



Premier Election Solutions ASSURE[®] 1.2 VSTL Certification Test Report

Prepared for
Premier Election Solutions

Allen, TX 75013
EAC Application # DBD0701

Version 2.0

(V)2009-22Jul-001(B)

This report has been submitted to the EAC for review and is pending their acceptance. No certification number has been issued. When iBeta receives notification that the report is accepted, a revised version of the report will be issued. The Certification number will appear here, in page headers and in Appendix K. Any other revisions will be noted in the version history.

Trace to Standards	
NIST Handbook 150-22	
Section 5.5, 5.10.1 through 5.10.3, 5.10.5, 5.10.6	
VSS	
Vol. #	Section(s) #
1	1.6.1
1	2, 3, 4, 5, & 6
1	9.6.3
2	2, 3, 4, 5, & 6
2	7.4 & 7.5.
2	Appendix B

Test Results in this report apply to the voting system configuration tested. Testing of voting systems that have been modified may or may not produce the same test results. This report shall not be reproduced, except in full.

iBeta Quality Assurance is accredited for Voting System Testing:



EAC Lab Code: 0702 - Effective thru 2/28/2009 - Renewal Approved by Commissioners - 7/14/2009



NVLAP LAB CODE 200749-0

3131 South Vaughn Way, Suite 650, Aurora, Colorado, 80014

Form-D: VSTL Test Report template

Version History				
Ver #	Description of Change	Author	Approved by	Date
v.1.0	Initial Release	Gail Audette Charles Cvetezar Dharma Valdez Michael Warner Kevin Wilson	Gail Audette - iBeta PM Sophia Lee - Premier PM	22 July 2009
v.2.0	<p>Significant changes to the test report are identified in blue text. insignificant changes (typographical, grammar, or spelling) are not identified.</p> <ul style="list-style-type: none"> • Table 4: Added definition of AutoCAST • Added clarification in Section 3.3 • Table 10: Added the OS and display adapter • Added clarification on the results of the Evolution of Testing in Section 5.3 • Added system configuration in accordance with Premier TDP • Appendix F updated with the Premier Warrant 	Gail Audette	Charles Cvetezar - iBeta Test Lead	30 July 2009

Trademarks

ASSURE[®], AccuVote[®], AccuVote ES[®], AccuView Printer[®], BallotStation[®], ExpressPoll[®], GEMS[®], Optical Scan Accumulator Adapter[™], Premier Election Solutions[®], UAID[®], and Key Card Tool[™] are trademarks owned by or licensed to Premier Election Solutions.

AutoMARK[™] and AIMS[™] are trademarks of AutoMARK Technical Systems

PhotoScribe[®] is a registered trademark of DRS Data & Research Services plc.

All other trademarks are the exclusive property of their respective owners.

TABLE OF CONTENTS

1	INTRODUCTION	5
1.1	ASSURE® 1.2 PHYSICAL & FUNCTIONAL CONFIGURATION AUDIT SCOPE	5
1.2	ASSURE® 1.2 EXCLUSIONS:	6
1.3	INTERNAL DOCUMENTATION	7
	Table 1 Internal Documents	7
1.4	EXTERNAL DOCUMENTATION	8
	Table 2 External Documents	8
1.5	TECHNICAL DATA PACKAGE DOCUMENTS	10
1.6	TEST REPORT CONTENTS	10
1.6.1	VSTL Program Manual Format Trace	10
	Table 3 Trace of the Test Report to the VSTL Program Manual	10
2	CERTIFICATION TEST BACKGROUND	12
2.1	TERMS AND DEFINITIONS	12
	Table 4 Terms and Definitions	12
2.2	PHYSICAL CONFIGURATION AUDIT	15
2.2.1	PCA TDP Source Code Review	15
2.2.2	PCA TDP Document Review	15
2.2.3	PCA System Configuration Review	16
2.2.4	Trusted Build and Installation	16
2.3	FUNCTIONAL CONFIGURATION AUDIT	16
2.3.1	FCA Test Documentation Review	16
2.3.2	FCA Functional, Accessibility, Maintainability & Reliability Tests	16
2.3.3	FCA Volume, Stress, Data Accuracy, and Error Recovery Tests	16
2.3.4	FCA Security Tests	16
2.3.5	FCA Hardware Environmental Tests	17
2.3.6	FCA Telephony and Cryptographic Review and Tests	17
3	ASSURE 1.2 VOTING SYSTEM IDENTIFICATION	18
3.1	SUBMITTED VOTING SYSTEM IDENTIFICATION	18
	Table 5 Voting System Name and Version	18
	Table 6 Voting System Polling Place and Central Count Hardware	18
	Table 7 Voting System EMS Software	18
3.2	ASSURE 1.2 VOTING SYSTEM IDENTIFICATION	18
	Table 8 Voting System Polling Place and Central Count Hardware	18
	Table 9 Voting System Software	19
3.3	VOTING SYSTEM TEST ENVIRONMENT	20
	Table 10 Voting System Hardware	20
	Table 11 Premier ASSURE 1.2 Voting Device Hardware Configuration for General and Primary Test Cases	23
	Table 12 Voting System Technical Data Package Documents	25
	Table 13 Other Software, Hardware and Materials	25
4	VOTING SYSTEM OVERVIEW	26
4.1	ELECTION MANAGEMENT SYSTEM - PRE VOTING CAPABILITIES	26
4.1.1	Global Election Management System (GEMS)	26
4.1.2	AutoMARK Information Management System (AIMS)	27
4.1.3	ASSURE Security Manager (ASM)	27
4.1.4	Key Card Tool (KCT)	27
4.2	POLLING PLACE - VOTING CAPABILITIES	28
4.2.1	AccuVote-OS Precinct Count Scanner	28
4.2.2	AccuVote OSX Scanner	29
4.2.3	AutoMARK Voter Assist Terminal (VAT)	29
4.2.4	Voter Card Programmer	30
4.2.5	BallotStation	30
4.2.5.1	AccuVote-TS R6	32
4.2.5.2	AccuVote-TSX	32

4.2.6	<i>ExpressPoll CardWriter</i>	32
4.2.7	<i>Voter Card Encoder</i>	33
4.3	CENTRAL COUNT SCANNER - POST VOTING CAPABILITIES.....	33
4.3.1	<i>AccuVote-OS Central Count Scanner</i>	33
4.3.2	<i>Premier Central Scan</i>	34
4.4	ELECTION MANAGEMENT SYSTEM - POST VOTING CAPABILITIES	35
4.4.1	<i>Global Election Management System (GEMS)</i>	35
5	CERTIFICATION REVIEW AND TEST RESULTS.....	36
5.1	PCA SOURCE CODE REVIEW.....	36
5.1.1	<i>3% Source Code Review Assessment for Reuse Results</i>	36
5.1.2	<i>ASSURE 1.2 Source Code Review Results</i>	36
5.2	PCA TDP DOCUMENT REVIEW.....	37
5.2.1	<i>ASSURE 1.2 TDP PCA Document Review Results</i>	37
5.3	FCA FUNCTIONAL AND SYSTEM INTEGRATION TESTING.....	37
5.3.1	<i>Evaluation of Functional and System Integration Tests</i>	37
5.3.2	<i>Regression Functional and System Level Testing</i>	38
5.4	FCA CHARACTERISTICS TESTING (RECOVERY, ACCESSIBILITY, USABILITY & MAINTAINABILITY)	38
5.4.1	<i>FCA Characteristics Tests (Recovery, Accessibility, Usability & Maintainability)</i>	38
5.5	FCA VOLUME, STRESS, AND ERROR RECOVERY TESTING.....	38
5.5.1	<i>FCA Volume, Stress and Error Recovery Level Test Results</i>	38
5.6	FCA DATA ACCURACY TESTING.....	39
5.6.1	<i>FCA Data Accuracy Test Results</i>	39
5.7	FCA SECURITY REVIEW AND TESTING.....	39
5.7.1	<i>FCA Security Review and Testing Results</i>	40
5.8	FCA HARDWARE ENVIRONMENTAL TESTING & REUSE	40
5.8.1	<i>FCA Hardware Environmental Testing and Results</i>	40
5.9	FCA TELEPHONY AND CRYPTOGRAPHIC REVIEW AND TESTING	40
5.9.1	<i>FCA Telephony and Cryptographic Review and Tests</i>	40
6	OPINIONS AND RECOMMENDATIONS.....	41
7	APPENDICES: TEST OPERATION, FINDINGS & DATA ANALYSIS	42
7.1	APPENDIX A: CERTIFICATION TEST REQUIREMENTS	42
7.2	APPENDIX B: PCA SOURCE CODE REVIEW	43
7.2.1	<i>SysTest Source Code Review Results</i>	43
7.2.2	<i>3% Source Code Review Results</i>	43
7.2.3	<i>ASSURE 1.2 Source Code Review Results</i>	43
7.3	APPENDIX C: PCA TDP DOCUMENTATION REVIEW.....	45
7.3.1	<i>PCA TDP Document Review</i>	45
7.3.2	<i>Technical Data Package Configuration & Quality Assurance Practices</i>	45
7.4	APPENDIX D: FCA TESTING	46
7.5	APPENDIX E- DISCREPANCY REPORT	47
7.6	APPENDIX F: WARRANT OF ACCEPTING CHANGE CONTROL RESPONSIBILITY.....	48
7.7	APPENDIX G: TRUSTED BUILD AND VALIDATION TOOLS ASSURE 1.2 VOTING SYSTEM	49
7.8	APPENDIX H: AMENDED TEST PLAN	50
7.9	APPENDIX I: STATE TEST REPORTS.....	51
7.10	APPENDIX J PREMIER ASSURE 1.2 IMPLEMENTATION STATEMENT.....	52
7.11	APPENDIX K – EAC CERTIFICATION NUMBER & VOTING SYSTEM CONFIGURATION.....	56

1 Introduction

This report is submitted to the Election Assistance Commission (EAC) by iBeta Quality Assurance summarizing the federal voting system certification testing of the Premier Election Solutions (Premier) ASSURE[®] 1.2 voting system to the Voting System Standards 2002 (VSS 2002).

The Premier ASSURE[®] 1.2 voting system has been submitted to iBeta for testing to support Premier's application #DBD0701 to the US Election Assistance Commission (EAC) for certification to the VSS 2002. This is an initial EAC certification.

The ASSURE[®] 1.2 voting system includes the following components:

- The Global Election Management System (GEMS[®]) for ballot preparation and central count functions;
- The AccuVote[®]-TSX touch screen Direct Recording Electronic (DRE) video and audio voter editable ballot devices with a Voter Verified Paper Audit Trail (VVPAT) with accessible ballot inputs for voters with manual dexterity limitations (Models A, B, C, and D);
- The AccuVote[®]-TS R6 touch screen DRE video and audio voter editable ballot devices with accessible ballot inputs for voters with manual dexterity limitations (Models A and B);
- The AccuVote[®]-OS (Models A, B, C, and D) and AccuVote[®]-OSX (Models A) precinct count optical scanners;
- The AccuVote[®]-OS (Models A, B, C, and D) optical scanners installed with Central Count firmware;
- The AutoMARK[™] Voter Assist Terminal (Models A100, A200, and A300);
- The PhotoScribe[®] PS900 iM2/PS960, an image-based, AccuVote[®]-OS ballot scanner workstation; and
- Premier Central Scan (PCS) batch-ballot counting application used to control the scanning and processing of AccuVote[®]-OS ballots in central count.

The purpose of this document is to provide an overview of the certification testing and findings. The complete list of the systems names, major subsystems, version numbers and any interfacing devices is detailed in section 3 ASSURE 1.2 Voting System Identification. Additional details of the design, structure, and processing capabilities are identified in the section 4 Voting System Overview.

Application #DBD0701 originally identified SysTest Labs (SysTest) as the VSTL. Due to the suspension of SysTest during the ASSURE[®] 1.2 certification effort, Premier was authorized by the EAC to transfer their application for certification of the ASSURE[®] 1.2 to iBeta. At the time of the suspension the ASSURE[®] 1.2 test plan revision 9 was approved by the EAC and an amount of testing had been completed. Premier petitioned the EAC to assess the testing performed by SysTest for consideration of reuse. The EAC issued a letter to Premier, [20 November 2008 Letter to Premier Reuse of Testing - Final](#), in which they outlined the conditions for the assessment of reuse process. This process is outlined in the as run test plan which is contained in the attached [Appendix H Amended Test Plan](#).

In the letters listed below, the EAC authorized the reuse of the PCA Source Code Review, the PCA Document Review, the Environmental Hardware testing (with exceptions), and the Data Accuracy testing (with exceptions).

- [1/16/09 - Approval Reuse of Testing FINAL Letter - Reuse of Hardware Testing and PCA Document Review](#)
- [2/3/09 -- Approval Reuse of Testing source code FINAL](#)
- [2/10/09 -- Approval Reuse of Testing - Data Accuracy FINAL](#)

1.1 ASSURE[®] 1.2 Physical & Functional Configuration Audit Scope

This certification test effort included a Physical Configuration Audit (PCA) and Functional Configuration Audit (FCA) of the ASSURE[®] 1.2 voting system. Due to the petition for reuse these tasks were performed by either SysTest or iBeta Quality Assurance. Assessment of the SysTest test results was performed by either iBeta or the EAC Technical Reviewers as stipulated in [20 November 2008 Letter to Premier Reuse of Testing - Final](#).

The Physical Configuration Audit (PCA) performed by iBeta for ASSURE[®] 1.2 incorporated a:

- PCA Document Review Assessment for reuse of the SysTest's review of the ASSURE[®] 1.2 Technical Data Package (TDP);
- 3% PCA Source Code Review Assessment for reuse of the SysTest source code review of the ASSURE[®] 1.2 source code review; and
- Examination of the voting system configuration submitted to iBeta.

A Functional Configuration Audit (FCA) of the ASSURE® 1.2 included a review of the testing performed by SysTest to:

- The requirements of VSS 2002 data accuracy;
- The ASSURE® 1.2 specifications of the Premier TDP; and
- The voting system requirements of section 301 of the Help American Vote Act (HAVA).

For the balance of the FCA iBeta identified the scope of the ASSURE® 1.2 that includes all FCA Functional and System Level Testing (including volume, stress, error recovery, and security requirements of the VSS 2002) for the Premier certification test effort.

In order to conduct the balance of the certification test tasks, iBeta:

- Developed a test plan;
- Developed and customized test cases;
- Managed the system configurations;
- Performed Trusted Builds of all applications;
- Executed tests, and
- Analyzed the test results for the iBeta executed tests.

Certification testing performed by iBeta complied with the requirements of VSS 2002, Volume 2 Test Standards. The iBeta test record included test executions and reviews performed by iBeta. These test executions and reviews included the record of requirements that were satisfactorily and unsatisfactorily completed, deficiencies noted, reports to Premier, software and manufacturing resolutions, validations of resolutions and documentation of incorporation of resolutions into the voting system. Test records for work performed by SysTest are retained by SysTest. Materials were provided to the EAC and iBeta for the assessment of reuse.

iBeta Quality Assurance, a limited liability company, is located in Aurora, Colorado. The company is a full service software testing laboratory providing Quality Assurance and Software Testing for the business and interactive entertainment communities. iBeta Quality Assurance accreditations for the testing of voting systems to the federal standards include

- National Voluntary Lab Accreditation Program (NVLAP) Voting System Test Lab (VSTL)
- Election Assistance Commission Voting Systems Test Lab (VSTL)

Testing was conducted at iBeta Quality Assurance in Aurora, Colorado, SysTest Labs in Denver, Colorado and various SysTest and iBeta subcontractor non-core hardware environmental test labs. 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
- Percept Technology Labs, 4735 Walnut St. #E, Boulder, CO 80301
- Advanced Product Testing (APT), 1601 Dry Creek Drive Suite 2000, Longmont, CO 80503
- Wyle Laboratories, 7800 Highway 20 West, Huntsville, AL, 35806

1.2 ASSURE® 1.2 Exclusions:

The following identifies the exclusions of the ASSURE® 1.2 voting system. As identified in the VSS 2002 vol.1 section 4.1.2, software is excluded if it:

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

The following functions are excluded from the ASSURE® 1.2 voting system and therefore not tested in this certification effort:

- Cumulative Voting;
- Ranked Order Voting;
- Use of Wireless Communications: There is no use of wireless communications;
- Shared Operating Environment: ASSURE® 1.2 does not share an environment with other data processing functions (with the exception of the ExpressPoll 4000/5000 and VCProgrammer that share an environment with voter registration applications; and
- There is no provision for the broadcasting of results.

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

1.3 Internal Documentation

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

Table 1 Internal Documents

Version #	Title	Abbreviation	Date	Author (Org.)
v1.0	Voting Certification Master Services Agreement	MSA contract	October 29, 2008	iBeta Quality Assurance
	Statement of Work 02	SOW 02	November 14, 2008	iBeta Quality Assurance
	Statement of Work 03	SOW 03	January 14, 2009	iBeta Quality Assurance
	Statement of Work 04	SOW04	May 26, 2009	iBeta Quality Assurance
iBeta	VSTL Procedures			
v.2.1	Voting Deliverable Receipt Procedure		9/19/08	iBeta Quality Assurance
v.2.0	PCA Source Code Review Procedure		4/21/09	iBeta Quality Assurance
v.5.0	C and C++ Review Criteria		3/2/09	iBeta Quality Assurance
v.4.0	C# Review Criteria		3/3/09	iBeta Quality Assurance
v.1.0	ABASIC Review Criteria		3/4/09	iBeta Quality Assurance
v.3.0	VB.NET Review Criteria		3/3/09	iBeta Quality Assurance
v.3.0	8051 Review Criteria		3/2/09	iBeta Quality Assurance
v.2.0	Z80 Review Criteria		3/3/09	iBeta Quality Assurance
v.2.0	Visual Basic Review Criteria		6/19/07	iBeta Quality Assurance
v.1.0	Witness Build Procedure		4/18/08	iBeta Quality Assurance
v.2.0	Trusted Build Procedure		1/23/09	iBeta Quality Assurance
v.4.0	Test Case Preparation and Execution Procedure		5/23/08	iBeta Quality Assurance
v.4.0	VSTL Test Planning Procedure		5/23/08	iBeta Quality Assurance
v.4.0	VSTL Certification Report Procedure		4/24/09	iBeta Quality Assurance
iBeta	Project Documents			
	Premier Code and Equipment Receipt		7/17/09	iBeta Quality Assurance
	PCA Configuration - Assure 1.2		7/21/09	iBeta Quality Assurance
	FCA GEN01 System Test Case Assure 1.2		7/9/09	iBeta Quality Assurance
	FCA GEN02 System Test Case Assure 1.2		6/18/09	iBeta Quality Assurance
	FCA GEN03 System Test Case Assure 1.2		6/18/09	iBeta Quality Assurance
	FCA GEN04a System Test Case Assure 1.2		6/18/09	iBeta Quality Assurance
	FCA GEN04b System Test Case Assure 1.2		6/18/09	iBeta Quality Assurance
	FCA PRI01 System Test Case Assure 1.2		6/18/09	iBeta Quality Assurance
	FCA PRI02 System Test Case Assure 1.2		6/18/09	iBeta Quality Assurance
	FCA Environmental Test Case - Assure 1.2		6/30/09	iBeta Quality Assurance
	FCA Security Review - Assure 1.2		7/7/09	iBeta Quality Assurance
	FCA Characteristics Test Case - Assure 1.2		6/18/09	iBeta Quality Assurance
	FCA Telephony and Cryptographic TC-Assure 1.2		7/6/09	iBeta Quality Assurance
	FCA Volume Test Case 01		6/16/09	iBeta Quality Assurance

Version #	Title	Abbreviation	Date	Author (Org.)
	FCA Volume Test Case 02a		5/1/09	iBeta Quality Assurance
	FCA Volume Test Case 02b		5/20/09	iBeta Quality Assurance
	GEMS-R85 Regression Test Case Assure 1.2		7/1/09	iBeta Quality Assurance
	VAT-RearEject Regression Test Case Assure 1.2		7/6/09	iBeta Quality Assurance
	VOL1 Regression Test Case Assure 1.2		6/29/09	iBeta Quality Assurance
	VOL1b Regression Test Case Assure 1.2		6/30/09	iBeta Quality Assurance
	VOL02b Regression Test Case Assure 1.2		6/29/09	iBeta Quality Assurance
	AVOS-PC-R94 Regression Test Case Assure 1.2		7/6/09	iBeta Quality Assurance
	GEN02-R Regression Test Case Assure 1.2		6/30/09	iBeta Quality Assurance
	GEN02-R Regression Test Case Assure 1.2 (V.1 added)		7/21/09	iBeta Quality Assurance
V.5.2	EAC Certification Program Requirements Matrix		7/21/09	EAC with input from iBeta Quality Assurance

1.4 External Documentation

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

Table 2 External Documents

Version #	Title	Abbreviation	Date	Author (Org.)
	Help America Vote Act	HAVA	10/29/02	107 th Congress
NIST Hdbk 150 2006 Ed.	NVLAP Voting System Testing	NIST 150	February 2006	NVLAP
NIST Hdbk 150-22	NVLAP Voting System Testing	NIST 150-22	December 2005	NVLAP
	Federal Election Commission Voting System Standards	VSS	April 2002	Federal Election Commission
	Voting System Testing & Certification Program Manual		1/1/07	EAC
V1.0	Voting System Test Laboratory Program Manual	VSTL Program Manual	July 2008	EAC
Form v.5.2	EAC Test Matrix Template			EAC
	EAC Decision on Request for Interpretation 2007-02, 2002 VSS, Vol. 1, Section 4.2.5 (single character)	Interpretation 2007-02	5/14/07	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	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	Interpretation 2008-06	8/29/2008	EAC

Version #	Title	Abbreviation	Date	Author (Org.)
	(Electrical Supply), 4.1.2.5 (Electrical Power Disturbance)			
	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 2008-08 2002 VSS Vol. I, Glossary 2005 VVSG Vol. I, Glossary	Interpretation 2008-08	8/1/2008	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	8/25/2008	EAC
	Notice of Clarification NOC 07-001: Timely Submission of Certification Application	NOC 07-01	7/17/07	EAC
	Notice of Clarification NOC 07-002: VSTL Work with Manufacturers Outside of Voting System Certification Engagements	NOC 07-02	7/24/07	EAC
	Notice of Clarification 07-05: Voting System Test Laboratory (VSTL) responsibilities in the management and oversight of third party testing.	NOC 07-05	9/7/07	EAC
	Notice of Clarification NOC 08-001: Validity of Prior Non-Core Hardware Environmental and EMC Testing	NOC 08-01	3/26/08	EAC
	Notice of Clarification NOC 08-003: Clarification of EAC Conformance Testing Requirements for VSTLs	NOC 08-03	7/30/08	EAC
	Notice of Clarification NOC 09-002: Laboratory Independence	NOC 09-02	5/4/09	EAC
	Warrant of Accepting Change Control Responsibility		7/15/09	Premier Election Solutions
ASSURE®	1.2 EAC Correspondence			
	Premier Permission to replace SysTest Labs Letter		October 29, 2008	Premier Election Solutions
	Approval of Premier Assure 1.2 Test Plan Letter		April 7, 2009	EAC
ASSURE®	1.2 Reuse Correspondence			
	Letter to Premier on reuse of testing - final		November 20, 2008	EAC
	Premier PCA Document Review Letter		January 7, 2009	iBeta Quality Assurance
	Premier Environmental Test Review Letter		January 8, 2009	iBeta Quality Assurance
	Reuse of prior testing conducted by SysTest Laboratories Letter (PCA Document Review and Environmental Hardware Testing)		January 16, 2009	EAC
	Premier PCA Source Code Review Letter		January 23, 2009	iBeta Quality Assurance
	Reuse of prior testing conducted by SysTest Laboratories Letter (PCA Source Code Review)		February 3, 2009	EAC
	Premier Data Accuracy Test Review Letter		February 5, 2009	iBeta Quality Assurance
	Reuse of prior testing conducted by SysTest Laboratories Letter (Data Accuracy Testing)		February 10, 2009	EAC
ASSURE®	1.2 Test Documents			
Rev.9.0	Premier Solutions Assure 1.2 Voting System Test Plan Document Number 06-V-DB-CTP-01		5/1/08	SysTest Labs
Rev.01	Premier Election Solutions Assure 1.2 Voting System Certification Test Report (Report Number 06-V-DB-		2/22/08	SysTest Labs

Version #	Title	Abbreviation	Date	Author (Org.)
	058-CTR-01			
090120-1367	EMC Qualification Test Report Premier Election Solutions OSX Ballot Box Rev 5 49-211669-000a		April 16, 2009	Criterion Technology
090410-1393	EMC Qualification Test Report Premier Election Solutions AccuVote®-TSX, A, with AVPM		May 7, 2009	Criterion Technology
090410-1394	EMC Qualification Test Report Premier Election Solutions AccuVote®-TSX, A, non-AVPM		May 7, 2009	Criterion Technology
090410-1395C	EMC Qualification Test Report Premier Election Solutions AccuVote®-TSX, C, with AVPM		July 13, 2009	Criterion Technology
090410-1396D	EMC Qualification Test Report Premier Election Solutions AccuVote®-TSX, D, with AVPM		July 13, 2009	Criterion Technology

1.5 Technical Data Package Documents

The Technical Data Package Documents submitted for this certification test effort are listed in Section 3 System Identification.

1.6 Test Report Contents

The contents of this Test Report include:

- Section 1: The Introduction- identifies the scope of certification testing.
- Section 2: The Certification Test Background identifies the process for the Physical and Functional Configuration Audits.
- Section 3: The Voting System Identification identifies the system configuration including hardware, software and the Technical Data Package documentation.
- Section 4: The Voting System Overview identifies the overall design and functionality of voting system.
- Section 5: The Certification Review and Test Results are the methods and results of the testing effort.
- Section 6: The Opinions & Recommendations of the acceptability of the voting system.

Test Operations, Findings and Data Analysis are in the appendices.

- [Appendix A](#): Certification Test Requirement (conformance to the applicable standard).
- [Appendix B](#): Source Code Reviews
- [Appendix C](#): TDP Document Reviews
- [Appendix D](#): Test Results (Functional, Environmental, Accuracy etc.)
- [Appendix E](#): Discrepancy Report
- [Appendix F](#): Warrant of Accepting Change Control Responsibility
- [Appendix G](#): Trusted Build and Validation Tools
- [Appendix H](#): Test Plan
- [Appendix I](#): State Test Reports
- [Appendix J](#): Premier Implementation Statement
- [Appendix K](#): EAC Certification Number

1.6.1 VSTL Program Manual Format Trace

Appendix B of the *Voting System Test Laboratory Program Manual v.1.0* identifies content in a specific format. The format of this report follows the recommended outline stipulated in the *VSS 2002 vol. 2 Appendix B*. As these documents identify placement of information in different locations a trace is being provided to clarify the location of the specified content in this report.

Table 3 Trace of the Test Report to the VSTL Program Manual

EAC VSTL Program Manual Appendix B		Test Report - VSS 2002 vol. 2 Appendix B	
1.	System Identification and Overview	1.	Introduction
		3.	Voting System Identification
		4.	Voting System Overview
2	Certification Test Background	2.	Certification Test Background
2.1	Revision History	2	Certification Test Background
2.2	Implementation Statement	2	Certification Test Background
		7.9	Implementation Statement
3	Test Findings and Recommendations	5	Certification Review and Test Results
3.1	Summary Finding and Recommendation	6	Opinions & Recommendations
3.2	Reasons for Recommendation of	N/A	Not applicable; no recommendation of

EAC VSTL Program Manual Appendix B		Test Report - VSS 2002 vol. 2 Appendix B	
	Rejection		rejection
3.3	Anomalies (may also be identified as discrepancies, issues or defects)	Update 5.1-5.7 section Appendices: A B D E	Provides a general description of how anomalies were encountered and reported during testing. Appendix A traces the VSS requirements to the specific anomalies. Addendum to Appendix B contains software related source code discrepancy detail. Appendix D Tables: "Issues Opened" traces the specific anomalies to the relevant test. Appendix E, <i>ASSURE® 1.2 Discrepancy Report</i> , provides the discrepancy number, date, tester, location, description, and VSS 2002 requirement information about anomalies encountered during document reviews and testing.
3.4	Correction of Deficiencies	Update 5.1-5.7 section Appendices: A B D E	Provides a general description of how deficiency corrections were confirmed. Appendix A traces the VSS requirements to the specific closed anomalies. Addendum to Appendix B reflects pass criteria for all reviewed source code. Appendix D Tables: "Issues Closed" traces the specific anomaly resolutions to the test Appendix E, <i>ASSURE® 1.2 Discrepancy Report</i> , provides the vendor responses and resolution validations for anomalies encountered during document reviews and testing.
Appendix A	Additional Findings	Appendices: A D	Appendix A: Certification Test Requirements contains "should" and "not applicable" requirements. Comments provide rationale and references to relevant EAC Interpretations or Notices of Clarification. Appendix D: Supported Voting Variations of the VSS 2002 Section 2.2.8.2 identifies "unsupported" optional functionality.
Appendix B	Warrant of Accepting Change Control Responsibility	Appendix F	Warrant of Accepting Change Control Responsibility
Appendix C	Witness Build	Appendix G	Trusted Build and Validation Tools documents the Witness of the Trusted Build
Appendix D	Test Plan	Appendix H	Test Plan
Appendix C	State Test Reports	Appendix I	State Test Reports
		Appendix J	Implementation Statement
		Appendix K	EAC Certification Number

2 Certification Test Background

Earlier versions of products in this effort completed qualification testing under the outdated NASED program. These earlier versions are in use, as permitted under the laws of the various states. Under the EAC program, all systems submitted must be fully tested as a new system. As such the ASSURE 1.2 Certification Test effort is an initial certification to the 2002 VSS.

Following the circumstances outlined in section 1, the scope of the Premier ASSURE 1.2 certification test effort resulted in a unique set of pre-certification test activities. The purpose of these activities was to assist the EAC in determining what certification testing and reviews performed by SysTest could be reused. Responsibility for these activities was designated to either iBeta or the EAC. These activities are outlined in section 1. Results of the activities performed by iBeta are provided below.

Following the determination of reuse and issuance of instructions by the EAC, iBeta conducted a review of the test documentation provided by Premier and SysTest to assess the scope of testing for conformance to the 2002 VSS for the functional and system level testing which included Volume, Stress, Error Recovery, Telecommunication, Cryptographic, and Security requirements.

As part of the EAC Certification application, Premier submitted an implementation statement for ASSURE 1.2. A copy of this statement is contained in section 7.10. During the test effort, numerous updates to the Premier application were submitted to the EAC; however, none of the application modifications impacted the implementation statement. Certification testing of the Premier ASSURE 1.2 included a Physical Configuration Audit and a Functional Configuration Audit. Daily status reports were sent to ASSURE 1.2 certification management staff and iBeta project test staff. These reports included project activity status, issues, and other relevant information. Weekly status calls were held with the EAC, EAC Reviewers and Premier. Upon request, iBeta provided the EAC with information to clarify the testing, test process, schedule, and interim discrepancy reports.

2.1 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.
AccuView Printer Module	AVPM	Premier VVPAT designed to allow voters to print and review their selections in each race while voting their ballot on the AccuVote-TSX unit.
AccuBasic	ABasic	Programming language designed to define ABasic reports. ABasic report files are used to format the content of reports and memory card labels that can be printed on AccuVote-OSX, AccuVote-OS Precinct Count and BallotStation units.
AccuFeed		Device that provides automated multisheet feeding capability for the AccuVote-OS CC.
AccuVote Optical Scan	AVOS, AVOSX	Mark-sense and scan image paper-ballot voting devices.
AccuVote-OS	AVOS	AccuVote-OS (optical scan) mark-sense ballot scanner. May be installed with either AccuVote-OS Precinct Count or AccuVote-OS Central Count firmware.
AccuVote-OSX	AVOSX	AccuVote-OSX image-scan ballot scanner. The AccuVote-OSX unit is pre-installed with custom AccuVote-OSX software running on the Windows CE operating system.
AccuVote TS	AccuVote-TS	Generic term used to refer to Premier's DRE (Direct Recording Electronic) touch screen voting devices, the AccuVote-TS R6 and the AccuVote-TSX.
ASSURE Security Manager	ASM	Software application that provides an interface to the ASSURE Security Service. The ASSURE Security Manager is used to define and dynamically control application users, user rights and other security

Term	Abbreviation	Definition
		features from a central location. Premier Central Scan (PCS) requires the use of ASS/ASM.
AutoCAST		A feature of the AutoMARK VAT that gives the voter the option to cast the ballot directly into a secure ballot box after verification.
BallotStation		Dedicated software application used in conjunction with the AccuVote-TS voting devices to display ballots, record votes, count and tally votes and make a report of election results.
Ballot Marking Device	BMD	A device that marks a paper ballot for a voter.
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 location.
Direction Recording Electronic	DRE	Touch screen voting device.
Election management system	EMS	A set of processing functions and databases within a voting system that define, develop and maintain election databases; perform election definition and setup functions; format ballots; count votes; consolidate and report results; and maintain audit trails.
Escrow Agency		EAC identified repository that retains the file signature of the trusted build.
Executable Lines of Code	eLOC	Lines of code that execute functionality. Comments and blank lines are excluded from counts of executable lines of code.
ExpressPoll		The ExpressPoll provides precinct management functionality including voter verification, signature capture, driver's license scanning, voter access card encoding, and updating of voter registration information.
ExpressPoll CardWriter		A software program used to encode Voter Access Cards for use by the AccuVote TS devices.
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.
Global Election Management System	GEMS	Name of Premier Election Solutions' Election Management System (EMS) software.
Graphical User Interface	GUI	A method of interaction with a computer which uses pictorial buttons (icons) and command lists controlled by a mouse.
Help America Vote Act	HAVA	Legislation enacted in 2002 which includes creation of the EAC, federal voting standards and accreditation of test labs.
Key Card Tool	KCT	PC-based software application designed to enhance the security provided by the AccuVote-TS units.
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.
Optical Scan Accumulator Adapter	OSAA	Hardware adapter that allows the memory card from an AccuVote-OS unit to be used with the AccuVote-TSX.
Plain Old Telephone Service	POTS	Terminology used to refer to analog voice-quality telephone service used by some types of telecommunications. The abbreviation is used especially to distinguish it from any digital telephone system.
Post-election logic and accuracy testing	Post-LAT	Post-LAT mode is used after the election to confirm the vote recording accuracy results match Pre-election LAT results. Vote simulation can be used in Post-LAT mode. Post-LAT mode votes cannot be intermixed or accumulated with Official Mode results.
Pre-election logic and accuracy	Pre- LAT	Pre-LAT mode is used for validating accurate vote

Term	Abbreviation	Definition
testing		recording accuracy prior to an election. Vote simulation can be used in Pre-LAT mode. Pre-LAT mode votes cannot be intermixed or accumulated with Official Mode results.
Precinct counter		A type of voting system that records paper or electronic ballots at the polling place.
Premier Central Scan	PCS	A software application designed for high-speed, AccuVote-OS batch-ballot processing.
Premier 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 GEMS and create VAT flash memory cards.
Primary – Closed		<p>Voters must declare a party affiliation in order to vote in the primary.</p> <p>The voter declares their party affiliation to the election official and receives a ballot containing only those party-specific contests, along with non-party-specific contests presented at the same election.</p> <p>Unaffiliated voters are permitted to vote only on non-party-specific contests.</p>
Primary – Open (Selective or Pick-A-Party)		<p>Voters do not have to declare a party affiliation in order to vote in the primary.</p> <p>Depending on state law, the voter can declare their party preference to the election official or make their choice of party within the privacy of the voting booth.</p> <p>The voter receives a ballot containing only those party-specific contests, along with non-party-specific contests presented at the same election.</p> <p>Unaffiliated voters are permitted to vote only on non-party-specific contests.</p>
Primary – Open		<p>Voters do not have to declare a party affiliation in order to vote in the primary.</p> <p>A primary election (aka Top Two) that allows voters to choose among all candidates running for each office. Candidates from all parties are listed under the same contest.</p>
Sip & Puff device	Sip & Puff	A DRE ballot navigation and vote selection assistive device, used by individuals with dexterity challenges or limitations on the use of their hands.
Smart Card		A credit-card sized identification card from which information can be read and to which information can be written. Smart cards used with election equipment include: Voter Access cards, Central Administrator and Supervisor cards and Security Key cards.
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.
Uninterruptible Power Supply	UPS	Uninterruptible Power Supply. Battery backup that provides emergency power.
Universal ADA Interface Device	UAID	Hardware Interface Device that offers voters with

Term	Abbreviation	Definition
		accessibility issues the opportunity to vote on an unassisted basis.
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.
Voter Assist Terminal	VAT	An AutoMARK device used to mark the ballot selections of voters who are visually impaired, have a disability, or who are more comfortable using an alternative language.
Voter Card Encoder	VCE	Device used to create voter access cards to be used for voting on an AccuVote-TS unit.
Voter Card Programmer	VCPprogrammer	Program used to create voter access cards for the AccuVote-TS; may either run on stand-alone basis, or interface with the jurisdiction's voting registration system.
Voting System Standards	VSS	Federal voting system test standards, predecessor of the VVSG.
Voting System Test Lab	VSTL	Lab accredited by the EAC to perform certification testing of voting systems.
Voting Variations		Significant variations among state election laws incorporating permissible ballot content, voting options and associated ballot counting logic.
Voter Verified Paper Audit Trail	VVPAT	A software independent printed record of the electronic DRE ballot cast which is to be confirmed by the voter as an accurate report of their vote.

2.2 Physical Configuration Audit

The Physical Configuration Audit (PCA) deals with the physical elements of the voting system, including the source code, documentation and system configuration reviews. Validation of COTs software and hardware, execution of a Trusted Build with the reviewed source code and installation of the executable are part of the PCA.

2.2.1 PCA TDP Source Code Review

The PCA TDP Source Code Review of ASSURE 1.2 was performed by SysTest Labs. Premier petitioned for reuse of this review. In order to assist in making a determination of reuse the EAC instructed iBeta to audit 3% of the Premier ASSURE 1.2 source code for assessment and recommendation of reuse of the applicable PCA Source Code Review conducted by SysTest. In assessing this sample iBeta reviewed the sampling to Vol. 1 Sect. 4.2 and Vol. 2 Sect. 5 of the VSS 2002. iBeta focused the review by selecting source code files and functions that process vote data, audit logs, and reporting. The results were recorded on Source Code Review sheets (Excel spreadsheets). All issues were identified in the review and logged on a Discrepancy Report. Following a peer review issued were identified as follows:

- Green: Non-logic issues - recommend for reuse per EAC instruction letter;
- Yellow: Potential logic issues- attach issues to the recommendation letter to the EAC for their consideration in determination of reuse; and
- Red: Confirmed logic issues - recommend 100% review to the EAC.

Any source code updates or changes received from Premier during the test effort were compared to the transferred code base from SysTest. All identified changes were 100% reviewed by iBeta.

2.2.2 PCA TDP Document Review

The PCA TDP Document Review of Premier ASSURE 1.2 for conformance to Vol. 2 Sect. 2 of the VSS 2002 was performed by SysTest Labs. Premier petitioned the EAC for reuse of this analysis. The EAC instructed iBeta to perform an assessment and provide a recommendation for reuse of the TDP in ASSURE 1.2. To conduct the audit, iBeta selected a sampling of the full Premier ASSURE 1.2 TDP. The documents selected for the sampling review and audit of each product as well as coverage of each section in the VSS Volume 2 Section 2 TDP requirements. Results of the review were recorded. Upon completion each review was peer reviewed. The status of the review as well as the peer was tracked in the Status Report and PCA Document Review spreadsheet. The results were provided to the EAC to assist in their determination of reuse. No discrepancies were written as a result of the assessment review.

During testing the review of documents necessary to complete ASSURE 1.2 trusted builds, sample code review; test planning and test execution were incorporated into these tasks and recorded in the daily status. Missing content or discrepancies were reported in iBeta's *ASSURE 1.2 Discrepancy Report*. The Discrepancy Report was forwarded to Premier for correction.

2.2.3 PCA System Configuration Review

The PCA System Configuration Review of Premier ASSURE 1.2 was performed to verify the hardware and software configuration is consistent with the technical data package (VSS Vol. 1 Sect. 8.7.1). Reviewed results were recorded on PCA System Configuration Review sheets (Excel spreadsheets).

2.2.4 Trusted Build and Installation

The Trusted Build and Installation of the executable code ("trusted build") for the Premier ASSURE 1.2 was performed using the source code reviewed by SysTest and iBeta, per VSS Vol. 1 Sect. 9.6.2. Completion of the build was documented in the Final Trusted Build and Code Comparison Template (Word Document).

2.3 Functional Configuration Audit

The Functional Configuration Audit was an examination of the functional aspects of the voting system. This included review of the Premier ASSURE 1.2 voting system submitted test documentation, user manuals and execution of all required tests. The voting system was configured in accordance with the Premier TDP; specifically the Premier's Windows Configuration Guide, Revision 10, which . A test method description of each test case is documented in Appendix D.

2.3.1 FCA Test Documentation Review

The FCA Test Documentation Review assessed the level of vendor testing of the voting system to the Vol. 1 Sect. 2, 3, 4, 5, 6, 7 and 9 requirements. This assessment was used to define the extent of functional testing.

2.3.2 FCA Functional, Accessibility, Maintainability & Reliability Tests

Functional and system level tests were conducted, in accordance with Vol. 2 Sect. 6. End-to-end mock elections were conducted to demonstrate the integrated functionality and processes of the Premier ASSURE 1.2 voting system incorporating shared state requirements and those specifically supported by Premier. Upon completion of these Functional and System Level test cases, the evaluation of the Premier ASSURE 1.2 voting system was found to meet the accessibility requirements of the *VSS 2002, Section 2.2.7 a) through e)* (note that there are no operable controls that are more than 10 inches behind the reference plane for this submitted voting system).

The system configuration, test objective, test steps, and expected results were identified in each test case. Acceptance and rejection results were recorded for each test step. Issues encountered during testing were identified in the test record and logged on the *PCA and FCA Discrepancy Report*, after completion of peer review. Premier resolved all discrepancies which did not meet the requirements of the *VSS 2002*. Regression tests were rerun to validate all submitted fixes. These validations were recorded in the *PCA and FCA Discrepancy Report*.

2.3.3 FCA Volume, Stress, Data Accuracy, and Error Recovery Tests

iBeta reviewed the Premier's *Practical System Limits* (Appendix A of GEMS 1.21.3 or later Election Administrator's Guide) to identify relevant application and system limits. Based upon the system and application limits identified in this document iBeta defined and conducted a set of three test cases. These test cases incorporated end-to-end mock elections to demonstrate the ability of the system to operate at the declared limits. Additional scenarios were incorporated into the test cases to demonstrate the systems ability to provide an appropriate response to an overloading conditions exceeding the limits and recover without losing vote data.

Based on the review of the SysTest Labs Data Accuracy test results and the EAC issued approval for reuse of all previous data accuracy test results with the exception of the TSX, the Data Accuracy *VSS 2002* requirements for the TSX were included and tested within the Volume Test Cases. Any issues encountered during testing were identified in the test record and logged on a Discrepancy Report, after completion of peer review. Premier resolved all discrepancies which did not meet the requirements of the *VSS 2002*. Tests were rerun to validate all submitted fixes.

2.3.4 FCA Security Tests

iBeta performed a security review of the Premier security documentation addressing Vol. 1 Sect. 2.2.1, 2.2.3, 2.2.5 and 6 and Vol. 2 Sect. 6.4. Based upon this review security specific tests were identified. In addition to functional and system level tests, these tests incorporated source code and document reviews. Functionality to meet the requirements incorporated secrecy, integrity, system audit, error recovery or access to the voting system. The review was either conducted or peer reviewed by an iBeta CISSP staff member. The tests or reviews to validate the

security of ASSURE 1.2 were recorded in the *FCA Security Review*. Premier resolved all discrepancies which did not meet the requirements of the *VSS 2002*. Tests were rerun to validate all submitted fixes.

2.3.5 FCA Hardware Environmental Tests

The SysTest's subcontractors listed in section 1 performed hardware testing of the ASSURE 1.2 voting system to the requirements of Vol.1 Sect. 3 in accordance with Vol.2 Sect. 4. The review, analysis, testing and test results are contained in the test reports and engineering change assessments listed in the Table 2 External Documents - [SysTest Labs Draft Final Report](#). Per the directions of the EAC for reuse of the previous environmental test results, iBeta reviewed the SysTest Labs attached third-party reports provided to confirm that they included documentation that the ASSURE 1.2 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 and is documented in more detail in the Appendix H - Updated ASSURE 1.2 Test Plan.

The EAC issued their approval for reuse of the majority of the results of the SysTest Environmental Hardware testing in the 16 January 2009 letter ([Reuse of prior testing conducted by SysTest Laboratories Letter](#)).

As the FCA Hardware Environmental Tests are non-core tests which must be performed by a laboratory accredited in the hardware environmental test methods identified in VSS vol.1, 4.6 and 4.7 and these non-core tests may be performed by subcontractor laboratories, under the supervision of the VSTL, if the VSTL does not hold these accreditations, iBeta validated Criterion Technologies accreditation to perform all required hardware environmental tests and engaged them as iBeta's subcontractor to perform the tests.

A detailed test case with test instructions was provided to Criterion to review, assess and test the ASSURE 1.2 AccuVote-TSX DRE and AccuVote-OSX and Ballot Box. iBeta created test election databases for all operating tests and to validate the operational status of the equipment before and after each environmental test. The system configuration, test objective, test steps, and expected results were identified. Acceptance and rejection results were recorded for each test step. Issues encountered during testing were documented in the test record. In addition to the iBeta test record, Criterion provided iBeta with anomaly and test reports following their internal processes. iBeta logged anomaly reports as issues on the *PCA and FCA Discrepancy Report*. Premier resolved all discrepancies which did not meet the requirements of the *VSS 2002*.

2.3.6 FCA Telephony and Cryptographic Review and Tests

An examination of the ASSURE 1.2 voting system was conducted to confirm that it does not contain wireless data interchange devices. The results of this review were recorded in the *FCA Telephony and Cryptographic Test Case*. Based upon this review specific tests were identified against the requirements of VSS Vol. 1 Section 5 and 6. Functionality to meet the requirements incorporated telephony and cryptography of the voting system. The testing and review was either conducted or peer reviewed by an iBeta CISSP staff member. The tests or reviews to validate the security of ASSURE 1.2 were recorded in the *FCA Security Review*. Premier resolved all discrepancies which did not meet the requirements of the *VSS 2002*. Tests were rerun to validate all submitted fixes.

3 ASSURE 1.2 Voting System Identification

The description of the Premier ASSURE® 1.2 submitted for certification is found in the EAC Scope of Certification, as noted in section 3.1. The hardware, software and the Technical Data Package documentation used in the certification test environment is identified in section 3.2.

3.1 Submitted Voting System Identification

Table 5 Voting System Name and Version

Voting System Name	Version
Identified in the EAC Scope of Certification	

Table 6 Voting System Polling Place and Central Count Hardware

Hardware	OS or Firmware & Version	Description
Identified in the EAC Scope of Certification		

Table 7 Voting System EMS Software

Software Applications	Version	EMS Function Description
Identified in the EAC Scope of Certification		

3.2 ASSURE 1.2 Voting System Identification

The Voting System Test Environment identifies the specific hardware and software that was used in the test environment. The Test Methods in Appendix D identify the specific Premier ASSURE 1.2 voting system software and firmware used in each test. This Voting System includes the following hardware (non-COTS):

Table 8 Voting System Polling Place and Central Count Hardware

Hardware & Model	Firmware & Version	Description
AccuVote-OS Precinct Count		
AccuVote-OS Models A, B, C, and D	1.96.13	Precinct Count ballot counting firmware installed on an AccuVote-OS ballot scanner.
	Ballot Box	A secure box used to house voted ballots counted by the AccuVote-OS.
AccuVote-OS Central Count		
AccuVote-OS Models A, B, C, and D	2.0.15	Central Count ballot counting firmware installed on an AccuVote-OS ballot scanner
AccuFeed Model A, rev E	Not Applicable - no firmware	Device configured with the AccuVote-OS for the purpose of processing AccuVote-OS ballots in high-speed batch mode.
AccuVote-OSX		
AccuVote-OSX Model A	1.2.6	Optical-scan voting device application for paper ballots
	BootLoader 1.3.11	Application that boots the hardware for the AccuVote TS R6, AccuVote TSX, and AccuVote OSX
	Windows CE 500.4.1	Operating System for AccuVote OSX Model A
	Ballot Box	A secure box used to house voted ballots counted by the AccuVote-OSX
BallotStation		
AccuVote-TS R6 Models A and B	BallotStation 4.7.8	Software application used in conjunction with the AccuVote-TS touch screen voting devices
	BootLoader 1.3.11	Application that boots the hardware for the AccuVote-TS R6, AccuVote -TSX, and AccuVote -OSX
	Windows CE 300.3.5	Operating System for AccuVote-TS R6 Models A and B
OSAA Model A	n/a	Hardware adapter that allows the

		memory card from an AccuVote-OS unit to be used with the AccuVote-TS R6
UAID Model A	n/a	Hardware Interface Device that offers voters with accessibility issues the opportunity to vote on an unassisted basis
AccuVote-TSX Models A, B, C, and D	Ballot Station 4.7.8	Software application used in conjunction with the AccuVote-TS touch screen voting devices
	BootLoader 1.3.11	Application that boots the hardware for the AccuVote-TS R6, AccuVote-TSX, and AccuVote-OSX
	Windows CE 410.3.10	Operating System for AccuVote-TSX Models A, B, C, and D
AVPM Model A	3.0.3	Premier VVPAT for the AccuVote-TSX
OSAA Model A	n/a	Hardware adapter that allows the memory card from an AccuVote-OS unit to be used with the AccuVote-TSX
UAID Model A	n/a	Hardware Interface Device that offers voters with accessibility issues the opportunity to vote on an unassisted basis
Optical Scanner		
AutoMARK VAT A100, A200, A300	1.3 PAVR (Build 1.3.3460)	Firmware for the AutoMARK VAT with AutoCAST that supports audio only
	1.3 PVR (Build 1.3.3460)	Firmware for the AutoMARK VAT with AutoCAST that supports audio and visual
WinCE	5.00.20	AutoMARK VAT Operating System

Table 9 Voting System Software

Software Applications	Version	COTS Platform and Function Description
Ballot Preparation and Central Count		
GEMS	1.21.5	COTS platform is a PC with Windows 2003 or XP. GEMS provides DRE and AccuVote-SO ballot preparation, optical scanner and PCS workstation programming and AccuVote-OS central count ballot tallying.
ASSURE Security Manager	1.2.5	COTS platform is a PC with Windows XP. Software application that provides an interface to the ASSURE Security Service. The ASSURE Security Manager is used to define and dynamically control application users, users rights and other security features from a central location. Premier Central Scan requires the use of Security Manager/Security Service.
ABasic Report Files	2.2.4	ABasic report files are used to format the content of reports and memory card labels that can be printed on AccuVote-OSX, AccuVote-OS Precinct Count and BallotStation units.
AutoMARK AIMS	1.3 (MDE 1.3.572, Template 1.3.572)	COTS platform is a PC with Windows XP. Software that prepares the ballots and the election database to be used by the VAT
Key Card Tool	4.7.8	COTS platform is a PC with Windows 2003 or XP. This PC-based software application that allows the user to create a smart card encoded with user-defined security codes or keys.
Premier Central Scan	2.2.5	COTS platform is a PC or PhotoScribe PS900 iM2/PS960 with Windows XP, optional DRS Transport Printer (COTS), and optional DigitalPersona U.areU 4000B, 4500 fingerprint readers (COTS). Software application that is designed for high-speed AccuVote-OS batch-ballot processing.
Polling Place		
VCProgrammer	4.7.8	COTS platform is a PC with Windows 2003 or XP. Software application is used to encode voter access cards (with or without input from a voter registration system) for the purpose of activating ballots on the AccuVote-TSX and AccuVote-TS R6 in

Software Applications	Version	COTS Platform and Function Description
		an election with ST-100 or ST-120 (COTS).
Voter Card Encoder	1.3.3	Software application is used to encode voter access cards for the purpose of activating ballots on the AccuVote-TSX and AccuVote-TS R6 in an election.
ExpressPoll Card Writer	1.1.6	An application run on the ExpressPoll 4000 or 5000 to encode voter access cards for the purpose of activating ballots on the AccuVote-TSX and AccuVote-TS R6 in an election.

3.3 Voting System Test Environment

The Voting System Test Environment identifies the specific hardware and software that was used in the test environment. The Test Methods in Appendix D identify the specific ASSURE 1.2 voting system software and firmware build installed for each test iteration. The table below identifies the hardware that was used for testing whereas the Appendix H Test Plan table of voting system hardware lists the hardware that was planned to be utilized during the test campaign.

Table 10 Voting System Hardware

Hardware or Equipment	Manufacturer	Version/Serial Number	Description (identify COTS)
Election Management System (GEMS - Ballot Preparation and Central Count)			Ballot preparation & Central Count
AccuVote-OS Model A with Central Count firmware installed	Premier Election Solutions	80787	AccuVote-OS ballot scanner installed with Central Count ballot counting firmware
AccuVote-OS Model A with Central Count firmware installed	Premier Election Solutions	79770	AccuVote-OS ballot scanner installed with Central Count ballot counting firmware
AccuVote-OS Model C with Central Count firmware installed	Premier Election Solutions	35265	AccuVote-OS ballot scanner installed with Central Count ballot counting firmware
AccuFeed Model A, rev E	Premier Election Solutions	50649	Ballot processing device that mates with the AccuVote-OS. Used to count large volumes of ballots.
PhotoScribe PS900 iM2	DRS	PS900-2206	Central Count image-based ballot scanner (COTS with Windows XP Pro SP3)
PhotoScribe PS960	DRS	900-2541-25	Central Count image-based ballot scanner (COTS with Windows XP Pro SP3)
PhotoScribe PS960	DRS	900-2368-25	Central Count image-based ballot scanner (COTS with Windows XP Pro SP3)
PhotoScribe PS900 iM2	DRS	PS900-2298	Central Count image-based ballot scanner (COTS with Windows XP Pro SP3)
Dimension 3100 Model DCSM	Dell	89KSLB1	GEMS and ASM COTS Server (with Windows XP Pro SP3 and display adapter Intel® 82915G/GV/910 Express Chipset Family) and also includes Key Card Tool and VCProgrammer
Dimension 3100 Model DCSM	Dell	HNKSLB1	GEMS and ASM COTS Server (with Windows XP Pro SP3 and display adapter Intel® 82915G/GV/910 Express Chipset Family) and also includes Key Card Tool and VCProgrammer
PowerEdge 1800	Dell	HX6HJ91	GEMS COTS Server (with Windows Server 2003 SP2 and display adapter RADEON 7000)

Hardware or Equipment	Manufacturer	Version/Serial Number	Description (Identify COTS)
			series) and also includes Key Card Tool and VCProgrammer
PowerEdge 2900	Dell	CN-0DC391-71070-661-0751	GEMS and AIMS COTS Server (with Windows XP Pro SP3 and display adapter ATI ES1000) and also includes Key Card Tool, Premier Central Scan, and VCProgrammer
AccuVote -TSX and -TS R6			DREs & associated hardware
AccuVote-TSX Model A (AVPM)	Premier Election Solutions	205176	Stand-alone touch screen DRE polling place voting device (also supports early voting) that incorporates a color LCD integral touch screen, integrated (voter) privacy flaps, internal memory for storing ballot data and voting records, removable results cartridge, and protective and public counters.
AccuVote-TSX Model A (AVPM)	Premier Election Solutions	209583	Polling Place DRE (see above)
AccuVote-TSX Model A (non-AVPM)	Premier Election Solutions	201946	Polling Place DRE (see above)
AccuVote-TSX Model A (AVPM)	Premier Election Solutions	203549	Polling Place DRE (see above)
AccuVote-TSX Model B (non-AVPM)	Premier Election Solutions	225205	Polling Place DRE (see above)
AccuVote-TSX Model C (AVPM)	Premier Election Solutions	278293	Polling Place DRE (see above)
AccuVote-TSX Model C (AVPM)	Premier Election Solutions	264782	Polling Place DRE (see above)
AccuVote-TSX Model D (AVPM)	Premier Election Solutions	246992	Polling Place DRE (see above)
AccuVote-TSX Model D (AVPM)	Premier Election Solutions	283028	Polling Place DRE (see above)
AccuVote-TSX Model D (AVPM)	Premier Election Solutions	286361	Polling Place DRE (see above)
AVPM	Premier Election Solutions	NA	A voter verifiable report printer used on the AccuVote-TSX
AVPM Base	Premier Election Solutions	None	AccuVote-TSX base with AVPM
Non-AVPM Base	Premier Election Solutions	None	AccuVote-TSX base without AVPM
AutoMARK A100	AutoMARK	AM0105430016	Polling Place Voter Assistance Device (auto ballot marking)
AutoMARK A200	AutoMARK	AM0206471989	Polling Place Voter Assistance Device (auto ballot marking)
AutoMARK A300	AutoMARK	AM0307420109	Polling Place Voter Assistance Device (auto ballot marking)
AutoMARK A300	AutoMARK	AM0307420125	Polling Place Voter Assistance Device (auto ballot marking)
AutoMARK A300	AutoMARK	AM0307420136	Polling Place Voter Assistance Device (auto ballot marking)
AccuVote-TS R6 Model A	Premier Election Solutions	102071	Polling Place or Early Voting DRE
AccuVote-TS R6 Model A	Premier Election Solutions	102066	Polling Place or Early Voting DRE
AccuVote-TS R6 Model A	Premier Election Solutions	126544	Polling Place or Early Voting DRE
AccuVote-TS R6 Model B	Premier Election Solutions	133847	Polling Place or Early Voting DRE
AccuVote-TS R6 Model B	Premier Election Solutions	160495	Polling Place or Early Voting DRE
Precinct Count			Mark-sense, optical scanners & associated hardware
AccuVote-OS Model A	Premier Election Solutions	34360	Polling Place Optical Scanner
AccuVote-OS Model B	Premier Election Solutions	33844	Polling Place Optical Scanner

Hardware or Equipment	Manufacturer	Version/Serial Number	Description (Identify COTS)
AccuVote-OS Model C	Premier Election Solutions	35100	Polling Place Optical Scanner
AccuVote-OS Model D	Premier Election Solutions	42889	Polling Place Optical Scanner
AccuVote-OS Model D	Premier Election Solutions	41407	Polling Place Optical Scanner
AccuVote-OS Model D	Premier Election Solutions	42885	Polling Place Optical Scanner
AccuVote-OS Ballot Box Unit	Premier Election Solutions	Model 33824	Polling place ballot box for AccuVote-OS
AccuVote-OSX Model A	Premier Election Solutions	036	Polling Place Optical Scanner
AccuVote-OSX Model A	Premier Election Solutions	038	Polling Place Optical Scanner
AccuVote-OSX Model A	Premier Election Solutions	435	Polling Place Optical Scanner
AccuVote-OSX Ballot Box Unit	Premier Election Solutions	01577	Ballot Box for AccuVote-OSX Ballot Scanner
AccuVote-OSX Ballot Box Unit	Premier Election Solutions	01574	Ballot Box for AccuVote-OSX Ballot Scanner
AccuVote-OSX Ballot Box Unit	Premier Election Solutions	01583	Ballot Box for AccuVote-OSX Ballot Scanner
Other Hardware			
Optical Scan Accumulator Adapter (OSAA)	Premier Election Solutions	None	Allows results from AccuVote-OS memory cards to be accumulated on AccuVote-TS R6 and AccuVote-TSX devices
Visually Impaired Ballot Station (VIBS)	Various	None	A voter assistance accessory that can be used with AccuVote-TS R6 and AccuVote-TSX (touch screen voting terminals)
Universal ADA Interface Device (UAID) with ADA switch kit or Sip & Puff	Various	None	A voter assistance accessory that can be used with AccuVote-TS R6 and AccuVote-TSX (touch screen voting terminals)
Privacy Filter	3M	None	Fits on top of the touch screen and restricts the side viewing of the display
ExpressPoll 4000	ADVANTECH	AD2K0576739C	Polling Place Voter Card Creation (COTS)
ExpressPoll 5000	ADVANTECH	EPS68Z0M001156	Polling Place Voter Card Creation (COTS)
Voter Card Encoder	SPYRUS	P300116131	Polling Place Voter Card Creation (COTS)
Voter Card Encoder	SPYRUS	P300116603	Polling Place Voter Card Creation (COTS)
Smart-Card Terminal ST100	SecureTech	87003252	Smart Card Reader (COTS)
Smart-Card Terminal ST120	SecureTech	86000297	Smart Card Reader (COTS)
U.are.U 4500	digitalPersona	8Y00B007930	COTS fingerprint reader
U.are.U 4500	digitalPersona	8Y00B007403	COTS fingerprint reader
Transport Printer	DRS	none	COTS Endorsement/Transport printer for the PhotoScribe
Digi PortServer II 16 Port	Digi International	V63820034	Port Servers (COTS)
Digi PortServer II 16 Port	Digi International	W91223997	Port Servers (COTS)
Office Connect Dual Speed 160Port Hub	3Com	0100/7T4F044698	Networking (COTS)
Office Connect Dual Speed 160Port Hub	3Com	0100/7T3F042478	Networking (COTS)
RICOH LP440C Printer	Ricoh	SPC811DN	Ballot Printer
Voter Access Cards Central Administration Cards Ballot Box Keys AccuVote-TSX Keys 128KB PCMCIA Memory Cards PCMCIA To Compact Flash Adapter Compact Flash Network	Various	None	Support equipment

Hardware or Equipment	Manufacturer	Version/Serial Number	Description (Identify COTS)
Interface Cards CAT5 Network Crossover Cable AccuVote-TSX Stand AC Power Cords AccuVote-OSX AC Power Cord Blank Ballots Marked Ballots Rolls of Thermal and non-thermal Printer Paper Headphones Telephone Cables			

The test configuration of the voting devices is provided below in Table 11 as a matrix highlighting the voting device configuration of the General and Primary test cases and a brief synopsis of the functionality tested. Not all particular models of each voting device were slated for use in the General or Primary test cases.

Table 11 Premier ASSURE 1.2 Voting Device Hardware Configuration for General and Primary Test Cases

HW / SW	GEN01	GEN02	GEN03	GEN04a-b	PRI01	PRI02
	Split Precincts: * 2 districts * 2 sub-districts * 1 Proposition District * 2 precincts * 3 splits per precinct Vote 1 of N Vote N of M Slate & Group Voting Proposition/Question Recall A - single Yes/No	Straight Party * Party column oriented w/races in 1st column * Cross-over if no declared candidate Tally Settings * TS: Non-PA Straight Party * OS: Exclusive, Non-mandatory X-Party Endorse Double Sided Ballots Non-Split Precincts: Vote 1 of N Vote N of M Slate & Group Voting Recall B - options follow 'Yes'	Multi-lingual Audio * import * direct record Accessibility (switching) Multiple Districts/Precincts * separate ballots * English combined ballots Straight Party * Party graphics Vote 1 of N Vote N of M Slate & Group Voting Proposition/Question Ballot Text Report	Split Precinct Vote 1 of N Vote N of M District rotation (set during District creation) Early Voting Provisionals Export/Import Rich Text Repeatability Race Rotations (set in Race Options): GEN04a: by precinct GEN04b: District	Open Primary: * Open primary with private declaration (Selective Primary) * Party selection is first choice (preference, non-mandatory) * list nominees, not delegates 2 Page Ballot Single Precinct Vote 1 of N Vote N of M Proposition/Question Absentee	Closed Primary: * Same as open primary with public declaration * list delegates with nominees Split Precincts: (same as GEN01) * 2 districts * 2 sub-districts * 1 Proposition District * 2 precincts * 3 splits per precinct Vote 1 of N Vote N of M Write-In (registered) Recall D- options follow either Yes or No Candidate Withdraw
GEMS	X	X	X	X	X	X
BallotStation	X	X	X	X	X	X
Premier Central Scan (PCS)		X		X	X	
Key Card Tool	X	X				
VCPprogrammer				X (provisional cards)		X
ASSURE Security Manager (ASM)		X		X	X	
AIMS		X	X	X	X	X
ABasic		X (196 Pennsylvania)				
Voter Card Encoder (VCE)				X (provisional cards)		
AccuVote-OS PC						
Model A, Low Profile						X

HW / SW	GEN01	GEN02	GEN03	GEN04a-b	PRI01	PRI02
Model A, High Profile						
Model B, Low Profile						
Model B, High Profile					X	
Model C, Low Profile				X		
Model C, High Profile		X				
Model D, Low Profile	X					
Ballot Box for AccuVote-OS	X	X				
AccuVote-OS CC						
Model A, Low Profile						
Model A, High Profile						
Model B, Low Profile						
Model B, High Profile						
Model C, Low Profile					X	
Model C, High Profile						
Model D, Low Profile		X		X		
AccuFeed Model A		X				
AccuVote-OSX						
Model A	X	X		X	X	X
Ballot Box for AccuVote-OSX	X	X		X	X	X
AccuVote-TS R6						
Model A			X			
Model B				X (Early voting) (provisional cards)		X
VIBS (keypad)			X			
Headphones			X			
AccuVote-TSX						
Model A	X	X	X			
Model B						
Model C					X	
Model D						
AccuVote-TSX Base (AVPM)	X (w/barcode)	X			X	
AccuVote-TSX Base (Non-AVPM)			X			
AVPM Model A	X					
OSAA Model A	X					
UAID Model A			X			
VIBS (keypad)						
Headphones			X			
AutoMARK						
A100						
A200			X			
A300		X	X	X	X	X
Headphones			X			
UAID Model A			X			
PhotoScribe						
PS900 iM2				X		
PS960		X	X		X	
ExpressPoll						
4000			X			
5000				X (provisional)		

HW / SW	GEN01	GEN02	GEN03	GEN04a-b cards)	PRI01	PRI02

Table 12 Voting System Technical Data Package Documents

Due to the size of Table 12, it is provided as an attachment and is not in the main body of this Test Report. To view, selection **Attachments** in the **View** menu in Adobe.

Table 13 Other Software, Hardware and Materials

Material	Material Description	Use in the Voting System
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
Barcode Scanner	2D bar scanning device	Supplied by iBeta: Used to verify the bar code on the VVPAT.
Teltone TLS-5	Telephone Line Simulator	Supplied by iBeta: Used during Telephony and Cryptographic Test Case execution
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
Center 325 Mini Sound Level Meter	IEC 651 Type 2 handheld sound level meter	Supplied by iBeta: Measure decibel level
Visual Studio 2003 v.7.1.3808 (Microsoft)	Build and source code review Integrated Development Environment	Supplied by iBeta: View source code review
RSM v.6.92 (M Squared Technologies)	C, C++, Java, and 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
Nessus v. 3.2.0	Network port scanner and vulnerability testing tool	Supplied by iBeta: Used to scan ports of Public Telecommunications Networking for vulnerabilities
WireShark v. 1.0 (Formerly Ethereal v. 0.99.0)	An open source network packet capture and analysis tool	Supplied by iBeta: Used to capture packets for later analysis of cryptography
BartPE ghost32.exe (916 CD)	OS to boot to for ghosting	Disk image backups for testing repeatability.
Norton Symantec Ghost v.11	Tool to create and restore ghost images	Disk image backups for testing repeatability and for Trusted Build submission to the NSRL
System Identification		
AutoMARK Validater	Hash code generation tool version 1.1.1.0	PC-based software utility used to verify that the firmware on the AutoMARK VAT units is certified firmware that has not been altered in any way.
AVValidator	Hash code generation tool version 1.0.1	Software utility used to verify, at any time, that the firmware installed on AccuVote-OSX, AccuVote-TSX, and AccuVote-TS R6 is certified firmware that has not been altered in any way.

4 Voting System Overview

The Premier ASSURE 1.2 system is a voting system developed by Premier Election Solutions consisting of:

- **Global Election Management System (GEMS)** is a comprehensive software application for conducting an election, from defining election configuration parameters, jurisdictional information, race and candidate ballot content and creating ballot artwork, to the programming of voting device memory cards with election and ballot information, receiving election results from uploaded memory cards, and issuing election results reports. GEMS is designed to interface with AccuVote-OS, AccuVote-OSX, AutoMARK VAT, PCS, and AccuVote-TS devices.
- **AccuVote-OS Precinct Count** is used for counting AccuVote-OS ballots at the polls. A complete system is comprised of an AccuVote-OS ballot scanner installed with Precinct Count firmware and a ballot box.
- **AccuVote-OS Central Count** is used for batch processing large volumes of AccuVote-OS ballots, such as absentee ballots. A complete system is comprised of an AccuVote-OS ballot scanner installed with Central Count firmware and an optional AccuFeed ballot feeder.
- **AccuVote-OSX** is a high-resolution image-based optical scanning device and ballot box. The unit comes installed with AccuVote-OSX software and runs on the Windows CE operating system.
- **BallotStation** is a dedicated software application designed for use on Premier Election Solutions' AccuVote-TS R6 and AccuVote-TSX touch screen voting devices.
- **Key Card Tool** is a PC-based software application designed to enhance the security provided by AccuVote-TS units used in an election. This application allows the user to create a smart card encoded with user-defined security codes or keys which may then be propagated to the election's voting equipment.
- **VCProgrammer** is a PC-based application that is used to encode voter access cards for the purpose of activating ballots on AccuVote-TS units used in an election.
- **Voter Card Encoder** is a device designed to encode voter access cards for the purpose of activating ballots on AccuVote-TS units used in an election.
- **ExpressPoll CardWriter** is a software tool used to encode Voter Access Cards for use by the AccuVote TS devices.
- **Premier Central Scan** is a high-speed, batch-ballot counting application used to count, adjudicate, and tally AccuVote-OS ballots. It is installed on the PhotoScribe, an AccuVote-OS ballot scanner but may also run on a COTS PC platform.
- **ASSURE Security Manager** is a software application used to define and manage the security services and users of Premier Central Scan software installed on multiple machines.
- **AutoMARK Information Management System (AIMS)** is a Windows PC-based application that manages the information required by the AutoMARK VAT for an election. AIMS is developed by Automark Technical Systems.
- **AutoMARK Voter Assist Terminal (VAT)** 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. The AutoMARK VAT is manufactured by Automark Technical Systems.
- **AutoCAST** is a feature of the AutoMARK VAT that gives the voter the option to cast the ballot directly into a secure ballot box after verification.

4.1 Election Management System - Pre Voting Capabilities

The ASSURE 1.2 election management system pre-vote functions are performed by four software applications that are installed on up to four COTS PCs.

4.1.1 Global Election Management System (GEMS)

Global Election Management System (GEMS) is an election management system software application for defining election configuration parameters, jurisdictional information, race and candidate ballot content, creating ballot artwork, programming of voting device memory cards with election and ballot information, receiving election results from uploaded memory cards, and issuing election results reports.

GEMS:

- Interfaces with the AccuVote-TS DRE units, AccuVote-OS marksense ballot counting devices, AccuVote-OSX image scan units, and Premier Central Scan;
- Can configure general or primary elections;
- Adds, updates and deletes users, languages, voter groups and counter groups;
- Facilitates jurisdictional definition;
- Creates, updates and deletes regions, vote centers, districts, base precincts and report precincts;
- Links base precincts to districts;
- Adds cumulative report precincts;

- Links cumulative report precincts to base precincts;
- Links report precincts to vote centers;
- Adds, updates and deletes races and candidates;
- Manages ballot artwork and ballot generation;
- Records and imports audio for audio ballots;
- Can import election data in different formats, including Standard Import, LA Import and Delaware Import;
- Can create the paper ballot styles required for each voting precinct in the jurisdiction, in the format required by the voting device used, based on the jurisdictional, race, candidate content defined;
- Can configure a single GEMS database corresponding to a unique election;
- Can configure a master GEMS database with the essential components common to all elections in a jurisdiction, then used as template for all subsequent elections;
- Can create, open, back up, load from backup, or delete a GEMS database; every GEMS database that is created corresponds to a unique election;
- Can create ballot artwork in alternate languages as required for PCS, AccuVote-TS, AccuVote-OSX and AccuVote-OS units,
- Can prepare audio ballot content for every AccuVote-TS ballot style in the election;
- Can automatically generate ballot artwork into a variety of ballot entities, including ballot styles, card styles, ballots, and cards, which take into account candidate rotation and multi-document ballots;
- Can preview ballot artwork in GEMS in either the Ballot or Card Editors for any of the card entities created; these editors may be used to preview and customize ballot artwork;
- Configures AccuVote-TS, AccuVote-OS and AccuVote-OSX voting and counting options; and
- Contains administrative and audit reporting capabilities.

4.1.2 AutoMARK Information Management System (AIMS)

The AutoMARK Information Management System includes the AIMS application software installed on a COTS PC. The AIMS application manages information required by the AutoMARK Voter Assist Terminal (VAT) for an election, including:

- Importation of GEMS election files;
- Optional manual entry of election data;
- Edit of election multilingual text information for proper pronunciation of synthesized speech messages;
- Store recorded multilingual voice messages in WAV format;
- Writing of the election database to a compact flash memory card (FMC) in order to provide ballot content information to the VAT;
- Review ballot set-up and preview on-screen ballot display;
- Performs no ballot counting or vote counting/reporting functions;
- Log changes to the election database in the AIMS audit log; and
- Backing up (archive) of the election database.

4.1.3 ASSURE Security Manager (ASM)

ASSURE Security Manager is a software application which provides a central location where users can define and manage the security services and users of Premier Central Scan software installed on multiple machines. The ASSURE Security Manager is a client application that provides an interface to the ASSURE Security Service. Modeled after Windows' security services, the ASSURE Security Manager and Security Service allow election administrators to dynamically manage Premier Central Scan users on multiple workstations from a central location. ASSURE Security Manager is used to:

- Create security service user roles and users;
- Create application user roles and users;
- Assign database access;
- Create a Logon Smart Card;
- Add an image to users;
- Add fingerprint scans to users;
- Remove or re-issue a user certificate;
- Create a Security Token card;
- Enable or disable Logon Smart Cards or Security Tokens; and
- Import Issuer certificate.

4.1.4 Key Card Tool (KCT)

The Key Card Tool is a software application installed on a COTS PC that is designed to enhance the security provided by AccuVote-TS touch screen units used in an election. This application allows authorized staff to create a smart card encoded with user-defined security codes or keys, which includes the smart card key and data key. The

application can also be used to update the smart card key and PIN on Central Administrator and Supervisor cards. Smart cards encoded with user-defined security codes or keys may then be propagated to the election's voting equipment. Smart cards that have not been encoded with the keys will be rejected by the encoded equipment.

This Key Card Tool is used to:

- Define security keys;
- Allow security keys from an existing Key card to be loaded into the Key Card Tool;
- Encode a PIN number and smart card key on the Central Administrator or Supervisor card;
- Create a Key card that is used to encode the security key values on the election's smart card encoding equipment;
- Create a data key that is used to encode the currently active election files;
- Create a data key that is used to encode AccuVote-TS units, which will then only accept election files with a compatible data key; and
- Allow AccuVote-TS, Voter Card Encoder, ExpressPoll, and VCProgrammer devices, when properly encoded with the keys, to create voter access cards that contain these keys, and only accept cards that either contain these keys or default keys.

4.2 Polling Place - Voting Capabilities

4.2.1 AccuVote-OS Precinct Count Scanner

AccuVote-OS Precinct Count firmware is used for counting GEMS AccuVote-OS ballots at the polls. A complete system is comprised of an AccuVote-OS ballot scanner installed with Precinct Count firmware. The AccuVote-OS is a mark sense-based ballot counting device for counting AccuVote-OS ballots.

Premier submitted 4 models of the AccuVote-OS for certification. Model A was the original or base model. The Model B modifications were to the housing manufacturing process from Pressure Form to Injection Molding. Model C replaced the modem and added reinforcement to the I/O panel and filtering components to the power supply. Model D added improvements to the ESD resistance for FEC 2002 testing per EC#A4474 while under previous NASED Certification Testing. All models can be either "high" or "low" profile - this designation is referring to the profile of the scan head. During the test campaign, EC#AD813 which concerned the inclusion of a service data label as well as EC#A2322 which addressed ESD testing mitigation were incorporated.

A Precinct Count AccuVote-OS unit:

- Can function in four distinct election modes: Pre-Download Mode, Pre-Election Mode, Election Mode, and Post-Election Mode.
- Accepts a memory card that is programmed with ballot and election information pertaining to the vote center once ballot layout has been completed;
- Is sealed into the ballot box on election day;
- Scans ballots fed in any one of four orientations – face up, face down, head first, and foot first.
- Displays ballot return messages that are simple and comprehensible;
- Automatically drops counted ballots into one of two compartments in a AccuVote-OS ballot box, depending on ballot selection criteria specified in GEMS;
- Allows ballots to be counted either at the precinct on election day, or as absentee, challenged or early voting ballots;
- Writes election results to the memory card as ballots are counted;
- Provides battery backup in case of power failure;
- Keeps an audit log of every transaction that occurs on the unit; and
- Can be configured to communicate with GEMS over a serial or modem connection.



4.2.2 AccuVote OSX Scanner

AccuVote-OSX is a high-resolution image-based optical scanning device and ballot box. The unit comes installed with AccuVote-OSX software, which runs on the Windows CE operating system. Election and ballot information defined in GEMS is downloaded to PCMCIA memory cards that are then installed on the AccuVote-OSX voting devices. The AccuVote-OSX user interface is a bright, four-line 3.5" liquid crystal display (LCD) which works in conjunction with two selector buttons just below it. During the test campaign, EC#AD813 which concerned the inclusion of a service data label as well as EC#AC285 which included a change to the crystal (but not to the crystal frequency) were incorporated.

AccuVote-OSX:

- Is configured to communicate with GEMS over a local area network, a modem, or a direct connection;
- Allows an administrator to select an option on the display by pressing one of the selector buttons for tasks that are performed Pre- and Post- Election. The LCD is covered with a locked compartment cover during the election;
- Features a smart card and password system;
- Supports user defined security keys;
- Produces reports, logs, and status messages on a thermal printer;
- Generates audit log records for every transaction performed on the AccuVote-OSX unit from the time it is powered on until it is powered off;
- Protects access to the printer and memory card compartments, the rear of the unit where the power button, smart card reader, and communication connections are located;

The AccuVote-OSX ballot box:

- Features three bins. The main compartment is divided into two bins, and there is a third bin in the door of the box;
- Uses the two internal compartments according to conditions set in GEMS;
- Allows for the use of the bin in the door until the AccuVote-OSX is replaced by a new unit, should a unit fail on Election Day;
- Protects access to the ballot box doors using locked compartments.

4.2.3 AutoMARK Voter Assist Terminal (VAT)

The AutoMARK VAT is an automated voter assistive paper ballot marking device. This device assists voters with visual, language and manual dexterity challenges. It only displays ballot for marking on paper. Temporary memory only retains votes until the printing operation is complete. VSS requirements for a DRE are applicable for ballot display and voter selection functions, only. The VAT is exempt from vote storage and reporting function requirements.

Premier submitted 3 models of the VAT for certification. The A100 is the original or baseline model. The changes from the A100 to the A200 concerned hardware mounting locations and included modifications to connector types and position. The changes from the A200 and the A300 for the most part dealt with branding. All labels became brand neutral and the included keys became Premier specific. Security seals were also added both internally and externally, and an access hole near the headphone jack was removed. During the test campaign, the AutoCAST hardware modification of ECR0362 was incorporated as well as EC#AD813 which is the inclusion of a service data label.



VAT Model A300 is pictured above. The VAT:

- Incorporates a touch screen monitor, tactile input buttons, connections for assistive input devices, audio output and a ballot marking printer;
- Password protects the System Maintenance Menu for setting date/time and loading firmware;
- Permits installation of an AIMS election database on a compact flash memory card;
- Provides a test mode for performance of set-up, reporting and maintenance functions;
- Provides audio, printing, screen and button readiness tests and verification of the ballot definition;
- Draws a preprinted blank ballot from the voter input tray to determine the form of ballot inserted;
- Presents the voter with the options to make a language selection for either an audio or visual ballot;
- Presents the voter with controls to adjust the display contrast/size, volume, speed for synthesized speech and repeat audio output;
- Present the ballot as a series of menu-driven voting choices on a color screen;
- Permits vote selection inputs via a touch screen or assistive switch-based devices (foot paddles);
- Accumulates the voter's choices in an internal memory until the voter has completed the selection process;
- Provides a summary of the voter's choices for review and confirmation;
- Marks and prints the paper ballot following voter confirmation of the summary;
- Accommodates insertion of the ballot in any orientation;
- Prints single and double-sided ballots;
- Returns the ballot to the voter after printing is completed;
- Clears its internal memory so that the paper ballot is the only lasting record of voter selections;
- Prevents access to the compact flash memory card via a key locked compartment;
- Operates on standard or back-up battery power;
- Provides a date/time stamped audit log of ballot marking operations that can be viewed or printed;
- Provides ballot rear eject option; and
- Can be outfitted with an **AutoCAST** (Rear Eject) device to automatically move the ballot to a secure ballot box without having to be handled.

4.2.4 Voter Card Programmer

VCProgrammer is a software application installed on a COTS PC that is to be used to encode voter access cards for the purpose of activating ballots on AccuVote-TS units used in an election. VCProgrammer is configured with a file listing all precinct and party combinations valid in the election imported from GEMS.

VCProgrammer:

- Allows the operator to select the appropriate precinct and party combination in VCProgrammer that is to be encoded to a voter's voter access card;
- Encodes a voter access card with a smart card key, which is authenticated by an AccuVote-TS unit prior to voting, and reset on the voter access card once the ballot has been cast;
- Encodes voter access cards with or without input from a voter registration system;
- Can be configured to interface with a voter registration system during a live election;
- Automatically determines ballot identification information from voter information updated in a file generated by the voter registration system; and
- Accepts installation of the smart card key using a *Key card*, created using the Key Card Tool application.

4.2.5 BallotStation

BallotStation is a dedicated software application designed for use on Premier Election Solutions' AccuVote-TS touch screen voting devices (AccuVote-TS R6 and AccuVote-TSX.)

BallotStation:

- Runs on the Windows CE operating system;
- Records vote by means of a visual ballot and/or audio ballot;
- Activates the voting process by insertion of a properly encoded voter access card into an AccuVote-TS smart card reader;
- Displays the visual ballot if the voter access card is not encoded to support an audio ballot;
- Plays back the audio ballot if the voter access card is encoded to support an audio ballot;
- Enables VIBS keypad functionality in tandem with the visual ballot display if the voter access card is encoded to support an audio ballot and a keypad is installed;
- Enables sip-and-puff and paddle-switch functionality in tandem with the visual ballot display if the voter access card is encoded to support an audio ballot and UAID hardware is installed;
- Reports results in Pre-Election Mode or Post-Election Mode for the current election on the memory card;
- Issues Accumulated Totals reports from Accumulator AccuVote-TS units for all AccuVote-TS units at the polling location;

- Prints the number of ballots cast on the AccuVote-TS unit on the Election Results report after the election has been ended;
- Lists candidate and measure response totals for each race on the Election Results report as well as the count of blank votes, undervotes, overvotes, and write-ins for the memory card.
- Does not produce a consolidated tally of all votes cast in the election for any race, as this is produced by the GEMS software;
- Issues Accumulated Totals reports from the Accumulator AccuVote-TS units to which voted ballots have been accumulated from AccuVote-TS units at the same voting location.
- Allows printing of Audit Logs during the election, if required, and after the election, when election results reports have been printed, results accumulated, and uploaded.
- Audit logs may be generated and printed at any time in the Pre-Election Mode or in Post-Election Mode;
- Capable of communicating with the GEMS server;
- Transmits data to the GEMS server either by modem, local area network, or direct connection;
- transmission between GEMS and the AccuVote-TS uses the Secure Sockets Layer (SSL) and Transport Layer Security (TLS) protocols;
- Communicates with GEMS in order for memory cards to be programmed once ballot artwork has been completed;
- Accumulates results from individual AccuVote-TS units to a single Accumulator AccuVote-TS unit at the polling location once the election has ended;
- Uploads results to the GEMS server following the completion of accumulation;
- **Visual Ballot:**
 - Initially presents a language selection panel in a multi-language election;
 - Records a vote by means of touching the AccuVote-TS unit's screen in designated contact positions;
 - Indicates Candidate contact positions by voting boxes, positioned adjacent to candidate names;
 - Fills the voting box with a white X on a maroon background when a candidate is selected;
 - Facilitates entry of write-in candidates by means of touching the appropriate letters and symbols on an electronic keyboard displayed upon selection of a write-in candidate;
 - Presents the voter a ballot review panel at the conclusion of voting, from which the voter may either return to voting the ballot, or cast the ballot;
 - Prints all candidate and response selections on the AccuView Printer Module printer once the voter has voted and reviewed the ballot;
 - Allows the voter to reject the AVPM ballot record up to three times. However, on the last iteration, the voter is forced to cast the ballot;
 - Allows the visual ballot voter at the outset of voting to: display voting instructions; increase or decrease ballot text size; select the language in which the ballot is presented; or select the contrast scheme the visual ballot is to be presented;
 - Allows the visual ballot voter in the course of voting to: display voting instructions; increase or decrease ballot text size; select the language in which the ballot is presented; or return directly to the ballot review window in ballot review mode;
- **Audio Ballot:**
 - Utilizing VIBS keypad, plays back audio input over the headphones provided, or over the voter's personal headphones;
 - Allows the audio voter to select the language intended for audio voting;
 - Allows the audio voter to vote the ballot by enumerating every race in the election, and playing back all or select candidates within the race list; only the candidate currently being played back on the audio ballot may be selected in a race;
 - Plays back the ballot record containing all candidate and response selections made in audio form once the voter has voted and reviewed the ballot, and prints the ballot record on the AccuView Printer Module;
- **UAID Ballot:**
 - Utilizes the visual ballot for UAID-based voting;
 - Enables two modes of UAID voting: "Sip and puff" or "Button Switches" (Jelly Buttons);
- **Sip-and-Puff:**
 - A long sip effects candidate selection;
 - A short puff effects a backward motion on the ballot;
 - A short sip effects a forward motion on the ballot;
 - When defining write-ins, continuous short sipping will cycle forward through the alphabet until the desired letter is reached, while puffing will allow the voter to cycle backward through the alphabet;
- **Button Switches:**
 - Selection is achieved by pressing the Forward switch for more than 4 seconds;
 - Cycling through the alphabet is achieved by continuously depressing either the Forward switch to advance, or the Back switch to move backwards;

4.2.5.1 *AccuVote-TS R6*

Premier submitted two models of the AccuVote-TS R6 for certification. The difference between the Model A and Model B is that the Model B is equipped with an updated LCD screen due to the Model A screen becoming obsolete. During the test campaign, EC#AD813 which concerned the inclusion of a service data label as well as EC#A2322 which addressed ESD testing mitigation were incorporated.

In addition to the capabilities addressed above, the AccuVote-TS R6 (pictured below on the right):

- Accepts voter access cards;
- Can be configured for visual ballot voting, audio ballot voting and UAID-based ballot voting;
- Supports the Optical Scan Accumulator Adapter (OSAA), which is used for installing the memory card from an AccuVote-OS voting device into an AccuVote-TS voting device;
- Prints the Election Results report; and
- Uploads Election Results to the GEMS host computer.



4.2.5.2 *AccuVote-TSX*

Premier submitted 4 models of the AccuVote-TSX for certification. Model A was the original or base model. The difference between the Model A and Model B is that the Model B is equipped with an updated LCD screen due to the Model A screen becoming obsolete. Model C added the necessary components for AVPM. Model D modifications were to both the graphic chip and the LCD due to the older ones becoming obsolete. During the test campaign, EC#AD813 which concerned the inclusion of a service data label as well as EC#A2322 and EC#AD586 which addressed ESD testing mitigation were incorporated.

In addition to the capabilities addressed in 4.2.5, BallotStation, the AccuVote-TSX (pictured above on the left):

- Accepts voter access cards;
- Can be configured for visual ballot voting, audio ballot VIBS keypad voting and UAID-based ballot voting;
- Supports the Optical Scan Accumulator Adapter (OSAA), which is used for installing the memory card from an AccuVote-OS voting device into an AccuVote-TS voting device.
- Allows it's touch screen tablet to be removed from its docking cradle and operated on battery power;
- Can be augmented with the optional purchase of the AccuView Printer Module, which prints a complete ballot report; and
- Uploads Election Results to the GEMS host computer.

4.2.6 *ExpressPoll CardWriter*

ExpressPoll CardWriter is software that allows the operator to create voter cards for use by the AccuVote-TS devices. The ExpressPoll CardWriter is a command line program designed to create voters cards as directed by a voter registration system.

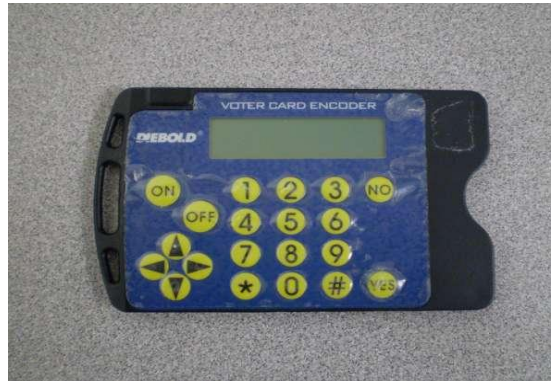
ExpressPoll CardWriter:

- Is a console (non-graphical) program since it is intended to be accessed only by a voter registration system;
- Decodes a XML formatted parameter file generated by a voter registration system;
- Employs a DLL that writes the data contained by the XML file to smart cards;
- Returns a non-zero status code and an explanation of the error in a file accessible to the voter registration system if any errors are encountered; and

- Runs under the Microsoft Windows CE environment revision 4.0 or later.

4.2.7 Voter Card Encoder

Voter Card Encoder is a device designed to encode voter access cards for the purpose of activating ballots on AccuVote-TSX and AccuVote-TS R6 units used in an election. Voter Card Encoder units are encoded with 'master' voter access cards previously encoded using VCProgrammer or the AccuVote-TS BallotStation application.



Voter Card Encoder (pictured above):

- Supports as many as eight different ballot types;
- Stores the precinct split and party corresponding to the ballot for each ballot type;
- Allows poll workers to encode voter access cards appropriate to each voter at the voting location;
- Encodes each voter access card with precinct and party information that corresponds to a unique ballot in BallotStation, but does not store any ballot content on the voter access card;
- Encodes voter access cards using specific display or playback options; for example, ballot magnification;
- Can also be used to create Challenge/Provisional voter access cards;
- Supports the use of the Key Card Tool smart card security key by means of a Key card; and
- Allows the operator to clear voter access cards when security keys are being changed for an election.

4.3 Central Count Scanner - Post Voting Capabilities

4.3.1 AccuVote-OS Central Count Scanner

AccuVote-OS Central Count is used for batch processing large volumes of GEMS AccuVote-OS ballots, such as absentee ballots. A complete system is comprised of an AccuVote-OS ballot scanner installed with Central Count firmware and an optional AccuFeed ballot feeder. All Central Count administrative reporting functionality, including ballot counts by deck, status, and time received is offered in real time by the host application. No ballot tallies are generated or stored on the unit. The 4 models of the AccuVote-OS are defined in Section 4.2.1 above.



A Central Count AccuVote-OS unit (pictured above):

- Is configured to communicate either directly, or over a local area network with GEMS, or to communicate directly with Premier Central Scan, Premier's batch ballot counting system;
- Accepts a memory card which stores communication configuration information. No ballot images or election results are stored on the memory card;
- Facilitates clean and continuous ballot feeding with minimal ballot returns;
- Can function with an optional AccuFeed ballot feeder;
- Scans ballots fed in any one of four orientations – face up, face down, head first, and foot first.
- Accepts only AccuVote-OS ballots valid to the election and vote center for which ballot processing has been enabled;
- Passes a ballot's card Id information to the controlling application for ballot identification;
- Retrieves mark detection data for the ballot from the host database;
- Examines each voting position on the ballot and notifies the controlling application whether a valid mark was detected for each as each ballot is processed;
- Does not generate or store ballot tallies; the controlling application manages the ballot tally;
- Processes ballots in groups called 'batches' or 'decks' using control cards such as Batch Start or Batch Header cards;
- When used with AccuFeed, drops a ballot into an out feed tray when a sort or return condition is detected, pauses ballot feeding, and displays a message describing the detected condition on the LCD;
- Allows the operator to remove a ballot from the output tray if a sort condition was detected, and press the Yes button to continue;
- Allows the operator to remove the ballot if a return condition was detected, and press the Yes button to continue, or override the return of the ballot by re-feeding it into the scanner while pressing the unit's Yes button;
- Prints override messages to tape when print override settings have been specified in conjunction with corresponding ballot return conditions, and the return of a previously rejected ballot is manually overridden;
- Displays the number of ballots counted in each deck on the AccuVote-OS LCD;
- Prints both the deck Id number and ballot count to the unit's printer tape when the scan of a deck ends;
- Supports a Setup mode for configuring the AccuVote-OS Central Count device for central counting; and
- Supports a Diagnostics mode to perform diagnostics tests on the AccuVote-OS device.

4.3.2 Premier Central Scan

Premier Central Scan is a high-speed, batch-ballot counting application used to control the scanning and processing of GEMS generated ballots in a central count environment. It is installed on the PhotoScribe, an AccuVote-OS ballot scanner and can optionally be installed on a PC. PCS workstations may be operated independently, or used on a LAN with other PCS workstations.



Premier Central Scan (pictured above):

- Can be configured to control the scanning and processing of ballots on other supported scanning devices, such as AccuVote-OS Central Count;
- Uploads results to GEMS which manages its intake of results files using the Poster function; and
- Shares scanned and processed ballot data among all online PCS workstations configured to process ballots for the same election and vote center.

4.4 Election Management System - Post Voting Capabilities

4.4.1 *Global Election Management System (GEMS)*

Global Election Management System (GEMS) is a software application for conducting an election and includes receiving election results from uploaded memory cards and issuing election results reports.

GEMS:

- Provides election results reports, including the Election Summary report, the Statement of Votes Cast, and the Cards Cast report with reporting tools for issuing election results with geographical, counting and tallying, and other formatting options;
- Can report election results by report precinct, as well as by district, counter group, summarized by district, issued with turnout percentages, and assorted other candidate and race reporting options;
- Accepts uploaded results tallies from AccuVote-OS units that are in Precinct Count mode;
- Accepts uploaded results from the AccuVote-OSX, the AccuVote-TS, and Premier Central Scan configured with image based scanners, which allow individual candidate selections to be viewed;
- Accepts uploaded Write-in candidates counted on AccuVote-TS, and AccuVote-OS ballots;
- Accepts uploaded challenge or provisional ballots from the AccuVote-TS, but results of these ballots will not be included in results tallies until the ballots are accepted in the GEMS Challenge Board;
- Exports election results to ASCII text or comma separated files using standard or customized formatting; and
- Prints audit logs such as the GEMS audit log, AVServer log, Central Count log, Poster log, and Regional Server log.

5 Certification Review and Test Results

The results and evaluations of the PCA and FCA reviews tests are identified below. Detailed data regarding the Acceptance/Rejection criteria, reviews and tests are found in the appendices.

- [Appendix A](#) identifies all certification test requirements traced to specific Test Cases
- [Appendix B](#) identifies the PCA Source Code Review Acceptance/Rejection criteria
- [Appendix C](#) identifies the PCA TDP Document Review Acceptance/Rejection criteria
- [Appendix D](#) identifies all FCA Testing Acceptance/Rejection criteria
- [Appendix E](#) identifies the PCA and FCA Discrepancies reported during review and testing

5.1 PCA Source Code Review

The source code review was performed by SysTest in the ASSURE 1.2 test effort. Documentation of that review is contained in the document [Premier Election Solutions Assure 1.2 Voting System Certification Test Report \(Report Number 06-V-DB-058-CTR-01\)](#). iBeta performed a 3% Source Code Review and provided a recommendation to the EAC regarding reuse of the SysTest code review for ASSURE 1.2. Any subsequent changes to source code submitted by Premier for ASSURE 1.2 were reviewed by iBeta.

During receipt and check in of the ASSURE 1.2 source code delivered by Premier, iBeta observed that the source code version control was consistent with the Premier configuration management practices.

5.1.1 3% Source Code Review Assessment for Reuse Results

The 3% source code review was conducted using iBeta's standard PCA Source Code Review Procedure. The detailed process for this review is found in [Appendix H Amended Test Plan](#) section 2.2 documentation of the 3% Source Code Review Process. This detail includes information about the language specific interpretations VSS 2002 (Vol. 1 Sect. 4.2.2 through 4.2.7, 6.2 & 6.4.2; and Vol. 2 Sect. 2.4.5.d & 5.4.2), use of analysis tools, sampling selection, management of code, and peer review.

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.

A total of 439 discrepancies were identified. The majority, 309 or 70%, were categorized as non-logic issues (Green- comments, headers, formatting, and style only, recommendation of reuse). In addition, 34 or 8% were a macro naming issue that are, in effect, considered a style issue bringing the total of non-logic issues to 343 or 78%. The remaining 96 discrepancies were categorized as Yellow EAC Decision. These discrepancies with Premier responses were forwarded to the EAC with the iBeta recommendation (see [Appendix B](#)). There were no confirmed logic issues (Red- recommendation of 100% 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:

- 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.
- 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 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 [Reuse of prior testing conducted by SysTest Laboratories Letter \(PCA Source Code Review\)](#) the EAC approved the reuse of the source code review conducted by SysTest Labs. The data supporting this review are found in [Appendix B](#).

5.1.2 ASSURE 1.2 Source Code Review Results

The code submitted for reuse was a baseline. In addition to that 3% review, iBeta incorporated the 162 open discrepancies remaining from the previous VSTL source code review and conducted the review of all delivered updated source code. All source code review discrepancies are closed and iBeta has performed a Trusted Build in accordance with the EAC Voting System Testing and Certification Program Manual Sections 5.5 and 5.6. The data

supporting this review are found in Appendix B. No instances of inconsistency in the version control of code delivered by Premier was noted.

5.2 PCA TDP Document Review

The PCA Technical Data Package Document Review was performed by SysTest in the ASSURE 1.2 test effort. As instructed by the EAC iBeta performed an audit to assess and recommend if any additional review was required. The audit of the Premier ASSURE 1.2 Technical Data Package (TDP) was in accordance with the EAC instructions and is documented in [Premier Election Solutions Assure 1.2 Voting System Certification Test Report \(Report Number 06-V-DB-058-CTR-01\)](#).

During the test effort, updated TDP documents were reviewed to verify continued compliance with the requirements of the VSS 2002. During receipt and check in of the ASSURE 1.2 TDP iBeta observed if document version control was consistent with the Premier configuration management practices.

5.2.1 ASSURE 1.2 TDP PCA Document Review Results

iBeta identified the SysTest PCA Document Review of ASSURE 1.2 adequate for reuse. This was reported to the EAC. Links to the applicable recommendation and reuse approval are contained in Appendix C. Any errors or nonconformities observed in this review and any subsequent use of the documentation was summarized in [Appendix E- Discrepancy Report](#). Documentation of corrections and verification of corrections are contained in each summary. Any instance of inconsistency in the version control of the delivered documents was reported as an informational issue.

5.3 FCA Functional and System Integration Testing

iBeta executed a review of the Premier ASSURE 1.2 voting system functionality to the requirements of the VSS 2002. (See Appendix A) Tests covering system functional requirements were incorporated into six standard system level integration test cases of end-to-end mock elections. Four of the tests were General Elections and two were Primary Elections. Election databases and ballots were prepared, installed, voted and reported exercising the input controls, error content, and audit message content of the voting system. The elections were programmed, voted and tallied to ensure ballot formats were accurately displayed, votes are accurately and reliably cast for the voting variations and functionality supported by the voting system. Effectiveness of security access controls, system integrity, availability, confidentiality and audit accountability were examined. The content and clarity of user instructions and processes was reviewed for usability. A General and a Primary election included visual and audio Spanish and English ballots. Votes were cast by testers with correctable visual disabilities to confirm that ballots can be accessed visually, aurally or with non-electronic dexterity aids in Spanish and English. Testing verified availability of screen contrast settings, ballot display settings, and required audio ballot controls. Content and accuracy of the Spanish translation was not tested. States and jurisdictions need to validate the content and accuracy of all translations.

The specific voting variations and system functions tested in the General and Primary Test Cases are identified in the Appendix D Test Methods. During the FCA Functional and System Level Testing numerous documentation and functional defects were noted. The functional discrepancies opened and closed in each test case are identified in the Appendix D Test Method. Premier resolved all identified defects. As appropriate, iBeta performed a document review and/or functional regression test. All regression testing was executed as an end-to-end system level test.

The testing was conducted on the system configuration identified in Section 3. [System configuration was conducted in accordance with the Premier TDP that disables all non-specified services](#). The individual test iterations include identification of the specific software and firmware build versions in the Appendix D Test Methods. In accordance with VSS 2002 vol. 1 section 1.5, iBeta reviewed the body of knowledge deposited in the EAC's Voting System Reports Clearinghouse. The Test Plan delineates the Test Methods and the test steps executed to address those issues and concerns were executed during the FCA Functional and System Integration testing as well as the Security Test Case execution.

After all hardware and software testing was completed a final trusted build was performed with the release versions of the software and firmware (see Appendix G). This build was installed on the hardware configurations that had been utilized for Functional and System Integration testing. A full regression system integration test was performed on this final system configuration and is documented below.

5.3.1 Evaluation of Functional and System Integration Tests

Upon completion of all iterations of the Functional and System Level test cases, the Premier ASSURE 1.2 voting system was found to meet the Functional and System Integration requirements of the VSS 2002. Appendices A and D provide specific information on the FCA Functional and System Integration Testing. The defects encountered, their resolution and validations are listed in Appendix E.

5.3.2 Regression Functional and System Level Testing

For the discrepancies that were functional defects and required software or firmware modifications, Premier submitted the modified source code, iBeta reviewed the code, performed a Trusted Build, wrote end-to-end and system level test cases, and executed those test cases. One full end-to-end test case and 1 system level test cases were executed to validate all submitted fixes. These validations were recorded in the PCA and FCA Discrepancy Report.

In addition, the functionality of the AutoMARK AutoCAST, which was not originally listed with the Premier Application to the EAC, was tested. At the conclusion of the regression testing, all functional defects were resolved.

5.4 FCA Characteristics Testing (Recovery, Accessibility, Usability & Maintainability)

iBeta re-used a sample election that included audio, visual, and English ballots. Test voting was performed by providing input direction to the voting machine touch screen and by using the Visually Impaired Ballot Station (VIBS) keypad. Usability testing examined the functional capabilities addressing cognitive, perceptual, interaction, and privacy issues identified in VSS Vol.2 Sect. 3.1. Accessibility testing examined the functional capabilities addressing visual, audio, dexterity, and mobility to confirm that the touch screen and VIBS keypad can be used to cast audio, visual, English ballots could be cast privately and independently on the TSX, TS-R6, and AutoMARK units as identified in VSS Vol.2 Sect. 3.2. Testing verified the functionality of screen contrast settings and text font ballot display settings, as well as the required audio ballot controls. All test conditions were in an ambient office environment. The Maintenance procedures outlined in the TDP were executed in conjunction with an examination of the physical characteristics and attributes of the TSX, TS-R6, AutoMARK, AVOS and OSX units to verify that they conformed to the requirements identified in VSS Vol.2 Sect. 4.2 and 4.3. During testing 1 functional defect was noted.

The testing was conducted on the system configuration identified in Section 3. The individual test iterations include identification of the specific software and firmware build versions in the Appendix D Test Methods.

5.4.1 FCA Characteristics Tests (Recovery, Accessibility, Usability & Maintainability)

The Premier Election Solutions voting system was found to meet the Recovery, Usability, Accessibility, Maintainability and Characteristics requirements of the VSS 2002. Appendices A and D provide specific information on the Characteristics (Maintainability, Usability and Accessibility) Testing. The defects encountered during the review, their resolution and validations are identified in Appendix E.

5.5 FCA Volume, Stress, and Error Recovery Testing

The Volume Stress and Error Recovery Tests were performed by iBeta. Premier provided documentation of their system limitations and information regarding the largest jurisdiction and State testing conducted.

iBeta performed 3 test cases with maximum and overloaded volume scenarios to test the various system limit conditions identified in the *Appendix A: Practical System Limits of the GEMS 1.21.3 or later Election Administrator's Guide* document. In discussions with the EAC it was agreed that the Volume test scenarios would incorporate validation that the system could perform to the identified system limit. Stress and error recovery conditions would validate that appropriate responses were encountered for overloaded conditions. Appropriate responses were to handle the overload, generate an error, or if the system halts processing without generating an error, the system recovers without any loss of data.

Error recovery was addressed in the source code review of the requirement v.1: 4.2.3.e which specifies a single exit point and as well as power recovery test results which validated recovery from power or system failure without loss of vote data.

Testing by iBeta was conducted on the system configuration identified in Section 3. The application was tested for the system limits, overload conditions and error recovery of the ASSURE 1.2 voting system and the voting/counting functionality of the AutoMARK VAT, AccuVote OSX, AccuVote OS Central Count, AccuVote OS Precinct Count, Premier Central Scan, AccuVote-TSX and AccuVote-TS R6.

5.5.1 FCA Volume, Stress and Error Recovery Level Test Results

iBeta executed a review of the Premier ASSURE 1.2 voting system limits to the requirements of the VSS 2002 (see Appendix A). Tests covering system limit requirements were incorporated into three test cases of end-to-end mock elections. The test cases are Volume 1, Volume 2a, and Volume 2b.

- Volume 1 objectives were to test and exceed the maximum number of active voting positions, ballot styles, voter groups, candidates per race, Precincts, ballots/cards cast per machine, and amount of memory cards per Polling Vote Center
- Volume 2a and 2b objectives were to validate the ability to process, store and report data using the allowed maximum number of voter groups categories, voter groups per voter group category, precincts and ballot styles (cards) within an election on different hardware configurations.

Election databases and ballots were prepared, installed, voted and reported exercising the input controls, error content, and audit message content of the voting system. The elections were programmed, voted and tallied to ensure ballot formats were accurately displayed, votes are accurately and reliably cast for the voting variations and functionality supported by the voting system. Testing verified availability of screen contrast settings and ballot display settings.

The specific voting variations and system limits tested in the Volume 1, Volume 2a, and Volume 2b Test Cases are identified in [Appendix D](#) section [FCA Volume \(Volume Stress, Performance and Error Recovery\) Testing](#). Failures, errors, nonconformities and anomalies observed during testing by iBeta are summarized in [Appendix E- Discrepancy Report](#). Any relevant ASSURE 1.2 issues that remained open at the time of transfer were incorporated into [Appendix E- Discrepancy Report](#). Documentation of corrections and verification of corrections are contained in each issue summary.

5.6 FCA Data Accuracy Testing

The VSS 2002 stipulates that a voting system fails if one error occurs before recording/reading 26,997 consecutive ballot positions correctly. A voting system must record/read 1,549,703 (or more) consecutive ballot positions correctly. If there's one error with more than 26,997 ballot positions but less than 1,549,703 correctly read, the test can be continued, with testing until another 1,576,701 consecutive ballot positions are counted without error (i.e. 3,126,404 with one error). SysTest completed Data Accuracy testing for the ASSURE 1.2 voting system. Premier petitioned the EAC for reuse of this testing and based on the iBeta review, the EAC authorized in the February 10, 2009 letter; [Approval Reuse of Testing Data Accuracy Final](#) the reuse of the data accuracy testing conducted by SysTest, with the exception of the AccuVote- TSX.

The testing was conducted on the system configuration identified in Section 3.

5.6.1 FCA Data Accuracy Test Results

The Premier ASSURE 1.2 voting system was found to meet the VSS 2002 Vol. 1 Section 3.2.1 requirements. Appendices A and D provide specific information on the Data Accuracy Testing. No issues were encountered during this testing.

5.7 FCA Security Review and Testing

iBeta's security specialist, a Certified Information System Security Professional, supervised execution of a security analysis of the applicable TDP documents of the VSS 2002 identify the threat model. First the analysis identified VSS 2002 security requirements that were currently addressed in the standard testing, source code and document reviews. The analysis next identified any unique voting system specific tests, source code and document reviews that were needed. The tests, source code or documents reviews were traced to the VSS 2002 requirement in the FCA Security Review and Testing table. The results of the standard tests and reviews were recorded in the applicable FCA Functional and System Integration Testing, PCA Source Code Review or the PCA Document Review. The unique tests and reviews were documented in the FCA Security Review and Testing table. This documentation included the steps, acceptance and rejection criteria, and results. [Appendix D](#) contains the FCA Security Review and Testing table and the specific Test Methodology. In the initial document review gaps were noted in the content of the Security documentation. These were identified as discrepancies 3 through 52 (see [Appendix E- Discrepancy Report](#)). Responses provided to many of these discrepancies were used to complete the test criteria for the Security Review and Testing.

In order to comply with the security test requirements identified in Vol.2 Sect. 6.4 of the VSS 2002. iBeta approached security testing of the VSS 2002 by first creating test scenarios which discounted the exposure to risk and excluded physical security procedures. However, in establishing acceptance and rejection criteria, iBeta assessed the potential exposure to risk and included physical security procedures as an acceptable security control, per the requirements of Vol. 1 Sect. 7.3 of the VSS 2002. To assess if an access control was effective iBeta considered the degree to which one or more of the following security controls was present: physical security procedures, password protection, detection in an audit, technical expertise required, obfuscation of sensitive

material, and encryption of sensitive material. In determining potential exposure to risk the security specialist considered access from the user and if the exposure was from a trusted user or non-trusted user. Systems were accepted as meeting the security requirements of the VSS 2002 if the security controls present were deemed effective to address the identified risk.

Testing was conducted on the system configuration identified in Section 3. The individual test iterations include identification of the specific software and firmware build versions in the [Appendix D](#) Test Methods.

5.7.1 FCA Security Review and Testing Results

Testing, source code and documents reviews of the ASSURE 1.2 voting system found that the system met the applicable VSS 2002 security requirements identified in the security analysis. Appendices A, B, C and D provide specific information on the FCA Security Review and Testing Failures, errors, nonconformities and anomalies observed in testing are summarized in [Appendix E- Discrepancy Report](#). Documentation of corrections and verification of corrections are contained in each summary.

5.8 FCA Hardware Environmental Testing & Reuse

SysTest Lab's and their subcontractors completed hardware environmental testing for the ASSURE 1.2 voting system. Premier petitioned the EAC for reuse of this testing in the ASSURE 1.2 certification test effort. SysTest documentation of the hardware environmental testing conducted under their auspices is contained in the document [Premier Election Solutions Assure 1.2 Voting System Certification Test Report \(Report Number 06-V-DB-058-CTR-01\)](#). The EAC directed iBeta to review those Environmental Test results through an audit. Based on the iBeta audit and review, iBeta recommended that the SysTest the hardware environmental test results for all but the AccuVote-TSX Models A, C, and D and the OSX Ballot Box were adequate for reuse in the Premier ASSURE 1.2 certification test effort. In the January 16, 2009 [Reuse of prior testing conducted by SysTest Laboratories Letter](#) the EAC authorized the reuse of the majority of the hardware testing conducted by SysTest's sub-contractors.

The hardware environmental testing was conducted on the system configuration identified in Section 3 and in the attached hardware test reports by Criterion Technology, Inc.

5.8.1 FCA Hardware Environmental Testing and Results

Electrostatic Disruption testing in accordance with VSS 2002 Vol. 1 Section 3.2.2.8 was conducted at Criterion Technology, Inc. As the VSS 2002 requires DRE's to include audio functionality, the environmental test was conducted with both visual and audio ballot operations. Hardware failures were encountered during the testing and documented in Discrepancies #67, #68, #69, and #70 (as documented in [Appendix E- Discrepancy Report](#)). Utilization of a test chamber was needed for Premier to troubleshoot and initial appropriate discrepancy remedies. A qualified Criterion engineer was provided for operation of the chamber, observation and communication of the results of the remedial action. The mitigation was performed in compliance with Section 2.5.2.1.3 of the EAC Laboratory Accreditation Program Manual. Documentation of corrections and verification of corrections are contained in each issue summary in [Appendix E- Discrepancy Report](#).

5.9 FCA Telephony and Cryptographic Review and Testing

The ASSURE 1.2 system uses telephony to transmit unofficial results by modem from precinct scanners (AccuVote OS-PC and AccuVote-OSX), precinct DREs (AccuVote-TS) to the Central Count GEMS Server. The ASSURE 1.2 system also uses telephony to transmit unofficial results by modem from a Regional GEMS to a Central Count GEMS. The ASSURE 1.2 system also has the capability to download ballot definition files from the GEMS Central Count to the precinct scanners, precinct DREs and PCS workstations.

5.9.1 FCA Telephony and Cryptographic Review and Tests

iBeta confirmed that the ASSURE 1.2 voting system election management hardware and installation procedures reflect the configuration described in Section 3. The AccuVote OS-PC downloads ballot definitions and uploads results by modem in the same manner as it downloads and uploads data over a serial communications cable in a local environment. The AccuVote-OSX and AccuVote-TS download ballot definitions and upload results by modem in the same manner as they download and upload data locally over a TCP/IP-Ethernet connection. Wireshark was used to monitor the communications in a local environment to compare to the transmissions over modem. Modem transmissions were monitored using an iBeta generated program which acted as a man-in-the-middle (MITM). Instead of dialing GEMS, the devices were configured to dial the MITM and the MITM in turn dialed GEMS and passed the data on (sometimes in a corrupted state as required by the specific test step). [Appendix D](#) contains the Telephony-and-Cryptographic-Review-and-Testing table and the specific Test Methodology. Failures, errors, nonconformities and anomalies observed in testing are summarized in [Appendix E- Discrepancy Report](#). Documentation of corrections and verification of corrections are contained in each summary.

6 Opinions and Recommendations

In addition to the portions of the SysTest Labs testing accepted for reuse by the EAC, iBeta Quality Assurance has completed the testing of Premier ASSURE 1.2 voting system. All testing prescribed the test plan or amended test plan was performed as identified. Documentation of any divergence from the test plan was included in the amended as run test plan (see Appendix H). All identified anomalies or failures were reported and resolved. The information provided in this report is an accurate representation of the certification test effort of the Premier Election Solutions, Inc. ASSURE 1.2 voting system. It is our opinion that the report is complete.

For disclosure, iBeta is noting that the expiration date of the authentication certificates between the EMS and the voting devices that are utilized to transmit data over public telecommunications is ignored.

Based on the findings identified in Section 5 it is our opinion that the acceptance requirements of the Federal Election Commission Voting System Standards April 2002 and the Premier manufacture specifications have been met for the hardware, software and user documentation of the system configuration submitted for certification testing.

iBeta Quality Assurance recommends that the Election Assistance Commission certifies Premier ASSURE 1.2.

See Appendix K for information regarding the EAC Certification number.



Gail Audette
Quality Manager
iBeta Quality Assurance

7 APPENDICES: TEST OPERATION, FINDINGS & DATA ANALYSIS

The *Voting System Test Laboratory Program Manual v.1.0* Appendix B identifies content in specific appendices. In order to ensure that this content and content required by *VSS 2002* Volume 2 Appendix B a trace is provided in section 1.4 to clarify the location of this specified content.

7.1 Appendix A: Certification Test Requirements

Appendix A identifies the test results to the Certification Test Requirement of the *VSS 2002*. Requirements marked:

- Accept: met the *VSS 2002* requirement
- Reject: did not meet the *VSS 2002* requirement
- NA: the requirement is not applicable to the voting system type submitted for Certification Testing
- Pending: *VSS 2002* requirements that cannot be completed by the VSTL until after Certification
- Out of Scope: *VSS 2002* requirements which are performed by entities other than the VSTL

Requirements marked Reject, NA, Pending or Out of Scope shall include an explanatory note. (Example: If a voting system is only a Central Count Scanner, the requirement is marked "NA" and a comment indicates "Not a DRE.")

Optional requirements which apply to the voting system type but are not supported by the Premier ASSURE 1.2 voting system are not marked "NA". Instead they are marked "Accept", with an explanatory comment. The reason for this is to provide a positive identification that iBeta reviewed the voting system for all applicable requirements, including this optional functionality and confirmed non-support. (Example: If a voting system does not have a VVPAT. The requirements are marked "Accept" and a comment indicates "DRE does not have a VVPAT".)

The test case trace corresponds to the Test Methods identified in the [Appendix H- Amended Test Plan](#) and [Appendix D- FCA Testing](#).

- F= Functional System Level, Accessibility, Maintainability, Accuracy & Reliability (GEN01, 02, 03, 04, PRI 01 and 02, Volume 01 for AccuVote-TSX Data Accuracy);
- X = SysTest PCA Document Review, Source Code Review, Data Accuracy Testing, and subcontractor Environmental;
- C = Characteristics;
- V= Volume 01 and 02;
- S = Security;
- T = Telephony & Cryptographic; and
- E = Subcontractor Environmental (non-reuse).

Many functional requirements were exercised in multiple test cases. These instances are noted in the Function Exercised column. The actual test case or test method might not contain a requirement trace in these instances.

Issues identified during testing are cross-referenced to the [Appendix E- Discrepancy Report](#).

EAC Decisions on Requests for Interpretation which were applicable to the voting system submitted for certification testing are noted in the comments.

Due to the size of this Appendix, it is provided as an attachment. To view, selection **Attachments** in the **View** menu in Adobe.

7.2 Appendix B: PCA Source Code Review

PCA Source Code Review was performed by SysTest. Premier petitioned the EAC for reuse. The terms of the reuse are identified in the EAC February 3, 2009 letter: [Reuse of prior testing conducted by SysTest Laboratories Letter \(PCA Source Code Review\)](#).

7.2.1 SysTest Source Code Review Results

The results of the SysTest source code review are contained in the [Premier Election Solutions Assure 1.2 Voting System Certification Test Report \(Report Number 06-V-DB-058-CTR-01\)](#).

7.2.2 3% Source Code Review Results

The [iBeta Letter documenting the 3% review of the SysTest Source Code Review](#) testing is listed in the Voting System Certification Correspondence on the EAC web site.

The applications and the source code reviewed by iBeta in the 3% sample and the potential logic issues provided to the EAC for consideration in their determination of reuse are found in [Appendix H - Amended Test Plan](#) section 2.2 PCA Source Code Review

7.2.3 ASSURE 1.2 Source Code Review Results

Listed below is the version of code received from SysTest Labs and the final code version that was used in the Trusted Builds performed by iBeta (see Appendix G: Trusted Build and Validation Tools ASSURE 1.2 voting system). During the source code review subsequent to the 3% review, iBeta closed all of the 162 discrepancies that remained open from the SysTest Labs review. iBeta noted 32 new discrepancies related to header sections, comments, pointer validations, multiple returns and levels of indentation. These source code review defects were provided to Premier for resolution. Updated source code was then reviewed to validate the submitted fixes. All source code review defects are closed.

The Premier configuration control of source code provides that the minor versioning (of 4 levels) is then reduced to a major versioning (of 3 levels) during the Trusted Build.

Product	Source Code	Language	3% Source Code Review	Trusted Build	Discrepancies
ASSURE 1.2	GEMS	C++	1.21.4.1	1.21.5	3
	AccuVote-OS PC	C	1.96.11	1.96.13	None
	AccuVote-OS CC	C	2.0.13	2.0.15	None
	AccuVote-OSX	C++	1.2.0.14	1.2.6	1
	BallotStation	C++	4.7.3	4.7.8	3
AutoMARK Information	Key Card Tool	C++	4.7.2	4.7.8	2
	VCProgrammer	C++	4.7.2	4.7.8	None
	Voter Card Encoder	C	1.3.3	1.3.3	None
	ExpressPoll CardWriter	C++	1.1.6	1.1.6	None
	Premier Central Scan	C++	2.2.0.26	2.2.5	9
	ASSURE Security Manager	C++	1.2.0.18	1.2.5	1
	ABasic	ABasic	2.2.4	2.2.4	None
	AVPM	C	3.0.3	3.0.3	None
	AVInstall	C++	1.0.2	1.0.2	None
	WinCE300	C++	300.3.5	300.3.5	None
	WinCE410	C++	410.3.10	410.3.10	None
	WINCE500	C++	500.4.0.5	500.4.1	None
	BootLoader	C++	1.3.10	1.3.11	None
	SharedComponents	C++	2.2.0.26	2.2.5	8
	AVValidator	C	1.0.1	1.0.1	None
	AIMSGEMSDLL	C#	1.0.2.2	1.0.2.2	None
	AutoMarkEncoder	C++	1.0.105	1.0.105	None
	MDB	VB	1.3.552	1.003.572	None
	Template	SQL	1.3.556	1.003.572	None
	AutoMark Validater	C++	n/a	1.1.1.0	6
AutoMARK Voter	AutomarkService	C++	1.0.4	1.0.4	None
	AutomarkStartup	C++	1.0.8	1.0.8	None
	DiagnosticLogger	C++	1.0.105	1.0.105	None
	NonVolatileLibrary	C/C++	1.0.122	1.0.122	None

Product	Source Code	Language	3% Source Code Review	Trusted Build	Discrepancies
	OperationLogger	C++	1.1.2	1.1.2	None
	PrinterEngineBoard	C	1.68.0	1.68.0	None
	ScanDriver	C++	1.544	1.544	None
	Scanner	C, Assembly	1.48	1.48	None
	SecurityLibrary	C/C++	1.3.2	1.3.2	None
	SwitchInterfaceBoard	C	1.43.2	1.43.2	None
	UltrasonicSheetDetector	C, Assembly	8.0.1	8.0.1	None
	Getmarks	C++	1.3.2	1.3.2	None
	AutomarkDataHelperLibrary	C++	1.0.119	1.0.121	None
	ScannerPrinterLibrary	C++	1.7.29	1.7.29	None
	Automark (PVR and PAVR)	VB.net	1.3.2874	1.3.3460	None
	AutomarkData	C#	1.3.2874	1.3.3460	None
	AutoMark32	VB.net	1.3.2874	1.3.3460	None

7.3 Appendix C: PCA TDP Documentation Review

PCA TDP Document review was performed by SysTest. Premier petitioned the EAC for reuse. The terms of the reuse are identified in the EAC February 3, 2009 letter: [EAC letter to iBeta QA Director on reuse of testing](#).

7.3.1 PCA TDP Document Review

The results of the SysTest PCA TDP Document review are contained in the [Premier Election Solutions Assure 1.2 Voting System Certification Test Report \(Report Number 06-V-DB-058-CTR-01\)](#).

The [iBeta recommendation on reuse of SysTest PCA Document Review](#) is listed in the Voting System Certification Correspondence on the EAC web site. There were two open SysTest discrepancies identified and noted in the *ASSURE 1.2 Discrepancy Report* (see [Appendix E- Discrepancy Report](#)) and include the original SysTest discrepancy reference.

7.3.2 Technical Data Package Configuration & Quality Assurance Practices

During the certification testing iBeta tracked all materials provided by Premier. Any instances where the delivered materials did not conform to Premier's identified Configuration and Quality Assurance practices were noted in the *ASSURE 1.2 Discrepancy Report* (see [Appendix E- Discrepancy Report](#)) as Informational issues.

7.4 Appendix D: FCA Testing

The system configuration identified in [Section 3](#) identifies the final configuration of the ASSURE 1.2 voting system. The initial baseline configuration is identified in the [Appendix H Amended Test Plan](#). Testing was conducted using the Trusted Builds. ASSURE 1.2 submitted any code changes for issues encountered during testing. At that time iBeta completed a Trusted Build and conducted final regression testing. All changes to the system configuration were identified and recorded in the PCA Configuration document. A cross reference to the applicable configuration in the PCA Configuration document was inserted in the test record each time a test case was executed.

Due to the size of this Appendix, it is provided as an attachment. To view, selection **Attachments** in the **View** menu in Adobe.

7.5 Appendix E- Discrepancy Report

Due to the size of this Appendix, it is provided as an attachment. To view, selection **Attachments** in the **View** menu in Adobe.

7.6 Appendix F: Warrant of Accepting Change Control Responsibility



PREMIER
ELECTION SOLUTIONS, INC.

P.O. Box 1019
Allen, TX

75013

p. 469.675.8930
f. 214.383.1596

www.premierelections.com

Warrant of Accepting Change Control Responsibility

July 29, 2009

Allen, Texas

During the testing of Premier Election Solutions ASSURE 1.2 system the following changes were required:

- EC#A2322
- EC#AD586
- EC#AD813

Premier Election Solutions' hereby warrants that these changes will be included in the final certified product that is delivered to the customer.

In addition,

- EC#0362 (AutoCAST) is an optional change to the current rear cleanout tray of AutoMARK VAT models A200 and A300 with the addition of a slot. The slot allows a ballot to be ejected at the back of the machine as an option to the voter.
- EC#AC285 is a motherboard change that will be implemented in the future production of AccuVote-OSX. The motherboard layout is changed to replace an obsolete crystal and provides a greater clearance around the mounting holes.

Talbot Iredale, PEng
Director Product Development

7.7 Appendix G: Trusted Build and Validation Tools

ASSURE 1.2 Voting System

The Premier ASSURE 1.2 voting system is composed of the hardware, software, and documents identified in section 3.

iBeta uses a COTS hash program (Maresware) to obtain File Size, MD5 and SHA1 hashes during trusted builds. Both algorithms have been validated using the test data from the NIST NSRL website (<http://www.nsrll.nist.gov/testdata/>). This program is widely used in forensic analysis of systems and also used by some states to verify their voting software. The MD5 and SHA1 hashes are taken to be consistent with the currently distributed NSRL data files which contain the hash resulting from each of those two algorithms.

Listed below are the source code versions reviewed by iBeta for the Final Trusted Builds versions of the Premier ASSURE 1.2 voting system (NIST Handbook 150-22 4.2.3, 4.13.2, 4.13.4, 5.10.4 VSS vol. 1: 9.6.2.4). During the Premier Trusted Build process, the reviewed minor version (typically of 4 levels) is then released to a major version of 4 levels with the exception of the AutoMARK PVR and PAVR that is versioned based on the compile date. As the Trusted Build process was executed a number of times during the test campaign, the Trusted Build sheets within this section contain, in many cases, numerous documentation of an application build. The final Trusted Build was utilized for the full end-to-end regression test in accordance with the requirements of the Section 5.6.3.4 of the EAC Testing and Certification Program Manual.

Due to the size of this Appendix, it is provided as an attachment. To view, selection **Attachments** in the **View** menu in Adobe.

Application	Reviewed Minor Version	Built Major Version	Date	Section
GEMS	1.21.4.2	1.21.5	07/17/09	7.7.1
AccuVote-OS CC	2.0.14.1	2.0.15	07/14/09	7.7.3
AccuVote-OS PC	1.96.12.1	1.96.13	07/14/09	7.7.3
AccuVote-OSX	1.2.4.1	1.2.6	07/17/09	7.7.1
BallotStation	4.7.7.1	4.7.8	07/17/09	7.7.1
Key Card Tool	4.7.7.1	4.7.8	07/17/09	7.7.1
VC Programmer	4.7.7.1	4.7.8	07/17/09	7.7.1
Voter Card Encoder	1.3.2.6 (Re-use)	1.3.3	02/13/09	7.7.7
ExpressPoll CardWriter	1.1.5.3 (Re-use)	1.1.6	02/26/09	7.7.6
Premier Central Scan	2.2.3.1	2.2.5	07/17/09	7.7.1
Assure Security Manager	1.2.3.1	1.2.5	07/17/09	7.7.1
Shared Components	2.2.4.1	2.2.5	07/17/09	7.7.1
AutoMARK AIMS	1.003.572	1.3.572	07/16/09	7.7.2
AutoMARK VAT PAVR	1.3.3418	1.3.3460	06/22/09	7.7.5
AutoMARK VAT PVR	1.3.3418	1.3.3460	06/22/09	7.7.5
AutoMARK Validater	1.1.1.0	1.1.1.0	06/22/09	7.7.5
ABasic Report Files	2.2.3.4 (Re-use)	2.2.4	02/13/09	7.7.7
Bootloader	1.3.10.1	1.3.11	06/24/09	7.7.4
WinCE 300	300.3.4.3 (Re-use)	300.3.5	06/24/09	7.7.4
WinCE 410	410.3.9.3 (Re-use)	410.3.10	06/24/09	7.7.4
WinCE 500	500.4.0.5 (Re-use)	500.4.1	06/24/09	7.7.4
AVPM	3.0.2.11 (Re-use)	3.0.3	02/13/09	7.7.7
AVValidator	1.0.0.7 (Re-use)	1.0.1	06/24/09	7.7.4
AVInstall	1.0.1.1	1.0.2	02/13/09	7.7.7

7.8 Appendix H: Amended Test Plan

The [Premier Election Solutions ASSURE[®] 1.2 VSTL Certification Test Plan Version 2.0 Plan](#) and the [Approval of Premier Assure 1.2 Test Plan Letter](#) are found on the EAC website.

This test plan was amended during test execution to version 3.0 and then updated to version 4.0 to incorporate comments from the EAC Review of this Test Report. This amended test plan is attached. Changes are provided in blue text for easy identification.

7.9 Appendix I: State Test Reports

No state testing was performed by iBeta concurrent to certification testing. State testing conducted by SysTest Labs has been identified to the EAC.

7.10 Appendix J Premier ASSURE 1.2 Implementation Statement

A copy of the Premier ASSURE 1.2 implementation statement which was submitted as part of the Premier application #DBD0701 to the EAC is provided below.

Implementation Statement



Declaration of Supported Voting Variations & Languages

Vendor Name: Premier Election Solutions Inc. **Preparer:** Premier Election Solutions Inc.

Date Prepared: February 2, 2007

Identify the voting variations and languages supported or unsupported by marking with a .

Insert Required descriptions where needed (Rotation, VVPAT, Open Primary, Closed Primary, etc).

(P & M= Paper and Marksense ballots)

Voting Variations Functionality & Languages	Sup-ported	Unsup-ported	Required description(s)
Vol. 1 Sect 2.2.8.2 ,2.3.1.3.1.a, 2.4.3.3, 3.2.5.1.2, 3,2,5,1,3 4.4.4, & 10			
Voter Verified Paper Audit Trails			
VVPAT	<input checked="" type="checkbox"/>		
Accessibility (vol. 1. sect. 2.2.7)			
Forward Approach	<input checked="" type="checkbox"/>		
Parallel (Side) Approach	<input checked="" type="checkbox"/>		
Closed Primary (vol. 1. sect. 2.2.8.2)			
Primary: Closed	<input checked="" type="checkbox"/>		
Open Primary (vol. 1. sect. 2.2.8.2)			
Primary: Open Standard (provide definition of how supported)	<input checked="" type="checkbox"/>		Open Primary, supported.
Primary: Open Blanket (provide definition of how supported)	<input checked="" type="checkbox"/>		
Partisan & Non-Partisan: (vol. 1. sect. 2.2.8.2)			
Partisan & Non-Partisan: Vote for 1 of N race	<input checked="" type="checkbox"/>		
Partisan & Non-Partisan: Multi-member ("vote for N of M") board races	<input checked="" type="checkbox"/>		
Partisan & Non-Partisan: "vote for 1" race with a single candidate and write-in voting	<input checked="" type="checkbox"/>		
Partisan & Non-Partisan "vote for 1" race with no declared candidates and write-in voting	<input checked="" type="checkbox"/>		
Write-In Voting: (vol. 1. sect. 2.2.8.2)			
Write-in Voting: System default is a voting position identified for write-ins.	<input checked="" type="checkbox"/>		
Write-in Voting: Without selecting a write in position.		<input checked="" type="checkbox"/>	
Write-in: With No Declared Candidates	<input checked="" type="checkbox"/>		
Write-in: Identification of write-ins for resolution at central count		<input checked="" type="checkbox"/>	
Primary Presidential Delegation Nominations & Slates: (vol. 1. sect. 2.2.8.2)			
Primary Presidential Delegation Nominations: Displayed delegate slates for each presidential party	<input checked="" type="checkbox"/>		
Slate & Group Voting: one selection votes the slate.	<input checked="" type="checkbox"/>		
Ballot Rotation: (vol. 1. sect. 2.2.8.2)			
Rotation of Names within an Office; define all supported rotation methods for location on the ballot and vote tabulation/reporting	<input checked="" type="checkbox"/>		
Straight Party Voting: (vol. 1. sect. 2.2.8.2)			
Straight Party: A single selection for partisan races in a general election	<input checked="" type="checkbox"/>		
Straight Party: Vote for each candidate individually	<input checked="" type="checkbox"/>		
Straight Party: Modify straight party selections with crossover votes	<input checked="" type="checkbox"/>		
Straight Party: A race without a candidate for one party	<input checked="" type="checkbox"/>		
Straight Party: "N of M race (where "N">1)	<input checked="" type="checkbox"/>		

Voting Variations Functionality & Languages	Sup-ported	Unsup-ported	Required description(s)
Vol. 1 Sect 2.2.8.2 ,2.3.1.3.1.a, 2.4.3.3, 3.2.5.1.2, 3,2,5,1,3 4.4.4, & 10			
Straight Party: Excludes a partisan contest from the straight party selection.	✓		
Cross-Party Endorsement: (vol. 1. sect. 2.2.8.2)			
Cross party endorsements, multiple parties endorse one candidate.	✓		
Split Precincts: (vol. 1. sect. 2.2.8.2)			
Split Precincts: Multiple ballot styles	✓		
Split Precincts: P & M system support splits with correct contests and ballot identification of each split	✓		
Split Precincts: DRE matches voter to all applicable races.	✓		
Split Precincts: Reporting of voter counts (# of voters) to the precinct split level; Reporting of vote totals is to the precinct level	✓		Precinct Level Only
Vote N of M: (vol. 1. sect. 2.2.8.2)			
Vote for N of M: Counts each selected candidate, if the maximum is not exceeded.	✓		
Vote for N of M: Invalidates all candidates in an overvote (paper)	✓		
Recall Issues, with options: (vol. 1. sect. 2.2.8.2)			
Recall Issues with Options: Simple Yes/No with separate race/election. (Vote Yes or No Question)	✓		
Recall Issues with Options: Retain is the first option, Replacement candidate for the second or more options (Vote 1 of M)	✓		
Recall Issues with Options: Two contests with access to a second contest conditional upon a specific vote in contest one. (Must vote Yes to vote in 2 nd contest.)	✓		
Recall Issues with Options: Two contests with access to a second contest conditional upon any vote in contest one. (Must vote Yes or No to vote in 2 nd contest)	✓		Overturned - US District Court 7/29/03: CA Election Code sect. 11383
Cumulative Voting (vol. 1. sect. 2.2.8.2, 10)			
Cumulative Voting: Voters are permitted to cast, as many votes as there are seats to be filled for one or more candidates. Voters are not limited to giving only one vote to a candidate. Instead, they can put multiple votes on one or more candidate.		✓	
Ranked Order Voting (vol. 1. sect. 2.2.8.2, 10)			
Ranked Order Voting: Voters rank candidates in a contest in order of choice. A candidate receiving a majority of the first choice votes wins. If no candidate receives a majority of first choice votes, the last place candidate is deleted, each ballot cast for the deleted candidate counts for the second choice candidate listed on the ballot. The process of eliminating the last place candidate and recounting the ballots continues until one candidate receives a majority of the vote.		✓	
Ranked Order Voting: Voters can write in a ranked vote.		✓	
Ranked Order Voting: A ballot stops being counting when all ranked choices have been eliminated		✓	
Ranked Order Voting: A ballot with two choices ranked the same, stops being counted at the point of two similarly ranked choices.		✓	
Ranked Order Voting: A ballot with a skipped rank counts the vote for the next rank.		✓	
Ranked Order Voting: The total number of votes for two or more candidates with the least votes is less than the votes of the candidate with the next highest number of votes, the candidates with the least votes are eliminated simultaneously and their votes transferred to the next-ranked continuing candidate.		✓	
Provisional or Challenged Ballots (vol. 1. sect. 2.2.8.2, 10)			
Provisional/Challenged Ballots: A voted provisional ballots is identified but not included in the tabulation, but can be added in the central count.	✓		

Voting Variations Functionality & Languages	Sup-ported	Unsup-ported	Required description(s)
Vol. 1 Sect 2.2.8.2 ,2.3.1.3.1.a, 2.4.3.3, 3.2.5.1.2, 3,2,5,1,3 4.4.4, & 10			
Provisional/Challenged Ballots: A voted provisional ballots is included in the tabulation, but is identified and can be subtracted in the central count.	✓		
Provisional/Challenged Ballots: Provisional ballots maintain the secrecy of the ballot.	✓		
Overvotes (vol. 1. sect. 4.4.4, 10)			Must support for specific type of voting system
Overvotes: P & M: Overvote invalidates the vote. Define how overvotes are counted.	✓		
Overvotes: DRE: Prevented from or requires correction of overvoting.	✓		
Overvotes: If a system does not prevent overvotes, it must count them. Define how overvotes are counted.	✓		Count as "overvote"
Overvotes: DRE systems that provide a method to data enter absentee votes must account for overvotes.		✓	We cannot enter absentee ballots on the TS units. We handle absentee ballots using AVOS.
Undervotes (vol. 1. sect. 4.4.4)			Must support
Undervotes: System counts undervotes cast for accounting purposes	✓		
Blank Ballots (vol. 1. sect. 2.4.3.3, 3.2.5.1.2, 3.2.5.1.3, & 4.4.4)			
Totally Blank Ballots: Any blank ballot alert is tested.	✓		
Totally Blank Ballots: If blank ballots are not immediately processed, there must be a provision to recognize and accept them	✓		
Totally Blank Ballots: If operators can access a blank ballot, there must be a provision for resolution.	✓		
Display/Printing Multi-Lingual Ballots (vol. 1. sect. 2.3.1.3.1.a)			Must support one <input checked="" type="checkbox"/>
Spanish	✓		
Alaska Native (Other Group specified)		✓	Optionally created per customer.
Aleut		✓	
Athabascan		✓	
Eskimo		✓	
Native (Other Group Specified)		✓	
Chinese (Mandarin, Cantonese)	✓		
Filipino (Tagalog)	✓		
Japanese	✓		
Korean	✓		
Vietnamese	✓		
Apache		✓	Optionally created per customer.
Cent/So American		✓	
Cheyenne		✓	
Chickasaw		✓	
Choctaw		✓	
Navajo		✓	
Other Tribe-Specified		✓	
Paiute		✓	
Pueblo		✓	
Seminole		✓	
Shoshone		✓	
Sioux		✓	
Tohono O'Odham		✓	
Tribe not specified		✓	
Ute		✓	
Yaqui		✓	
Yuman		✓	

Voting Variations Functionality & Languages	Sup-ported	Unsup-ported	Required description(s)
Vol. 1 Sect 2.2.8.2 ,2.3.1.3.1.a, 2.4.3.3, 3.2.5.1.2, 3,2,5,1,3 4.4.4, & 10			
French	✓		
Haiti Creole	✓		
Demonstrates the voting system capability to handle the designated language groups. (vol. 1. sect. 2.3.1.3.1.a)			
Default language (English),	✓		
Secondary language using a Western European font	✓		
Ideographic language (such as Chinese or Korean),	✓		
Non-written languages requiring audio support		✓	Optionally created per customer.

7.11 Appendix K – EAC Certification Number & Voting System Configuration

This report was submitted to the Election Assistance Commission on (insert date). It is pending their acceptance. No certification number has been issued. When iBeta receives notification that the report is accepted, a revised version of the report will be issued. The Certification number will appear here and on the Title page. Any other revisions will be noted in the version history

This Certification is for the Voting System Hardware and Software configuration(s) listed in section 3.1.