0.0.0 Test Plan identifies results validation: • Accept: expected results is observed • Reject: expected result is NOT observed • Not Testable (NT): rejection of a previous test step prevents validation of this step or this was tested in another test case • Not Applicable (NA): not applicable to the current test scope or to the component under review • Not Supported (NS): not supported in the current test scope
Record observations and all input/outputs for each election;	EAC shall review and determine the data to be recorded and the method of analysis submitted by SysTest Labs in their testing, test records and test report is acceptable for reuse.

8 Appendix B – Reused Environmental Test Reports & Tested Configurations Matrixes

The following tables indentify the applicable test report(s) (number) and the tested hardware configuration (alpha) for each voting device. Issues identified in Table 9 are referenced next to the report name.

8.1 *DS200 Environmental Hardware Test Reports &Tested Configuration Matrix*

1) DS200 EMS Test Report 070214-134A 5/15/07 (Criterion See #3 in)
2) DS200 ENV Temp Humid Report 5/15/07 (APT)
3) DS200 ENV VIB Report 07-00207 5/15/07 (APT)
4) Percept Hardware Test Report 1.0 (#2 & 3)
5) ESS DS200 Product Safety Test Report Rev E-2 (Components)
6) DS200with Optional Ballot Box ESD Test Report 1.0 (Percept - #1)
7) DS200EMC Report R071107-30-01 (NCEE #3)
8) DS200EMC Report R071107-30-01B (NCEE #3)

DS200 Hardware	MIL STD 810D						EMC								OSHA
Tested Configuration	516.3 Bench Handling	514.3 Cat 1 Vibration	502 Low Temp	501 High Temp	507-2 Humidity	501 & 502 Temp & Power Var & 163 hr Reliability	Electromag Rad Part 15 Class B	Power Disturb 61000-4-11	ESD 61000-4-2	Electromag Susct 61000-4-3	Elec Fast Trans 61000-4-4	Lightening Surge 61000-4-5	RF Immunity 61000-4-6	Magnetic Fields Immunity 61000-4-8	Safety Title 29, Part 1910
Configurations tested w/ ballot box: • A: DS200 SN0002, AC Adapter SN72573415, Ballot box SN2007 • B: DS200 SN0004, AC Adapter SN72573407, Ballot box SN3016 • C: DS200 SN0003, AC Adapter SN72573407, Ballot box SN3016 • D: DS200 SN0010, AC Adapter SN72632719, Ballot box SN3016 • E: DS200 SN0011, AC Adapter SN72573413, Ballot box SN2804 • H: DS200 SN0001, AC Adapter SN72573407 or not specifically identified, Ballot box SN2804 Configurations tested w/o ballot box: • F: DS200 SN0003, AC Adapter SN72632720 • G: DS200 SN0004, AC Adapter SN72573407 • I: DS200 SN S/N11027011 AC Adapter not identified	4 C	3 & 4 C	4 C	4 C	4 C	2 & 4 D, E, F, & G	8 I 1 & 4 H	7 I 1 & 4 H	8 I 6 & 4 H	7 I 1 & 4 H	7 I 1 & 4 H	1 & 4 H	7 I 1 & 4 H	7 I 1 & 4 H	4 & 5 A

8.2 *M-650 Environmental Hardware Test Reports & Tested Configuration Matrix*

Central count scanner is exempt from non-operating environmental tests
1) NCEE EMC Test Report No. R071107-30-02A
2) Certificate of Compliance UL 60950-1 (2nd Ed.) No. ESS-0806-R05-COC
3) Testing Services Report M650 Job No. 08-00654 (APT #6)
4) Voting System Test Summary Report, Test Report for testing through 10/22/08 for ES&S Unity 4.0 Voting System, Report Number 01-V-ESS-035-CTP-01 rev.0.2

-650 Hardware	MIL STD 810D						EMC								OSHA
Tested Configuration	516.3 Bench Handling	514.3 Cat 1 Vibration	502 Low Temp	501 High Temp	507-2 Humidity	501 & 502 Temp & Power Var & 163 hr Reliability	Electromag Rad Part 15 Class B	Power Disturb 61000-4-11	ESD 61000-4-2	Electromag Susct 61000-4-3	Elec Fast Trans 61000-4-4	Lightening Surge 61000-4-5	RF Immunity 61000-4-6	Magnetic Fields Immunity 61000-4-8	Safety Title 29, Part 1910
Configurations: • A: M-650 1102 7011 Accessories: 2 @ Epson LQ-590 Dot Matrix Printers S/N: FSQY094255, FSQY093497, 1 @ Belkin F6C1500-TW-RK, Battery Backup S/N: 20V06516248WE • B: M-650 S/N 11027011 & 7003 • C: M-650 S/N 2406 8013	Ex-empt	Ex-empt	Ex-empt	Ex-empt	Ex-empt	3 & 4 B	1 A	1 A	1 A	1 A	1 A	1 A	1 A	1 A	2 C

8.3 *VAT A-100 Environmental Hardware Test Reports & Tested Configuration Matrix*

1) AutoMARK EMC Test Report1/31/05 (Criterion)
2) Electrical Safety Testing to UL 60950-1 (Report No. ATS-0501-R01-Rev.1 4/10/06; replaces R01 4/30/05)
3) VAT A100 EMC report 080327-1225 Criterion – Report issued for Premier
4) ES&S AutoMARK VAT A200 (Report No. 080521-1215A 6/11/08) (#8 in)
5) AutoMARK Voter Assist Terminal Test Report rev.1.3 (Percept - #7 in)
6) Testing Services Report AutoMARK Voter Assist Terminal S/N:002 Job No. 04-00542 (APT 1/12/05 Vibration & Bench)

VAT A-100	MIL STD 810D						EMC								OSHA
Tested Configuration	516.3 Bench Handling	514.3 Cat 1 Vibration	502 Low Temp	501 High Temp	507-2 Humidity	501 & 502 Temp & Power Var & 163 hr Reliability	Electromag Rad Part 15 Class B	Power Disturb 61000-4-11	ESD 61000-4-2	Electromag Susct 61000-4-3	Elec Fast Trans 61000-4-4	Lightening Surge 61000-4-5	RF Immunity 61000-4-6	Magnetic Fields Immunity 61000-4-8	Safety Title 29, Part 1910
Configurations: • A: A100 – S/N 005 • B: A100 – S/N AM0205420004 • C: A100 – S/N AM0105521108 (HW submitted by Premier)	6 D	6 D	5 G	5 G	5 F	5 G	1 A 4 E	1 A	1 A 3 C	1 A	1 A 4 E	1 A	1 A	1 A	2 B

VAT A-100	MIL STD 810D						EMC								OSHA
Tested Configuration	516.3 Bench Handling	514.3 Cat 1 Vibration	502 Low Temp	501 High Temp	507-2 Humidity	501 & 502 Temp & Power Var & 163 hr Reliability	Electromag Rad Part 15 Class B	Power Disturb 61000-4-11	ESD 61000-4-2	Electromag Susct 61000-4-3	Elec Fast Trans 61000-4-4	Lightening Surge 61000-4-5	RF Immunity 61000-4-6	Magnetic Fields Immunity 61000-4-8	Safety Title 29, Part 1910
• D: A100 – S/N 002 • E: A200 – S/N AM0206462702 • F: A100 – S/N 008 • G: A100 – S/N 005, 007, 008, DV3.5-2, & DV3.5-3									4 E						

8.4 *VAT A-200 Environmental Hardware Test Reports & Tested Configuration Matrix*

1) AutoMARK EMC Test Report1/31/05 (Criterion)
2) Electrical Safety Testing to UL 60950-1 (Report No. ATS-0501-R01-Rev.1 4/10/06; replaces R01 4/30/05)
3) VAT A300 EMC report 070730-1165 (Criterion - #9)
4) VAT Accuracy Test Case Rev.02 (no date or organization identified)
5) AutoMARK Voter Assist Terminal Test Report rev.1.3 (Percept 5/19/05)
6) Testing Services Report AutoMARK Voter Assist Terminal S/N:002 Job No. 04-00542 (APT 1/12/05 Vibration & Bench)

VAT A-200	MIL STD 810D						EMC								OSHA
Tested Configuration	516.3 Bench Handling	514.3 Cat 1 Vibration	502 Low Temp	501 High Temp	507-2 Humidity	501 & 502 Temp & Power Var & 163 hr Reliability	Electromag Rad Part 15 Class B	Power Disturb 61000-4-11	ESD 61000-4-2	Electromag Susct 61000-4-3	Elec Fast Trans 61000-4-4	Lightening Surge 61000-4-5	RF Immunity 61000-4-6	Magnetic Fields Immunity 61000-4-8	Safety Title 29, Part 1910
VAT A100 Configurations: • A: A100 – S/N 005 • B: A100 – S/N AM0205420004 • D: A100 – S/N 002 • F: A100 – S/N 008 • G: A100 – S/N 005, 007, 008, DV3.5-2, or DV3.5-3 VAT A300 Configurations: • C: A300 – S/N AM0307420125	6 D	6 D	5 G	5 G	5 F	5 G	1 C	1 A	1 C	1 C	1 A	1 A	1 A	1 A	2 B

9 Appendix C Unity v.4.0.0.0 EAC Approved Test Plan

The SysTest Labs *ES&S Unity 4.0 Certification Test Plan Document Number 07-V-ESS-035-CTP-01is* an attachment to this document.

Select the paper clip icon to access this attached document.