iBeta QUALITY ASSURANCE

MicroVote General Corporation Election Management System (EMS) Voting System v. 4.0 VSTL Certification Test Report

EAC Application # MVT0701
Prepared for
MicroVote General Corporation
6366 Guilford Ave.
Indianapolis IN 46220
Version 5.0

(V)2008-25JUN-001(E)

Trace to Standards			
NIST Handbook 150-22			
Section 5.5, 5.10.1 through 5.10.3, 5.10.5, 5.10.6			
VVS		VVSG	
Vol. #	Section(s) #	Vol. #	Section(s) #
1	1.6.1	1	1.4.1
1	2, 3, 4, 5, & 6	1	2, 3, 4, 5, 6, & 7
1	9.6.3	2	1.8.3
2	2, 3, 4, 5, & 6	2	2, 3, 4, 5, & 6
2	7.4 & 7.5.	2	7.4 & 7.5.
2	Appendix B	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.

U.S. Election Assistance Commission
VSTL

EAC Lab Code: 0702 Effective thru 2/28/2009

NVLAP®

NVLAP LAB CODE 200749-0

This report was provided to Bernie Hirsch of MicroVote to confirm that the report accurately describes the system submitted under EAC Application MVT0701. Additionally Mr. Hirsch has provided instruction on sections of the report that MicroVote's wishes to be marked as protected information under section 10 of the United States Election Assistance Commission Testing and Certification Program Manual v.1.0.

Version History

Ver #	Description of Change	Author	Approved by	Issue Date
v.1.0	(V)2008-25JUN-001(A) Initial report -released	Gail Audette Carolyn Coggins Debra Harwood	Carolyn Coggins QA Director Voting	6/25/2008
v.2.0	(V)2008-25JUN-001(B) Response to EAC Review. newly release applicable interpretations and VSTL Program Manual Report Requirements **Requirements trace to the EAC Certification Matrix** **Section 1**: • Exclusions clarification language identifies *The Election Management System software is an application installed on a standalone COTS PC or laptop. Connection of these platforms to a network (LAN or WAN) or connection of multiple OMR or Gemplus card readers to the EMS is outside the voting system configuration submitted for certification testing* for.v.1:4.1.2.15 • Exclusions added "*Independent Verification System"* for v.1: 7.8: • VSTL Program Manual Appx B: o Exclusions added: *No state testing was performed by iBeta on the MicroVote EMS voting system. & (it does not) contain a bar code reader* per o 1.4: Added listings for Appx H, I & J o 1.4.1Added VSTL Program Manual Format Trace • Table 1: Update date of General 2 Test Case • Table 2: Added applicable EAC Interpretations **Section 2:** • 2.3.7 added *"connection of EMS to a LAN or WAN is outside the certification system configuration"* (v.1: 4.1.2.15) **Section 3:** • Table 6 & 8: Update EMS build v.4.0.21.0 • Table 9: Update version & date for Section 2.5, 2.6 & 2.11, Appx. AA, V & Y; added Implementation Statement • Table 10: Added ComUtil109 **Section 5:** • 5.5 Infinity Voting Panel DRE added detail clarifying simulator tool validation • 5.6 Added detail regarding testing to Interpretation 2008-06 **Section 6:** • Section 6: Added 2.10.5.3 VSTL Attestation content per the VSTL Program Manual **Appendix A:** • v.1: 2.1.4.i : added reference to code review • v.1: 4.1.2.15: changed to "*No network connection*" • v.1: 7.2.1 to 7.2.1.2: added *"Appx C 2.6"* • v.1: 7.3.2: added "*Document Review #130 to 134"* • v.1: 7.4.4: changed Appx C to B • v.1: 7.4.6: changed reference to "*Appx C 2.6 & F 7.6.3";* added *"#125 to 129"* • v.1: 7.4.4.f: added *"#136"* • v.1:7.5.1.a: added *"See 2.1.2.d, #135 " & "System does not use Telecommunications and Data Transmission nor does it use Telecommunications and Audio Transmission, but it does use Data Transmission in the absence of*	Carolyn Coggins Kevin Wilson	Carolyn Coggins QA Director Voting	9/26/2008

Version History				
Ver #	Description of Change	Author	Approved by	Issue Date
	Telecommunications • v.1: 7.5.4: changed to "*Not a shared environment*" • v.1: 7.5.5: added section 7.5.5 • v.1: 7.5.5.a: added *"EMS has no external access or query capability."* • v.1: 7.5.5.b.i & ii: traced to *"G, S"* • v.1: 7.5.6: removed duplication of 7.5.5 • v.1: 7.6.1: added *"#130 to 134 & 137"* **Appendix B** • v.1:7.5.1.a: Section 7.2.2 & 7.2.3 v. 4.0.21.0 & date updated **Appendix C** • v.1:7.4.6: document review of Appx AA update • v.2: 2.6.4 - correct reference to *"7.4"* **Appendix D** • v.1: 2.1.1.a: Added clarifying language regarding how security testing was performed to the General 1 Test Method; added more detail to the validations in the Security Test Method. • v.1:7.3: General 1 Test Method added clarification: *While the polls are open but before Tally confirm the panel cannot be put into pretest or reset mode by action of the buttons or the poll worker card*. • v.1: 7.3.1: Security Test Method - References: added 7.3. • v.1 7.4.1a thru e: added validations to Security Test Method • v.1:7.5.1.a: added to the Security Test Method - Voting: Ballot Activation and Casting Verifications *"No data transmission prior to ballot casting" &* Added Source Code Review for #135 checksum validation • v.1: 7.5.5.b.i & ii: General 1 & Security Test Method added: *"The Infinity voting panel utilizes 2-factor authentication, possession of a token and knowledge of a password to access results after the polls are closed"* • General 1 & Security Test Methods added clarification: "*For the identified user entity confirm access and use to only the permitted functions and data* " • General 2 Test Method added EMS v.4.21.0 regression **Appendix E** • v.1: 7.4.4.f: added #136 • v.1: 7.4.6: added #125 to 129 install documentation • v.1:7.5.1.a: added #135 checksum validation of transmitted data • v.1: 7.6.1: added #130 to document modem disabling • v.1: 7.6.1: added #131 to 134 & 137 conflicting TDP LAN references **Appendix F** • EAC Cert Prog Man 5.6: In 7.6.2 Note 1 was updated to clarify changes to trusted build • v.1: 7.4.4.b.i: Section 7.6.2 added #4 - encrypt.exe • v.1: 7.4.6: Section 7.6.3 added "*iBeta reviewed the installation documentation to the requirements of v.2: 2.6.4 (See Appendix C)*" ; updated version of Appx AA • v.1: 7.4.5: added hash statement **Appendix H, I & J** • Added appendices per the VSTL Program Manual Appendix B			
v.3.0	(V)2008-25JUN-001(C) Response to EAC Review. **Section 3:** • Table 8: Support of Windows 2000 references removed • Table 9: updated version and dates for the Appx B doc, Section 2.6 Security Specification, Section 2 System Overview, Appendix Y – Build and Installation Instructions, Appendix V User Manual, and Section 2.5 Software Design	Carolyn Coggins Kevin Wilson	Carolyn Coggins QA Director Voting	12/15/08

Version History				
Ver #	Description of Change	Author	Approved by	Issue Date
	and Specification. • Table 9: added docs for Appx B-5, Sharp LCD Specification (6:1), EMS v.4.0 System Limitation (w/ maximum field observations) **Appendix A:** • 3.1.1. 3.2.2.1.a, 3.2.2.2.a, 3.2.3 changed trace to Appx E #23 and added comment: *Interpretation 2007-03 #23 Closed Document review; test results delivered to the EAC* • 3.2.2.1.d added a comment *"Not a color display"* • 3.2.2.2.c.ii & iii added a comment *"EAC confirmed with US Accessibility Board that there have been no reports of issues with standard headphones"* **Addendum to Appendix B** • Added detail for "Comment" related discrepancies **Appendix C** • v.2: 2.6: document review of Appx B-5 new submission **Appendix D** • Added to General 2 & Primary 1 Test Method: o VVSG 2005 Trace: 3.1, 3.1.2, 3.1.3 o Voting: Casting Verifications: *Accessible ballots can be voted securely, privately and independently & Accessible ballots can be changed or correct errors prior to casting* • Deleted references to Windows 2000 in the operational environment for General 1 and Environmental Test Methods			
v.4.0	(V)2008-25JUN-001(D) Response to EAC Review. **Title Page** • Added EAC logo **Section 3:** • Table 9: Deleted *EMS Installation Instructions Election Management System* (document superseded by *Appendix Y*) • Table 10: Added identification tool **Addendum to Appendix B** • Added detail for 5.2.7.b & c "Comment" related discrepancies **Addendum to Appendix F** • Added to 7.6.3 confirmation of identification tool functionality	Carolyn Coggins	Carolyn Coggins QA Director Voting	12/19/08
v.5.0	(V)2008-25Jun-001 (E) Added EAC Certification Number	Carolyn Coggins	Carolyn Coggins QA Director Voting	3/2/09

TABLE OF CONTENTS

1 Introduction

This report is submitted to the US Election Assistance Commission (EAC) and MicroVote General Corporation (MicroVote) by iBeta Quality Assurance (iBeta) summarizing the federal voting system certification testing to the *US Election Assistance Commission Voluntary Voting System Guidelines* December 2005 (VVSG 2005) of the MicroVote Election Management System voting system v.4.0 (EMS voting system), including: the Election Management System ballot preparation and central count software (EMS software), the Infinity Voting Panel Direct Recording Electronic (DRE) push button polling place device with an audio ballot mode, the Infinity Voting Panel firmware and a dual sided COTS paper ballot optical mark reader (scanner). The Election Management System ballot preparation and central count software are developed by MicroVote General Corporation (MicroVote). The Infinity Voting Panel and the Infinity firmware are manufactured/developed by Carson Manufacturing Company, Inc. The Chatsworth ACP2200 dual-sided Optical Mark Reader (OMR) is manufactured by Chatsworth Data Corporation. The purpose of this document is to provide an overview of the certification testing and findings.

Exclusions:

- The MicroVote EMS voting system does not support ballot rotation; it is not a non-standard voting device provided by a local jurisdiction; it does not contain wireless technology nor use of the public networks; it does not provide for broadcasting of results or contain a bar code reader.
- The Election Management System software is an application installed on a standalone COTS PC or laptop. Connection of these platforms to a network (LAN or WAN) or connection of multiple OMR or Gemplus card readers to the EMS is outside the voting system configuration submitted for certification testing.
- The Infinity Voting Panel does not include an independent verification system, voter verified paper audit trail or electronic dexterity equipment.
- The Chatsworth OMR is not a precinct based paper counter.
- No state testing was performed by iBeta on the MicroVote EMS voting system.

Any activities in these areas are limited to documentation that the functions are not applicable to this voting system.

Testing was conducted at iBeta in Aurora, Colorado and Wyle Laboratories in Huntsville, AL. Testing was completed June 6, 2008.

The MicroVote EMS voting system was submitted to iBeta for Voting System Test Lab (VSTL) certification testing to the VVSG 2005. This testing supports MicroVote's Application #MVT0701 to the US Election Assistance Commission (EAC) for initial certification of the MicroVote EMS voting system to the VVSG 2005. Delivery of a VSTL test report is required as part of the voting system application process (see *EAC Voting System Certification and Testing Program Manual* section 4.2).

This certification test effort included a Physical Configuration Audit (PCA) of:

- The Technical Data Package (TDP) consisting of the voting system document and the voting system source code;
- Witness of all tested builds from the reviewed source code;
- Preparation of a trusted build with the final reviewed version of source code; and
- Examination and recording of the voting system configuration, including model and serial number, of each test environment.

Additionally a Functional Configuration Audit (FCA) to the requirements of the 2005 VVSG and the MicroVote EMS voting system test requirements included:

- A review of the test documentation submitted by MicroVote General Corporation (MicroVote) for the Election Management System voting system;
- Development of a test plan detailing all testing;
- Managing and recording the voting system configurations, including model and serial number, of each test environment,
- Development and execution of test cases incorporating recording all test data, report outputs, test observations of performance and equipment condition for:

  - A set of functional system level test methods;
  - Security review and test scenarios;
  - Reliability and accuracy test methods, incorporating availability, and volume testing;
  - Characteristics test methods, incorporating the accessibility, usability and maintainability of the Infinity Vote Panel; and
  - Environmental hardware test methods, assessment of a COTS optical scanner, subcontractor test management, assessment and execution by Wyle Laboratories of the Infinity Vote Panel;
- And, an analysis of all test results.

Certification testing was performed in compliance with the requirements of VVSG 2005, Volume II *National Certification Testing Guidelines*. The test record included all test executions and reviews. All test executions and reviews included the record of requirements that were satisfactorily and unsatisfactorily completed, deficiencies noted, reports to MicroVote, software and manufacturing resolutions, validations of resolutions and documentation of incorporation of resolutions into the voting system.

During all phases of the certification testing iBeta provide MicroVote with status reports.

iBeta is a full service software testing laboratory providing quality assurance and software testing for the business and interactive entertainment communities. iBeta accreditations for the testing of voting systems include:

- National Voluntary Lab Accreditation Program (NVLAP) Voting System Testing Certificate of Accreditation to ISO/IEC 17025:2005, Voting System Testing scope of accreditation (NVLAP Lab Code 200749-0 assessment of conformance to the criteria set forth in NIST Handbooks 150 and 150-22)
- United States Election Assistance Commission Voting Systems Test Lab (VSTL) Certification of Accreditation recognized for the testing of voting systems to the 2002 Voting System Standards 2005 Voluntary Voting System Guidelines (EAC Lab Code 0702)

Non-core hardware environmental testing is outside iBeta's test accreditation scope as a VSTL. Non-core hardware environmental assessments and testing were subcontracted to Wyle Laboratories, 7800 Highway 20 West, Huntsville, AL, 35806. iBeta verified Wyle's qualifications. They are accredited to perform all VVSG 2005 identified environmental test methods by the American Association of Laboratory Accreditation under Certificate Numbers 845.01 (Electrical) and 845.02 (Acoustics and Vibration). The accredited test methods are traced to the applicable VVSG 2005 requirement for:

Accredited Test Method A2LA No. 845.01, expiration date: 12/31/09	VVSG 2005 Vol.2 Requirement
MIL-Std 810 M 516 Transportation Shock	4.6.2 Bench Handling Test
MIL-Std 810 M 514 Road Transport (Bounce- Loose Cargo)	4.6.3 Vibration Test
MIL-Std 810 M 502 Low Temperature	4.6.4 Low Temperature Test 4.7.1 Temperature & Power Variation Test
MIL-Std 810 M 501 High Temperature	4.6.5 High Temperature Test 4.7.1 Temperature & Power Variation Test
MIL-Std 810 M 507 Humidity (Temperature /Humidity)	4.6.6 Humidity Test

Accredited Test Method A2LA No. 845.02, expiration date: 12/31/09	VVSG 2005 Vol.2 Requirement
EN 61000-4-11 Testing and Measurement Techniques-Section 11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Test	4.8.a Power Disturbance Disruption
FCC Class B Requirements per ANSI C63.4	4.8.b Electromagnetic Radiation
EN 61000-4-2 Electrostatic Discharge Susceptibility	4.8.c Electrostatic Disruption
EN 61000-4-3 Radiated Susceptibility, 80 MHz to 1	4.8.d Electromagnetic Susceptibility

Accredited Test Method A2LA No. 845.02, expiration date: 12/31/09	VVSG 2005 Vol.2 Requirement
GHz, Electric Field	
EN 61000-4-4 Conducted Susceptibility, Electrical Fast/Burst Transients, Signal and Power lines and Cables	4.8.e Electrical Fast Transient Protection
EN 61000-4-5 Testing and Measurement Techniques-Section 5: Surge Immunity Test	4.8.f Lightning Sure Protection
EN 61000-4-6 Conducted Susceptibility, Common Mode Cable Injection, 150 kHz to 80 MHz	4.8.g Conducted RF Immunity
EN 61000-4-8 Testing and Measurement Techniques-Section 18: Power Frequency Magnetic Field Immunity Test	4.8.h AC Magnetic Fields RF Immunity

During the test effort Wyle Laboratories gained accreditation for the testing of voting systems, which expands their qualifications to incorporate core voting system testing. The accreditations are:

- National Voluntary Lab Accreditation Program (NVLAP) Voting System Testing Certificate of Accreditation to ISO/IEC 17025:2005, Voting System Testing scope of accreditation (NVLAP Lab Code 200771- 0 assessment of conformance to the criteria set forth in NIST Handbooks 150 and 150-22)
- United States Election Assistance Commission Voting Systems Test Lab (VSTL) Certification of Accreditation recognized for the testing of voting systems to the 2002 Voting System Standards 2005 Voluntary Voting System Guidelines (EAC Lab Code 0704)

1.1 *Internal Documentation*

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

Table 1 Internal Documents

Version #	Title	Abbreviation	Date	Author (Org.)
v.1.0	Voting Certification Master Services Agreement- MicroVote	MSA contract		iBeta Quality Assurance
	FCA Test Document Review_EMSv.4_0_0		6/1/07	iBeta Quality Assurance
	PCA Document Review-EMSv_4_0_0		7/17/07	iBeta Quality Assurance
v.1.0	PCA Source Code Review Procedure		11/13/07	iBeta Quality Assurance
v.2.0	SQL Review Criteria		6/19/07	iBeta Quality Assurance
v.2.0	VB.NET Review Criteria		6/19/07	iBeta Quality Assurance
v.2.0	Visual Basic Review Criteria		6/19/07	iBeta Quality Assurance
v.3.0	C and C++ Review Criteria		6/19/07	iBeta Quality Assurance
v.1.0	Witness Build Procedure		4/7/08	iBeta Quality Assurance
v.3.0	MicroVote General Corporation Election Management System (EMS) Voting System v. 4.0.0 VSTL Certification Test Plan			iBeta Quality Assurance
v.4.0	MicroVote General Corporation Election Management System (EMS) Voting System v. 4.0.0 VSTL Certification Test Plan			iBeta Quality Assurance
	FCA Accuracy Test Case_EMSv4_0_0-Infinity	Accuracy – DRE	6/12/08	iBeta Quality Assurance
	FCA Accuracy Test	Accuracy –	4/28/08	iBeta Quality Assurance

Version #	Title	Abbreviation	Date	Author (Org.)
	Case_EMSv4_0_0-OMR	OMR		
	FCA Characteristic Test Case EMSv4.0.0	Characteristics, C	9/21/07	iBeta Quality Assurance
	FCA Environmental Test Case EMSv4.0.0	Environ-mental, E	5/2/2008	iBeta Quality Assurance
	FCA Security Review_EMSv4_0_0	Security Review, S	9/21/07	iBeta Quality Assurance
	FCA Telephony and_ Cryptographic_EMSv4_0_0-Infinity	T	9/14/07	iBeta Quality Assurance
	FCA Primary 1_EMSv4_0_0	Primary 1, P1	10\22\07	iBeta Quality Assurance
	General 1 System TC_ EMSv4_0_0	General 1, G1	10/3/07	iBeta Quality Assurance
	General 2 System TC_ EMSv4_0_0	General 2, G2	9/25/08	iBeta Quality Assurance
	PCA Configuration_ EMSv.4_0_0		6/2/08	iBeta Quality Assurance
	PCA and FCA Discrepancy Report_EMS_4_0_0	Discrepancy Report	6/6/08	iBeta Quality Assurance
	83107 MicroVote Status – ComUtil 109 Validation		8/31/07	iBeta Quality Assurance

1.2 *External Documentation*

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

Table 2 External Documents

Version #	Title	Abbreviation	Date	Author (Org.)
	Test Plan Approval Letter		1/22/08	Election Assistance Commission
	Help America Vote Act	HAVA	10/29/02	107th Congress
NIST Handbook 150 2006 Edition	NVLAP Voting System Testing	NIST 150	February 2006	National Voluntary Lab Accreditation Program
NIST Handbook 150-22	NVLAP Voting System Testing	NIST 150-22	December 2005	National Voluntary Lab Accreditation Program
	Withdrawal of OMR 9002 and request for waiver		2/26/08	MicroVote General Corporation
v.1.1	Implementation Statement		2/20/08	MicroVote General Corporation
	Voluntary Voting System Guidelines	VVSG	December 2005	Election Assistance Commission
	Testing and Certification Program Manual		1/1/07	Election Assistance Commission
	EAC Decision on Request for Interpretation 2007-03, 2005 VVSG Vol. 1 Section 3.1.1	Interpretation 2007-03	9/5/07	Election Assistance Commission
	EAC Decision on Request for Interpretation 2007-04, 2005 VVSG Vol. 1 Section 3.1.3	Interpretation 2007-04	10/29/07	Election Assistance Commission
	EAC Decision on Request for Interpretation 2007-05, 2005 VVSG Vol. 1 Section	Interpretation 2007-05	11/6/07	Election Assistance Commission

Version #	Title	Abbreviation	Date	Author (Org.)
	4.2.1 (Testing Focus and Applicability)			
	EAC Decision on Request for Interpretation 2007-06, 2005 VVSG Vol. 1 Section 4.1.1, 2.1.2c &f, 2.3.3.3o & 2.4.3c&d. (Recording and reporting undervotes)	Interpretation 2007-06	11/7/07	Election Assistance Commission
	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	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-02, Battery Backup for Optical Scan Voting machines	Interpretation 2008-02	2/19/08	Election Assistance Commission
	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	Election Assistance Commission
	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	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-06, 2002 VSS Vol. I, Sections 3.2.2.4c, 3.2.2.5 2005 VVSG Vol. I, V. 1.0, Sections 4.1.2.4c (Electrical Supply), 4.1.2.5 (Electrical Power Disturbance)	Interpretation 2008-06	8/29/2008	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-08 2002 VSS Vol. I, Glossary 2005 VVSG Vol. I, Glossary	Interpretation 2008-08	8/1/2008	Election Assistance Commission
	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	Election Assistance Commission
	EAC Decision on Request for Interpretation 2008-10 (Electrical Fast Transient) 2005 VVSG Vol. I, Sect.4.1.2.6 2005 VVSG Vol. II, Section 4.8	Interpretation 2008-10	8/28/2008	Election Assistance Commission
	NOC 07-05: Voting System Test Laboratory (VSTL) responsibilities in the management and oversight of third party testing.		9/7/07	Election Assistance Commission

Version #	Title	Abbreviation	Date	Author (Org.)
	Wyle Letter No. 54578.02B-001R1	Environmental Assessment	7/13/07	Wyle Laboratories
	Hardware Testing and Evaluation of the MicroVote Infinity DRE Voting System (Report NO: T54578.02-01)	Wyle report	6/10/2008	Wyle Laboratories

1.3 *Technical Data Package Documents*

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

1.4 *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. Additionally MicroVote documents required for submission in the *Voting System Test Laboratory Program Manual v.1.0* Appendix B are referenced in the appendices.

- Appendix A: Certification Test Requirements (matrix identifying conformance to the applicable standard with a trace to the Test Method and issues encountered in testing).
- Appendix B: PCA Source Code Reviews
- Appendix C: PCA TDP Document Reviews
- Appendix D: Test Results (Functional, Security, Environmental, Accuracy etc.)
- Appendix E: PCA and FCA Discrepancy Report
- Appendix F: Trusted Build and Validation Tools
- Appendix G: EAC Certification Number
- Appendix H: Warrant of Accepting Change Control Responsibility
- Appendix I: Test Plan
- Appendix J: MicroVote Implementation Statement

1.4.1 VSTL Program Manual Format Trace

Release of the *Voting System Test Laboratory Program Manual v.1.0* occurred subsequent to completion of all testing and preparation of v.1.0 of this test report. Appendix B of the manual identifies content in a specific format. The current format of this report follows the recommended outline stipulated in the VVSG 2005 vol. 2 Appendix B. This VVSG stipulated test report format was reviewed and approved by NVLAP in our Voting System Testing accreditation audit. A trace is provided below to clarify the location of the VSTL Program Manual specified content in this report.

1. System Identification and Overview is found in:

- Section 1 Introduction
- Section 3 Voting System Identification
- Section 4 Voting System Overview

2. Certification Test Background is found in:

- Section 2 Certification Test Background
  - 2.2 Revision History is found in:
    - Section 1 Introduction
  - 2.3 Implementation Statement is referenced in:
    - Appendix I Implementation Statement

3. Test Findings and Recommendations
   - 3.1 Summary Finding and Recommendation is found in:
     - Section 5 Certification Review and Test Results
     - Section 6 Opinions and Recommendations
   - 3.2 Reasons for Recommendation of Rejection is:
     - Not applicable, see Section 6 Opinions and Recommendations
   - 3.3 Anomalies may also be identified as discrepancies, issues or defects are found in:
     - Section 5.1 to 5.8 provides a general description of how anomalies were encountered and reported during testing.
     - Appendix A traces the VVSG requirements to the specific anomalies.
     - Addendum to Appendix B contains software related source code discrepancy detail.
     - Appendix D Sections 7.4.1 to 7.4.6 "Issues Opened" traces the specific anomalies to the relevant software build.
     - Appendix E, PCA and FCA Discrepancy Report, provides the discrepancy number, date, tester, location, description, and VVSG requirement information about anomalies encountered during document reviews and testing.
   - 3.4 Correction of Deficiencies is found in:
     - Section 5.1 to 5.8 provides a general description of how deficiency corrections were confirmed.
     - Appendix A traces the VVSG requirements to the specific closed anomalies.
     - Appendix B reflects pass criteria for all reviewed source code.
     - Appendix D Sections 7.4.1 to 7.4.6 "Issues Closed" traces the specific anomaly resolutions to the build
     - Appendix E, PCA and FCA Discrepancy Report, provides the vendor responses and resolution validations for anomalies encountered during document reviews and testing.

Appendix A: Additional Finding is found in:

- 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: Section 7.4.1 Supported Voting Variations of the VVSG 2005 Section 2.1.7.2 identify "unsupported" optional functionality.

Appendix B: Warrant of Accepting Change Control Responsibility is found in:

- Appendix H: Warrant of Accepting Change Control Responsibility

Appendix C: Witness Build is found in:

- Appendix F: Witness of the Trusted Build

Appendix D: Test Plan

- Appendix J: Test Plan contains a reference to the final revised test plan submitted as a separate document

Appendix E: State Test Reports

- No state testing was performed by iBeta on the MicroVote EMS Voting System v.4.0. This is documented in the Section 1 Exclusions.

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2 Certification Test Background

Certification testing of the MicroVote EMS voting system included a Physical Configuration Audit and a Functional Configuration Audit. Daily status reports were sent to MicroVote's certification management staff and iBeta project test staff. These reports included project activity status, issues, and other relevant information.

2.1 *Terms and Definitions*

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

Table 3 Terms and Definitions

Term	Abbreviation	Definition
Activations		The method by which ballot displays are programmed for precincts, precinct splits or party.
Ballot Cards or Official Ballot Cards	C312, C402, C256 or 312, 402, 256 OMR Ballot Cards	Paper ballot cards read with the OMR and ACP scanners. The digits refer to the number of locations on the card.
Ballot Objects		Ballot objects group items that will go on the ballot, including: ballot text, offices, and straight party locations on the ballot.
Candidate Sorting – By Name		A candidate name sort, alphabetically by last name
Candidate Sorting – By Name within Party		A candidate name sort, alphabetically by last name within each party
Candidate Sorting – None		Candidate names are listed in the order they are filed.
Candidate Stacking – Always		Ballot formatting option: Stacks all names on the entire ballot regardless of candidate name length.
Candidate Stacking – On entire ballot when required		Ballot formatting option: Stacks the names on the entire ballot if one of the candidates' names is too long to fit on one line.
Candidate Stacking – Only within race when required		Ballot formatting option: Stacks the names within a race if one of the candidate's names is too long to fit on one line.
Carson Manufacturing Company, Inc.	Carson	The manufacturer of the Infinity Voting Panel and developer of the Infinity firmware
Certified Information System Security Profession	CISSP	A certification for information systems security practitioners, indicating successful completion of the CISSP examination administered by the International Information Systems Security Certification Consortium
Chatsworth ACP2200 dual-sided optical mark reader	OMR or ACP scanner	Optical scanner for reading and transferring votes from both sides of a paper ballot card to the EMS
Direct Recording Electronic	DRE	A voting system that records votes by means of a ballot display provided with mechanical or electro-optical components that can be actuated by the voter; that process the data by means of a computer program; and that records voting data and ballot images in internal and/or external memory components. It produces a tabulation of the voting data stored in a removable memory component and in printed copy.
Doubletalk (Audio Ballot)	Doubletalk	Required for an audio ballot; a voice

Term	Abbreviation	Definition
		synthesis/sound system, connected to the Infinity Voting Panel, used to convert text to speech
Election Database		A mode of the EMS that limits changes to the current open election; changes made appear in only the current opened election. Default settings of the Installation Mode are not changed
Election Management System software	EMS software	The ballot preparation and central count software of the Election Management Software voting system. It is used to program an election on the Infinity Voting Panel and paper ballots; and to consolidate and report results from the voted ballots.
Election Management System v 4.0	EMS v.4.0	The release version of MicroVote Election Management System voting system.
Election Management System voting system	EMS voting system	The MicroVote voting system integrating the hardware and software of the EMS ballot preparation and central count software, the Infinity Voting Panel, the Infinity firmware, and the OMR ballot reader.
Executable Lines of Code	eLOC	Lines of code that execute functionality. Comments and blank lines are excluded from counts of executable lines of code.
Escrow Agency		EAC identified repository that retains the file signature of the trusted build.
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.
GEMPLUS Smart Card Reader/Writer	GEMPLUS	COTS hardware for reading and writing the Start, Vote and Tally Smartcards
Help America Vote Act	HAVA	Legislation enacted in 2002 which includes creation of the EAC, federal voting standards and accreditation of test labs
Infinity Voting Panel	Infinity	Direct Recording Electronic (DRE) polling place device of the MicroVote Election Management System voting system
Infinity Voting Panel firmware	Infinity firmware	The software that runs the Infinity Voting Panel
Installation Database		A mode of the EMS for definition of default settings that are present in every new election created.
Manual Vote Entry – in central count reports		Method to enter votes that are not recorded on Tally Cards or optical scan cards. Votes may be entered as a single vote, by selected precinct, or by machine serial number.
MicroVote General Corporation	MicroVote	The manufacture submitting the Election Management System voting system.
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.
Secondary Vote Limit		A voting variation outside the VVSG, which is supported by an additional vote limit that can

Term	Abbreviation	Definition
		be placed on grouped contests, so that multiple limits are placed on the vote.
Start Card (Green)	Start card	For initializing the Infinity Voting Panel
Tally Card (Red)	Tally card	For transferring votes from the Infinity Voting Panel to the Tally card, to the EMS voting system.
Technical Data Package	TDP	The documentation and code relating to the voting system, submitted by the manufacturer for review.
U.S. Election Assistance Commission	EAC	U.S. agency established by the Help America Vote Act of 2002 for administration of Federal elections.
Voluntary Voting System Guidelines	VVSG	Federal voting system test standards created by the EAC. Eventually these will replace the VSS.
Vote Card (Blue)	Vote card	For ballot selection and activation of ballot
Vote N Card		Vote N cards are used only by Election Administrators in early voting situations. Vote N Cards facilitates retraction of challenged ballots.
Voting System Standards	VSS	Federal voting system test standards, VVSG predecessor
Voting System Test and Certification Authority	VSTCA	If used it should be read as VSTL. This is a term used in the NIST Handbook 150-22 that was not implemented by the EAC
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

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, in addition to the witness of the build and installation of the reviewed source code.

2.2.1 PCA TDP Source Code Review

The PCA TDP Source Code Review of the MicroVote EMS voting system was performed to verify conformance to VVSG 2005 Vol. 1 Sect 5.2 and Vol. 2 Sect. 5. Reviewed results were recorded on Source Code Review sheets. Issues were identified in the review and logged on a separate source code review discrepancy report, after completion of peer review. The source code review discrepancies were forwarded to MicroVote for correction.

2.2.2 PCA TDP Document Review

The PCA TDP Document Review of MicroVote EMS voting system performed to verify conformance to Vol. 2 Sect. 2 of the VVSG 2005. Reviewed results are recorded on *PCA TDP Document Review* sheets. Issues were identified in the review and logged on the *PCA and FCA Discrepancy Report*, after completion of peer review. The *PCA and FCA Discrepancy Report* was forwarded to MicroVote for correction.

2.2.3 PCA System Configuration Review

The PCA System Configuration Review of MicroVote EMS voting system was performed to verify conformance to VVSG Vol. 1 Sect 9.7.1. Reviewed results are recorded on *PCA System Configuration*

Review sheets. Issues were identified in the review and logged on the *PCA and FCA Discrepancy Report*, after completion of peer review. The *PCA and FCA Discrepancy Report* was forwarded to MicroVote for correction.

2.2.4 Witness (Trusted) Build and Installation

The Witness Build and Installation of the executable code for the MicroVote EMS voting system was performed using the reviewed source code per VVSG Vol. 2 Sect 1.8.2.4. All builds performed by iBeta during testing were documented. iBeta documented performance of the final Trusted Build in accordance with the Witness Build Procedure and documented the *Witness of the Final Build Template* (Word Document) and is provided as Appendix F to this report.

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 MicroVote EMS voting system submitted test documentation, user manuals and execution of all required tests. 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 and System Level 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 MicroVote EMS voting system incorporating shared state requirements and those specifically supported by MicroVote. 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. MicroVote resolved all discrepancies which did not meet the requirements of the VVSG 2005. Regression tests were rerun to validate all submitted fixes. These validations were recorded in the *PCA and FCA Discrepancy Report.*

2.3.3 FCA Security Review and Tests

Review and testing of voting system security was incorporated into the *PCA Source Code Review, PCA Document Review, FCA Functional and System Level Test Cases*, and unique MicroVote specific security tests, source code and document reviews. The review/test acceptance and rejection criteria for each security requirement were documented in the *FCA Security Review and Tests* with the location of the review/test and the review/test result recorded. Issues encountered during testing were recorded in the identified test record and logged on the *PCA and FCA Discrepancy Report,* after completion of peer review. MicroVote resolved all discrepancies which did not meet the requirements of the VVSG 2005. Regression tests were rerun to validate all submitted fixes. These validations were recorded in the *PCA and FCA Discrepancy Report.*

2.3.4 FCA Accuracy Test (Accuracy, Reliability, Availability, & Volume)

Accuracy testing is not limited to this test case. Testing of the accuracy requirements of the VVSG is included in the *FCA Functional and System Level Test Cases* and *FCA Security Review and Tests*. Separate comprehensive tests incorporating Data Accuracy and Reliability (Vol.2 Section 4.7.1, 4.7.1.1 and 4.7.3) were performed on the Infinity Voting Panel and the ACP2200 OMR. Execution of the test on the non-COTS hardware was under temperature and power variations. Data Accuracy validated the correct recording and reporting of the individual ballot positions, not to exceed a specified maximum error rate, while processing a specified number of ballot positions. Maximization of ballot positions and large numbers of votes incorporated ballot stress and volume test conditions. Issues encountered during testing were identified in the test record and logged on the *PCA and FCA Discrepancy Report,* after completion of peer review. MicroVote resolved all discrepancies which did not meet the requirements of the VVSG 2005. Regression tests were rerun to validate all submitted fixes. These validations were recorded in the *PCA and FCA Discrepancy Report.*

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

Review and testing of the Infinity Voting Panel characteristics, usability, accessibility, and maintainability were incorporated into a single test case in accordance with VVSG Vol. 1 Sect. 3, 4.1.2.4.c (2 hour battery back-up), 4.2, 4.3 and Interpretation 2007-03. Interpretation 2008-02 stipulates that the 2 hour battery back-up is applicable to central count scanners. The ACP2200 OMR, a central count optical scanner, was added to the *FCA Characteristics Test Case* for this one requirement. A mock election incorporating audio, visual and multi-lingual ballots was installed to assess the usability and functional performance of the accessible, usability, recovery and maintenance features of the voting system. (Note: Testing of the accurate presentation, recording and reporting of accessible ballots was incorporated into *FCA Functional and System Level Test Cases*.) 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 identified in the test record and logged on the *PCA and FCA Discrepancy Report,* after completion of peer review. MicroVote resolved all discrepancies which did not meet the requirements of the VVSG 2005. Regression tests were rerun to validate all submitted fixes. These validations were recorded in the *PCA and FCA Discrepancy Report*.

2.3.6 FCA Hardware Environmental Tests

FCA Hardware Environmental Tests are non-core tests which must be performed by a laboratory accredited in the hardware environmental test methods identified in VVSG 2005 vol.1, 4.6 and 4.7. 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 Wyle Laboratories accreditation to perform all required hardware environmental tests and engaged them as iBeta's subcontractor to perform the tests.

Prior to initiating an assessment of the MicroVote EMS voting system hardware iBeta contacted the EAC and received confirmation that as the hardware environmental testing requirements of the VVSG 2005 were essentially unchanged from the FEC Voting System Standards 2002, environmental hardware testing performed by Wyle Laboratories to the 2002 standards in a prior qualification effort would be valid for reuse if the following conditions were met:

- The hardware was unchanged and Wyle verified in an independent assessment that the equipment they tested was essentially the same as the system tendered for certification to the VVSG 2005;
- Wyle agreed to issue a report for the environmental tests as a subcontractor to iBeta; and
- iBeta confirmed that Wyle was accredited by A2LA to perform all the VVSG 2005 required test methods accredited in the test methods they performed on the date of test execution.

A detailed test case with test instructions was provided to Wyle to review, assess and test the Infinity Voting Panel. iBeta created test election databases for all operating tests and to validate the operational status of the voting panel 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, Wyle provided iBeta with anomaly and test reports following their internal processes. iBeta logged anomaly reports as issues on the *PCA and FCA Discrepancy Report*. MicroVote resolved all discrepancies which did not meet the requirements of the VVSG 2005.

EAC Interpretation 2007-05 provided that there is no merit to the interpretation that requires FCA Hardware Environmental testing of unmodified COTS equipment. Instead the interpretation requires the confirmation of FCC Class 15B and CE marks affixed to each unit indicating that the COTS product has been certified to meet those standards and a copy of the COTS manufacturer's Declaration of

Conformity confirming the manufacturer’s compliance claim. iBeta followed the interpretation for the ACP2200 OMR COTS scanner.

2.3.7 FCA Telephony and Cryptographic Review and Tests

An examination of the MicroVote EMS voting system was conducted to confirm that it does not contain wireless technology or use of the public networks. The results of this review were recorded in the *FCA Telephony and Cryptographic Test Case*. As a result of this review it was determined that the voting system is exempted from the Telephony and Cryptographic requirements of VVSG Vol.1 Sect. 6 & 7.

It should be noted that connection of the COTS EMS PC or laptop to a network (LAN or WAN) is outside the system configuration submitted for certification.

3 Voting System Identification

The System Identification stipulates the configuration of the MicroVote EMS voting system v.4.0 hardware, software and the Technical Data Package documentation submitted for testing to the VVSG 2005.

3.1 *Submitted Voting System Identification*

Table 4 Voting System Name and Version

Voting System Name	Release Version
MicroVote Election Management System	4.0

The MicroVote Election Management System Voting System release version includes the following:

Table 5 Voting System Polling Place and Central Count Hardware

Hardware	Firmware & Version	Description
Ballot Prep & Central Count		
Dell computer desktop with monitor, keyboard and mouse	Windows XP Professional 2002 Service Pack 2	COTS Personal computer for
Dell laptop	Windows XP Professional 2002 Service Pack 2	COTS Laptop
GemPlus card reader	ISO7816-3 standard interface	COTS Card reader
Report printer		COTS Printer
DRE		
Infinity Voting Panel Model VP-1 Rev: C	Infinity Voting Panel Firmware v 4.0	Push button DRE with an audio ballot mode
ELPAC Power Systems Power Supply	Model FW3012	Infinity COTS Power supply: Input 100–240 VAC 47–63Hz Output 12VDC, 2.5A
Infinity storage case	Regular and Accessible	Polling booth (regular and accessible) and storage case
Seiko Instruments Printer	Model DPU-414 or DPU-3445	COTS Report printers, varied speeds
DoubleTalk LT	DoubleTalk v.1.0 RC8650 BIOS0212	COTS Text-to-speech portable voice synthesizer
Headphones		COTS headphones for audio ballots
Smart Cards		COTS smart cards for Start, Vote, Vote N and Tally functions
Optical Scanner		
Chatsworth ACP-2200 Dual-Sided Optical Mark Reader	Model 605000-190	COTS Dual-Sided Optical Mark Reader for scanning paper ballots into the EMS software.
UPS Backup	Unit capable of sustaining 100 watts output at 120 volts for a minimum of 2 hours according to manufacturer specifications	COTS Central count universal power supply

Table 6 Voting System EMS Software

Software Applications	Version	EMS Function Description
Ballot Prep & Central Count		
Election Management System (EMS)	4.0 4.0.21.0	Ballot preparation and central count software; reporting software for the OMR optical scanner
Microsoft Windows XP Professional	XP svc pack 2	COTS personal computer operating system
Microsoft Desktop Engine	MS SQL Server 2000	COTS personal computer desktop engine

DRE		
Infinity Voting Panel Firmware	v.4.0 (Build 9. 68)	DRE software programmed in C
Encrypt.exe	v.2.14	Non-distributed executable used in the Infinity build process
InfUpdater.exe	v.1.01	Software for loading Infinity executable onto Infinity panel
GetUpdt.exe	v.2.16	Distributed executable used in the update process

3.2 *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 a specific MicroVote EMS voting system software and firmware build installed for each test iteration.

Table 7 Voting System Hardware

Hardware or Equipment (#)	Manufacturer	Version/ Model	Description (identify COTS)
Infinity Voting Panel (9)	Carson Manufacturing Company, Inc.	Model VP-1 Rev: C SN: 2213, 3627, 3628, 3629, 3630, 10402, 10403, 10404, 10405	DRE 16¼ "X 13 " X 2½"; 6 Lbs. w/ power supply & cord -Power Input: Standard ¼" miniature power jack, 12VDC ± 10% @ 2.5A max -Interface: RJ45 connector with RS-232 levels and special pin assignments for use with adapters connected to printer or –PC, automatic baud rate selection for PC or printer. ---------Communication: 1 start bit, 8 data bits, no parity, baud rate = 38K for PC and 9600 for printer, hardware handshake (DTR/DSR) -Computer: AAEON PC/104 SBC with X386 processor -Memory: CompactFlash 8Mb primary, Disk-On-Chip 8Mb backup -Display: Sanyo 9¼ in. LCD, 640 x 480 resolution B/W transflective -Indicators: (2) Red LED Cast Vote indicators -Keyboards: Custom conductive rubber over gold contact-
Batteries (8) cells		Alkaline "C"	COTS: Back up power supply for the Infinity Voting Panel.
DoubleTalk LT (3)	RC Systems, Inc.	LT RC8650 chipset BIOS 0212	COTS: Text-to-speech portable voice synthesizer
Power Supply: ELPAC Power Systems model FW3012 Power Supply Input 100–240 VAC 47–63Hz Output 12VDC, 2.5A UL CE	ELPAC	ELPAC Model FW3012	Power supply for the Infinity Voting Panel.

Hardware or Equipment (#)	Manufacturer	Version/ Model	Description (identify COTS)
Dell computer desktop (1)	Dell, Inc.	Model DHM* SN: SDBFL61	COTS. Personal computer Intel Pentium R processor 2.80GHz, 2.79GHz, 512 MB RAM Windows XP Professional 2002 Svc Pack 2
Dell Laptop (1)	Dell, Inc.	Model PP17L* SN: CN-06G834-48643-65R-3140	COTS Personal computer Intel Pentium M processor 1.73GHz, 795MHz, 504 MB RAM Windows XP Professional 2002 Svc Pack 2
PS/2 to USB Adapter (1)	Adesso	Model ADP-PU21	COTS Connect keyboard and mouse to USB port
Seiko Printer (1)	Seiko Instruments	Model DPU-414	COTS report printer
Seiko Printer (1)	Seiko Instruments	Model DPU-3445	COTS high speed report printer
GemPlus with ISO7816-3 standard interface (2)	GEMPLUS	SN: R04304113302427, R02A0109759	COTS. Card Reader
Chatsworth ACP-2200 Dual-Sided Optical Mark Reader (3)	Chatsworth Data Corporation	Model 605000-190 SN:CDT03600288, CDT09600346, CDT09600335	COTS. Dual-Sided Optical Mark Reader for scanning paper ballots into the EMS software.
Seiko Printer Cable	Seiko Instruments		COTS. Cable to connect the printer and the Infinity
EMS Cable			COTS: Standard modular plug-8 positions
Smart Cards			COTS: Start card, Vote card, Vote N card and Tally card.
Keyboard*	Dell, Inc.		COTS: USB Keyboard
Mouse*	Dell, Inc.		COTS: USB 2-Button
Speakers	Dell, Inc.	A215*	COTS: Two Piece Stereo Speaker System
APC Smart-UPS Backup (1)	APC	Model SUA2200* SN: JS0743009644	COTS: Backup Power Supply
Dell Monitor (1)	Dell Inc	Model E153FPb* CN-0D5421-46633-55U-0E2L	COTS: 15 Inch Flat Panel
Audio headphones (1)	Radio Shack		COTS: headphones
Dell Laser Jet Printer (1)	Dell, Inc.		COTS: Report printer
Infinity Storage/Shipping Case	(4)		Polling booth & shipping case
Infinity Storage/Shipping Case (Handicap accessible)	(1)		Wheelchair accessible polling booth & shipping case

* Model or version identifies the one used in testing. For this equipment the MicroVote specifications do not identify a specific version.

Table 8 Voting System Software

Application	Manufacturer	Version	Description (identify COTS)
Election Management System (EMS)	MicroVote General Corp.	4.0 (Build 4.0.21.0)	Ballot preparation and central count software programmed in VB.Net and SQL
Infinity Voting Panel Firmware	Carson Manufacturing Company, Inc.	v.4.0 (Build 9. 68)	DRE software programmed in C
Encrypt.exe	Carson Manufacturing Company, Inc.	v.2.14	Non-distributed executable used in the Infinity build process
InfUpdater.exe	Carson Manufacturing Company, Inc.	v.1.01	Software for loading Infinity executable onto Infinity panel
GetUpdt.exe	Carson Manufacturing Company, Inc.	v.2.16	Distributed executable used in the update process
Microsoft Windows XP Professional	Microsoft	XP svc pack 2	COTS personal computer operating system
Microsoft Desktop Engine	Microsoft		COTS database software
DOUBLETALK LT	RC Systems	1.0	COTS: Text-to-speech voice synthesizer software

Table 9 Voting System Technical Data Package Documents

Title	Version	Date	Author (Org.)
Appendices Table of Contents Election Management System	1.4	9/19/2007	MicroVote General Corp.
Appendix AA MicroVote System Identification Tool User Manual	1.5	9/5/2008	MicroVote General Corp.
Appendix A TEST PLANS Election Management System	0.4	7/23/2007	MicroVote General Corp.
Appendix A0 Test Execution Plan for Logon	1.0	2/15/2007	MicroVote General Corp.
Appendix A1 Test Execution Plan for Menu Bar	1.1	3/3/2006	MicroVote General Corp.
Appendix A10 Test Execution Plan for Election Data (Form Actions (FR-GUI-SP-0012400))	1.0	2/6/2006	MicroVote General Corp.
Appendix A11 Test Execution Plan for Security	1.1	3/23/2007	MicroVote General Corp.
Appendix A12 Test Execution Plan for Office Entry	1.1	3/3/2006	MicroVote General Corp.
Appendix A13 Test Execution Plan for Candidate Filing	1.2	1/9/2007	MicroVote General Corp.
Appendix A14 Test Execution Plan for Secondary Vote Limit	1.1	3/3/2006	MicroVote General Corp.
Appendix A15 Test Execution Plan for Create and Edit Ballots	1.1	3/3/2006	MicroVote General Corp.
Appendix A16 Test Execution Plan for Build Activations	1.0	2/6/2006	MicroVote General Corp.
Appendix A17 Test Execution Plan for Assign Ballots	1.0	2/6/2006	MicroVote General Corp.
Appendix A18 Test Execution Plan for Ballot Printing	1.0	2/6/2006	MicroVote General Corp.
Appendix A19 Test Execution Plan for EMS – INFINITY PROGRAMMING EMS – VOTE CARD ACTIVATION INFINITY FIRMWARE – ELECTION FUNCTIONS	1.0	2/10/2006	MicroVote General Corp.
Appendix A2 Test Execution Plan for Preferences	1.2	2/14/2007	MicroVote General Corp.
Appendix A20 Test Execution Plan for Clear Votes	0.2	3/3/2006	MicroVote General Corp.
Appendix A21 Test Execution Plan for OMR Ballot Cards	0.2	3/20/2006	MicroVote General Corp.
Appendix A22 Test Execution Plan for Tally Cards	0.2	3/3/2006	MicroVote General Corp.
Appendix A23 Test Execution Plan for Manual Vote Entry	0.1	3/7/2006	MicroVote General Corp.
Appendix A24 Test Execution Plan for Overall System Functionality	0.1	5/10/2006	MicroVote General Corp.
Appendix A26 Test Execution Plan for Election Data	0.1	6/1/2006	MicroVote General Corp.
Appendix A27 Test Execution Plan for Election Data	0.1	6/1/2006	MicroVote General Corp.
Appendix A28 Test Execution Plan for Election Data	0.1	6/1/2006	MicroVote General Corp.
Appendix A29 Test Execution Plan for Infinity Programming – Defect #146	0.1	7/24/2006	MicroVote General Corp.
Appendix A3 Test Execution Plan for Political Parties	2.0	8/9/2006	MicroVote General Corp.
Appendix A30 Test Execution Plan for Infinity Programming	0.2	4/13/2006	MicroVote General Corp.

Title	Version	Date	Author (Org.)
– Voter Control Page			
Appendix A31 Test Execution Plan for Infinity Programming – Defect #151 with Button Tags	0.1	7/24/2006	MicroVote General Corp.
Appendix A32 Test Execution Plan for Election Data – Straight Party Report	0.1	6/1/2006	MicroVote General Corp.
Appendix A33 Test Execution Plan for Election Data	0.1	6/1/2006	MicroVote General Corp.
Appendix A33 Test Execution Plan for Election Data – Office Detail Report	0.3	4/27/2007	MicroVote General Corp.
Appendix A34 Test Execution Plan for Infinity Programming – Change Date	0.1	6/6/2006	MicroVote General Corp.
Appendix A35 Test Execution Plan for Election Data	0.1	6/1/2006	MicroVote General Corp.
Appendix A36 Test Execution Plan for Infinity Programming – Start Card Functions- Defect #166	0.1	6/6/2006	MicroVote General Corp.
Appendix A37 Test Execution Plan for Infinity Programming – Tally & Accumulate Card Functions- Defect #167	0.1	6/6/2006	MicroVote General Corp.
Appendix A38 Test Execution Plan for Election Data	0.1	8/8/2006	MicroVote General Corp.
Appendix A39 Test Execution Plan for Election Data – Early Vote Extraction	0.1	8/1/2006	MicroVote General Corp.
Appendix A4 Test Execution Plan for Vote Type	1.0	2/6/2006	MicroVote General Corp.
Appendix A40 Test Execution Plan for Election Data	0.1	6/1/2006	MicroVote General Corp.
Appendix A41 Test Execution Plan for Election (Data Network OMR Ballot Cards)	0.1	8/1/2006	MicroVote General Corp.
Appendix A42 Test Execution Plan for Election Data (Network Tally Cards)	0.1	8/1/2006	MicroVote General Corp.
Appendix A43 Test Execution Plan for OMR Straight Party	1.0	8/15/2006	MicroVote General Corp.
Appendix A44 Test Execution Plan for General Election #1	1.0	3/19/2007	MicroVote General Corp.
Appendix A45 Test Execution Plan for General/Primary Election #3	1.0	3/19/2007	MicroVote General Corp.
Appendix A46 Test Execution Plan for Primary Election System Test	0.1	3/16/2007	MicroVote General Corp.
Appendix A47 Test Execution Plan for Tally Card/Advanced Voting Volume Testing	0.1	2/14/2007	MicroVote General Corp.
Appendix A48 Test Execution Plan for Election Summary Report	0.1	3/16/2007	MicroVote General Corp.
Appendix A49 Test Execution Plan for Precinct Summary Report	0.1	3/8/2007	MicroVote General Corp.
Appendix A5 Test Execution Plan for Precincts	1.0	2/6/2006	MicroVote General Corp.
Appendix A50 Test Execution Plan for Tally Card Detail Report	0.1	2/14/2007	MicroVote General Corp.
Appendix A51 Test Execution Plan for Undervotes and Overvotes Report	0.1	3/15/2007	MicroVote General Corp.
Appendix A52 Test Execution Plan for Insert, Update and Delete Office, Candidate, Text Messages	1.0	3/21/2007	MicroVote General Corp.
Appendix A53 Test Execution Plan for OMR Ballot Card Testing Matrix for Types (C312,C402,C256)	0.1	4/2/2007	MicroVote General Corp.
Appendix A54 Test Execution Plan and Test Report Common Industry Format Usability Testing of the Infinity Voting Panel Version 0.2	0.2	8/3/2006	MicroVote General Corp.
Appendix A54 Test Execution Plan for Common Industry Format Dexterity Testing of the Infinity Voting Panel	0.2	8/3/2006	MicroVote General Corp.
Appendix A6 – Test Execution Plan for Ballot Text	1.2	1/9/2007	MicroVote General Corp.
Appendix A7 Test Execution Plan for Ballot Graphics	1.0	2/6/2006	MicroVote General Corp.
Appendix A8 Test Execution Plan for Equipment	1.0	2/6/2006	MicroVote General Corp.
Appendix A9 Test Execution Plan for Assign Equipment	1.1	3/3/2006	MicroVote General Corp.
Appendix B Carson Manufacturing Documents Election Management System	0.4	10/10/2008	MicroVote General Corp.
Appendix B-1 INFINITY VOTING PANEL Technical Reference Manual	0.8	5/9/08	MicroVote General Corp.
Appendix B-2 CARSON MANUFACTURING QUALITY ASSURANCE PROCEDURES Election Management System	0.1	5/28/2006	MicroVote General Corp.
Appendix B3 – Infinity Firmware Functional Specifications	0.6	12/18/2007	MicroVote General Corp.

Title	Version	Date	Author (Org.)
(cover) – Election Management System			
Appendix B-4 INFINITY COMMUNICATIONS SPECIFICATIONS Election Management System	0.1	8/3/2007	MicroVote General Corp.
Appendix B-5 Infinity Encryption Algorithm Election Management System	0.1	10/10/2008	MicroVote General Corp.
Appendix C COTS SPECIFICATIONS EMS	1.4	5/9/08	MicroVote General Corp.
Appendix D GLOSSARY OF TERMS Election Management System	1.1	8/15/2007	MicroVote General Corp.
Appendix E Completed COTS Testing Forms	1.0	1/12/2007	MicroVote General Corp.
Appendix E COMPLETED COTS TESTING FORMS Election Management System	1.0	1/12/2007	MicroVote General Corp.
Appendix F VOTING VARIATIONS Election Management System	1.5	8/23/2007	MicroVote General Corp.
Appendix G COTS INVOICES AND CERTIFICATIONS Election Management System	1.0	1/12/2007	MicroVote General Corp.
Appendix G COTS INVOICES AND CERTIFICATIONS Election Management System	1.1	8/15/2007	MicroVote General Corp.
Appendix H ACP-20 OPTICAL SCANNER QUICK START GUIDE Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix I ACP-20 OPTICAL SCANNER USER’S MANUAL Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix J SEIKO DPU-3445-20 PRINTER USER’S MANUAL Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix K SEIKO DPU-414 PRINTER USER’S MANUAL Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix L GEMPLUS CARD READER/WRITER USER’S MANUAL Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix N DOUBLETALK PC/LT USER’S MANUAL Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix O 3.5” BAY 7-IN-1 Flash Card Reader USB 2.0	1.1	9/7/2007	MicroVote General Corp.
Appendix O1 3.5” BAY 7-IN-1 Flash Card Reader USB 2.0 TECHNICAL SPECIFICATION Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix O2 3.5” BAY 7-IN-1 Flash Card Reader USB 2.0 USER’S MANUAL Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix P INSTALLATION CHECKLISTS AND SCHEDULES Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix P-1 INSTALLATION CHECKLIST Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix P-2 DATABASE CREATION CHECKLIST Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix P-3 INFINITY PROGRAMMING CHECKLIST Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix P-4 DELIVERABLE SCHEDULE Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix Q DEFECT TRACKING SYSTEM Election Management System	0.3	9/7/2007	MicroVote General Corp.
Appendix R GUI SPECIFICATIONS Election Management System	1.6	8/26/2007	MicroVote General Corp.
Appendix T PROGRAM SPECIFICATIONS Election Management System	1.2	8/15/2007	MicroVote General Corp.
Appendix U EMS Poll Worker’s Manual	1.9	6/20/2008	MicroVote General Corp.
Appendix V Election Management System User Manual	2.6	11/21/2008	MicroVote General Corp.
Appendix W SAMPLE COUNTY INVOICE Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix X SOURCE CODE FILES LIST Election Management System	1.1	9/7/2007	MicroVote General Corp.
Appendix Y – Build and Installation Instructions – Election Management System	2.3	12/1/2008	MicroVote General Corp.
Appendix Z Machine Technical Manual – Election Management System	0.2	12/18/2007	MicroVote General Corp.
Appendix Z OMR-9002 Card Reader USER’S MANUAL	1.0	3/29/2007	MicroVote General Corp.

Title	Version	Date	Author (Org.)
Election Management System			
CERTIFICATION OF: VOTING MACHINE PROGRAMMER	no version	no date	MicroVote General Corp.
ECR/ECN 101 Part Number 0431164951	no version	4/21/2008	MicroVote General Corp.
EMS v.4.0 System Limitations	no version	12/1/2008	MicroVote General Corp.
File Name of Unit Compliance Status Comments	1.0	4/16/2007	MicroVote General Corp.
Implementation Statement Election Management System	1.1	2/20/2008	MicroVote General Corp.
INFINITY FIRMWARE TEST VERSION 9.56 RELEASE NOTES 4/12/07 WHC	no version	4/12/2007	MicroVote General Corp.
loginlog	no version	10/19/2007	MicroVote General Corp.
MicroVote General Corp.	1.0	1/12/2007	MicroVote General Corp.
Quality Assurance Procedures	0.1	5/28/2006	MicroVote General Corp.
Section 2.1 SCOPE Election Management System	1.1	8/15/2007	MicroVote General Corp.
Section 2.10 PERSONNEL DEPLOYMENT AND TRAINING REQUIREMENTS Election Management System	1.1	8/15/2007	MicroVote General Corp.
Section 2.11 CONFIGURATION MANAGEMENT PLAN Election Management System	1.5	9/5/2008	MicroVote General Corp.
Section 2.12 QUALITY ASSURANCE PROGRAM Election Management System	1.2	8/15/2007	MicroVote General Corp.
Section 2.13 SYSTEM CHANGE NOTES Election Management System	1.1	8/15/2007	MicroVote General Corp.
Section 2.2 System Overview – Election Management System	1.9	11/21/2008	MicroVote General Corp
Section 2.3 SYSTEM FUNCTIONALITY DESCRIPTION Election Management System	1.2	8/15/2007	MicroVote General Corp.
Section 2.4 SYSTEM HARDWARE SPECIFICATION Election Management System	1.3	8/15/2007	MicroVote General Corp.
Section 2.5 SOFTWARE DESIGN AND SPECIFICATION Election Management System	2.7	12/1/2008	MicroVote General Corp.
Section 2.6 SYSTEM SECURITY SPECIFICATION Election Management System	1.6	11/21/2008	MicroVote General Corp.
Section 2.7 SYSTEM TEST AND VERIFICATION SPECIFICATION Election Management System	1.1	8/15/2007	MicroVote General Corp.
Section 2.8 SYSTEM OPERATIONS PROCEDURES Election Management System	1.3	8/15/2007	MicroVote General Corp.
Section 2.9 SYSTEM MAINTENANCE PROCEDURES Election Management System	1.2	8/15/2007	MicroVote General Corp.
Technical Data Package (TDP) TABLE OF CONTENTS Election Management System	1.1	8/15/2007	MicroVote General Corp.
Appendix B1 – INFINITY VOTING PANEL Technical Reference Manual	0.7	5/9/2008	Carson Manufacturing Co. Inc.
Appendix B3 – Infinity Firmware Functional Specifications – Election Management System	0.5	12/18/2007	Carson Manufacturing Co. Inc.
Infinity Encryption Algorithms	1.01	10/10/2008	Carson Manufacturing Co. Inc.
Carson Manufacturing Company, Inc. Proprietary and Confidential Notice	no version	no date	Carson Manufacturing Co. Inc.
ECN Request	no version	4/13/2008	Carson Manufacturing Co. Inc.
Engineering Change Notice 1330	no version	4/16/2001	Carson Manufacturing Co. Inc.
Engineering Change Notice 1408	no version	6/7/2005	Carson Manufacturing Co. Inc.
Engineering Change Notice 1413	no version	10/10/2005	Carson Manufacturing Co. Inc.
Engineering Change Notice 1420	no version	3/14/2006	Carson Manufacturing Co. Inc.
Engineering Change Notice 1424	no version	5/12/2006	Carson Manufacturing Co. Inc.
Engineering Change Notice 1437	no version	8/22/2007	Carson Manufacturing Co. Inc.
Engineering Change Notice 1438	no version	9/19/2007	Carson Manufacturing Co. Inc.
Engineering Change Notice 1449	no version	4/13/2008	Carson Manufacturing Co. Inc.
Engineering Change Notice 1450	no version	5/15/2008	Carson Manufacturing Co. Inc.
Getupdt Build Instructions	no version	9/19/2007	Carson Manufacturing Co. Inc.
Infinity Communication Specification	1.06	8/3/2007	Carson Manufacturing Co. Inc.
Infinity Firmware Design Specification	3.01	2/23/2006	Carson Manufacturing Co. Inc.
Infinity Revision C Engineering Change Notice Declaration	no version	1/23/2008	Carson Manufacturing Co. Inc.
InfUpdater 101 Build Instructions	no version	9/11/2007	Carson Manufacturing Co. Inc.

Title	Version	Date	Author (Org.)
ACP -20 Dual Sided Optical Mark Reader	1.1	4/15/2004	Chatsworth Data Corp.
Assy TOP-ACP20 RS Red FCC/CE 1 of 2	no version	3/13/08	Chatsworth Data Corporation
Assy TOP-ACP20 RS Red FCC/CE 2 of 2	no version	3/13/08	Chatsworth Data Corporation
Declaration of Conformity Regarding European directive 204/18/EC	no version	2/12/2008	Chatsworth Data Corporation
Declaration of Conformity Regarding FCC Part15 subpart B	no version	3/10/2008	Chatsworth Data Corporation
READ ME FIRST (OMR ACP 20)	no version	no date	Chatsworth Data Corporation
Regulatory Datasheet OptiPlex GX520, OptiPlex GX520n	no version	3/14/2008	Dell, Inc.
Regulatory Datasheet Latitude D510	no version	3/7/2008	Dell, Inc.
Fair-Rite Part Data Sheet	no version	4/1/2008	Fair-Rite Products Corp
Part Number: 0431164951 (31 Round Cable Core Assembly)	no version	4/1/2008	Fair-Rite Products Corp
GemCore V1.21-Based Reader Reference Manual	1.0	1/12/2007	Gemplus
Chatsworth Data Corporation ACP-20 Dual Sided Optical Mark Reader EMC Test Report	2.4	12/19/2007	Nemko USA, Inc.
Engineering Change Notice (ECN) # 1023	no version	5/28/2008	RC Systems
Engineering Change Notice (ECN) # 1024	no version	5/28/2008	RC Systems
Engineering Change Notice (ECN) # 1025	no version	5/28/2008	RC Systems
Engineering Change Notice (ECN) # 1026	no version	6/5/2008	RC Systems
RC Systems DoubleTalk RC8650 Voice Synthesizer	no version	4/18/2007	RC Systems
Sharp Liquid Crystal Display Spec No. LC02Y20A Model LM64K83	no version	11/24/92	Sharp Corporation
DPU-414 Operation Manual	3rd ed.	Dec 1998	Seiko Instruments, Inc.
User's Guide Thermal Printer DPU-3445-20	11th ed.	Dec 2004	Seiko Instruments, Inc.
StarTech.com Spec Sheet (StarTech ID: 35FCREADBK)	no version	no date	StarTech
USB 2.0 Flash Card Reader	no version	9/12/2006	StarTech

Table 10 Other Software, Hardware and Materials

Testing Software, Hardware & Material	Description	Description of use in testing
Paper ballots or ballot cards	COTS Pre-printed data cards 256 position: 2615–STB 7/99 312 position: LP 2628 9/98 402 position: LP 2443-B, &	Paper ballot cards to record votes for the OMR
Pens and pencils	COTS Pencils and black, blue, red and green ink pens	Marking votes on paper data cards
Paper (81/2 x 11)	COTS Paper, Inkjet Printer	Central tally reports
Paper rolls	COTS Paper, Thermal Printer	Infinity open and close poll reports
ComUtil109	Vote simulation tool	Environmental operation simulating the casting of ballots
Multiple desktop and laptop PCs	A variety of PCs running Microsoft operating systems	Supplied by iBeta: Preparation, management and recording of test plans, test cases, reviews and results
Repository servers	Separate servers for storage of test documents and source code, running industry standards operating systems, security and back up utilities	Supplied by iBeta: Documents are maintained on a secure network server. Source code is maintained on a separate data disk on a restricted server
Microsoft Office 2003	Excel and Word software and document templates	Supplied by iBeta: The software used to create and record test plans, test cases, reviews and results
SharePoint 2003	TDP and test documentation repository	Supplied by iBeta: TDP and test documentation repository and configuration management tool

Testing Software, Hardware & Material	Description	Description of use in testing
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 & 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
Trusted Build Software	Description	Description of use in testing
Secure Erase (CMRR) HDDErase v3.3	(NIST 800-88) Secure Erase command tool	Supplied by iBeta: used to clean the build environment
Microsoft .NET Framework v1.1 .NET 1.1 SP1 for above (KB867460)	Development framework and compiler	COTS: used to compile the EMS
Visual Studio 2003 SP1	Development framework and compiler	COTS: used to compile the EMS
Franson Serial Tools SDK v2.01g	3rd party libraries	COTS: used to compile the EMS
ComponentOne Studio Enterprise 2005	3rd party libraries	COTS: used to compile the EMS
C1.C1Pdf.dll v1.1.20053.42	3rd party DLL	COTS: used to compile the EMS
C1.C1PrintDocument.dll v1.0.20053.287	3rd party DLL	COTS: used to compile the EMS
C1.Win.C1Command.dll v1.0.20052.128	3rd party DLL	COTS: used to compile the EMS
C1.Win.C1FlexGrid.dll v2.5.20053.220	3rd party DLL	COTS: used to compile the EMS
C1.Win.C1Input.dll v1.0.20052.99	3rd party DLL	COTS: used to compile the EMS
C1.Win.C1List.dll v1.1.20052.78	3rd party DLL	COTS: used to compile the EMS
C1.Win.C1PrintPreview.dll v1.0.20053.287	3rd party DLL	COTS: used to compile the EMS
C1.Win.C1Report.dll v2.5.20053.188	3rd party DLL	COTS: used to compile the EMS
C1CommandConverter.dll v1.0.20023.2	3rd party DLL	COTS: used to compile the EMS
C1.Common.dll v1.0.20052.118	3rd party DLL	COTS: used to compile the EMS
7Adodb.dll v7.0.9466.0	3rd party DLL	COTS: used to compile the EMS
Interop.ACTIVEVOICEPROJECTLib.dll v1.0.0.0	3rd party DLL	COTS: used to compile the EMS
Interop.IasHelperLib.dll v1.0.0.0	3rd party DLL	COTS: used to compile the EMS
Interop.SpeechLib.dll v1.0.0.0	3rd party DLL	COTS: used to compile the EMS
Microsoft.mshtml.dll v7.0.3300.0	3rd party DLL	COTS: used to compile the EMS
SerialNET.dll v2.0.0.1	3rd party DLL	COTS: used to compile the EMS
Borland C++ Development Suite v. 5.02	Development framework and compiler	COTS: used to compile Infinity
Visual Studio 6 Professional Edition SP 6 (VB6)	Development framework and compiler	COTS: used to compile Infinity
Lgb1.chr, Lgb2.chr, Lgn1.chr, Lgn2.chr	Borland COTS font files	COTS: used to compile Infinity

Testing Software, Hardware & Material	Description	Description of use in testing
Smb1.chr, Smb2.chr, Smn1.chr, Smn2.chr		
Greenleaf CommLibTM v. 5.1	3rd party libraries	COTS: used to compile Infinity
DataLight Rom-DOS v6.22	3rd party libraries	COTS: used to compile Infinity
Pkzip v2.04g	3rd party libraries	COTS: used to compile Infinity
OROS Low Level Interface Library v1.0	3rd party libraries	COTS: used to compile Infinity
WGCRANSI.DLL DataLight Rom-DOS v6.22	3rd party DLL	COTS: used to compile Infinity
System Identification	Description	Description of use in testing
MicroVote System ID Tool CD	MicroVote system identification tool CD	Confirm system identification tool functions as described in the Appendix AA
MediaGear Allcards II memory card reader	Memory card reader	COTS: used to read the flash card for system identification

4 Voting System Overview

The MicroVote EMS voting system v.4.0 is a voting system consisting of the:

- EMS software (EMS software), a ballot preparation and central count software application developed by MicroVote General Corporation;
- Infinity Voting Panel, a DRE polling place device manufactured by Carson Manufacturing with audio ballot capabilities provided by the DoubleTalk, a COTS text-to-speech audio device manufactured by RC Systems; and
- Chatsworth ACP2200 OMR, a COTS scanner, manufactured by Chatsworth Data Corporation.

The EMS software Ballot Preparation functionality includes the Installation Database and the Election Database. In order to modify these databases the user selects either the Installation or Election mode. Election Databases can be created from either mode. The Installation Database contains standard data that is unlikely to change from election-to-election. The Election Database contains data for one specific election. The standard default data is generated by the Installation Database. These standard defaults can be used or overwritten for a specific election in the Election Database.

The Infinity Voting Panel is a DRE voting device that presents a visual ballot on an LCD panel with a text-to-speech voice synthesized audio ballot option. Non-electronic methods, such as mouth sticks, head sticks or use of the foot provide non-manual vote entry. Voters record a candidate or referendum selection by pushing a button mapped to a selection location. Access to poll worker administrative functions is controlled by smart card insertion (Start and Tally cards) and password entry. Access to a voting session is performed by the poll worker via smart card insertion (Vote and N Vote cards).

The EMS software Central Count functionality supports vote capture and tabulation of paper ballots (standard data cards) read by the Chatsworth COTS central count dual sided ACP2200 OMR. This software consolidates and reports Infinity Voting Panel and optical scan election results. Election Summary, Precinct Summary and Audit Log reports can be displayed and printed.

4.1 *Election Management System- Pre Voting Capabilities*

4.1.1 MicroVote Election Management System

The EMS software pre-voting capabilities include the system security, administration, management of the Installation and Election Databases, preparation of absentee and Infinity ballots, and preparation of election materials and Infinity programming.

Administrative capabilities include.

- Managing EMS Administrative Security
  - Create, modify and delete EMS users
  - Assign Elections and Security Access Levels
  - Reset passwords

Security capabilities include.

- Accessing the EMS software
  - Restriction of access based on Security Access Levels
- Audit logging
  - EMS software access
  - Changes to the Installation and Election Databases
  - Writing of election materials and election installation
- Installation checksum validation of data transfer to the Infinity via the interface connector

Ballot Preparation capabilities include:

- Create, modify and delete Installation Database, standard data, including:
  - Jurisdiction and county information;
  - Political parties (maximum 10), precincts (with optional voter registration), vote types (machine, absentee and provisional);
  - Standard ballot text including instructions, headers and footers;
  - Equipment use/assignment (tracked by serial number to precinct/polling location); and
  - Entry of English and Spanish versions for visual and audio ballots
- Create, modify and delete Election Database, election specific data, including:
  - Use or overwrite standard data from the Installation Database;
  - Election details (election type, date, report naming, straight party voting);
  - Offices (vote for # and secondary vote limits) and referendums;
  - Candidates, running mates, and associated descriptive text;
  - Election access controls and election reports;
  - Infinity ballots and ballot styles (maximum of 600 selection locations)
  - Absentee ballots and ballot styles (standard data cards containing 256, 312, and 402 selection locations);
  - Activations for the assignment of Infinity and Absentee ballots and ballot styles for General and Primary Elections;
  - Election reports, ballot, and ballot report viewing and printing; and
  - Entry of English and Spanish versions for visual and audio ballots;
- Writing and installation of election specific materials:
  - Smart cards written for early voting, provisional and Election Day voter access, and;
  - Election Database is installation on the Infinity Voting Panel.

4.2 *Polling Place- Voting Capabilities*

4.2.1 MicroVote Infinity Vote Panel

The Infinity Voting Panel consists of a monochrome LCD display, with selection buttons for 32 locations. In voting mode the display is organized as a two-column ballot with 15 selection locations (buttons) on each side of the display. A 16^{th} location button, at the bottom of each column, is used for backwards and forward page navigation. After a voter has completed and reviewed all selections, they submit their vote by selecting the “Cast Vote” button. Lights associated with this button identify when it is active. Capabilities include the system security, system readiness, poll opening, voting, poll closing, report printing and extraction of results.

Security capabilities include.

- Accessing the Infinity:
  - Pre and post vote administration requires smart cards (Start and Tally) and password
  - Voting session access requires smart cards (Vote and N Vote)
- Ballot checksum validation;
- Multiple stored copies of cast vote records and tabulations;
- Displays of current status, public and protective counter, memory capacity and battery capacity;
- Audit logging:
  - Administrative tasks performed by the poll worker; and
  - Events between power on and power off, except voter selections.

Administrative capabilities include.

- Pre-vote validation of system readiness:
  - Test of card reader, selection buttons, lights and display;
  - Ballot review; and
  - View/print a zero proof report;
- Opening the polls;
- Ballot access and selection for presentation in an visual and audio format;
- Closing the polls; and
- Printing and extracting the tally, vote record (ballot image) and audit reports.

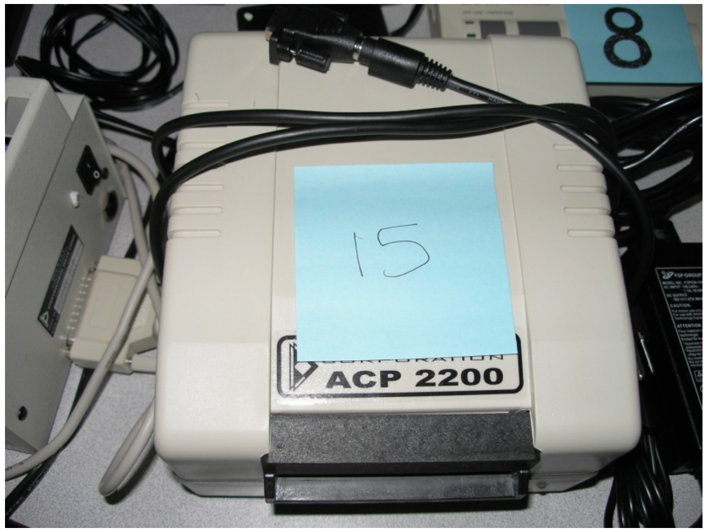
Voting capabilities include:

- Presentation of ballots for supported voting variations;
- Voter selection of candidates and contest options;
- Voter ballot casting; and
- Vote recording.

4.3 *Election Management System- Post Voting Capabilities*

4.3.1 MicroVote Election Management System

The Election Management System software consolidates and reports Infinity and optical scan election results. The software supports the vote capture and tabulation of paper ballots (ballot data cards) manually fed, one at a time, into the Chatsworth COTS central count dual sided ACP2200 OMR optical scanner. Central count capabilities include the system security, system readiness for optical scanning of absentee ballots, tabulation/reporting of scanned absentee ballots, importation of Infinity tally results, and presentation/printing of summary and audit log reports.



Security capabilities include.

- Accessing the EMS software
  - Restriction of access based on Security Access Levels
- Infinity serial number check to prevent duplication
- Prohibition of changes to Tally Card, Infinity direct or OMR direct vote inputs
- Audit logging
  - EMS software access
  - Reading of results into the election database

Administrative capabilities include.

- Pre-scanning validation of system readiness to read absentee ballots;
- Initialization validation and printing a zero proof;

Capabilities for consolidation and reporting of votes from various sources include:

- Election Day precinct counts from the Infinity panels
  - Read results from the Tally Cards or direct connection to the Infinity panel
  - Reporting of read status by Infinity serial number
- Absentee ballot cards hand-fed through the COTS optical scanners
  - Conversion and reporting of marks read by the scanner
- Early voting counts extracted directly from the Infinity panels
- Backup manual vote entry from Infinity paper tally reports, hand counts or other appropriate vote tabulation sources
- Tabulation and reporting of votes by precinct
- Election and precinct report summaries provide:
  - Office detail and reporting by vote type (machine, absentee, provisional);
  - Tracking of the number of precincts reported and unreported;
  - Tracking of voter turnout; and
  - Ballots submitting straight party votes
- Consolidated reporting of under and over votes

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 identified 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

iBeta followed their standard review and test methodology in executing the test cases. A trace of the voting variations and system functions supported by the MicroVote EMS voting system v.4.0 is found in Appendix D.

5.1 *PCA Source Code Review*

iBeta Quality Assurance reviewed the MicroVote internally developed coding standards for the software submitted in section 3 in certification of the MicroVote EMS version 4.0 and Infinity version 4.0. Review criteria were customized to incorporate the requirements of *VVSG 2005* Vol. 1 Sect 5.2 and Vol. 2 Sect. 5, language specific conventions (C, VB.net, VB 6, and SQL) and the internally developed coding standards as referenced. The specific review criteria for this test effort and the documentation of the building of the executable code from the reviewed source code (Witness Build) are identified in Appendix B.

iBeta tracked a number of metrics obtained from the results of the source code review during this certification test effort:

- The number of comment related discrepancies (considered to have a higher impact on software maintainability but a lower impact on system function),
- The number of discrepancies that may impact software function, and
- An overall discrepancy-to-eLOC (executable Lines of Code) percentage.

Discrepancies are written against a module which may be defined as either a file or a function within a file and, as such, each discrepancy may represent one or more instances of non-compliance with a *VVSG 2005* requirement.

5.1.1 Infinity 4.0 – C and Visual Basic 6.0 Source Code Review Results

Infinity 4.0 consists of a Visual Basic 6.0 InfUpdated version 1.0.1 and the following minor versions of Borland C source code:

- Infinity Panel v.9.67
- Infinity Encrypt v.2.14
- Infinity GetUpdtr v.2.16

A total of 596 files/functions were reviewed and all instances of non-conformance to the *VVSG 2005* were validated to be closed. A total of 238 discrepancies were identified and validated to be resolved. Those 238 discrepancies encompassed 371 instances of *VVSG 2005 requirements* identified as not being met at the initial source code review.

Comment Related Instances/Discrepancies

Each iBeta source code review requires source code adherence to 43 *VVSG 2005* requirements. Of those, 14 requirements address formatting and comments. Of the total 371 *VVSG 2005* requirement non-compliances, 287 or 77.4% were rejected against these 14 comment-related requirements. All instances were noted in discrepancies; the comments were addressed by MicroVote, reviewed by iBeta, and validated to be closed.

Software Related Instances/Discrepancies
In reviewing the source code for the remaining 29 software related requirements, iBeta identified 84 non-compliance or 22.6% of identified issues. All instances were noted in discrepancies, addressed by MicroVote, reviewed by iBeta, and validated to be closed.

File Function Line Counts/Discrepancies
The file function line count results identified 14 files or functions that exceeded 240 eLOCs with the justification provided that these files/functions contained only variable initialization and had a cyclomatic complexity (number of execution paths within the file/function) of only 1.

Discrepancy-to-eLOC Percentage
At the file/function and discrepancy level, the discrepancy-to-eLOC (executable Lines of Code) percentage was calculated as 238 discrepancies in 29,754 eLOCs as 0.8%. This is well within the expected target benchmark of 1%.

The source code was found to meet the requirements of the *VVSG 2005.* The data supporting this review are found in Appendix B.

5.1.2 EMS 4.0 VB.Net Source Code Review Results

EMS 4.0 consists of a VB.Net and SQL (see next section for SQL results). A total of 1976 files/functions were reviewed and all instances of non-conformance to the *VVSG 2005* were validated to be closed. A total of 540 discrepancies were identified and validated to be resolved. Those 540 discrepancies encompassed 1102 instances of *VVSG 2005* requirements identified as not being met at the initial source code review.

Comment Related Instances/Discrepancies
Of the total 1121 VVSG *2005* requirement non-compliances, 852 or 76% were rejected against the 14 comment-related requirements. All instances were noted in discrepancies; the comments were addressed by MicroVote, reviewed by iBeta, and validated to be closed.

Software Related Instances/Discrepancies
In reviewing the source code for the remaining 29 software related requirements, Ibeta identified 269 non-compliances or 24% of identified issues. All instances were noted in discrepancies, addressed by MicroVote, reviewed by iBeta, and validated to be closed.

File Function Line Counts/Discrepancies
The file function line count results identified 14 files or functions that exceeded 240 eLOCs with the justification provided that these files/functions contained only variable initialization and had a cyclomatic complexity (number of execution paths within the file/function) of only 1.

Discrepancy-to-eLOC Percentage
At the file/function and discrepancy level, the discrepancy-to-eLOC (executable Lines of Code) percentage was calculated as 540 discrepancies in 42,496 eLOCs as 1.27%. This slightly exceeds the expected target benchmark of 1%. The entire voting system combined does meet the target benchmark.

The source code was found to meet the requirements of the *VVSG 2005.* The data supporting this review are found in Appendix B.

5.1.3 EMS 4.0 SQL Source Code Review Results

EMS 4.0 consists of a VB.Net and SQL (see previous section for VB.Net results). A total of 213 files/functions were reviewed and all instances of non-conformance to the *VVSG 2005* were validated to be closed. A total of 98 discrepancies were identified and validated to be resolved. Those 98 discrepancies encompassed 336 instances of *VVSG 2005* requirements identified as not being met at the initial source code review.

Comment Related Instances/Discrepancies
Of the total 336 *VVSG 2005* requirement non-compliances, 322 or 95.8% were rejected against the 14 comment-related requirements. All instances were noted in discrepancies; the comments were addressed by MicroVote, reviewed by iBeta, and validated to be closed.

Software Related Instances/Discrepancies
In reviewing the source code for the remaining 29 software related requirements, Ibeta identified 14 non-compliances or 4.2 of identified issues. All instances were noted in discrepancies, addressed by MicroVote, reviewed by iBeta, and validated to be closed..

File Function Line Counts/Discrepancies
The file function line count results identified no functions that exceeded 240 eLOCs.

Discrepancy-to-eLOC Percentage
At the file/function and discrepancy level, the discrepancy-to-eLOC (executable Lines of Code) percentage was calculated as 98 discrepancies in 13,835 eLOCs as 0.71%. This is well within the expected target benchmark of less than 1%.

The source code was found to meet the requirements of the *VVSG 2005.* The data supporting this review are found in Appendix B.

5.2 *PCA TDP Document Review*

iBeta reviewed all MicroVote submitted TDP documents of the Election Management System voting system against the Vol. 2 Sect. 2 requirements of the VVSG 2005. (See Section 7.3.2 for a list of the reviewed documents.) Each submitted document was reviewed against the specific section of the VVSG applicable to that category of document. If the required content was present in one or more submitted documents results were summarized and the requirement was accepted. If it was not present the requirement was rejected. On the initial review 23 document defects and 3 informational issues were noted. MicroVote submitted updated documents addressing these.

The MicroVote Configuration and Quality Policies were reviewed per the requirements of VVSG 2005 Vol.2 Sect. 2.11, 2.12 and Vol.1 Section 8.3 through 8.7 and 9.2 through 9.6, and recorded in the *PCA TDP Document Review* sheets. Instances where the MicroVote test deliverables did not conform to their state policies were noted in the *PCA and FCA Discrepancy Report* as Informational issues.

Appendix C contains the specific PCA Document Review criteria for the TDP.

5.2.1 PCA TDP Document Review Results

The documents of the MicroVote Technical Data Package have been found to meet the requirements of Vol.2 Sect. 2 of the VVSG 2005. The data supporting these review results are found in Appendix C. The defects and issues encountered during the review, their resolution and validations are identified in Appendix E.

5.3 *FCA Functional and System Integration Testing*

iBeta executed a review of the MicroVote EMS voting system v.4.0 functionality to the requirements of the VVSG 2005. (See Appendix A) Tests covering system functional requirements were incorporated into three standard system level integration test cases of end-to-end mock elections. Two of the tests were General Elections and one was a Primary. (In the EMS voting system a Closed Primary and an Open Primary with public choice function in exactly the same manner.) 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 1, 2 and Primary 1 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. MicroVote 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. The individual test iterations include identification of the specific software and firmware build versions in the Appendix D Test Methods.

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 F). This build was installed on the hardware configuration that had completed environmental, accuracy and reliability testing. A full system integration test was performed on this final system configuration (See Section 7.2.1.4 General 2 Test Method).

5.3.1 Evaluation of Functional and System Integration Testing

Upon completion of all iterations of the Functional and System Level test cases, the MicroVote EMS voting system was found to meet the Functional and System Integration requirements of the VVSG 2005. 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

5.4 *FCA Security Review and Testing*

iBeta's security specialist, a Certified Information System Security Profession, executed a security analysis of the applicable TDP documents of the MicroVote EMS voting system v.4.0 to identify the threat model. First the analysis identified VVSG 2005 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 VVSG 2005 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. During the FCA Security Review and Testing 2 documentation and 2 functional defects were noted. The specific discrepancy numbers are identified in the Appendix D Security Review and Testing Method.

In order to comply with the security test requirements identified in Vol.2 Sect. 6.4 of the VVSG 2005, iBeta approached security testing of the MicroVote EMS voting system 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 VVSG 2005. 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 VVSG 2005 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.

5.4.1 FCA Security Review and Tests

The MicroVote EMS voting system was found to meet the requirements of the VVSG 2005. Appendices A, B, C, and D provide specific information on the results of the FCA Security Review and Testing. The defects encountered during the review, their resolution and validations are listed in Appendix E.

5.5 *FCA Accuracy Testing (Accuracy, Reliability, Volume, & Stress)*

The accuracy requirements of the VVSG 2005 are addressed in all test cases. Any time a test required an election to be created, installed, voted, and/or reported the accuracy of the MicroVote EMS voting system v.4.0 was being tested.

The FCA Accuracy Testing is specifically the Data Accuracy testing called out in vol.2 section 4.7.1.1. This is a test performed in conjunction with the Temperature and Power Variations Test (v.2 section 4.7.1) and Reliability testing (v.2. section 4.7.3).

Data Accuracy Testing

The VVSG 2005 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).

Temperature and Power Variations Testing & Reliability Testing

The VVSG 2005 stipulates that non-COTS precinct and central count systems must execute Data Accuracy testing in a chamber while operating for 48 hours in temperatures between 50° F and 95° F at varying voltage (see Appendix D Test Method). Reliability required a minimum operation of 163 hours. February 6, 2008 Interpretation 2008-01 was issued. It identified the number of hours multiple voting systems must accumulate. In the case of MicroVote this was 4 units run for 48 hours through Temperature and Power variations cycles and 16 hour ambient. Operation included panel programming, readiness, automated ballot generation, and reporting. The panels remained powered during test administration.

Infinity Voting Panel DRE

Testing incorporated manual voting and an automated vote simulation on four Infinity Voting Panels. MicroVote provided two versions of code. Both versions were source code reviewed and built by iBeta. A comparison of the code confirmed the only difference was to permit use of the simulator. The second version of code was only used for VSTL testing to permit running of a script that simulates the card activation and pressing of the buttons. In the code review iBeta confirmed that from this point forward the paths were identical. The simulation tool was verified to confirm it addressed precinct and ballot selection, ballot display, vote selection and casting the ballot. The tool was also validated for accuracy against a predicted result. Manual testing of the buttons and card activator is still a prerequisite for pre-vote setup and testing for the election used with the simulator. Some volume and stress variables were incorporated into the test, including ballot sizes near system maximums, maximum number of parties, and the number of ballots cast exceeding the typical election levels. The manual votes incorporated 10% of the required ballot positions. There were five separate voting sessions. Session 1 and 5 encompassed manual votes only. Sessions 2 through 4 included both manual and simulated votes. Each manual vote session incorporated 2% of the required ballot positions. The simulation was an external script run on a laptop that was connect to the Com Port of a panel. The simulator incremented each time it sent the vote script instruction to the panel. Tallies were run at the end of the first and fifth session. The independent record of script sends was recorded in the test case. Tallies for each panel were transferred to the central count and compared to the predicted results identified in the test case (i.e. the manually entered votes combined with the simulation votes). The tally for sessions 1 through 4 matched the predicted results of the 4,248,720 ballot positions without error (10,116 ballots). The tally for session 5 correctly reported the votes but one vote on panel s/n 3630 was reported in precinct 16 instead of precinct 14. The manual tester stated that she may have made an error in her selection of the precinct on one vote. Given the accuracy of the test up through session 4 it is likely that the vote cast in the incorrect precinct was due to human error in the manually entered votes, but this could not be verified. Without verification of tester error, the one error in session 5 remains in the test record. The Data Accuracy results were accepted, because the total of 4,265,520 ballot positions exceeded the requirement of 3,126,404 ballot positions with one error.

While all units completed the test, panel s/n 3628 failed the post-test Operational Status Check. (Details are identified in Appendix E #106 and #107.) Diagnosis of the failures revealed that the four panels submitted for testing were older demonstration models that did not include six Engineering Change Notices (ECN) incorporated in current production. MicroVote immediately submitted the ECNs (see section 8 of the *MicroVote General Corporation Election Management System (EMS) Voting System v. 4.0.0 VSTL Certification Test Plan, v.4.0*). Failure to complete the Operation Status Check resulted in rejection of the Reliability test. iBeta, in consultation with Wyle engineers, concluded that the changes did not effect the Data Accuracy results.

The initial run of this test occurred prior to issuance of Interpretation 2008-01. The Reliability regression test was run after. This resulted in a test plan change. (See the Accuracy DRE Test Method of the *MicroVote General Corporation Election Management System (EMS) Voting System v. 4.0.0 VSTL Certification Test Plan, v.4.0*) MicroVote provided four current production models for the regression Reliability test. In order to assess reliable operation an automated vote simulation was run using the same test election database and the automated vote simulation on four current production Infinity Voting Panels. Session 1 through 4 were executed in the chamber under temperature and power variations for 48 hours. Session 5 ran an additional 16 hours at ambient. The Infinity Voting Panel successfully completed the test and the operational status check. Tallies were run and transferred to the central count. A total of 15,610 ballots were cast, including 6,556,200 ballot position with no errors.

Chatsworth ACP2200 OMR Scanner

A separate accuracy test was conducted for the central count ACP220 OMR scanner. As the ACP220 OMR is COTS hardware it was exempted from the Temperature and Power Variations Test (v.2 section 1.7.1.1) the Accuracy and Reliability testing was conducted at ambient office temperature. The test variables included a maximum size ballot card (402 ovals) with 11 contests and 35 candidates per contest (385 Ballot Positions per Ballot). A total of 4026 ballots were supplied by MicroVote. These had been marked by hand in pencil. Ballots were inserted two times in different orientations. The test was executed three times. The initial test was halted due to a failure to record scanned cards into the EMS. (Details are identified in Appendix E #114.) A new version of the EMS software was submitted and after resolution of the issue was validated, a second test was halted upon multiple random ballot misreads occurred. (Details are identified in Appendix E #115). The ACP2200 OMR hardware was returned to the Chatsworth for diagnosis. No problems were identified except for a bent pin. The scanner was returned to iBeta with two additional scanners. The ballot batch that had been identified as problematic was scanned on all three units. All three reported random misreads. The problem ballot batch was forwarded to MicroVote. The result of this examination was for MicroVote to retest and revise their specification for ballot marking devices. New ballots were tendered by MicroVote which complied with the specification for black ink. iBeta marked 10% of the cards with BIC 0.7mm #2 lead pencils. All ballots were successfully read.

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.

5.5.1 FCA Accuracy Tests

The MicroVote EMS voting system was found to meet the VVSG Vol. 1 Sect. 2.1.2, 4.1.1, 4.1.2.13, and 4.3.3 requirements. Appendices A and D provide specific information on the Accuracy Testing. The issues encountered during testing are identified in Appendix E.

5.6 *FCA Characteristics Testing (Recovery, Accessibility, Usability & Maintainability)*

iBeta created a test election that included audio, visual, English and Spanish ballots. Testing was executed using manual and non-manual input. Usability testing examined the functional capabilities addressing alternative languages and cognitive, perceptual, interaction, and privacy issues identified in VVSG Vol.1 Sect. 3.1. Accessibility testing examined the functional capabilities addressing visual, audio, dexterity, and mobility to confirm that manual and non-manual audio, visual, English and Spanish ballots could be cast privately and independently on the Infinity Voting Panel as identified in VVSG Vol.1 Sect. 3.2. Testing verified the functionality of screen contrast settings, ballot display settings, and 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 Infinity Voting Panel to confirm that they conformed to the requirements identified in VVSG Vol.1 Sect. 4.2 and 4.3. A document review of the MicroVote submitted usability testing was performed to confirm it complied with Interpretation 2007-03 of VVSG Vol. 1 Sect. 3.1.1. During Accessibility Testing 2 functional defects were noted. During the Maintainability examination 5 documentation defects and 1 functional defect were noted. MicroVote resolved all identified defects.

It should be noted that Interpretation 2008-06 was released subsequent to completion of certification testing. This effectively removed the requirement for a central count scanner two hour back-up power supply in favor of requirements for a graceful shut down. The COTS back-up power supply specified and tested conformed to the more rigid Interpretation 2008-02, which far exceeds the requirements of Interpretation 2008-06.

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.

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

The MicroVote EMS voting system was found to meet the Recovery, Usability, Accessibility, Maintainability and Characteristics requirements of the VVSG 2005. 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

5.7 *FCA Hardware Environmental Testing*

The Infinity Voting Panel, Chatsworth ACP2200 Dual-Sided OMR COTS scanner and the EMS Dell PC and Laptop incorporate the vote scanning, counting and DRE voting equipment of the MicroVote EMS voting system.

iBeta performed an examination of the Chatsworth ACP2200 Dual-Sided OMR and EMS Dell PC and Laptop against the system specifications to confirm documented evidence of COTS equipment and operation per *VVSG 2005* Vol.1 Sect. 4.1.2 and Interpretation 2007-05. iBeta confirmed that they had FCC Class 15B and CE Marks affixed to each unit indicating that the product has been certified to meet these requirements and the COTS manufacturer’s Declaration of Conformity confirming the manufacturer compliance claims.

As the *VVSG 2005* requires DRE's to include audio functionality the environmental tests which require performance while the unit is operating must include audio operations. The Environmental Operating Tests must therefore include both visual and audio ballot operations. As the DoubleTalk audio unit and visual vote simulator required use of the same external port on the Infinity Voting Panel it was not possible to use the vote simulator for simultaneous audio operation. Operating tests necessitated execution in a vote simulation mode and execution in an audio operating mode. Vote simulation was provided by the method described in the Accuracy Test using a ballot with two contests. Audio operation was generated by inclusion of a ballot referendum that would playback for 10 minutes (Interpretation 2007-05).

Wyle Laboratories' personnel reviewed and assessed all past test results and provided iBeta with the following recommendation for testing:

- Test WSG 2005 V.1: 4.3.8 – Safety – as the Safety Standard the unit was previously tested to is obsolete;
- Test WSG 2005 V.1: 4.1.2.9 Electromagnetic Emissions –in audio and visual modes as the FCC test standard had been updated since 2006;
- Test all EMC in the Environmental Operating Audio mode, the EMC engineers assess that the execution of tests in audio mode provided sufficient validation for reuse of the results of EMC Environmental Operating Visual mode 2006 testing, including:
  - VVSG V.1: 4.1.2.4.a & b Electrical Supply
  - VVSG V.1: 4.1.2.5 Electrical Power Disturbance
  - VVSG V.1: 4.1.2.6 Electrical Fast Transit
  - VVSG V.1: 4.1.2.7 Lightning Surge
  - VVSG V.1: 4.1.2.8 Electrostatic Disruption
  - VVSG V.1: 4.1.2.10 Electromagnetic Susceptibility
  - VVSG V.1: 4.1.2.11 Conducted RF Immunity
  - VVSG V.1: 4.1.2.12 Magnetic Fields Immunity
- For the VVSG V.1: 4.1.2.14 Environmental Control – Transit and Storage tests:
  - Test Vibration – MIL-STD-810D, Methods 501.2 and 502.2 Procedure I-Storage execution to validate a minor change (ECN 1408) to the spacers on the card reader.
  - Reuse Bench Handling - MIL-STD-810D, Methods 516.3 Procedure VI, as a Pass on the Vibration test was sufficient validation for Wyle to reissue results based upon 2002 testing
  - Reuse High/Low Temperature Storage Non-Operating MIL-STD-810D, Methods 514.3 Category 1-Basifc Transportation Common Carrier
  - Reuse Humidity Storage Non-Operating – MIL-STD-810D, Methods 507.2 Procedure I-Natural Hot Humid
- Test VVSG V.1: 4.1.2.13 Environmental Control – Operating Environment (Temperature and Power Variation V2: 4.7.1) in conjunction with the Accuracy Test.

iBeta accepted Wyle's recommendation for testing and use of earlier valid test data and test results.

iBeta provided an operational status check that was performed by both on-site iBeta test staff and iBeta trained Wyle test staff. Detail of this check is provided the Appendix D Test Method.

Hardware failures were encountered during the Electrostatic Disruption and FCC Part 15 Class B tests. Wyle's notices of anomaly were documented in Discrepancies #116, 117, and 119. Utilization of a test chamber was needed for MicroVote to troubleshoot and initiate appropriate remedies. A request was sent to the EAC to authorize MicroVote to initiate this work on-site at Wyle. A qualified Wyle chamber engineer was provided for operation of the chamber, observation and communication of the results of the remedial actions performed by Carson Manufacturing on MicroVote's behalf. Wyle's notices of anomaly and the mitigation work performed are provided in their report. A link to this report is contained in Appendix D.

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.

6 Opinions & Recommendations

iBeta Quality Assurance has completed the testing of MicroVote Election Management System voting system v.4.0. All testing prescribed by the test plan or amended test plan was performed as identified. Documentation of any divergence from the test plan was included in the test report. All identified voting system anomalies or failures were reported and resolved. The information provided in this report is an accurate representation of the certification test effort of the MicroVote Election Management System voting system v.4.0. It is our opinion that the report is complete.

Based upon the findings identified in Section 5 it is our opinion the acceptance requirements of Election Assistance Commission Voluntary Voting System Guidelines December 2005 and the MicroVote 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 MicroVote Election Management System voting system v.4.0.

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iBeta Quality Assurance

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	and time-dependent or programmed events that occur without the intervention of the voter or a polling place operator				exceptions are reported to the user, recorded in the audit log, or handled at the time of execution such that corrective action is achieved & v.2:5.4.2.p Audit records log errors & events
j.	Include built-in measurement, self-test, and diagnostic software and hardware for detecting and reporting the system's status and degree of operability	Accept	S, G1	G2, P1	
	DRE Systems Standards In addition to the common requirements, DRE systems shall:				
k.	Maintain a record of each ballot cast using a process and storage location that differs from the main vote detection, interpretation, processing, and reporting path	Accept	S, G1	G2, P1	
l.	Provide a capability to retrieve ballot images in a form readable by humans	Accept	S, G1	G2, P1	
2.1.5	**System Audit** See the requirement for context of these requirements.				
2.1.5.1	Operational Requirements				
	Audit records shall be prepared for all phases of election operations performed using devices controlled by the jurisdiction or its contractors. These records rely upon automated audit data acquisition and machine-generated reports, with manual input of some information. These records shall address the ballot preparation and election definition phase, system readiness tests, and voting and ballot-counting operations. The software shall activate the logging and reporting of audit data as described below.	Accept	G1	G2, P1, A-OMR, A-In	#68 – closed
a.	Time, Sequence, and Preservation of Audit Records The timing and sequence of audit record entries is as important as the data contained in the record. All voting systems shall meet the requirements for time, sequence and preservation of audit records outlined below.		G1	G2, P1, A-OMR, A-In	
i.	Except where noted, systems shall provide the capability to create and maintain a real-time audit record. This capability records and provides the operator or precinct official with continuous updates on machine status. This information allows effective operator identification of an error condition requiring intervention, and contributes to the reconstruction of election-related events necessary for recounts or litigation.	Accept	G1	G2, P1, A-OMR, A-In	
ii.	All systems shall include a real-time clock as part of the system's hardware. The system shall maintain an absolute record of the time and date or a record relative to some event whose time and data are known and recorded.	Accept	G1	G2, P1, A-OMR, A-In	
iii.	All audit record entries shall include the time-and-date stamp.	Accept	G1	G2, P1, A-OMR, A-In	
iv.	The audit record shall be active whenever the system is in an operating mode. This record shall be available at all times, though it need not be continually visible.	Accept	G1	G2, P1, A-OMR, A-In	
v.	The generation of audit record entries shall not be terminated or altered by program control, or by the intervention of any person. The physical security and integrity of the record shall be maintained at all times.	Accept	S, G1	G2	
vi.	Once the system has been activated for any function, the system shall preserve the contents of the audit record during any interruption of power to the system until processing and data reporting have been	Accept	G1	A-OMR	

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	completed.				
vii.	The system shall be capable of printing a copy of the audit record. A separate printer is not required for the audit record, and the record may be produced on the standard system printer if all the following conditions are met: • The generation of audit trail records does not interfere with the production of output reports • The entries can be identified so as to facilitate their recognition, segregation, and retention • The audit record entries are kept physically secure	Accept	G1	G2, P1, A-OMR, A-In	
b.	Error messages All voting systems shall meet the requirements for error messages below.				
i.	The voting system shall generate, store, and report to the user all error messages as they occur.	Accept	G1	G2, P1, A-OMR, A-In	#36, 55 – closed
ii.	All error messages requiring intervention by an operator or precinct official shall be displayed or printed clearly in easily understood language text, or by means of other suitable visual indicators.	Accept	G1	G2, P1, A-OMR, A-In	
iii.	When the voting system uses numerical error codes for trained technician maintenance or repair, the text corresponding to the code shall be self-contained or affixed inside the voting machine. This is intended to reduce inappropriate reactions to error conditions, and to allow for ready and effective problem correction.	Accept	G1	G2, P1, A-OMR, A-In	
iv.	All error messages for which correction impacts vote recording or vote processing shall be written in a manner that is understandable to an election official who possesses training on system use and operation, but does not possess technical training on system servicing and repair.	Accept	G1	G2, P1, A-OMR, A-In	
v.	The message cue for all voting systems shall clearly state the action to be performed in the event that voter or operator response is required.	Accept	G1	G2, P1, A-OMR, A-In	# 36 – closed
vi.	Voting system design shall ensure that erroneous responses will not lead to irreversible error.	Accept	G1	G2, P1, A-OMR, A-In	
vii.	Nested error conditions are corrected in a controlled sequence such that voting system status shall be restored to the initial state existing before the first error occurred.	Accept	G1	G2, P1, A-OMR, A-In	
c.	Status Messages The Standards/Guidelines provide latitude in software design so that vendors can consider various user processing and reporting needs. The jurisdiction may require some status and information messages to be displayed and reported in real-time. Messages that do not require operator intervention may be stored in memory to be recovered after ballot processing has been completed.				
	The voting system shall display and report critical status messages using clear indicators or English language text. The voting system need not display non-critical status messages at the time of occurrence. Voting systems may display non-critical status messages (i.e., those that do not require operator intervention) by means of numerical codes for subsequent interpretation and reporting as unambiguous text.	Accept	G1	G2, P1, A-OMR, A-In	#56 – closed
	Voting systems shall provide a capability for the status messages to become part of the real-time audit record.	Accept	G1	G2, P1, A-OMR, A-In	
	The voting system shall provide a capability for a	Accept	G1	G2, P1,	

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	jurisdiction to designate critical status messages.			A-OMR, A-In	
2.1.5. 2	Use of Shared Computing Platforms See the guidelines for the context of these requirements.. Three operating system protections are required on all such systems on which election software is hosted.				
	Authentication shall be configured on the local terminal (display screen and keyboard) and on all external connection devices ("network cards" and "ports"). This ensures that only authorized and identified users affect the system while election software is running.	Accept	G1	G2, P1, A-OMR, A-In	
	Operating system audit shall be enabled for all session openings and closings, for all connection openings and closings, for all process executions and terminations, and for the alteration or deletion of any memory or file object. This ensures the accuracy and completeness of election data stored on the system. It also ensures the existence of an audit record of any person or process altering or deleting system data or election data.	Accept	G1	G2, P1, A-OMR, A-In	
	The system shall be configured to execute only intended and necessary processes during the execution of election software. The system shall also be configured to halt election software processes upon the termination of any critical system process (such as system audit) during the execution of election software.	Accept	G1	G2, P1, A-OMR, A-In	
2.1.6	**Election Management System**				
	The Election Management System (EMS) is used to prepare ballots and programs for use in casting and counting votes, and to consolidate, report, and display election results. An EMS shall generate and maintain a database, or one or more interactive databases, that enables election officials or their designees to perform the following functions: • Define political subdivision boundaries and multiple election districts as indicated in the system documentation • Identify contests, candidates, and issues • Define ballot formats and appropriate voting options • Generate ballots and election-specific programs for voting equipment • Install ballots and election-specific programs • Test that ballots and programs have been properly prepared and installed • Accumulate vote totals at multiple reporting levels as indicated in the system documentation • Generate the post-voting reports required by Subsection 2.4 • Process and produce audit reports of the data as indicated in Subsection 5.5	Accept	G1	G2, P1, A-OMR, A-In	#82, 83 – closed
a.	Define of the political subdivision boundaries and multiple election districts, as indicated in the system documentation.	Accept	G1	G2, P1, A-OMR, A-In	
b.	Identify of contests, candidates, and issues.	Accept	G1	G2, P1, A-OMR, A-In	
c.	Define of ballot formats and appropriate voting options.	Accept	G1	G2, P1, A-OMR, A-In	
d.	Generate ballots and election-specific programs for vote recording and vote counting equipment.	Accept	G1	G2, P1, A-OMR, A-In	
e.	Install ballots and election-specific programs.	Accept	G1	G2, P1, A-OMR, A-In	

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
f.	Test that ballots and programs have been properly prepared and installed.	Accept	G1	G2, P1, A-OMR, A-In	
g.	Accumulate vote totals at multiple reporting levels as indicated in the system documentation.	Accept	G1	G2, P1, A-OMR, A-In	
h.	Generation of post-voting reports per Section 2.5.	Accept	G1	G2, P1, A-OMR, A-In	
i.	Process and produce audit reports of the data indicated in Section 4.5.	Accept	G1	G2, P1, A-OMR, A-In	
2.1.7	**Vote Tabulating Program**				
2.1.7.1	Functions The vote tabulating program software resident in each voting machine, vote count server, or other devices shall include all software modules required to:				
a.	Monitor of system status and generating machine-level audit reports	Accept	G1	G2, P1, A-OMR, A-In	
b.	Accommodate device control functions performed by polling place officials and maintenance personnel	Accept	G1	G2, P1, A-OMR, A-In	
c.	Register and accumulating votes	Accept	G1	G2, P1, A-OMR, A-In	
d.	Accommodate variations in ballot counting logic	Accept	G1	G2, P1, A-OMR, A-In	
2.1.7.2	Voting Variation The Technical Data Package accompanying the system shall specifically identify which of the following items can and cannot be supported by the voting system, as well as how the voting system can implement the items support. • Closed primaries • Open primaries • Partisan offices • Non-partisan offices • Write-in voting • Primary presidential delegation nominations • Ballot rotation • Straight party voting • Cross-party endorsement • Split precincts • Vote for N of M • Recall issues, with options • Cumulative voting • Ranked order voting • Provisional or challenged ballots	Accept	PCA Document Review		# 5, 18 –closed See Appendix D for supported voting variations. Test execution of G1, G2 & P1 included walking through the user manuals to confirm that supported voting variations were addressed.
2.1.8	**Ballot Counter** For all voting systems, each device that tabulates ballots shall provide a counter that:.				
a.	Can be set to zero before any ballots are submitted for tally	Accept	G1, G2	P1	
b.	Records the number of ballots cast during a particular test cycle or election	Accept	G1, G2	P1, A-OMR, A-In	
c.	Increases the count only by the input of a ballot	Accept	G1, G2	P1, A-OMR, A-In	
d.	Prevents or disables the resetting of the counter by any person other than authorized persons at authorized points	Accept	G1, G2	P1	
e.	Is visible to designated election officials	Accept	G1, G2	P1	
2.1.9	**Telecommunications** For all voting systems that use telecommunications for				

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	ballot and program installation:				
	All systems provide a means of installing ballots and programs on each piece of polling place or central count equipment according to the ballot requirements of the election and the jurisdiction.	Accept	G1, G2	P1, A-OMR, A-In	
a.	A detailed work plan or other documentation providing a schedule and steps for the software and ballot installation, including a table outlining the key dates, events and deliverables.	Accept	PCA Document Review		v.2: 2.8.5.g
b.	A capability for automatically verifying that the software has been properly selected and installed in the equipment or in programmable memory devices and for indicating errors.	Accept	G1, G2	P1, A-In, C, E	
c.	A capability for automatically validating that software correctly matches the ballot formats that it is intended to process, for detecting errors, and for immediately notifying an election official of detected errors.	Accept	G1, G2	P1, A-OMR, A-In, C, E	
2.2.4	**Readiness Testing** Election personnel conduct voting equipment and voting system readiness tests prior to the start of an election to ensure that the voting system functions properly, to confirm that voting equipment has been properly integrated, and to obtain equipment status reports. All voting systems shall provide the capabilities to				
a.	Verify the voting equipment and data processing equipment, precinct count equipment are properly prepared for an election, and collect data that verifies equipment readiness	Accept	G1, G2	P1, A-OMR, A-In, E	
b.	Obtains status and data reports from each set of equipment	Accept	G1, G2	P1, A-OMR, A-In, E	
c.	Verify the correct installation and interface of all system equipment	Accept	G1, G2	P1, A-OMR, A-In, E	
d.	Verify that hardware and software function correctly	Accept	G1, G2	P1, A-OMR, A-In, E	
e.	Generate consolidated data reports at the polling place and higher jurisdictional levels	Accept	G1, G2	P1, A-OMR, A-In, E	
f.	Segregate test data from actual voting data, either procedurally or by hardware/software features	Accept	G1, G2	P1, A-OMR, A-In, E	
	Resident test software, external devices, and special purpose test software connected to or installed in voting devices to simulate operator and voter functions used for these tests meeting the following standards:				
g.	These elements are capable of being tested separately, and are proven to be reliable verification tools prior to their use	Accept	G1, G2	P1, A-OMR, A-In, E	
h	These elements are incapable of altering or introducing any residual effect on the intended operation of the voting device during any succeeding test and operational phase.	Accept	G1, G2	P1, A-OMR, A-In, E	
	Paper-Based Systems Paper-based systems shall:				
i.	Supports conversion testing that uses all potential ballot positions as active positions	Accept	A-OMR		
j.	Supports conversion testing of ballots with active position density for systems without pre-designated ballot positions	Accept	A-OMR		
2.2.5	**Verification at the Polling Place** All systems shall provide a formal record of the following, in any media, upon verification of the authenticity of the command source:				

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
a.	The election's identification data;	Accept	G1	G2, P1, A-OMR, A-In, E	
b.	The identification of all equipment units;	Accept	G1	G2, P1, A-OMR, A-In, E	
c.	The identification of the polling place;	Accept	G1	G2, P1, A-OMR, A-In, E	
d.	The identification of all ballot formats;	Accept	G1	G2, P1, A-OMR, A-In, E	
e.	The contents of each active candidate register by office and of each active measure register at all storage locations (showing that they contain only zeros);	Accept	G1	G2, P1, A-OMR, A-In, E	
f.	A list of all ballot fields that can be used to invoke special voting options	Accept	G1	G2, P1, A-OMR, A-In, E	
g.	Other information needed to confirm the readiness of the equipment, and to accommodate administrative reporting requirements	Accept	G1	G2, P1, A-OMR, A-In, E	
	To prepare voting devices to accept voted ballots, all voting systems shall provide the capability to test each device prior to opening to verify that each is operating correctly. At a minimum the tests shall include.				
h.	Confirmation that there are no hardware or software failures.	Accept	G1	G2, P1, A-OMR, A-In, E	#79 – closed.
i.	Confirmation that the device is ready to be activated for accepting votes.	Accept	G1	G2, P1, A-OMR, A-In, E	#79 – closed.
	If a precinct count system includes equipment for the consolidation of polling place data at one or more central counting locations, it shall have means to verify the correct extraction of voting data from transportable memory devices, or to verify the transmission of secure data over secure communication links.	Accept	G1	G2, P1, A-OMR, A-In, E	
2.2.6	**Verification at Central Location** Election officials perform verification at the central location to ensure that vote counting and vote consolidation equipment and software function properly before and after an election. Upon verification of the authenticity of the command source, any system used in a central count environment shall provide a printed record of the following:				
a.	The election's identification data	Accept	G1	G2, P1, A-OMR, A-In, E	
b.	The contents of each active candidate register by office and of each active measure register at all storage locations (showing that they contain only zeros);	Accept	G1	G2, P1, A-OMR, A-In, E	
c.	Other information needed to confirm the readiness of the equipment, and to accommodate administrative reporting requirements.	Accept	G1	G2, P1, A-OMR, A-In, E	
2.3	**Voting Capabilities**				
2.3.1.	**Opening the Polls** At a minimum, the systems shall provide the functional capabilities indicated below.				
2.3.1.1	Precinct Count Systems To allow voting devices to be activated for voting, all precinct count systems shall provide:				
a.	An internal test or diagnostic capability to verify that all of the polling place tests specified in 2.2.5 have been successfully completed.	Accept	G1, G2	P1, A-OMR, A-In, E	#79 – closed.
b.	Automatic disabling any device that has not been tested	Accept	G1, G2	P1, A-	#79 – closed

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	until it has been tested.			OMR, A-In, E	
2.3.1.2	Paper-Based System Requirements To facilitate opening the polls, all paper-based systems shall include:				
a.	A means of verifying ballot punching or marking devices are prepared and ready to used;	N/A			Not a Precinct Based Paper Ballot System
b.	A voting booth or similar facility, in which the voter may punch or mark the ballot in privacy	N/A			Not a Precinct Based Paper Ballot System
c.	Secure receptacles for holding voted ballots. Ballot boxes.	N/A			Not a Precinct Based Paper Ballot System
	Precinct Count Paper-Based Systems In addition to the above requirements, all paper-based precinct count equipment shall include a means of:				
d.	Activating the ballot counting device.	N/A			Not a precinct count system for paper-based ballots
e.	Verifying that the device has been correctly activated and is functioning properly	N/A			Not a precinct count system for paper-based ballots
f.	Identifying device failure and corrective action needed.	N/A			Not a precinct count system for paper-based ballots
2.3.1.3	DRE System Requirements To facilitate opening the polls, all DRE systems shall include:				
a.	A security seal, a password, or a data code recognition capability to prevent the inadvertent or unauthorized actuation of the poll-opening function	Accept	G1	G2, P1, A-In, E	
b.	A means of enforcing the execution of steps in the proper sequence if more than one step is required	Accept	G1	G2, P1, A-In, E	
c.	A means of verifying the system has been activated correctly	Accept	G1	G2, P1, A-In, E	
d.	A means of identifying system failure and any corrective action needed	Accept	G1	G2, P1, A-In, E	
2.3.2	**Activating the Ballot (DRE Systems)** To activate the ballot, all DRE systems shall:				
a.	Enable election officials to control the content of the ballot presented to the voter, whether presented in printed form or electronic display, such that each voter is permitted to record votes only in contests in which that voter is authorized to vote	Accept	G1	G2, P1, A-In, E	
b.	Allow each eligible voter to cast a ballot	Accept	G1	G2, P1, A-In, E	
c.	Prevent a voter from voting on a ballot to which he or she is not entitled	Accept	G1	G2, P1, A-In, E	
d.	Prevent a voter from casting more than one ballot in the same election	Accept	G1	G2, P1, A-In, E	
e.	Activate the casting of a ballot in a general election	Accept	G1	G2, P1, A-In, E	
f.	Enable the selection of the ballot that is appropriate to the party affiliation declared by the voter in a primary election	Accept	G1	G2, P1, A-In, E	
g.	Activate all parts of the ballot upon which the voter is entitled to vote	Accept	G1	G2, P1, A-In, E	
h.	Disable of all parts of the ballot upon which the voter is not entitled to vote	Accept	G1	G2, P1, A-In, E	
2.3.3	**Casting a Ballot**				
2.3.3.1	Common Requirements To facilitate casting a ballot. All systems shall:				
a.	Provide test that is at least 3 millimeters high and provide the capability to adjust or magnify the text to an apparent size of 6.3 millimeters	Accept	C		
b.	Protect the secrecy of the vote such that the system	Accept	C	G1, G2,	

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	cannot reveal any information about how a particular voter voted, except as otherwise required by individual State law			P1	
c.	Record the selection and non-selection (undervote) of individual vote choices for each contest and ballot measure	Accept	C	G1, G2, P1, A-In, A-OMR	
d.	Record the voter's selection of candidates whose names do not appear on the ballot, if permitted under State law, and record as many write-in votes as the number of candidates the voter is allowed to select	Accept	C	G1, G2, P1	
e.	In the event of a failure of the main power supply external to the voting system, provide the capability for any voter who is voting at the time to complete casting a ballot, allow for the successful shutdown of the voting system without loss or degradation of the voting and audit data, and allow voters to resume voting once the voting system has reverted to back-up power	Accept	C		
f.	Provide the capability for voters to continue cast ballots in the event of a failure of a telecommunications connection within the polling place or between the polling place and any other location	N/A			Telecommunications Not Used
2.3.3.2	Paper-based System Requirement All paper-based systems shall:				
a.	Allow the voter to easily identify the voting field that is associated with each candidate or ballot measure response	Accept	G2	P1, A-OMR	
b.	Allow the voter to punch or mark the ballot to register a vote	Accept	G2	P1, A-OMR	
c.	Allow either the voter or the appropriate election official to place the voted ballot into the ballot counting device (precinct count systems) or a secure receptacle (central count systems)	Accept	G2		
d.	Protect the secrecy of the vote throughout the process	Accept	G2	P1, A-OMR	
	Precinct Count Paper-Based Systems In addition to the above requirements, all paper-based precinct count equipment shall include a means of:				
e.	Provide feedback to the voter identifies specific contests or ballot issues for which an overvote or undervote is detected	N/A			Not a Precinct Count Paper based system
f.	Notify the voter if he or she has made more than the allowable number of selections for any contest (e.g., overvotes)	N/A			Not a Precinct Count Paper based system
g.	Notify the voter before the ballot is cast and counted of the effect of making more than the allowable number of selections for a contest	N/A			Not a Precinct Count Paper based system
h.	Provide the voter opportunity to correct the ballot for either an undervote or overvote before the ballot is cast and counted	N/A			Not a Precinct Count Paper based system
2.3.3.3	DRE Systems Standards				
a.	Prohibit the voter from accessing or viewing any information on the display screen that has not been authorized by election officials and preprogrammed into the voting system (i.e., no potential for display of external information or linking to other information sources)	Accept	G1, G2, P1		
b.	Enable the voter to easily identify the selection button or switch, or the active area of the ballot display that is associated with each candidate or ballot measure response	Accept	G1, G2, P1		
c.	Allow the voter to select his or her preferences on the ballot in any legal number and combination	Accept	G1, G2, P1		
d.	Indicate that a selection has been made or canceled	Accept	G1, G2, P1		

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
e.	Indicate to the voter when no selection, or an insufficient number of selections, has been made in a contest (e.g. undervotes)	Accept	G1, G2, P1		
f.	Notify the voter if he or she has made more than the allowable number of selections for any contest (e.g., overvotes)	Accept	G1, G2, P1		
g.	Notify the voter before the ballot is cast and counted of the effect of making more than the allowable number of selections for a contest	Accept	G1, G2, P1		
h.	Provide the voter opportunity to correct the ballot for either an undervote or overvote before the ballot is cast and counted	Accept	G1, G2, P1		
i.	Notify the voter when the selection of candidates and measures is completed	Accept	G1, G2, P1		
j.	Allow the voter, before the ballot is cast, to review his or her choices and, if the voter desires, to delete or change his or her choices before the ballot is cast	Accept	G1, G2, P1		
k.	For electronic image displays, prompt the voter to confirm the voter's choices before casting his or her ballot, signifying to the voter that casting the ballot is irrevocable and directing the voter to confirm the voter's intention to cast the ballot	Accept	G1, G2, P1		
l.	Notify the voter after the vote has been stored successfully that the ballot has been cast	Accept	G1, G2, P1		
m.	Notify the voter that the ballot has not been cast successfully if it is not stored successfully, including storage of the ballot image, and provide clear instruction as to the steps the voter should take to cast his or her ballot should this event occur	Accept	G1, G2, P1		
n.	Provide sufficient computational performance to provide responses back to each voter entry in no more than three seconds	Accept	G1, G2, P1		
o.	Ensure that the votes stored accurately represent the actual votes cast	Accept	G1, G2, P1	A-In, A-OMR	Interpretation 2007-06
p.	Prevent modification of the voter's vote after the ballot is cast	Accept	G1	G2, P1	
q.	Provide a capability to retrieve ballot images in a form readable by humans [in accordance with the requirements of Subsections 2.1.2 (f) and 2.1.4 (k) and (l)]	Accept	G1	G2, P1	
r.	Increment the proper ballot position registers or counters	Accept	G1	G2, P1	
s.	Protect the secrecy of the vote throughout the voting process	Accept	G1	G2, P1	
t.	Prohibit access to voted ballots until after the close of polls	Accept	G1	G2, P1	
u.	Provide the ability for election officials to submit test ballots for use in verifying the end-to-end integrity of the voting system	Accept	G1	G2, P1	
v.	Isolate test ballots such that they are accounted for accurately in vote counts and are not reflected in official vote counts for specific candidates or measure	Accept	G1	G2, P1	
2.4	Post-Voting Capabilities				
2.4.1	**Closing the Polls** These requirements for closing the polls and locking voting systems against future voting are specific to precinct count systems. The voting system shall provide the means for:				
a.	Preventing the further casting of ballots once the polls has closed	Accept	G1	G2, P1	
b.	Provides an internal test that verifies that the prescribed closing procedure has been followed, and that the device status is normal	Accept	G1	G2, P1	
c.	Incorporating a visible indication of system status	Accept	G1	G2, P1	
d.	Producing a diagnostic test record that verifies the sequence of events, and indicates that the extraction of	Accept	G1	G2, P1	

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	voting data has been activated				
e.	Precluding the unauthorized reopening of the polls once the poll closing has been completed for that election	Accept	G1	G2, P1	
2.4.2	**Consolidating Vote Data**				
	All systems provide a means to consolidate and report vote data from all polling places, and optionally from other sources such as absentee ballots, provisional ballots, and voted ballots requiring human review (e.g., write-in votes).	Accept	G1	G2, P1, A-OMR, A-In	
2.4.3	**Producing Reports**				
	All systems shall be able to create reports summarizing the data on multiple levels.	Accept	G1	G2, P1, A-OMR, A-In	
	Common Standards All systems shall provide capabilities to:				
a.	Support of geographic reporting, which requires the reporting of all results for each contest at the precinct level and additional jurisdictional levels	Accept	G1	G2, P1, A-OMR, A-In	#88 – closed
b.	Produce a printed report of the number of ballots counted by each tabulator	Accept	G1	G2, P1, A-OMR, A-In	#80 – closed.
c.	Produce a printed report for each tabulator of the results of each contest that includes the votes cast for each selection, the count of undervotes, and the count of overvotes	Accept	G1	G2, P1, A-OMR, A-In	#89 – closed
d.	Produce a consolidated printed report of the results for each contest of all votes cast (including the count of ballots from other sources supported by the system as specified by the vendor) that includes the votes cast for each selection, the count of undervotes, and the count of overvotes	Accept	G1	G2, P1, A-OMR, A-In	#89 closed Interpretation 2007-06
e.	Be capable of producing a consolidated printed report of the combination of overvotes for any contest that is selected by an authorized official (e.g.; the number of overvotes in a given contest combining candidate A and candidate B, combining candidate A and candidate C, etc.)	Accept	G1	G2, P1, A-OMR, A-In	
f.	Produce all system audit information required in Section 5.4 in the form of printed reports, or in electronic memory for printing centrally	Accept	G1	G2, P1, A-OMR, A-In	
g.	Prevent data from being altered or destroyed by report generation, or by the transmission of results over telecommunications lines	Accept	G1	G2, P1, A-OMR, A-In	
	Precinct Count Systems In addition, all precinct count voting systems shall:				
a.	Prevent the printing of reports and the unauthorized extraction of data prior to the official close of the polling place	Accept	G1	G2, P1	
b.	Provide a means to extract information from a transportable programmable memory device or data storage medium for vote consolidation	Accept	G1	G2	
c.	Consolidate the data contained in each unit into a single report for the polling place when more than one voting machine or precinct tabulator is used	Accept	G1	G2, P1, A-In	
d.	Prevent data in transportable memory from being altered or destroyed by report generation, or by the transmission of results over telecommunications lines	Accept	G1	G2, P1, A-In	
2.4.4	**Broadcasting Results**				
a.	Provide only aggregated results, and not data from individual ballots	Accept			Results are not broadcast
b.	Provide no access path from unofficial electronic reports or files to the storage devices for official data	Accept			Results are not broadcast
c.	Clearly indicate on each report or file that the results it contains are unofficial	Accept			Results are not broadcast
2.5	**Maintenance, Transportation and Storage**				

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	All systems shall be designed and manufactured to facilitate preventive and corrective maintenance, conforming to the hardware standards described in Subsection 4.1. All vote casting and tally equipment designated for storage between elections shall: a. Function without degradation in capabilities after transit to and from the place of use, as demonstrated by meeting the performance standards described in Subsection 4.1 b. Function without degradation in capabilities after storage between elections, as demonstrated by meeting the performance standards described in Subsection 4.1 (See subsection 4.1)				
3	***Usability and Accessibility Requirements*** *Note: Only testable Discussion text that provides significant clarification is included. Consult the VVSG for the full text.*				
3.1	**Usability Requirements** The voting process shall provide a high level of usability for voters. Accordingly, voters shall be able to negotiate the process effectively, efficiently, and comfortably. The mandatory voting system standards mandated in HAVA Section 301 relate to the interaction between the voter and the voting system. Except as provided in subparagraph (B), the voting system (including any lever voting system, optical scanning voting system, or direct recording electronic system) shall --				
	• Permit the voter to verify (in a private and independent manner) the votes selected by the voter on the ballot before the ballot is cast and counted.	Accept	G2, C		
	• Provide the voter with the opportunity (in a private and independent manner) to change the ballot or correct any error before the ballot is cast and counted (including the opportunity to correct the error through the issuance of a replacement ballot if the voter was otherwise unable to change the ballot or correct any error).	Accept	G2, C		
	If the voter selects votes for more than one candidate in a single office: • Notify the voter that the voter has selected more than one candidate for a single office on the ballot.	Accept	G2, C		
	• Notify the voter before the ballot is cast and counted of the effect of casting multiple votes for the office.	Accept	G2, C		
	• Provide the voter with the opportunity to correct the ballot before the ballot is cast and counted.	Accept	G2, C		
	The voting system shall ensure that any notification required under this paragraph preserves the privacy of the voter and the confidentiality of the ballot.	Accept	G2, C		
	Additional requirements for task performance are independence and privacy: the voter should normally be able to complete the voting task without assistance from others, and the voter selection should be private.	Accept	G2, C		
3.1.1	**Usability Testing**				
	The vendor shall conduct summative usability tests on the voting system using individuals representative of the general population. The vendor shall document the	Accept	Appx E #23		Interpretation 2007-03 #23 Closed Document review; test

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	testing performed and report the test results using the Common Industry Format. This documentation shall be included in the Technical Data Package submitted to the EAC for national certification.				results delivered to the EAC
3.1.2	**Usability Testing** The voting process shall provide certain functional capabilities to support voter usability.				
a.	The voting system shall provide feedback to the voter that identifies specific contests or ballot issues for which he or she has made no selection or fewer than the allowable number of selections (e.g., undervotes)	Accept	G1	G2, P1	
b.	The voting system shall notify the voter if he or she has made more than the allowable number of selections for any contest (e.g., overvotes)	Accept	G1	G2, P1	
c.	The voting system shall notify the voter before the ballot is cast and counted of the effect of making more than the allowable number of selections for a contest	Accept	G1	G2, P1	
d.	The voting system shall provide the voter the opportunity to correct the ballot for either an undervote or overvote before the ballot is cast and counted. *Discussion: Certain differences in presentation are mandated by state law, such as the order in which candidates are listed and provisions for voting for write-in candidates. But comparable characteristics such as font size or voice volume and speed must be the same for all choices.*	Accept	G1	G2, P1	
e.	The voting system shall allow the voter, at his or her choice, to submit an undervoted ballot without correction	Accept	G1	G2, P1	
f.	DRE voting machines shall allow the voter to change a vote within a contest before advancing to the next contest.	Accept	G1	G2, P1	
g.	DRE voting machines should provide navigation controls that allow the voter to advance to the next contest or go back to the previous contest before completing a vote on the contest currently being presented (whether visually or aurally).	Accept	G1	G2, P1	
3.1.3	**Alternative Languages**				
	The voting equipment shall be capable of presenting the ballot, ballot selections, review screens and instructions in any language required by state or federal law.	Accept	G2	C, P1	#87 – closed Interpretation 2007-04
3.1.4	**Cognitive Issues** The voting process shall be designed to minimize cognitive difficulties for the voter.				
a.	Consistent with election law, the voting system should support a process that does not introduce any bias for or against any of the selections to be made by the voter. In both visual and aural formats, contest choices shall be presented in an equivalent manner.	Accept	C	G1, G2	
b.	The voting machine or related materials shall provide clear instructions and assistance to allow voters to successfully execute and cast their ballots independently.	Accept	C	G1, G2	
i	Voting machines or related materials shall provide a means for the voter to get help at any time during the voting session.	Accept	G1	G2	
ii.	The voting machine shall provide instructions for all its valid operations. *Discussion: If an operation is available to the voter, it must be documented.*	Accept	G1	G2	
c.	The voting system shall provide the capability to design a ballot for maximum clarity and comprehension.	Accept	G1	G2	
i.	The voting equipment should not visually present a single contest spread over two pages or two columns. Discussion: Such a visual separation poses the risk that the voter may perceive one contest as two. If a contest has a large number of candidates, it may be infeasible to	Accept	C	G1, G2	

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	observe this guideline.				
ii.	The ballot shall clearly indicate the maximum number of candidates for which one can vote within a single contest.	Accept	C	G1, G2	
iii.	There shall be a consistent relationship between the name of a candidate and the mechanism used to vote for that candidate.	Accept	G1	G2	
d.	Warnings and alerts issued by the voting system should clearly state the nature of the problem and the set of responses available to the voter. The warning should clearly state whether the voter has performed or attempted an invalid operation or whether the voting equipment itself has malfunctioned in some way.	Accept	G1	G2	
e.	The use of color by the voting system should agree with common conventions:	Accept	C	G1, G2	
(a)	green, blue or white is used for general information or as a normal status indicator;	Accept	C		System does not use color
(b)	amber or yellow is used to indicate warnings or a marginal status;	Accept	C		System does not use color
c)	red is used to indicate error conditions or a problem requiring immediate attention.	Accept	C		System does not use color
3.1.5	**Perceptual Issues** The voting process shall be designed to minimize perceptual difficulties for the voter.				
a.	No voting machine display screen shall flicker with a frequency between 2 Hz and 55 Hz.	Accept	C		
b.	Any aspect of the voting machine that is adjustable by the voter or poll worker, including font size, color, contrast, and audio volume, shall automatically reset to a standard default value upon completion of that voter's session. *Discussion: The voting machine must present the same initial appearance to every voter.*	Accept	C		
c.	If any aspect of a voting machine is adjustable by the voter or poll worker, there shall be a mechanism to reset all such aspects to their default values.	Accept	C		
d.	All electronic voting machines shall provide a minimum font size of 3.0 mm (measured as the height of a capital letter) for all text.	Accept	C		
e.	All voting machines using paper ballots should make provisions for voters with poor reading vision..	Accept	C		
f.	The default color coding shall maximize correct perception by voters with color blindness.	Accept	C		
g.	Color coding shall not be used as the sole means of conveying information, indicating an action, prompting a response, or distinguishing a visual element.	Accept	C		
h.	All text intended for the voter should be presented in a sans serif font.	Accept	C		
i.	The minimum figure-to-ground ambient contrast ratio for all text and informational graphics (including icons) intended for the voter shall be 3:1.	Accept	C		
3.1.6	**Interaction Issues** The voting process shall be designed to minimize interaction difficulties for the voter.				
a.	Voting machines with electronic image displays shall not require page scrolling by the voter.	Accept	C	G2	
b.	The voting machine shall provide unambiguous feedback regarding the voter's selection, such as displaying a checkmark beside the selected option or conspicuously changing its appearance.	Accept	C	G2	
c.	If the voting machine requires a response by a voter within a specific period of time, it shall issue an alert at least 20 seconds before this time period has expired and provide a means by which the voter may receive additional time.	Accept	C		There are no time out function
d.	Input mechanisms shall be designed to minimize	Accept	C	G2	

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	accidental activation.				
i.	On touch screens, the sensitive touch areas shall have a minimum height of 0.5 inches and minimum width of 0.7 inches. The vertical distance between the centers of adjacent areas shall be at least 0.6 inches, and the horizontal distance at least 0.8 inches.	Accept	C		Not a touch screen DRE
ii.	No key or control on a voting machine shall have a repetitive effect as a result of being held in its active position.	Accept	C		
3.1.7	**Privacy**				
	The voting process shall preclude anyone else from determining the content of a voter's ballot, without the voter's cooperation. *Discussion: Privacy ensures that the voter can make selections based solely on his or her own preferences without intimidation or inhibition. Among other practices, this forbids the issuance of a receipt to the voter that would provide proof of how he or she voted.*	Accept	C	G1	
3.1.7.1	Privacy at the Polls When deployed according to the installation instructions provided by the vendor, the voting station shall prevent others from observing the contents of a voter's ballot.				
a.	The ballot and any input controls shall be visible only to the voter during the voting session and ballot submission.	Accept	C		
b.	The audio interface shall be audible only to the voter.	Accept	C		
c.	As mandated by HAVA 301 (a)(1)(C), the voting system shall notify the voter of an attempted overvote in a way that preserves the privacy of the voter and the confidentiality of the ballot.	Accept	G1	G2, P1	
3.1.7.2	No Recording of Alternate Format Usage Voter anonymity shall be maintained for alternative format ballot presentation.				
a.	No information shall be kept within an electronic cast vote record that identifies any alternative language feature(s) used by a voter.	Accept	G2		
b.	No information shall be kept within an electronic cast vote record that identifies any accessibility feature(s) used by a voter.	Accept	G2		
3.2	**Accessibility Requirements** The voting process shall be accessible to voters with disabilities. As a minimum, every polling place shall have at least one voting station equipped for individuals with disabilities, as provided in HAVA 301 (a)(3)(B). A machine so equipped is referred to herein as an accessible voting station. (See HAVA for complete text.)				
3.2.1	**General** The voting process shall incorporate the following features that are applicable to all types of disabilities:				
a.	When the provision of accessibility involves an alternative format for ballot presentation, then all information presented to voters including instructions, warnings, error and other messages, and ballot choices shall be presented in that alternative format.	Accept	C	G2	#87, 108 – closed
b.	The support provided to voters with disabilities shall be intrinsic to the accessible voting station. It shall not be necessary for the accessible voting station to be connected to any personal assistive device of the voter in order for the voter to operate it correctly.	Accept	C		
c.	When the primary means of voter identification or authentication uses biometric measures that require a voter to possess particular biological characteristics, the voting process shall provide a secondary means that does not depend on those characteristics.	Accept	C		System does not use biometric measures
3.2.2	**Vision**				

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	The voting process shall accessible to voters with visual disabilities *Discussion: Note that all aspects of the voting process are to be accessible, not just the voting machine.*				
3.2.2.1	Partial Vision The accessible voting station shall be accessible to voters with partial vision.				
a.	The vendor shall conduct summative usability tests on the voting system using partially sighted individuals. The vendor shall document the testing performed and report the test results using the Common Industry Format. This documentation shall be included in the Technical Data Package submitted to the EAC for national certification.	Accept	Appx E #23		Interpretation 2007-03 #23 Closed Document review; test results delivered to the EAC
b.	The accessible voting station with an electronic image display shall be capable of showing all information in at least two font sizes, (a) 3.0-4.0 mm and (b) 6.3-9.0 mm, under control of the voter.	Accept	C		
c.	An accessible voting station with a monochrome-only electronic image display shall be capable of showing all information in high contrast either by default or under the control of the voter or poll worker. High contrast is a figure-to-ground ambient contrast ratio for text and informational graphics of at least 6:1.	Accept	C		
d.	An accessible voting station with a color electronic image display shall allow the voter to adjust the color or the figure-to-ground ambient contrast ratio. *Discussion: See Technical Guide for Color, Contrast and Text Size in Appendix D for examples of how a voting station may meet this requirement by offering a limited number of discrete choices. In particular, it is not required that the station offer a continuous range of color or contrast values.*	Accept	C		Not a color display
e.	Buttons and controls on accessible voting stations shall be distinguishable by both shape and color.	Accept	C		
f.	An accessible voting station using an electronic image display shall provide synchronized audio output to convey the same information as that which is displayed on the screen.	Accept	C	G2	
3.2.2.2	Blindness The accessible voting station shall be accessible to voters who are blind.				
a.	The vendor shall conduct summative usability tests on the voting system using individuals who are blind. The vendor shall document the testing performed and report the test results using the Common Industry Format. This documentation shall be included in the Technical Data Package submitted to the EAC for national certification.	Accept	Appx E #23		Interpretation 2007-03 #23 Closed Document review; test results delivered to the EAC
b.	The accessible voting station shall provide an audio-tactile interface (ATI) that supports the full functionality of the visual ballot interface, as specified in Subsection 2.3.3. *Discussion: Note the necessity of both audio output and tactilely discernible controls for voter input. Full functionality includes at least:* • *Instructions and feedback on initial activation of the ballot (such as insertion of a smart card), if this is normally performed by the voter on comparable voting stations* • *Instructions and feedback to the voter on how to operate the accessible voting station, including settings and options (e.g., volume control, repetition)* • *Instructions and feedback for navigation of the ballot* • *Instructions and feedback for contest choices, including write-in candidates*	Accept	C		

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	• Instructions and feedback on confirming and changing selections *• Instructions and feedback on final submission of ballot*				
i.	The ATI of the accessible voting station shall provide the same capabilities to vote and cast a ballot as are provided by other voting machines or by the visual interface of the standard voting machine.	Accept	C	G2	
ii.	The ATI shall allow the voter to have any information provided by the voting system repeated.	Accept	C	G2	
iii.,	The ATI shall allow the voter to pause and resume the audio presentation.	Accept	C	G2	# 76 & 121 – Closed
iv.	The ATI shall allow the voter to skip to the next contest or return to previous contests.	Accept	C	G2	
v.	The ATI shall allow the voter to skip over the reading of a referendum so as to be able to vote on it immediately.	Accept	C	G2	
c.	All voting stations that provide audio presentation of the ballot shall conform to the following requirements: *Discussion: These requirements apply to all voting machine audio output, not just to the ATI of an accessible voting station.*		C		
i.	The ATI shall provide its audio signal through an industry standard connector for private listening using a 3.5mm stereo headphone jack to allow voters to use their own audio assistive devices.	Accept	C		
ii.	When a voting machine utilizes a telephone style handset or headphone to provide audio information, it shall provide a wireless T-Coil coupling for assistive hearing devices so as to provide access to that information for voters with partial hearing. That coupling shall achieve at least a category T4 rating as defined by American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids, ANSI C63.19.	Accept	C		EAC confirmed with US Accessibility Board that there have been no reports of issues with standard headphones
iii.,	No voting equipment shall cause electromagnetic interference with assistive hearing devices that would substantially degrade the performance of those devices. The voting equipment, considered as a wireless device, shall achieve at least a category T4 rating as defined by American National Standard for Methods of Measurement of Compatibility between Wireless Communications Devices and Hearing Aids, ANSI C63.19..	Accept	C		Not a wireless device and EAC confirmed with US Accessibility Board that there have been no reports of issues with standard headphones
iv.	A sanitized headphone or handset shall be made available to each voter.	Accept	C		#77 – closed.
v.	The voting machine shall set the initial volume for each voter between 40 and 50 dB SPL.	Accept	C		#75, 76 – closed.
vi.	The voting machine shall provide a volume control with an adjustable volume from a minimum of 20dB SPL up to a maximum of 100 dB SPL, in increments no greater than 10 dB.	Accept	C		
vii.	The audio system shall be able to reproduce frequencies over the audible speech range of 315 Hz to 10 KHz.	Accept	C		
viii.	The audio presentation of verbal information should be readily comprehensible by voters who have normal hearing and are proficient in the language. This includes such characteristics as proper enunciation, normal intonation, appropriate rate of speech, and low background noise. Candidate names should be pronounced as the candidate intends.	Accept	C	G2	
ix.	The audio system shall allow voters to control the rate of speech. The range of speeds supported should be at least 75% to 200% of the nominal rate.	Accept	C		
d.	If the normal procedure is to have voters initialize the activation of the ballot, the accessible voting station shall	Accept	C		Ballot activation is performed by the poll

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	provide features that enable voters who are blind to perform this activation.				worker.
e.	If the normal procedure is for voters to submit their own ballots, then the accessible voting station shall provide features that enable voters who are blind to perform this submission.	Accept	C	G2	
f.	All mechanically operated controls or keys on an accessible voting station shall be tactilely discernible without activating those controls or keys.	Accept	C		
g.	On an accessible voting station, the status of all locking or toggle controls or keys (such as the "shift" key) shall be visually discernible, and discernible either through touch or sound.	Accept	C		Shift or locking control keys are not used
3.2.3	**Dexterity** The voting process shall be accessible to voters who lack fine motor control or use of their hands.				
a.	The vendor shall conduct summative usability tests on the voting system using individuals lacking fine motor control. The vendor shall document the testing performed and report the test results using the Common Industry Format. This documentation shall be included in the Technical Data Package submitted to the EAC for national certification.	Accept	Appx E #23		Interpretation 2007-03 #23 Closed Document review; test results delivered to the EAC
b.	All keys and controls on the accessible voting station shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls and keys shall be no greater 5 lbs. (22.2 N).	Accept	C		
c.	The accessible voting station controls shall not require direct bodily contact or for the body to be part of any electrical circuit.	Accept	C		
d.	The accessible voting station shall provide a mechanism to enable non-manual input that is functionally equivalent to tactile input. *Discussion: All the functionality of the accessible voting station (e.g., straight party voting, write-in candidates) that is available through the other forms of input, such as tactile, must also be available through a non-manual input mechanism if it is provided by the accessible voting station.*	Accept	C		
e.	If the normal procedure is for voters to submit their own ballots, then the accessible voting station shall provide features that enable voters who lack fine motor control or the use of their hands to perform this submission.	Accept	C		
3.2.4	**Mobility** The voting process shall be accessible to voters who use mobility aids, including wheelchairs.				
a.	The accessible voting station shall provide a clear floor space of 30 inches (760 mm) minimum by 48 inches (1220 mm) minimum for a stationary mobility aid. The clear floor space shall be level with no slope exceeding 1:48 and positioned for a forward approach or a parallel approach.	Accept	C		
b.	All controls, keys, audio jacks and any other part of the accessible voting station necessary for the voter to operate the voting machine shall be within reach as specified under the following sub-requirements: *Discussion: Note that these requirements have meaningful application mainly to controls in a fixed location. A hand-held tethered control panel is another acceptable way of providing reachable controls.*	Accept	C		
i.	If the accessible voting station has a forward approach with no forward reach obstruction then the high reach shall be 48 inches maximum and the low reach shall be 15 inches minimum. (See Figure 1. in the VVSG)	Accept	C		

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
ii.	If the accessible voting station has a forward approach with a forward reach obstruction, the following requirements apply (See Figure 2): • The forward obstruction shall be no greater than 25 inches in depth, no higher than 34 inches and its bottom surface no lower than 27 • If the obstruction is no more than 20 inches in depth, then the maximum high reach shall be 48 inches, otherwise it shall be 44 inches.	Accept	C		
iii,	Space under the obstruction between the finish floor or ground and 9 inches (230 mm) above the finish floor or ground shall be considered toe clearance and shall comply with the following provisions: • Toe clearance shall extend 25 inches (635 mm) maximum under the obstruction • The minimum toe clearance under the obstruction shall be either 17 inches (430 mm) or the depth required to reach over the obstruction to operate the accessible voting station, whichever is greater • Toe clearance shall be 30 inches (760 mm) wide minimum	Accept	C		
iv.	Space under the obstruction between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground shall be considered knee clearance and shall comply with the following provisions: • Knee clearance shall extend 25 inches (635 mm) maximum under the obstruction at 9 inches (230 mm) above the finish floor or ground. • The minimum knee clearance at 9 inches (230 mm) above the finish floor or ground shall be either 11 inches (280 mm) or 6 inches less than the toe clearance, whichever is greater. • Between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground, the knee clearance shall be permitted to reduce at a rate of 1 inch (25 mm) in depth for each 6 inches (150 mm) in height. *Discussion: It follows that the minimum knee clearance at 27 inches above the finish floor or ground shall be 3 inches less than the minimum knee clearance at 9 inches above the floor.* • Knee clearance shall be 30 inches (760 mm) wide minimum.	Accept	C		
v.	If the accessible voting station has a parallel approach with no side reach obstruction then the maximum high reach shall be 48 inches and the minimum low reach shall be 15 inches. (See Figure 3 in the VVSG)	Accept	C		
vi.	If the accessible voting station has a parallel approach with a side reach obstruction, the following sub-requirements apply. See Figure 4. • The side obstruction shall be no greater than 24 inches in depth and its top no higher than 34 inches. • If the obstruction is no more than 10 inches in depth, then the maximum high reach shall be 48 inches, otherwise it shall be 46 inches. Discussion: Since this is a parallel approach, no clearance under the obstruction is required.	Accept	C		
c.	All labels, displays, controls, keys, audio jacks, and any other part of the accessible voting station necessary for the voter to operate the voting machine shall be easily legible and visible to a voter in a wheelchair with normal eyesight (no worse than 20/40, corrected) who is in an appropriate position and orientation with respect to the accessible voting station. *Discussion: There are a number of factors that could make relevant parts of the accessible voting station difficult to see such as; small*	Accept	C		

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	lettering, controls and labels tilted at an awkward angle from the voter's viewpoint, and glare from overhead lighting.				
3.2.5	**Hearing** The voting process shall be accessible to voters with hearing disabilities.				
a.	The accessible voting station shall incorporate the features listed under requirement 3.2.2.2 I for voting equipment that provides audio presentation of the ballot to provide accessibility to voters with hearing disabilities.	Accept	C		#75 – closed.
b.	If voting equipment provides sound cues as a method to alert the voter, the tone shall be accompanied by a visual cue, unless the station is in audio-only mode.	Accept	C		
3.2.6	**Speech** The voting process shall be accessible to voters with speech disabilities.				
a.	No voting equipment shall require voter speech for its operation.	Accept	C		
3.2.7	**English Proficiency**				
a.	For voters who lack proficiency in reading English, or whose primary language is unwritten, the voting equipment shall provide spoken instructions and ballots in the preferred language of the voter, consistent with state and federal law. The requirements of 3.2.2.2 I shall apply to this mode of interaction.	Accept	C	G2	
3.2.8	**Cognition** The voting process shall be accessible to voters with cognitive disabilities. *Discussion: At present there are no design features specifically aimed at helping those with cognitive disabilities. Requirements 3.2.2.1 (f), the synchronization of* *audio with the screen in a DRE, is helpful for some cognitive disabilities such as dyslexia. Requirements in Subsection 3.1.4 also address cognitive issues relative to voting system usability.*				
4	***Hardware Standards***				
4.1	**Performance Requirements** Performance requirements address a broad range of parameters (see below)				
4.1.1	**Accuracy Requirements** Voting system accuracy addresses the accuracy of data for each of the individual ballot positions that could be selected by a voter, including the positions that are not selected. For a voting system, accuracy is defined as the ability of the system to capture, record, store, consolidate and report the specific selections and absence of selections, made by the voter for each ballot position without error. Required accuracy is defined in terms of an error rate that for testing purposes represents the maximum number of errors allowed while processing a specified volume of data.				
a. i. ii.	For all paper-based voting systems: Scanning ballot positions on paper ballots to detect selections for individual candidates and contests Conversion of selections detected on paper ballots into digital data	Accept	G2, A-OMR		
b. i. ii.	For all DRE voting systems: Recording the voter selections of candidates and contests into voting data storage Recording voter selections of candidates and contests into ballot image storage independently from voting data storage	Accept	G1	G2, P1, A-In	
c. i.	For precinct-count voting systems (paper-based and DRE):	Accept	G1	G2, P1, A-In	

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	Consolidation of vote selection data from multiple precinct-based voting machines to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data				
d. i.	For central-count voting systems (paper-based and DRE): Consolidation of vote selection data from multiple counting devices to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data	Accept	G1	G2,P1 A-In, A-OMR	#89 (Undervotes) closed. Interpretation 2007-06
	For testing purposes, the acceptable error rate is defined using two parameters: the desired error rate to be achieved, and the maximum error rate that should be Accept by the test process. For each processing function indicated above, the voting system shall achieve a target error rate of no more than one in 10,000,000 ballot positions, with a maximum acceptable error rate in the test process of one in 500,000 ballot positions.	Accept	A-OMR		#115 – closed
4.1.2	**Environmental Requirements** All voting systems shall be designed to withstand the environmental conditions contained in the appropriate test procedures of the Standards/Guidelines. These procedures will be applied to all devices for casting, scanning and counting ballots, except those that constitute COTS devices that have not been modified in any manner to support their use as part of a voting system and that have a documented record of performance under conditions defined in the Standards/Guidelines.				Interpretation 2007-05
	The Technical Data Package supplied by the vendor shall include a statement of all requirements and restrictions regarding environmental protection, electrical service, recommended auxiliary power, telecommunications service, and any other facility or resource required for the proper installation and operation of the system.	Accept	E		
4.1.2.1	Shelter Requirements				
	Precinct count systems are designed for storage and operation in any enclosed facility ordinarily used as a warehouse or polling place, with prominent instructions as to any special storage requirements	Accept	E		
4.1.2.2	Space Requirements				
	The arrangement of the voting system does not impede performance of their duties by polling place officials, the orderly flow of voters through the polling place, or the ability for the voter to vote in private	Accept	E		
4.1.2.3	Furnishings and Fixtures				
	Any furnishings or fixtures provided as a part of voting systems, and any components provided by the vendor that are not a part of the system but that are used to support its storage, transportation, or operation, comply with the design and safety requirements of Subsection 4.3.8.	Accept	E		
4.1.2.4	Electrical Supply Components of voting systems that require an electrical supply shall meet the following standards:				
a.	Precinct count systems operate with the electrical supply ordinarily found in polling places (Nominal 120 Vac/60Hz/1 phase)	Accept	E		
b.	For components of voting systems that require an electrical supply, central count systems operate with the electrical supply ordinarily found in central tabulation	Accept	E		

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	facilities or computer room facilities (120vac/60hz/1, 208vac/60hz/3, or 240vac/60hz/2);				
c.	All voting machines shall also be capable of operating for a period of at least 2 hours on backup power, such that no voting data is lost or corrupted nor normal operations interrupted. When backup power is exhausted the voting machine shall retain the contents of all memories intact. The backup power capability is not required to provide lighting of the voting area.	Accept	C		Interpretation 2008-02 Interpretation 2008-06
4.1.2.5	Electrical Power Disturbance Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand, without disruption of normal operation or loss of data:				Interpretation 2008-02 Interpretation 2008-06
a.	Voltage dip of 30% of nominal @10 ms;	Accept	E		
b.	Voltage dip of 60% of nominal @100 ms & 1 sec	Accept	E		
c.	Surges of >95% interrupt @5Sec;	Accept	E		
d.	Surges of + or – 15% line variations of nominal line voltage	Accept	E		
e.	Electric power increases of 7.5% and reductions of 12.5% of nominal specified power supply for a period of up to four hours at each power level.	Accept	E		
4.1.2.6	Electrical Fast Transient Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand, without disruption of normal operation or loss of data, electrical fast transients of:				
a.	+ 2 kV and – 2 kV on External Power lines (both AC and DC)	Accept	E		
b.	+ 1 kV and – 1 kV on Input/Output lines (signal, data, and control lines) longer than 3 meters	Accept	E		
c.	Repetition Rate for all transient pulses will be 100 kHz	Accept	E		Interpretation 2008-10
4.1.2.7	Lighting Surge Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand, without disruption of normal operation or loss of data, surges of:				
a.	+ or – 2 kV AC line to line	Accept	E		
b.	+ or – 2 kV AC line to earth	Accept	E		
c.	+ or – 0.5 kV DC line to line >10m	Accept	E		
d.	+ or – 0.5 kV DC line to earth >10m	Accept	E		
e.	+ or – 1 kV I/O sig/control >30m	Accept	E		
4.1.2.8	Electrostatic Disruption				
	The vote scanning and counting equipment for paper-based systems, and all DRE equipment, is able to withstand ±15 kV air discharge and ±8 kV contact discharge without damage or loss of data. The equipment may reset or have momentary interruption so long as normal operation is resumed without human intervention or loss of data. Loss of data means votes that have been completed and confirmed to the voter.	Accept	E		#116 & 117 closed
4.1.2.9	Electromagnetic Emissions				
	Vote scanning and counting equipment for paper-based systems, and all DRE equipment, complies with the Rules and Regulations of the Federal Communications Commission, Part 15, Class B requirements for both radiated and conducted emissions	Accept	E		
4.1.2.10	Electromagnetic Susceptibility				
	Vote scanning and counting equipment for paper-based systems, and all DRE equipment, is able to withstand an electromagnetic field of 10 V/m modulated by a 1 kHz 80% AM modulation over the frequency range of 80	Accept	E		

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	MHz to 1000 MHz, without disruption of normal operation or loss of data				
4.1.2.11	Conducted RF Immunity Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand, without disruption of normal operation or loss of data, conducted RF energy of:				
a.	10V rms over the frequency range 150 KHz to 80 MHz with an 80% amplitude modulation with a 1 KHz sine wave AC & DC power	Accept	E		
b.	10V sig/control >3 m over the frequency range 150 KHz to 80 MHz with an 80% amplitude modulation with a 1 KHz sine wave	Accept	E		
4.1.2.12	Magnetic Fields Immunity				
	Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand, without disruption of normal operation or loss of data, AC magnetic fields of 30 A/m at 60 Hz	Accept	E		
4.1.2.13	Environmental Control – Operating Environment				
	Equipment used for election management activities or vote counting (including both precinct and central count systems) shall be capable of operation in temperatures ranging from 50 to 95 degrees Fahrenheit.	Accept	E		
4.1.2.14	Environmental Control – Transit and Storage Equipment used for vote casting or for counting votes in a precinct count system, shall meet these specific minimum performance standards that simulate exposure to physical shock and vibration associated with handling and transportation by surface and air common carriers, and to temperature conditions associated with delivery and storage in an uncontrolled warehouse environment:				
a.	High and low storage temperatures ranging from -4 to +140 degrees Fahrenheit, equivalent to MIL-STD-810D, Methods 501.2 and 502.2, Procedure I-Storage;	Accept	E		
b.	Bench handling equivalent to the procedure of MIL-STD-810D, Method 516.3, Procedure VI;	Accept	E		
c.	Vibration equivalent to the procedure of MIL-STD-810D, Method 514.3, Category 1- Basic Transportation, Common Carrier	Accept	E		
d.	Uncontrolled humidity equivalent to the procedure of MIL-STD-810D, Method 507.2, Procedure I-Natural Hot-Humid.	Accept	E		
4.1.2.15	Data Network Requirements				
	Voting systems may use a local or remote data network. If such a network is used, then all components of the network shall comply with the telecommunications requirements described in Section 6 and the Security requirements described in Section 7.	Accept	G1		No network connection
4.1.3	**Election Management System (EMS) Requirements** The Election Management System (EMS) requirements address electronic hardware and software used to conduct the pre-voting functions defined in Section 2 with regard to ballot preparation, election programming, ballot and program installation, readiness testing, verification at the polling place, and verification at the central location.				
4.1.3.1	Recording Requirements Voting systems shall accurately record all election management data entered by the user, including election officials or their designees.				
a.	Record every entry made by the user;	Accept	G1	G2, P1	
b.	Add permissible voter selections correctly to the memory	Accept	G1	G2, P1	

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	components of the device;				
c.	Verify the correctness of detection of the user selections and the addition of the selections correctly to memory	Accept	G1	G2, P1	
d.	Add various forms of data entered directly by the election official or designee, such as text, line art, logos, and images	Accept	G1	G2, P1	
e.	Verify the correctness of detection of data entered directly by the user and the addition of the selections correctly to memory	Accept	G1	G2, P1	
f.	Preserve the integrity of election management data stored in memory against corruption by stray electromagnetic emissions, and internally generated spurious electrical signals	Accept	G1	G2, P1	
g.	Log corrected data errors by the system.	Accept	G1	G2, P1	
4.1.3.2	Memory Stability Memory devices used to retain election management data shall have demonstrated error-free data retention for a period of 22 months.	Accept	G1	G2, P1	
4.1.4	**Vote Recording Requirements**				
4.1.4.1	Common Requirements All voting systems shall provide voting booths or enclosures for poll site use. Such booths or enclosures may be integral to the voting system or supplied as components of the voting system, and shall:				
a.	Be integral to, or make provisions for installation of the voting device;	Accept	G1		
b.	Ensure by its structure stability against movement or overturning during entry, occupancy, and exit by the voter	Accept	C		
c.	Provide privacy for the voter, and be designed in such a way as to prevent observation of the ballot by any person other than the voter	Accept	C		
d.	Capable of meeting the accessibility requirements of Section 2.2.7.1.	Accept	C		
4.1.4.2	Paper-based Recording Requirements The paper-based recording requirements govern: • Ballot cards or sheets, and pages or assemblies of pages containing ballot field identification data • Ballot marking devices • Frames or fixtures to hold the ballot while it is being marked • Compartments or booths where voters record selections • Secure containers for the collection of voted ballots				
a. i.	Paper ballots used by paper-based voting systems shall meet the following standards: Marks that identify the unique ballot format shall be outside the area in which votes are recorded, so as to minimize the likelihood that these marks will be mistaken for vote responses and the likelihood that recorded votes will obliterate these marks	Accept	G2		
ii.	If printed alignment marks are used to locate the vote response fields on the ballot, these marks shall be outside the area in which votes are recorded, so as to minimize the likelihood that these marks will be mistaken for vote responses and the likelihood that recorded votes will obliterate these marks	Accept	G2		
iii.	The Technical Data Package shall specify the required paper stock, size, shape, opacity, color, watermarks, field layout, orientation, size and style of printing, size and location of mark fields used for vote response fields and to identify unique ballot formats, placement of alignment marks, ink for printing, and folding and bleed-through limitations for preparation of ballots that are compatible with the system	Accept	G2		

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b.	The Technical Data Package shall specify marking devices, which, if used to make the prescribed form of mark, produce readable marked ballots such that the system meets the performance requirements for accuracy in Subsection 4.1.1. Marking devices can be either manual (such as pens or pencils) or electronic. These specifications shall identify:	Accept	G2, A-OMR		
i.	Specific characteristics of marking devices that affect readability of marked ballots	Accept	G2		
ii.	Performance capabilities with regard to each characteristic	Accept	A-OMR		
iii.	For marking devices manufactured by multiple external sources, a listing of sources and model numbers that are compatible with the system.	Accept	A-OMR		#115 – closed
a.	A frame or fixture for printed ballot cards is optional. If such a device is provided, it shall:	Accept	N/A		System does not use a frame or fixture for printed ballot cards
i.	Be of any size and shape consistent with its intended use;	Accept	N/A		System does not use a frame or fixture for printed ballot cards
ii.	Position the card properly;	Accept	N/A		System does not use a frame or fixture for printed ballot cards
iii.	Hold the ballot card securely in its proper location and orientation for voting	Accept	N/A		System does not use a frame or fixture for printed ballot cards
iv.	Comply with the design and construction requirements in Section 3.4.	Accept	N/A		System does not use a frame or fixture for printed ballot cards
a.	Ballot boxes and ballot transfer boxes which serve as secure containers for the storage and transportation of voted ballots, shall:	Accept	N/A		System does not use ballot boxes
i.	Be of any size, shape, and weight commensurate with their intended use	Accept	N/A		System does not use ballot boxes
ii.	Incorporate locks or seals, and specifications in the system documentation	Accept	N/A		System does not use ballot boxes
iii.	Provide specific points where ballots are inserted, with all other points on the box constructed in a manner that prevents ballot insertion	Accept	N/A		System does not use ballot boxes
iv.	For precinct count systems, contain separate compartments for segregating unread ballots, ballots with write-in votes, or irregularities that may require special handling or processing. In lieu of compartments, conversion processing may mark such ballots with an identifying spot or stripe to facilitate manual segregation	N/A			Not a precinct count system
4.1.4.3	DRE Systems Recording Requirements				
a.	DRE systems shall include an audible or visible activity indicator providing the status of each voting device. This indicator shall:	Accept	G1	G2, P1	
i.	Indicate whether the device has been activated for voting	Accept	G1	G2, P1	
ii.	Indicate whether the device is in use.	Accept	G1	G2, P1	
b.	To ensure vote recording accuracy and integrity while protecting the anonymity of the voter, all DRE systems shall:	Accept			
i.	Contain all mechanical, electromechanical, and electronic components; software; and controls required to detect and record the activation of selections made by the voter in the process of voting and casting a ballot	Accept	G1	G2, P1	
ii.	Incorporate redundant memories to detect and allow correction of errors caused by the failure of any of the individual memories	Accept	G1	G2, P1	
iii.	Provide at least two processes that record the voter's selections that:	Accept	G1	G2, P1	

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	• To the extent possible, are isolated from each other • Designate one process and associated storage location as the main vote detection, interpretation, processing and reporting path				
iv.	Use a different process to store ballot images, for which the method of recording may include any appropriate encoding or data compression procedure consistent with the regeneration of an unequivocal record of the ballot as cast by the voter.	Accept	G1	G2, P1	
v.	Provide a capability to retrieve ballot images in a form readable by humans.	Accept	G1	G2, P1	
vi.	Ensure that all processing and storage protects the anonymity of the voter.	Accept	G1	G2, P1	
c.	DRE systems meet the following requirements for recording accurately each vote and ballot cast:	Accept	G1	G2, P1, A-In	
i.	Detect every selection made by the voter	Accept	G1	G2, P1, A-In	
ii.	Correctly add permissible selections to the memory components of the device	Accept	G1	G2, P1, A-In	
iii.	Verify the correctness of the detection of the voter selections and the addition of the selections to memory	Accept	G1	G2, P1, A-In	
iv.	Achieve an error rate not to exceed the requirement indicated in Section 4.4.1	Accept	A-In		
v.	Preserve the integrity of voting data and ballot images (for DRE machines) stored in memory for the official vote count and audit trail purposes against corruption by stray electromagnetic emissions, and internally generated spurious electrical signals	Accept	E		
vi.	Maintain a log of corrected data	Accept	G1	G2, P1, A-In	
	Recording reliability refers to the ability of the DRE system to record votes accurately at its maximum rated processing volume for a specified period of time. The DRE system shall record votes reliably in accordance with the requirements of Subsection 4.3.3.	Accept	A-In		
4.1.5	**Paper-based Conversion Requirements**				
4.1.5.1	Ballot Handling : Ballot handling consists of a ballot card's acceptance, movement through the read station and transfer into a collection station or receptacle.				
a.	The capacity to convert the marks on individual ballots into signals is uniquely important to central count systems. The capacity for a central count system shall be documented by the vendor. This documentation shall include capacity for individual components that impact the overall capacity.	Accept	G2	P1, A-OMR	
b. i. ii. Iii.	When ballots are unreadable or some condition is detected requiring that the cards be segregated from normally processed ballots for human review (e.g. write-ins), all central count paper-based systems shall do one of the following: Outstack the ballot Stop the ballot reader and display a message prompting the election official or designee to remove the ballot Mark the ballot with an identifying mark to facilitate its later identification	Accept	G2	P1, A-OMR	
c.	Additionally, the system shall provide a capability that can be activated by an authorized election official to identify ballots containing overvotes, blank ballots, and ballots containing undervotes in a designated race. If enabled, these capabilities shall perform one of the above actions in response to the indicated condition	Accept	G2	P1, A-OMR	
d.	When ballots are unreadable or when some condition is detected requiring that the cards be segregated from normally processed ballots for human review (e.g. write-	N/A			Not a precinct count system

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	in votes) all precinct count systems shall:				
i.	In response to an unreadable or blank ballot, return the ballot and provide a message prompting the voter to examine the ballot	N/A			Not a precinct count system
ii.	In response to a ballot with a write-in vote, segregate the ballot or mark the ballot with an identifying mark to facilitate its later identification	N/A			Not a precinct count system
Iii.	In response to a ballot with an overvote the system shall: • Provide a capability to identify an overvoted ballot • Return the ballot • Provide an indication prompting the voter to examine the ballot • Allow the voter to correct the ballot • Provide a means for an authorized election official to deactivate this capability entirely and by contest	N/A			Not a precinct count system
iv.	In response to a ballot with an undervote, the system shall: • Provide a capability to identify an undervoted ballot • Return the ballot • Provide an indication prompting the voter to examine the ballot • Allow the voter to correct the ballot • Allow the voter to submit the ballot with the undervote • Provide a means for an authorized election official to deactivate this capability	N/A			Not a precinct count system
e.	Ballot readers shall prevent multiple feed or detect and provide an alarm indicating multiple feed. Multiple feed occurs when a ballot reader attempts to read more than one ballot at a time.	Accept	G2	P1, A-OMR	
i.	If multiple feed is detected, the card reader shall halt in a manner that permits the operator to remove the unread cards causing the error, and reinsert them in the card input hopper	Accept	G2	P1, A-OMR	
ii.	The frequency of multiple feeds with ballots intended for use with the system shall not exceed 1 in 10,000	Accept	A-OMR		
4.1.5.2 a. b. c.	Ballot Reading Accuracy This paper-based system requirement governs the conversion of the physical ballot into electronic data. Reading accuracy for ballot conversion refers to the ability to: a. Recognize vote punches or marks, or the absence thereof, for each possible selection on the ballot b. Discriminate between valid punches or marks and extraneous perforations, smudges, and folds c. Convert the vote punches or marks, or the absence thereof, for each possible selection on the ballot into digital signals To ensure accuracy, paper-based systems shall:				
d.	Detect punches or marks that conform to vendor specifications with an error rate not exceeding the requirement indicated in Subsection 4.1.1	Accept	A-OMR		#115 – closed
e.	Ignore, and not record, extraneous perforations, smudges, and folds;	Accept	A-OMR		
f.	Reject ballots that meet all vendor specifications at a rate not to exceed 2 percent.	Accept	A-OMR		
4.1.6	**Processing Requirements**				
4.1.6.1 a.	Paper-based Processing Requirements Processing accuracy refers to the ability of the system to receive electronic signals produced by punches for punch card systems and vote marks and timing information for marksense systems; perform logical and numerical operations upon these data; and reproduce the contents of memory when required, without error.				

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	Specific requirements are detailed below:				
i.	Processing accuracy shall be measured by vote selection error rate, the ratio of uncorrected vote selection errors to the total number of ballot positions that could be recorded across all ballots when the system is operated at its nominal or design rate of processing	Accept	A-OMR		#115 – closed
ii.	The vote selection error rate shall include data that denotes ballot style or precinct as well as data denoting a vote in a specific contest or ballot proposition	Accept	A-OMR		
iii.	The vote selection error rate shall include all errors from any source	Accept	A-OMR		#115 – closed
iv.	The vote selection error rate shall not exceed the requirement indicated in Subsection 4.1.1	Accept	A-OMR		#115 – closed
b.	Paper-based system memory devices, used to retain control programs and data, shall have demonstrated error-free data retention for a period of 22 months, under the environmental conditions for operation and non-operation (i.e., storage).	Accept	A-OMR		
4.1.6.2 a.	DRE Voting Systems The DRE voting systems processing requirements address all mechanical devices, electromechanical devices, electronic devices, and software required to process voting data after the polls are closed. DRE voting systems shall meet the following requirements for processing speed:				
i.	Operate at a speed sufficient to respond to any operator and voter input without perceptible delay (no more than three seconds)	Accept	G1	G2	
ii.	if the consolidation of polling place data is done locally, perform this consolidation in a time not to exceed five minutes for each device in the polling place	Accept	G1	G2	
4.1.6.2.2 b.	Processing Accuracy Processing accuracy is defined as the ability of the system to process voting data stored in DRE voting devices or in removable memory modules installed in such devices. Processing includes all operations to consolidate voting data after the polls have been closed. DRE voting systems shall:				
i.	Produce reports that are completely consistent, with no discrepancy among reports of voting device data produced at any level	Accept	G1	G2	
ii.	Produce consolidated reports containing absentee, provisional or other voting data that are similarly error-free. Any discrepancy, regardless of source, is resolvable to a procedural error, to the failure of a non-memory device or to an external cause	Accept	G1	G2	
c.	DRE system memory devices used to retain control programs and data shall have demonstrated error-free data retention for a period of 22 months. Error-free retention may be achieved by the use of redundant memory elements, provided that the capability for conflict resolution or correction among elements is included.	Accept	G1	G2	
4.1.7	**Reporting Requirements**				
4.1.7.1	Removable Storage Memory				
	All storage media that can be removed from the voting system and transported to another location for readout and report generation, these media shall use devices with demonstrated error-free retention for a period of 22 months under the environmental conditions for operation and non-operation contained in Subsection 4.1.2. Examples of removable storage media include:	Accept	G1	G2	

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	programmable read-only memory (PROM), random access memory (RAM) with battery backup, magnetic media or optical media.				
4.1.7.2	Printers All printers used to produce reports of the vote count shall be capable of producing:				
a.	Alphanumeric headers	Accept	G1	G2	
b.	Election, office and issue labels	Accept	G1	G2	
c.	Alphanumeric entries generated as part of the audit record.	Accept	G1	G2	
4.1.8	**Vote Data Management Requirements** The vote data management requirements for all systems address capabilities that manage, process, and report voting data after the data has been consolidated at the polling place or other jurisdictional levels. These capabilities allow the system to:				
	• Consolidate voting data from polling place data memory or transfer devices • Report polling place summaries • Process absentee ballots, data entered manually, and administrative ballot definition data The requirements address all hardware and software required to generate output reports in the various formats required by the using jurisdiction.	Accept	G1	G2	
4.1.8.1	Data File Management All voting systems shall provide the capability to:				
a.	Integrate voting data files with ballot definition files	Accept	G1	G2	
b.	Verify file compatibility.	Accept	G1	G2	
c.	Edit and update files as required.:	Accept	G1	G2	
4.1.8.2	Data Report Generation All voting systems shall include:				
	Report generators for producing output reports at the device, polling place, and summary level, with provisions for administrative and judicial subdivisions as required by the using jurisdiction**.**	Accept	G2, A-OMR		The OMR 'device' consists of the OMR Reader and the Election Management System.
4.2	**Physical Characteristics**				
4.2.1	**Size**				
	There is no numerical limitation on the size of any voting equipment, but the size of each voting machine should be compatible with its intended use and the location at which the equipment is to be used.	Accept	C		
4.2.2	**Weight**				
	There is no numerical limitation on the weight of any voting equipment, but the weight of each voting machine should be compatible with its intended use and the location at which the equipment is to be used.	Accept	C		
4.2.3	**Transport and Storage of Precinct Systems** All precinct voting systems shall:				
a.	Provide a means to safely and easily handle, transport, and install voting equipment, such as wheels or a handle or handles	Accept	C		
b. i. ii.	Be capable of using, or be provided with, a protective enclosure rendering the equipment capable of withstanding: Impact, shock and vibration loads associated with surface and air transportation Stacking loads associated with storage	Accept	C		#94 – closed
4.3	**Design, Construction, and Maintenance Characteristics**				
4.3.1	**Materials Process and Parts** The approach to system design is unrestricted, and may incorporate any form or variant of technology capable of meeting the voting systems requirements and standards. Precinct count systems shall be designed in accordance				

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	with best commercial practice for microcomputers, process controllers, and their peripheral components. Central count voting systems and equipment used in a central tabulating environment shall be designed in accordance with best commercial and industrial practice. All voting systems shall:				
a.	Be designed and constructed so that the frequency of equipment malfunctions and maintenance requirements are reduced to the lowest level consistent with cost constraints.	Accept	C		
b.	Include, as part of the accompanying TDP, an approved parts list	Accept	C		
c.	Exclude parts or components not included in the approved parts list.	Accept	C		#98 – closed
4.3.2	**Durability**				
	All voting systems shall be designed to withstand normal use without deterioration and without excessive maintenance cost for a period of ten years.	Accept	C		Interpretation 2008-05
4.3.3	**Reliability**				
	There was no degradation of performance such that the device was unable to perform its intended function for longer than 10 seconds. The reliability of voting system devices shall be measured as Mean Time Between Failure (MTBF) for the system submitted for testing. MBTF is defined as the value of the ratio of operating time to the number of failures which have occurred in the specified time interval. A typical system operations scenario consists of approximately 45 hours of equipment operation, consisting of 30 hours of equipment set-up and readiness testing and 15 hours of elections operations. For the purpose of demonstrating compliance with this requirement, a failure is defined as any event which results in either the: • Loss of one or more functions • Degradation of performance such that the device is unable to perform its intended function for longer than 10 seconds The MTBF demonstrated during certification testing shall be at least 163 hours.	Accept	A-OMR, A-In		#114 – closed
4.3.4	**Maintainability** See the requirement for detail about Maintainability				
4.3.4.1	Physical Attributes The following physical attributes will be examined to assess reliability:				
a.	Presence of labels and the identification of test points	Accept	C		
b.	Provision of built-in test and diagnostic circuitry or physical indicators of condition	Accept	C		
c.	Presence of labels and alarms related to failures	Accept	C		
d.	Presence of features that allow non-technicians to perform routine maintenance tasks (such as update of the system database)	Accept			
4.3.4.2	Additional Attributes The following additional attributes will be examined to assess maintainability:		C		
a.	Ease of detecting that equipment has failed by a non-technician	Accept	C		
b.	Ease of diagnosing problems by a trained technician	Accept	C		
c.	Low false alarm rates (i.e., indications of problems that do not exist)	Accept	C		
d.	Ease of access to components for replacement	Accept	C		
e.	Ease with which adjustment and alignment can be performed	Accept	C		
f.	Ease with which database updates can be performed by a non-technician	Accept	C		

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g.	Adjust, align, tune or service components	Accept	C		#95, #96 – closed
4.3.5	**Availability**- The availability of a voting system is defined as the probability that the equipment (and supporting software) needed to perform designated voting functions will respond to operational commands and accomplish the function. The voting system shall meet the availability standard for each of the following voting functions:				
a.	For all paper-based voting systems:	Accept	G2	A-OMR	
1	Recording voter selections (such as by ballot marking or punch)	Accept	G2	A-OMR	
2	Scanning the punches or marks on paper ballots and converting them into digital data	Accept	G2	A-OMR	
b.	For all DRE systems, recording and storing voter ballot selections	Accept	G1,	G2, A-In	
c.	For precinct count systems (paper-based and DRE), consolidation of vote selection data from multiple precinct based systems to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data	Accept	G1,	G2, A-In	
d.	For central-count systems (paper-based and DRE), consolidation of vote selection data from multiple counting devices to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data	Accept	G1,	G2, A-In	
	System availability is measured as the ratio of the time during which the system is operational (up time) to the total time period of operation (up time plus down time). Inherent availability (Ai) is the fraction of time a system is functional, based upon Mean Time Between Failure (MTBF) and Mean Time To Repair (MTTR), that is: Ai = (MTBF)/(MTBF + MTTR) MTTR is the average time required to perform a corrective maintenance task during periods of system operation. Corrective maintenance task time is active repair time, plus the time attributable to other factors that could lead to logistic or administrative delays, such as travel notification of qualified maintenance personnel and travel time for such personnel to arrive at the appropriate site. Corrective maintenance may consist of substitution of the complete device or one of its components, as in the case of precinct count and some central count systems, or it may consist of on-site repair. The voting system shall achieve at least 99 percent availability during normal operation for the functions indicated above. This standard encompasses for each function the combination of all devices and components that support the function, including their MTTR and MTBF attributes.	Accept	A-In, A-OMR		
	Vendors shall specify the typical system configuration that is to be used to assess availability, and any assumptions made with regard to any parameters that impact the MTTR. These factors shall include at a minimum:	Accept	PCA Document Review		
e.	Recommended number and locations of spare devices or components to be kept on hand for repair purposes during periods of system operation	Accept	PCA Document Review		
f.	Recommended number and locations of qualified maintenance personnel who need to be available to support repair calls during system operation Organizational affiliation (i.e., jurisdiction, vendor) of qualified maintenance personnel	Accept	PCA Document Review		
g.	Organizational affiliation (i.e., jurisdiction, vendor) of qualified maintenance personnel	Accept	PCA Documen		

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			t Review		
4.3.6	**Product Marking** All voting systems shall:				
a.	Identify all devices with a permanently affixed nameplate or label containing the name of the manufacturer or vendor, the name of the device, its part or model number, its revision letter, its serial number, and if applicable, its power requirements	Accept	C		
b.	Display on each device a separate data plate containing a schedule for and list of operations required to service or to perform preventive maintenance	Accept	C		#97 – closed
c.	Display advisory caution and warning instructions to ensure safe operation of the equipment and to avoid exposure to hazardous electrical voltages and moving parts at all locations where operation or exposure may occur	Accept	C		
4.3.7	**Workmanship** To help ensure proper workmanship, all manufacturers of voting systems shall:				
a.	Adopt and adhere to practices and procedures to ensure their products are free from damage or defect that could make them unsatisfactory for their intended purpose	Accept	C		
b.	Ensure components provided by external suppliers are free from damage or defect that could make them unsatisfactory for their intended purpose.	Accept	C		
4.3.8	**Safety** All voting systems shall meet the following requirements for safety:				
a.	All voting system and their components shall be designed to eliminate hazards to personnel or the equipment itself.	Accept	E		
b.	Defects in design and construction that can result in personal injury or equipment damage must be detected and corrected before voting systems and components are placed into service.	Accept	E		
c.	Equipment design for personnel safety is equal to or better than the appropriate requirements of the Occupational Safety and Health Act, Code of Federal Regulations, as identified in Title 29, part 1910	Accept	E		Interpretation 2008-09
5.	**Software Standards**				
5.3	**Data and Document Retention** All systems shall:				
a.	Maintain the integrity of voting and audit data during an election, and for at least 22 months thereafter, a time sufficient to resolve most contested elections and support other activities related to the reconstruction and investigation of a contested election	Accept	G1		
b.	Protect against the failure of any data input or storage device at a location controlled by the jurisdiction or its contractors, and against any attempt at improper data entry or retrieval	Accept	G1		
5.4	**Audit Record Data** Audit trails are essential to ensure the integrity of a voting system. Operational requirements for audit trails are described in Subsection 2.5.1.1. Audit record data are generated by these procedures. The audit record data in the following subsections are essential to the complete recording of election operations and reporting of the vote tally. This list of audit records may not reflect the design constructs of some systems. Therefore, vendors shall supplement it with information relevant to the operation of their specific systems.				
5.4.1	**Pre-election Audit Records**				
	During election definition and ballot preparation, the	Accept	G1	G2	

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	system shall audit the preparation of the baseline ballot formats and modifications to them, a description of these modifications, and corresponding dates. The log shall include:				
a.	The allowable number of selections for an office or issue;	Accept	G1	G2	
b.	The combinations of voting patterns permitted or required by the jurisdiction	Accept	G1	G2	
c.	The inclusion or exclusion of offices or issues as the result of multiple districting within the polling place	Accept	G1	G2	
d.	Any other characteristics that may be peculiar to the jurisdiction, the election, or the polling place's location	Accept	G1	G2	
e.	Manual data maintained by election personnel	Accept	G1	G2	
f.	Samples of all final ballot formats	Accept	G1	G2	
g.	Ballot preparation edits listings.	Accept	G1	G2	
5.4.2	**System Readiness Audit Records** The following minimum requirements apply to system readiness audit records:				
a.	Prior to the start of ballot counting, a system process shall verify hardware and software status and generate a readiness audit record. This record shall include the identification of the software release, the identification of the election to be processed, and the results of software and hardware diagnostic tests	Accept	G1	G2	
b.	In the case of systems used at the polling place, the record shall include polling place identification	Accept	G1	G2	#99 –closed
c.	The ballot interpretation logic shall test and record the correct installation of ballot formats on voting devices	Accept	G1	G2	
d.	The software shall check and record the status of all data paths and memory locations to be used in vote recording to protect against contamination of voting data	Accept	G1	G2	
e.	Upon the conclusion of the tests, the software shall provide evidence in the audit record that the test data have been expunged	Accept	G1	G2	
f.	If required and provided, the ballot reader and arithmetic-logic unit shall be evaluated for accuracy, and the system shall record the results. It shall allow the processing or simulated processing of sufficient test ballots to provide a statistical estimate of processing accuracy	Accept	A-OMR, A-In		
g. i. ii. iii. iv.	For systems that use a public network, provide a report of test ballots that includes: Number of ballots sent When each ballot was sent Machine from which each ballot was sent specific votes or selections contained in the ballot	Accept			Public Network Not Used
5.4.3	**In-Process Audit Records** In-process audit records document system operations during diagnostic routines and the casting and tallying of ballots. At a minimum, the in-process audit records shall contain:				
a.	Machine generated error and exception messages to demonstrate successful recovery. Examples include, but are not necessarily limited to:	Accept	G1	G2	
i.	The source and disposition of system interrupts resulting in entry into exception handling routines	Accept	G1	G2	
ii.	All messages generated by exception handlers	Accept	G1	G2	
iii.	The identification code and number of occurrences for each hardware and software error or failure	Accept	G1	G2	
iv.	Notification of system login or access errors, file access errors, and physical violations of security as they occur, and a summary record of these events after processing	Accept	G1	G2	
v.	Other exception events such as power failures, failure of critical hardware components, data transmission errors or other types of operating anomalies	Accept	G1	G2	

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b.	Critical system status messages other than informational messages displayed by the system during the course of normal operations. These items include, but are not limited to:	Accept	G1	G2	
i.	Diagnostic and status messages upon startup	Accept	G1	G2	
ii.	The "zero totals" check conducted before opening the polling place or counting a precinct centrally	Accept	G1	G2, P1, A-OMR, A-In	
iii.	For paper-based systems, the initiation or termination of card reader and communications equipment operation	Accept	G1	G2	
iv.	For DRE machines at controlled voting locations, the event (and time, if available) of activating and casting each ballot (i.e., each voter's transaction as an event). This data can be compared with the public counter for reconciliation purposes	Accept	G1	G2	
c.	Non-critical status messages that are generated by the machine's data quality monitor or by software and hardware condition monitors	Accept	G1	G2	
d.	System generated log of all normal process activity and system events that require operator intervention, so that each operator access can be monitored and access sequence can be constructed	Accept	G1	G2	
5.4.4	**Vote Tally Data** In addition to the audit requirements described above, other election-related data is essential for reporting results to interested parties, the press, and the voting public, and is vital to verifying an accurate count. Voting systems shall meet these reporting requirements by providing software capable of obtaining data concerning various aspects of vote counting and producing printed reports. At a minimum, vote tally data shall include:				
a.	Number of ballots cast, using each ballot configuration, by tabulator, by precinct, and by political subdivision	Accept	G1	G2	
b.	Candidate and measure vote totals for each contest, by tabulator	Accept	G1	G2	#85 – closed
c.	The number of ballots read within each precinct and for additional jurisdictional levels, by configuration, including separate totals for each party in primary elections	Accept	G1	G2	
d.	Separate accumulation of overvotes and undervotes for each contest, by tabulator, precinct and for additional jurisdictional levels (no overvotes would be indicated for DRE voting devices)	Accept	G1	G2	
e.	For paper-based systems only, the total number of ballots both able to be processed and unable to be processed; and if there are multiple card ballots, the total number of cards read	Accept	G1	G2	#88 – closed
f.	For systems that produce an electronic file containing vote tally data, the contents of the file shall include the same minimum data cited above for printed vote tally reports.	Accept	G1	G2	
5.5	**Voter Secrecy on DRE Systems** All DRE systems shall ensure vote secrecy by:				
a.	Immediately after the voter chooses to cast his or her ballot, record the voter's selections in the memory to be used for vote counting and audit data (including ballot images), and erase the selections from the display, memory, and all other storage, including all forms of temporary storage	Accept	G1	G2	
b.	Immediately after the voter chooses to cancel his or her ballot, erase the selections from the display and all other storage, including buffers and other temporary storage	Accept	G1	G2	
6	**Telecommunications**				
6.2	**Design, Construction, and Maintenance Requirement**				
	Design, construction, and maintenance requirements for telecommunications represent the operational capability	Accept	N/A		System does not use Telecommunications

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	of both system hardware and software. These capabilities shall be considered basic to all data transmissions.				
6.2.1	**Accuracy**				
	The telecommunications components of all voting systems shall meet the accuracy requirements of 4.1.1.	Accept	N/A		System does not use Telecommunications
6.2.2	**Durability**				
	The telecommunications components of all voting systems shall meet the Durability requirements of 4.1.2.	Accept	N/A		System does not use Telecommunications
6.2.3	**Reliability**				
	The telecommunications components of all voting systems shall meet the Reliability requirements of 4.1.3.	Accept	N/A		System does not use Telecommunications
6.2.4	**Maintainability**				
	The telecommunications components of all voting systems shall meet the maintainability requirements of 4.1.4.	Accept	N/A		System does not use Telecommunications
6.2.5	**Availability**				
	The telecommunications components of all voting systems shall meet the availability requirements of 4.1.5.	Accept	N/A		System does not use Telecommunications
6.2.6	**Integrity** For WANs using public telecommunications, boundary definition and implementation shall meet the requirements below.				
a.	Outside service providers and subscribers of such providers shall not be given direct access or control of any resource inside the boundary.	Accept	N/A		System does not use Public Telecommunications Networks
b.	Voting system administrators shall not require any type of control of resources outside this boundary. Typically, an end point of a telecommunications circuit will be a subscriber termination on a Digital Service Unit/Customer Service Unit although the specific technology configuration may vary. Regardless of the technology used, the boundary point must ensure that everything on the voting system side is locally configured and controlled by the election jurisdiction while everything on the public network side is controlled by an outside service provider.	Accept	N/A		System does not use Public Telecommunications Networks
c.	The system shall be designed and configured such that it is not vulnerable to a single point of failure in the connection to the public network which could cause total loss of voting capabilities at any polling place.	Accept	N/A		System does not use Public Telecommunications Networks
6.2.7	**Confirmation** Confirmation occurs when the system notifies the user of the successful or unsuccessful completion of the data transmission, where successful completion is defined as accurate receipt of the transmitted data. To provide confirmation, the telecommunications components of a voting system shall				
	Notify the user of the successful or unsuccessful completion of the data transmission; and	Accept	N/A		System does not use Telecommunications
	In the event of unsuccessful transmission, notify the user of the action to be taken.	Accept	N/A		System does not use Telecommunications
7	**Security Standards**				
7.2	**Access Controls**				
7.2.1	**General Access Control Policy**				
	The vendor shall specify the general features and capabilities of the access control policy recommended to provide effective voting system security.	Accept	Appx C 2.6	S, G1, G2,	
	Although the jurisdiction in which the voting system is operated is responsible for determining the access policies for each election, the vendor shall provide a description of recommended policies for:	Accept	Appx C 2.6	S, G1, G2,	
a.	Software access controls;	Accept	Appx C 2.6	S, G1, G2,	

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b.	Hardware access controls;	Accept	Appx C 2.6	S, G1, G2,	
c.	Communications;	Accept	Appx C 2.6	S, G1, G2,	
d.	Effective password management;	Accept	Appx C 2.6	S, G1, G2,	
e.	Protection abilities of a particular operating system;	Accept	Appx C 2.6	S, G1, G2,	
f.	General characteristics of supervisory access privileges;	Accept	Appx C 2.6	S, G1, G2,	
g.	Segregation of duties; and	Accept	Appx C 2.6	S, G1, G2,	
h.	Any additional relevant characteristics.	Accept	Appx C 2.6	S, G1, G2,	
7.2.1.1	Individual Access Privileges Voting system vendors shall:				
a.	Identify each person to whom access is granted, and the specific functions and data to which each person holds authorized access	Accept	Appx C 2.6	S, G1, G2,	
b.	Specify whether an individual's authorization is limited to a specific time, time interval or phase of the voting or counting operations	Accept	Appx C 2.6	S, G1, G2,	
c.	Permit the voter to cast a ballot expeditiously, but preclude voter access to all aspects of the vote counting processes	Accept	Appx C 2.6	S, G1, G2,	
7.2.1.2	Access Control Measures Vendors shall provide a detailed description of all system access control measures designed to permit authorized access to the system and prevent unauthorized access, such as:				
a.	Use of data and user authorization	Accept	Appx C 2.6	S, G1, G2,	
b.	Program unit ownership and other regional boundaries	Accept	Appx C 2.6	S, G1, G2,	
c.	One-end or two-end port protection devices	Accept	Appx C 2.6	S	
d.	Security kernels	Accept	Appx C 2.6	S	
e.	Computer-generated password keys	Accept	Appx C 2.6	S	
f.	Special protocols	Accept	Appx C 2.6	S	#28 – closed
g.	Message encryption and	Accept	Appx C 2.6	S	
g.	Controlled access security.	Accept	Appx C 2.6	S, G1, G2,	
	Vendors also shall define and provide a detailed description of the methods used to prevent unauthorized access to the access control capabilities of the system itself.	Accept	Appx C 2.6	S, G1, G2,	
7.3	**Physical Security Measures**				
	A voting system's sensitivity to disruption or corruption of data depends, in part, on the physical location of equipment and data media, and on the establishment of secure telecommunications among various locations. Most often, the disruption of voting and vote counting results from a physical violation of one or more areas of the system thought to be protected. Therefore, security procedures shall address physical threats and the corresponding means to defeat them.	Accept	S		Includes testing, document and code review
7.3.1	**Polling Place Security**				
	For polling place operations, vendors shall develop and provide detailed documentation of measures to enable poll workers to physically protect and perform orderly	Accept	S	G1	Document review

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	shutdown of voting equipment to counteract vandalism, civil disobedience, and similar occurrences.				
	The measures shall allow the immediate detection of tampering with vote casting devices and precinct ballot counters. They also shall control physical access to a telecommunications link if such a link is used	Accept	S		System does not use Telecommunications
7.3.2	**Central Count Location Security**				
	Vendors shall develop and document in detail measures to be taken in a central counting environment. These measures shall include physical and procedural controls related to the Handling of ballot boxes Preparing of ballots for counting Counting operations and Reporting data	Accept	Appx C 2.6	S	Document review #130 to 134 & 137 closed
7.4	**Software Security**				
7.4.1	**Software and Firmware Installation** The system shall meet the following requirements for installation of software, including hardware with embedded firmware.				
a.	If software is resident in the system as firmware, the vendor shall require and state in the system documentation that every device is to be retested to validate each ROM prior to the start of elections operations.	Accept	S		
b.	To prevent alteration of executable code, no software shall be permanently installed or resident in the voting system unless the system documentation states that the jurisdiction must provide a secure physical and procedural environment for the storage, handling, preparation, and transportation of the system hardware.	Accept	S		
c.	The voting system bootstrap, monitor, and device-controller software may be resident permanently as firmware, provided that this firmware has been shown to be inaccessible to activation or control by any means other than by the authorized initiation and execution of the vote counting program, and its associated exception handlers.	Accept	S		
d.	The election-specific programming may be installed and resident as firmware, provided that such firmware is installed on a component (such as a computer chip) other than the component on which the operating system resides.	Accept	S		
e.	After initiation of election day testing, no source code or compliers or assemblers shall be resident or accessible.	Accept	S		
7.4.2	**Protection Against Malicious Software** Voting systems shall deploy protection against the many forms of threats to which they may be exposed such as file and macro viruses, worms, Trojan horses, and logic bombs				
	Vendors shall develop and document the procedures to be followed to ensure that such protection is maintained in a current status.	Accept	S		
7.4.3	**Software Distribution and Setup Validation** Subsections 7.4.4, 7.4.5 and 7.4.6 specify requirements for the distribution of voting system software and the setup validation performed on voting system equipment. These requirements are applicable to voting systems that have completed certification testing. (see the Guidelines for the full text)				
7.4.4	**Software Distribution**				
a.	The vendor shall document all software including voting system software, third party software (such as operating systems and drivers) to be installed on the certified voting system, and installation programs.	Accept	Appx B & F		

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i.	The documentation shall have a unique identifier (such as a serial number or part number) for the following set of information: documentation, software vendor name, product name, version, the certification application number of the voting system, file names and paths or other location information (such as storage addresses) of the software.	Pending			Pending certification & direction from the EAC
ii.	The documentation shall designate all software files as static, semi-static or dynamic. *Discussion: Static voting system software such as executable code does not change based on the election being conducted or the voting equipment upon which it is installed. Semi-static voting system software contains configuration information for the voting system based on the voting equipment that is installed and the election being conducted. Semi-static software is only modified during the installation of (a) the voting system software on voting equipment or (b) the election-specific software such as ballot formats. Dynamic voting system software changes over time once installed on voting equipment. However, the specific time or value of the change in the dynamic software is usually unknown in advance, making it impossible to create reference information to verify the software.*	Accept	Appx B & F		
b.	The EAC accredited testing lab shall witness the final build of the executable version of the certified voting system software performed by the vendor.	Accept	Appx F		
i.	The testing lab shall create a complete record of the build that includes: a unique identifier (such as a serial number) for the complete record; a list of unique identifiers of unalterable storage media associated with the record; the time, date, location, names and signatures of all people present; the source code and resulting executable file names; the version of voting system software; the certification application number of the voting system; the name and versions of all (including third party) libraries; and the name, version, and configuration files of the development environment used for the build.	Accept	Appx F		
ii.	The record of the source code and executable files shall be made on unalterable storage media. Each piece of media shall have a unique identifier. *Discussion: Unalterable storage media includes technology such as a CD-R, but not CD-RW. The unique identifiers appear on indelibly printed labels and in a digitally signed file on the unalterable storage media.*	Accept	Appx F		
iii.	The testing lab shall retain this record until notified by the EAC that it can be archived.	Accept	Appx F		
c.	After EAC certification has been granted, the testing lab shall create a subset of the complete record of the build that includes a unique identifier (such as a serial number) of the subset, the unique identifier of the complete record, a list of unique identifiers of unalterable storage media associated with the subset, the vendor and product name, the version of voting system software, the certification number of the voting system, and all the files that resulted from the build and binary images of all installation programs.	Pending	Appx F		Pending certification and direction from the EAC
	The record of the software shall be made on unalterable storage media. Each piece of media shall have a unique identifier.	Pending	Appx F		Pending certification and direction from the EAC
	The testing lab shall retain a copy, send a copy to the vendor, and send a copy to the NIST National Software	Pending	Appx F		Pending certification and direction from the EAC

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	Reference Library (NSRL)2 and/or to any repository designated by a State.				
	The NSRL shall retain this software until notified by the EAC that it can be archived.	Out of scope			
d.	The vendor shall provide the NSRL and any repository designated by a state with a copy of the software installation disk, which the vendor will distribute to purchasers–including the executable binary images of all third party software.	Out of scope			
i.	All voting system software, installation programs and third party software (such as operating systems and drivers) used to install or to be installed on voting system equipment shall be distributed using unalterable storage media.	Out of scope			
ii.	The vendor shall document that the process used to verify the software distributed on unalterable storage media is the certified software by using the reference information provided by the NSRL or other designated repository before installing the software.	Out of scope			
e.	The voting system equipment shall be designed to allow the voting system administrator to verify that the software is the certified software by comparing it to reference information produced by the NSRL or other designated repository.	Out of scope			
f.	The vendors and testing labs shall document to whom they provide voting system software.	Accept			iBeta Voting Project Mgmt Procedure Task 6.3.3 #136 Closed
7.4.5	**Software Reference Information** The NSRL or other repository designated by a state election office shall generate reference information using the binary images of the (a) certified voting system software received on unalterable storage media from testing labs and (b) election- specific software received on unalterable storage media from jurisdictions. See Guidelines for complete text	Out of Scope			
7.4.6	**Software Setup Validation**	Out of Scope			EAC Certification Program Manual 5.8
a.	Setup validation methods shall verify that no unauthorized software is present on the voting equipment.	Accept	Appx C 2.6	Appx F 7.6.3	Document Review only #125 closed
b.	The vendor shall have a process to verify that the correct software is loaded, that there is no unauthorized software, and that voting system software on voting equipment has not been modified, using the reference information from the NSRL or from a State designated repository. i. The process used to verify software should be possible to perform without using software installed on the voting system. ii. The vendor shall document the process used to verify software on voting equipment. iii. The process shall not modify the voting system software on the voting system during the verification process	Accept	Appx C 2.6	Appx F 7.6.3	Document Review only
c.	The vendor shall provide a method to comprehensively list all software files that are installed on voting systems.	Accept	Appx C 2.6	Appx F 7.6.3	Document Review only #126 closed
d.	The verification process should be able to be	Accept	Appx C 2.6	Appx F 7.6.3	Document Review only #127 closed

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	performed using COTS software and hardware available from sources other than the voting system vendor. i. If the process uses hashes or digital signatures, then the verification software shall use a FIPS 140-2 level 1 or higher validated cryptographic module. ii. The verification process shall either (a) use reference information on unalterable storage media received from the repository or (b) verify the digital signature of the reference information on any other media.				
e.	Voting system equipment shall provide a means to ensure that the system software can be verified through a trusted external interface, such as a read-only external interface, or by other means. i. The external interface shall be protected using tamper evident techniques ii. The external interface shall have a physical indicator showing when the interface is enabled and disabled iii. The external interface shall be disabled during voting iv. The external interface should provide a direct read-only access to the location of the voting system software without the use of installed software	Accept	Appx C 2.6	Appx F 7.6.3	Document Review only #128 closed
f.	Setup validation methods shall verify that registers and variables of the voting system equipment contain the proper static and initial values. i. The vendor should provide a method to query the voting system to determine the values of all static and dynamic registers and variables including the values that jurisdictions are required to modify to conduct a specific election. ii. The vendor shall document the values of all static registers and variables, and the initial starting values of all dynamic registers and variables listed for voting system software, except for the values set to conduct a specific election.	Accept	Appx C 2.6	Appx F 7.6.3	Document Review only #129 closed
7.5	**Telecommunications and Data Transmission**				
7.5.1	**Maintaining Data Integrity**				
	Voting systems that use telecommunications to communicate between system components and locations are subject to the same security requirements governing access to any other system hardware, software, and data function.	Accept	T		System does not use Telecommunications and Data Transmission
a.	Voting systems that use electrical or optical transmission of data shall ensure the receipt of valid vote records is verified at the receiving station. This should include standard transmission error detection and correction methods such as checksums or message digest hashes. Verification of correct transmission shall occur at the voting system application level and ensure that the correct data is recorded on all relevant components consolidated within the polling place prior to the voter completing casting of his or her ballot.	Accept	T, S		System does not use Telecommunications and Data Transmission nor does it use Telecommunications and Audio Transmission, but it does use Data Transmission in the absence of Telecommunications. See 2.1.2.d There is no transmission of data prior to the voter casting a ballot.

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					#135 closed
	Data Interception Prevention Voting systems that use telecommunications to communicate between system components and locations before the polling place is officially closed shall:				
a.	Implement an encryption standard currently documented and validated for use by an agency of the U.S. Federal Government and	Accept			System does not use Telecommunications and Data Transmission
b.	Provide a means to detect the presence of an intrusive process, such as an Intrusion Detection System.	Accept			System does not use Telecommunications and Data Transmission
7.5.2	**Protection Against External Threats**				
a.	Voting systems that use public telecommunications networks shall implement protections against external threats to which commercial products used in the system may be susceptible.	Accept			System does not use Telecommunications and Data Transmission
b.	Voting systems that use public telecommunications networks shall provide system documentation that clearly identifies all COTS hardware and software products and communications services used in the development and/or operation of the voting system, including operating systems, communications routers, modem drivers and dial-up networking software.	Accept			System does not use Telecommunications and Data Transmission
i.	Such documentation shall identify the name, vendor, and version used for each such component.	Accept			System does not use Telecommunications and Data Transmission
c.	Voting systems that use public telecommunications networks shall use protective software at the receiving-end of all communications paths to:	Accept			System does not use Telecommunications and Data Transmission
i.	Detect the presence of a threat in a transmission	Accept			System does not use Telecommunications and Data Transmission
ii.	Remove the threat from infected files/data	Accept			System does not use Telecommunications and Data Transmission
iii.	Prevent against storage of the threat anywhere on the receiving device	Accept			System does not use Telecommunications and Data Transmission
iv.	Provide the capability to confirm that no threats are stored in system memory and in connected storage media	Accept			System does not use Telecommunications and Data Transmission
v.	Provide data to the system audit log indicating the detection of a threat and the processing performed	Accept			System does not use Telecommunications and Data Transmission
d.	Vendors shall use multiple forms of protective software as needed to provide capabilities for the full range of products used by the voting system.	Accept			System does not use Telecommunications and Data Transmission
7.5.4.3	Monitoring and Responding to External Threats				
	Voting system that use public telecommunications networks may become vulnerable, by virtue of their system components, to external threats to the accuracy and integrity of vote recording, vote counting, and vote consolidation and reporting processes. Therefore, vendors of such systems shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to:	Accept			System does not use Telecommunications and Data Transmission
a.	Monitor threats, such as through the review of	Accept			System does not use

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	assessments, advisories, and alerts for COTS components issued by the Computer Emergency Response Team (CERT), for which a current listing can be found at http://www.cert.org, the National Infrastructure Protection Center (NIPC), and the Federal Computer Incident Response Capability (FedCIRC), for which additional information can be found at www.uscert.gov				Telecommunications and Data Transmission
b.	Evaluate the threats and, if any, proposed responses	Accept			System does not use Telecommunications and Data Transmission
c.	Develop responsive updates to the system and/or corrective procedures	Accept			System does not use Telecommunications and Data Transmission
d.	Submit the proposed response to the test labs and appropriate states for approval, identifying the exact changes and whether or not they are temporary or permanent	Accept			System does not use Telecommunications and Data Transmission
e.	After implementation of the proposed response is approved by the state, assist clients, either directly or through detailed written procedures, how to update their systems and/or to implement the corrective procedures within the timeframe established by the state	Accept			System does not use Telecommunications and Data Transmission
f.	Address threats emerging too late to correct the system by:	Accept			System does not use Telecommunications and Data Transmission
i.	Providing prompt, emergency notification to the accredited test labs and the affected states and user jurisdictions	Accept			System does not use Telecommunications and Data Transmission
ii.	Assisting client jurisdictions directly or advising them through detailed written procedures to disable the public telecommunications mode of the system	Accept			System does not use Telecommunications and Data Transmission
iii.	Modifying the system after the election to address the threat, submitting the modified system to an accredited test lab and the EAC or state certification authority for approval, and assisting client jurisdictions directly or advising them through detailed written procedures, to update their systems and/or to implement the corrective procedures after approval	Accept			System does not use Telecommunications and Data Transmission
7.5.4	**Shared Operating Environment** Ballot recording and vote counting can be performed in either a dedicated or non-dedicated environment. If ballot recording and vote counting operations are performed in an environment that is shared with other data processing functions, both hardware and software features shall be present to protect the integrity of vote counting and of vote data. Systems that use a shared operating environment shall:				
a.	Use security procedures and logging records to control access to system functions	Accept			Not a shared environment
b.	Partition or compartmentalize voting system functions from other concurrent functions at least logically, and preferably physically as well	Accept			Not a shared environment
c.	Control system access by means of passwords, and restrict account access to necessary functions only	Accept			Not a shared environment
d.	Have capabilities in place to control the flow of information, precluding data leakage through shared system resources	Accept			Not a shared environment
7.5.5	**Access to Incomplete Election Returns and Interactive Queries** If the voting system provides access to incomplete election returns and interactive inquiries before the completion of the official count, the system shall:				
a.	For equipment that operates in a central counting environment, be designed to provide external access to	Accept			EMS has no external access or query

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	incomplete election returns only if that access for these purposes is authorized by the statutes and regulations of the using agency. This requirement applies as well to polling place equipment that contains a removable memory module, or that may be removed in its entirety to a central place for the consolidation of polling place returns.				capability. .
b. i.	Design voting system software and its security environment designed such that data accessible to interactive queries resides in an external file or database created and maintained by the elections software under the restrictions applying to any other output report, namely, that: Design voting system software and its security environment designed such that data accessible to interactive queries resides in an external file or database created and maintained by the elections software under the restrictions applying to any other output report, namely, that: The output file or database has no provision for write-access back to the system.	Accept	G1, S		
ii.	Persons whose only authorized access is to the file or database are denied write-access, both to the file or database, and to the system.	Accept	G1, S		
7.6	**Use of Public Communications Networks**				
7.6.1	**Data Transmission** All systems that transmit data over public telecommunications networks shall:				
a.	Preserve the secrecy of voter ballot selections and prevent anyone from violating ballot privacy	Accept			System does not use Public Telecommunications Networks
b.	Employ digital signatures for all communications between the vote server and other devices that communicate with the server over the network	Accept			System does not use Public Telecommunications Networks
c.	Require that at least two authorized election officials activate any critical operation regarding the processing of ballots transmitted over a public communications network, i.e. the passwords or cryptographic keys of at least two employees are required to perform processing of vote	Accept			System does not use Public Telecommunications Networks
7.6.2	**Casting Individual Ballots**				
	Systems designed for transmission of telecommunications over public networks shall meet security standards that address the security risks attendant with the casting of ballots from polling places controlled by election officials using voting devices configured and installed by election officials and/or their vendor or contractor, and using in-person authentication of individual voters.	Accept			System does not use Public Telecommunications Networks
7.6.2.1	Documentation of Mandatory Security Activities Vendors of voting systems that cast individual ballots over a public telecommunications network shall provide detailed descriptions of:				
a.	All activities mandatory to ensuring effective voting system security to be performed in setting up the system for operation, including testing of security before an election	Accept			System does not use Public Telecommunications Networks
b.	All activities that should be prohibited during voting equipment setup and during the timeframe for voting operations, including both the hours when polls are open and when polls are closed	Accept			System does not use Public Telecommunications Networks
7.6.2.2	Ability to Operate During Interruption of Service These systems shall provide the following capabilities to provide resistance to interruptions of				

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	telecommunications service that prevent voting devices at the polling place from communicating with external components via telecommunications:				
a.	Detect the occurrence of a telecommunications interruption at the polling place and switch to an alternative mode of operation that is not dependent on the connection between polling place voting devices and external system components	Accept			System does not use Public Telecommunications Networks
b.	Provide an alternate mode of operation that includes the functionality of a conventional electronic voting system without losing any single vote	Accept			System does not use Public Telecommunications Networks
c.	Create and preserve an audit trail of every vote cast during the period of interrupted communication and system operation in conventional electronic voting system mode	Accept			System does not use Public Telecommunications Networks
d.	Upon reestablishment of communications, transmit and process votes accumulated while operating in conventional electronic voting system mode with all security safeguards in effect	Accept			System does not use Public Telecommunications Networks
e.	Ensure that all safeguards related to voter identification and authentication are not affected by the procedures employed by the system to counteract potential interruptions of telecommunications capabilities	Accept			System does not use Public Telecommunications Networks
7.7	**Wireless Communication**				
7.7.1	**Controlling Usage**				
a.	If wireless communications are used in a voting system, then the vendor shall supply documentation describing how to use all aspects of wireless communications in a secure manner. This documentation shall include:	Accept			System does not use Wireless Communication
i.	A complete description of the uses of wireless in the voting system including descriptions of the data elements and signals that are to be carried by the wireless mechanism	Accept			System does not use Wireless Communication
ii.	A complete description of the vulnerabilities associated with this proposed use of wireless, including vulnerabilities deriving from the insertion, deletion, modification, capture or suppression of wireless messages	Accept			System does not use Wireless Communication
iii.	A complete description of the techniques used to mitigate the risks associated with the described vulnerabilities including techniques used by the vendor to ensure that wireless cannot send or receive messages other than those situations specified in the documentation. Cryptographic techniques shall be carefully and fully described, including a description of cryptographic key generation, management, use, certification, and destruction	Accept			System does not use Wireless Communication
iv.	A rationale for the inclusion of wireless in the proposed voting system, based on a careful and complete description of the perceived advantages and disadvantages of using wireless for the documented uses compared to using non-wireless approaches Discussion: In general, convenience is not a sufficiently compelling reason, on its own, to justify the inclusion of wireless communications in a voting system. Convenience must be balanced against the difficulty of working with cryptographic keys.	Accept			System does not use Wireless Communication
b.	The details of all cryptographic protocols used for wireless communications, including the specific features and data, shall be documented.	Accept			System does not use Wireless Communication
c.	The wireless documentation shall be closely reviewed for accuracy, completeness, and correctness.	Accept			System does not use Wireless Communication
d.	There shall be no undocumented use of the wireless capability, nor any use of the wireless capability that is	Accept			System does not use Wireless Communication

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	not entirely controlled by an election official. Discussion: This can be tested by reviewing all of the software, hardware, and documentation, and by testing the status of wireless activity during all phases of testing.				
e.	If a voting system includes wireless capabilities, then the voting system shall be able to accomplish the same function if wireless capabilities are not available due to an error or no service.	Accept			System does not use Wireless Communication
i.	The vendor shall provide documentation how to accomplish these functions when wireless is not available.	Accept			System does not use Wireless Communication
f.	The system shall be designed and configured so it is not vulnerable to a single point of failure using wireless communications that causes a total loss of any voting capabilities.	Accept			System does not use Wireless Communication
g.	If a voting system includes wireless capabilities, then the system shall have the ability to turn on the wireless capability when it is to be used and to turn off the wireless capability when the wireless capability is not in use.	Accept			System does not use Wireless Communication
h.	If a voting system includes wireless capabilities, then the system shall not activate the wireless capabilities without confirmation from an elections official.	Accept			System does not use Wireless Communication
7.7.2	**Identifying Usage** Since there are a wide variety of wireless technologies (both standard and proprietary) and differing physical properties of wireless signals, it is important to identify some of the characteristics of the wireless technologies used in the voting system.				
a.	If a voting system provides wireless communications capabilities, then there shall be a method for determining the existence of the wireless communications capabilities.	Accept			System does not use Wireless Communication
b.	If a voting system provides wireless communications capabilities, then there shall be an indication that allows one to determine when the wireless communications (such as radio frequencies) capability is active.	Accept			System does not use Wireless Communication
c.	The indication shall be visual.	Accept			System does not use Wireless Communication
d.	If a voting system provides wireless communications capabilities, then the type of wireless communications used (such as radio frequencies) shall be identified either via a label or via the voting system documentation.	Accept			System does not use Wireless Communication
7.7.3	**Protecting Transmitted Data**				
a.	All information transmitted via wireless communications shall be encrypted and authenticated–with the exception of wireless T-coil coupling–to protect against eavesdropping and data manipulation including modification, insertion, and deletion.	Accept			System does not use Wireless Communication
i.	The encryption shall be as defined in Federal Information Processing Standards (FIPS) 197, “Advanced Encryption Standard (AES).”	Accept			System does not use Wireless Communication
ii.	The cryptographic modules used shall comply with FIPS 140-2, Security Requirements for Cryptographic Modules.	Accept			System does not use Wireless Communication
b.	The capability to transmit non-encrypted and non-authenticated information via wireless communications shall not exist.	Accept			System does not use Wireless Communication
c.	If audible wireless communication is used, and the receiver of the wireless transmission is the human ear, then the information shall not be encrypted. *Discussion: This specifically covers wireless T-Coil coupling for assistive devices used by people who are hard of hearing.*	Accept			System does not use Wireless Communication

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
7.7.4	**Protecting the Wireless Path** If wireless communications are used, then the following capabilities shall exist in order to mitigate the effects of a denial of service (DoS) attack:				
a.	The voting system shall be able to function properly throughout a DoS attack, since the DoS attack may continue throughout the voting period.	Accept			System does not use Wireless Communication
b.	The voting system shall function properly as if the wireless capability were never available for use.	Accept			System does not use Wireless Communication
c.	Alternative procedures or capabilities shall exist to accomplish the same functions that the wireless communications capability would have done.	Accept			System does not use Wireless Communication
d.	If infrared is being used, the shielding shall be strong enough to prevent escape of the voting system signal, as well as strong enough to prevent infrared saturation jamming. *Discussion: Since infrared has the line-of-sight property, securing the wireless path can be accomplished by shielding the path between the communicating devices with an opaque enclosure. However, this is only practical for short distances. This shielding would also help prevent accidental eye damage from the infrared signal.*	Accept			System does not use Wireless Communication
7.7.5	**Protecting the Voting System** Physical security measures to prevent access to a voting system are not possible when using a wireless communications interface because there is no discrete physical communications path that can be secured.				
a.	The security requirements in Subsection 2.1.1 shall be applicable to systems with wireless communications.	Accept			System does not use Wireless Communication
b.	The accuracy requirements in Subsection 2.1.2 shall be applicable to systems with wireless communications.	Accept			System does not use Wireless Communication
c.	The use of wireless communications that may cause impact to the system accuracy through electromagnetic stresses is prohibited.	Accept			System does not use Wireless Communication
d.	The error recovery requirements in Subsection 2.1.3 shall be applicable to systems with wireless communications.	Accept			System does not use Wireless Communication
e.	All wireless communications actions shall be logged.	Accept			System does not use Wireless Communication
i.	The log shall contain at least the following entries: times when the wireless is activated and deactivated, services accessed, identification of device to which data was transmitted to or received from, identification of authorized user, and successful and unsuccessful attempts to access wireless communications or service. *Discussion: Other information such as the number of frames or packets transmitted or received at various logical layers may be useful, but is dependent on the wireless technology used.*	Accept			System does not use Wireless Communication
f.	Device authentication shall occur before any access to, or services from, the voting system are granted through wireless communications. *Discussion: Authentication is an important element to protect the security of wireless communications. Authentication verifies the identity and legitimacy of users, devices, and services.*	Accept			System does not use Wireless Communication
i.	User authentication shall be at least level 2 as per NIST Special Publication 800-63 Version 1.0.1, Electronic Authentication Guideline.	Accept			System does not use Wireless Communication
7.8	**Independent Verification Systems** (See the guidelines for the complete text.)				
7.8.1	**Overview** (See the guidelines for the complete text.)				
7.8.2	**Basic Characteristics of IV Systems**				
	An independent verification system produces at least two independent cast vote records of ballot selections	Accept			Not an IV System

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	via interactions with the voter, such that one record can be compared against the other to check their equality of content. *Discussion: This is the fundamental characteristic of IV systems. The records can be checked against one another to determine whether or not the voter selections are correctly recorded.*				
	The voter verifies the content of each cast vote record and either (a) verifies at least one of the records directly or (b) verifies both records indirectly if the records are each under the control of independent processes. *Discussion: Direct verification involves using human senses; for example, directly reading a paper record via one's eyesight. Indirect verification involves using an intermediary to perform the verification; for example, verifying an electronic ballot image on the voting machine.*	Accept			Not an IV System
	The creation, storage and handling of the cast vote records are sufficiently separate that the failure or compromise of one record does not cause the failure or compromise of another. *Discussion: The records must be stored on different media and handled independently of each other so that no one process could compromise all records. If an attack can alter one record, it should still be very difficult to alter the other record*.	Accept			Not an IV System
	Both cast vote records are highly resistant to damage or alteration and capable of long-term storage. *Discussion: The records should be difficult to alter or damage so that they could be used in case the counted records are damaged or lost*.	Accept			Not an IV System
	The processes of verification for the cast vote records do not all depend on the same device, software module, or system for their integrity, and are sufficiently separate that each record provides evidence of the voter's selections independently of its corresponding record. *Discussion: For example, the verification of the summary screen (electronic record) of a DRE is sufficiently separate from the verification of a paper record printed by a VVPAT component or a copy of the electronic record stored on a separate system.*	Accept			Not an IV System
	The multiple cast vote records are linked to their corresponding audit records by including a unique identifier within each record. *Discussion: The identifier serves the purpose of uniquely identifying and linking the records for cross-checking.*	Accept			Not an IV System
	Each cast vote record includes information identifying the following: • An identification of the polling place and precinct • Whether the balloting is provisional, early, or on election day • Ballot style • A timestamp generated when the voting machine is enabled to begin a voting session that can be used to correctly group the cast vote records • A unique identifier associated with the voting machine *Discussion: The identifier could be a serial number or other unique ID.*	Accept			Not an IV System
	The cryptographic software used in IV systems is approved by the U.S. Government's Cryptographic Module Validation Program, as applicable. *Discussion: IV voting systems may use cryptographic software for a number of different purposes, including calculating checksums, encrypting records, authentication, generating random numbers, and for digital signatures. This software should*	Accept			Not an IV System

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	be reviewed and approved by the Cryptographic Module Validation Program (CMVP). There may by cryptographic voting schemes where the cryptographic algorithms used are necessarily different from any algorithms that have approved CMVP implementations, thus CMVP-approved software shall be used where feasible. The CMVP website is http://csrc.nist.gov/cryptval.				
7.9	**Voter Verifiable Paper Audit Trail Requirements** This section contains requirements for DREs with a Voter Verifiable Paper Audit Trail (VVPAT) component. VVPAT capability is not required for national certification. However, these requirements will be applied for certification testing of DRE systems that are intended for use in states that require DREs to provide this capability. The vendor's certification testing application to the EAC must indicate whether the system being presented for testing includes this capability, as provided under Subsection 1.6.2.5 extensions.				
7.9.1	**Display and Print a Paper Record.**				
a.	The voting system shall print and display a paper record of the voter ballot selections prior to the voter making his or her selections final by casting the ballot. *Discussion: This is the basic requirement for VVPAT capability. It requires the paper record to be created as a distinct representation of the voter ballot selections. It requires the paper record to contain the same information as the electronic record and be suitable for use in verifications of the voting machine's electronic records.*	Accept			DRE does not have a VVPAT
b.	The paper record shall constitute a complete record of ballot selections that can be used to assess the accuracy of the voting machine's electronic record, to verify the election results, and, if required by state law, in full recounts. *Discussion: This requirement exists to make clear that it is possible to use the paper record for checks of the voting machine's accuracy in recording voter ballot selections, as well as usable for election audits (such as mandatory 1% recounts). The paper record shall also be suitable for use in full recounts of the election if required by state law.*	Accept			DRE does not have a VVPAT
c.	The paper record shall contain all voter selection information stored in the electronic (ballot image) record. Discussion: The electronic ballot image record cannot hide any information related to ballot selections; all information relating to voter selections must be equally present in both records. The electronic record may contain other items that don't necessarily need to be on the paper record, such as digital signature information.	Accept			DRE does not have a VVPAT
7.9.2	**Approve or Void the Paper Record**				
a.	The voting equipment shall allow the voter to approve or void the paper record. *Discussion: There are three possible scenarios regarding the voter's disposition of the paper record:* *• The voter can verify that the ballot selections displayed on the DRE summary screen and those printed on the paper record are the same. If they are, and the voter is satisfied with these selections, the voter can proceed to cast his or her ballot, thereby approving the paper record.* *• If the selections match, but the voter wishes to change one or more selections, the paper record must be voided so a new paper record can be created to compare to the new summary screen displayed after the voter changes his or her ballot selections.*	Accept			DRE does not have a VVPAT

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	• *In the event the selections do not match between the summary screen and the paper record, the voter shall immediately request assistance from a poll worker. A non-match could indicate a potential voting machine or printer malfunction.*				
b.	The voting equipment shall, in the presence of the voter, mark the paper record as being approved by the voter if the ballot selections are Accept; or voided or if the voter decides to change one or more selections.	Accept			DRE does not have a VVPAT
c.	If the records do not match, the voting equipment shall mark and preserve the paper record and shall provide a means to preserve the corresponding electronic record so the source of error or malfunction can be analyzed.	Accept			DRE does not have a VVPAT
d.	The voting machine shall not record the electronic record until the paper record has been approved by the voter.	Accept			DRE does not have a VVPAT
e.	Vendor documentation shall include procedures to enable the election official to return a voting machine to correct operation after a voter has used it incompletely or incorrectly. This procedure shall not cause discrepancies between the tallies of the electronic and paper records.	Accept			DRE does not have a VVPAT
7.9.3	**Electronic and Paper Record Structure**				
a.	All cryptographic software in the voting system shall be approved by the U.S. Government's Cryptographic Module Validation Program, as applicable. *Discussion: Cryptographic software may be used for a number of different purposes, including calculating checksums, encrypting records, authentication, generating random numbers, and digital signatures. This software should be reviewed and approved by the Cryptographic Module Validation Program (CMVP). There may be cryptographic voting schemes where the cryptographic algorithms used are necessarily different from any algorithms that have approved CMVP implementations, thus CMVP approved software should be used where feasible but is not required. The CMVP website is http://csrc.nist.gov/cryptval.*	Accept			DRE does not have a VVPAT
b.	The electronic ballot image and paper records shall include information about the election.	Accept			DRE does not have a VVPAT
i.	The voting equipment shall be able to include an identification of the particular election, the voting site and precinct, and the voting machine. *Discussion: If the voting site and precinct are different, both should be included*.	Accept			DRE does not have a VVPAT
ii.	The records shall include information identifying whether the balloting is provisional, early, or on election day, and information that identifies the ballot style in use.	Accept			DRE does not have a VVPAT
iii.	The records shall include a voting session identifier that is generated when the voting equipment is placed in voting mode, and that can be used to identify the records as being created during that voting session. *Discussion: If there are several voting sessions on the same voting machine on the same day, the voting session identifiers must be different. They should be generated from a random number generator.*	Accept			DRE does not have a VVPAT
c.	The electronic ballot image and paper records shall be linked by including a unique identifier within each record that can be used to identify each record uniquely and each record's corresponding record. Discussion: The identifier serves the purpose of uniquely identifying and linking the records for cross-checking.	Accept			DRE does not have a VVPAT
d.	The voting machine should generate and store a digital signature for each electronic record.	Accept			DRE does not have a VVPAT

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
e.	The electronic ballot image records shall be able to be exported for auditing or analysis on standards-based and /or COTS information technology computing platforms.	Accept			DRE does not have a VVPAT
i.	The exported electronic ballot image records shall be in a publicly available, non-proprietary format. Discussion: It is advantageous when all electronic records, regardless of manufacturer, use the same format or can easily be converted to a publicly available, non-proprietary format; for example, the OASIS Election Markup Language (EML) Standard.	Accept			DRE does not have a VVPAT
ii.	The records should be exported with a digital signature, which shall be calculated on the entire set of electronic records and their associated digital signatures. *Discussion: This is necessary to determine if records are missing or substituted.*	Accept			DRE does not have a VVPAT
iii.	The voting system vendor shall provide documentation as to the structure of the exported ballot image records and how they shall be read and processed by software.	Accept			DRE does not have a VVPAT
iv.	The voting system vendor shall provide a software program that will display the exported ballot image records and that may include other capabilities such as providing vote tallies and indications of undervotes.	Accept			DRE does not have a VVPAT
v.	The voting system vendor shall provide full documentation of procedures for exporting electronic ballot image records and reconciling those records with the paper audit records.	Accept			DRE does not have a VVPAT
f.	The paper record should be created in a format that may be made available across different manufacturers of electronic voting systems. Discussion: There may be a future requirement for some commonality in the format of paper records.	Accept			DRE does not have a VVPAT
g,	The paper record shall be created such that its contents are machine readable. *Discussion: This can be done by using specific OCR fonts or barcodes.*	Accept			DRE does not have a VVPAT
i.	The paper record shall contain error correcting codes for the purpose of detecting read errors and for preventing other markings on the paper record from being misinterpreted when machine reading the paper record. *Discussion: This requirement is not mandatory if a state prohibits the paper record from containing any information that cannot be read and understood by the voter. This requirement serves the purpose of detecting scanning errors and preventing stray or deliberate markings on the paper from being interpreted as valid data.*	Accept			DRE does not have a VVPAT
h.	If barcode is used, the voting equipment shall be able to print a barcode with each paper record that contains the human-readable contents of the paper record. *Discussion: This requirement is not mandatory if a state prohibits the paper record from containing any information that cannot be read and understood by the voter.*	Accept			DRE does not have a VVPAT
i.	The barcode shall use an industry standard format and shall be able to be read using readily available commercial technology. *Discussion: Examples of such codes are Maxi Code or PDF417.*	Accept			DRE does not have a VVPAT
ii.	If the corresponding electronic record contains a digital signature, the digital signature shall be included in the barcode on the paper record.	Accept			DRE does not have a VVPAT
iii.	The barcode shall not contain any information other than the paper record's human-readable content, error correcting codes, and digital signature information.	Accept			DRE does not have a VVPAT
7.9.4	**Equipment Security and Reliability**				
a.	The voting machine shall provide a standard, publicly	Accept			DRE does not have a

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	documented printer port (or the equivalent) using a standard communication protocol. *Discussion: Using a standard, publicly documented printer protocol assists in security evaluations of system software.*				VVPAT
b.	Tamper-evident seals or physical security measures shall protect the connection between the printer and the voting machine.	Accept			DRE does not have a VVPAT
c.	If the connection between the voting machine and the printer has been broken, the voting machine shall detect this event and record it in the DRE internal audit log.	Accept			DRE does not have a VVPAT
d.	The paper path between the printing, viewing and storage of the paper record shall be protected and sealed from access except by authorized election officials.	Accept			DRE does not have a VVPAT
e.	The printer shall not be permitted to communicate with any system or machine other than the voting machine to which it is connected.	Accept			DRE does not have a VVPAT
f.	The printer shall only be able to function as a printer; it shall not contain any other services (e.g., provide copier or fax functions) or network capability.	Accept			DRE does not have a VVPAT
g.	The voting machine shall detect errors and malfunctions such as paper jams or low supplies of consumables such as paper and ink that may prevent paper records from being correctly displayed, printed or stored. *Discussion: This could be accomplished in a variety of different ways; for example, a printer that is out of paper or jammed could issue a different audible alarm for each condition.*	Accept			DRE does not have a VVPAT
h.	If an error or malfunction occurs, the voting machine shall suspend voting operations and should present a clear indication to the voter and election officials of the malfunction.	Accept			DRE does not have a VVPAT
i.	The voting machine shall not record votes if an error or malfunction occurs.	Accept			DRE does not have a VVPAT
j.	Printing devices should contain sufficient supplies of paper and ink to avoid reloading or opening equipment covers or enclosures and thus potential circumvention of security features; or be able to reload paper and ink with minimal disruption to voting and without circumvention of security features such as seals.	Accept			DRE does not have a VVPAT
k.	Vendor documentation shall include procedures for investigating and resolving printer malfunctions including, but not limited to; printer operations, misreporting of votes, unreadable paper records, and power failures.	Accept			DRE does not have a VVPAT
l.	l. Vendor documentation shall include printer reliability specifications including Mean Time Between Failure estimates, and shall include recommendations for appropriate quantities of backup printers and supplies.	Accept			DRE does not have a VVPAT
	Protective coverings intended to be transparent on voting equipment shall be maintainable via a predefined cleaning process. If the coverings become damaged such that they obscure the paper record, they shall be replaceable.	Accept			DRE does not have a VVPAT
	n. The paper record shall be sturdy, clean, and of sufficient durability to be used for verifications, reconciliations, and recounts conducted manually or by automated processing.	Accept			DRE does not have a VVPAT
7.9.5	**Preserving Voter Privacy** VVPAT records can be printed and stored by two different methods: • Printed and stored on a continuous spool-to-spool paper roll where the voter views the paper record in a window • Printed on separate pieces of paper, which are				

VVSG	Certification Test Requirements EAC Voluntary Voting System Guidelines 2005	Test Result	Test Case	Function Exercised	Comments & References to Test Issues
	deposited in a secure Receptacle. If a requirement applies to only one method, that will be specified. Otherwise, the requirement applies to both.				
a.	Voter privacy shall be preserved during the process of recording, verifying and auditing his or her ballot selections. Discussion: The privacy requirements from Section 3 also apply to voting equipment with VVPAT.	Accept			DRE does not have a VVPAT
b.	When a VVPAT with a spool-to-spool continuous paper record is used, a means shall be provided to preserve the secrecy of the paper record of voter selections.	Accept			DRE does not have a VVPAT
c.	When a VVPAT with a spool-to-spool continuous paper record is used, no record shall be maintained of which voters used which voting machine or the order in which they voted.	Accept			DRE does not have a VVPAT
d.	The electronic and paper records shall be created and stored in ways that preserve the privacy of the voter. *Discussion: For VVPAT systems that use separate pieces of paper for the record, this can be accomplished in various ways including shuffling the order of the records or other methods to separate the order of stored records.*	Accept			DRE does not have a VVPAT
e.	The privacy of voters whose paper records contain an alternative language shall be maintained.	Accept			DRE does not have a VVPAT
f.	Unique identifiers shall not be displayed in a way that is easily memorable by the voter. Discussion: Unique identifiers on the paper record are displayed or formatted in such a way that they are not memorable to voters, such as by obscuring them in other characters.	Accept			DRE does not have a VVPAT
g.	Both paper rolls and paper record secure receptacles shall be controlled, protected, and preserved with the same security as a ballot box.	Accept			DRE does not have a VVPAT
7.9.6	**VVPAT Usability**				
a.	All usability requirements from Subsection 3.1 shall apply to voting machines with VVPAT. Discussion: The requirements in this section are in addition to those in Subsection 3.1.	Accept			DRE does not have a VVPAT
b.	The voting equipment shall be capable of showing the information on the paper in a font size of at least 3.0 mm and should be capable of showing the information in at least two font ranges; 3.0-4.0 mm, and 6.3-9.0 mm, under control of the voter or poll worker. Discussion: In keeping with requirements in Subsection 3.1, the paper record should use the same font sizes as displayed by the voting machine, but at least be capable of 3.0 mm. While larger font sizes may assist voters with poor vision, certain disabilities such as tunnel vision are best addressed by smaller font sizes.	Accept			DRE does not have a VVPAT
c.	The voting equipment shall display, print and store the paper record in any of the written alternative languages chosen for the ballot.	Accept			DRE does not have a VVPAT
i.	To assist with manual auditing, candidate names on the paper record shall be presented in the same language as used on the DRE summary screen.	Accept			DRE does not have a VVPAT
ii,	Information on the paper record not needed by the voter to perform verification shall be in English. Discussion: In addition to the voter ballot selections, the marking of the paper record as Accept or void, and the indication of the ballot page number need to be printed in the alternative language. Other information, such as precinct and election identifiers, shall be in English to facilitate use of the paper record for auditing.	Accept			DRE does not have a VVPAT
d.	The paper and electronic records shall be presented to allow the voter to read and compare the records without the voter having to shift his or her position.	Accept			DRE does not have a VVPAT
e.	If the paper record cannot be displayed in its entirety on	Accept			DRE does not have a

7.2 *Appendix B: PCA Source Code Review*

7.2.1 Infinity 4.0 C and Visual Basic 6.0 Source Code Review Data

Voting System: Election Management System **Report Date:** 6/4/2008
Component: Infinity **Version:** 4.00
Programming Language: C (Borland C++ 5.02 compiler)

VVSG	Requirement	Definition	
Vol. 1 Section 5.2.2-Software Integrity			Instances
v.1: 5.2.2	**Self-modifying code**	Self-modifying, dynamically loaded, or modification of compiled or interpreted code is prohibited	0
Vol. 1 Section 5.2.3- Software Modularity and Programming			Instances
v.1: 5.2.3.a	**Specific function**	Module performs a specific function	0
v.1: 5.2.3.b	**Module has unique name**	Uniquely and mnemonically named using names that differ by more than a single character	1
v.1: 5.2.3.b 5.2.7 (a, a.1-a.6)	**Module has header**	Header describes purpose, other units needed, inputs, outputs, files read or written, globals, revision records (for modules greater than 10 lines) Header comments shall provide the following information: 1) The purpose of the unit and how it works; 2) Other units called and the calling sequence 3) A description of input parameters and outputs 4) File references by name and method of access 5) Global variables used 6) Date of creation and a revision record	132
v.1: 5.2.3.c	**Required resources**	All required resources, such as data accessed by the module, should either be contained within the module or explicitly identified	1
v.1: 5.2.3.e	**Single Entry Point**	Module has a single entry point	0
v.1: 5.2.3.e	**Single Exit Point**	Module has a single exit point	1
v.1: 5.2.3.f	**Control structures**	Support the modular concept and apply to any language feature where program control passes from one activity to the next.	0
Vol. 1 Section 5.2.4-Control Constructs			Instances
v.1: 5.2.4.a	**Acceptable Constructs**	Acceptable constructs are Sequence, If-Then-Else, Do-While, Do-Until, Case, and the General loop (including the special case for loop);	0
v.1: 5.2.4.b	**Vendor Defined Constructs with Justification**	If the programming language used does not provide these control constructs, the vendor shall provide them (that is, comparable control structure logic). The constructs shall be used consistently throughout the code. No other constructs shall be used to control program logic and execution	0
v.1: 5.2.4.c	**Execution through Control Constructs**	While some programming languages do not create programs as linear processes, stepping from an initial condition, through changes, to a conclusion, the program components nonetheless contain procedures (such as “methods” in object-oriented languages). Even in these programming languages, the procedures must execute through these control constructs.	0
v.1: 5.2.4.d	**Program re-direction**	Logic that evaluates received or stored data shall not re-direct program control	0
Vol. 1 Section 5.2.5-Naming Conventions			Instances
v1: 5.2.5.a	**Name Readability**	Names shall be selected so that their parts of speech represent their use.	2
v.1: 5.2.5.b 5.2.5.c	**Class, function and variable names**	Consistent names are used. Names shall be unique within an application and differ by more than a single character.	0
v.1: 5.2.5.d	**Keyword**	Keywords shall not be used as names of objects, functions, procedures, or variables	0
Vol. 1 Section 5.2.6-Coding Conventions			Instances
v.2: 5.4.2.a	**Uniform calling sequences**	Uses uniform calling sequences.	2
v.2: 5.4.2.a	**Parameters type and range validation**	All parameters shall either be validated for type and range on entry into each unit or the unit comments shall explicitly identify the types and ranges	0
v.2: 5.4.2.b	**Explicit return values**	The return is explicitly defined for functions and explicitly assigned	0

VVSG	Requirement	Definition	
v.2: 5.4.2.c	**Macros**	Does not use macros that contain returns or pass control beyond the next statement	0
v.2: 5.4.2.d	**Unbound arrays**	Provides controls to prevent writing beyond the array, string, or buffer boundaries	25
v.2: 5.4.2.e	**Pointers**	Provides controls that prevent pointers from being used to overwrite executable instructions or to access areas where vote counts or audit records are stored	0
v.2: 5.4.2.f	**Case statements**	Default choice explicitly defined	0
v.2: 5.4.2.g	**Vote counter overflowing**	Provides controls to prevent any vote counter from overflowing	0
v.2: 5.4.2.h	**Indentation**	Code is indented consistently and clearly	2
v.2: 5.4.2.j	**Code generator**	Generated code should be marked as such with comments defining the logic invoked	0
v.2: 5.4.2.k	**Line length**	No line of code exceeding 80 columns in width without justification	37
v.2: 5.4.2.l	**Executable statement**	One executable statement for each line of source code	8
v.2: 5.4.2.m	**Embedded executable statement**	The single embedded statement may be considered a part of the conditional expression. Any additional executable statements should be split out to the other lines.	0
v.2: 5.4.2.n	**Mixed-mode operations**	Avoids mixed-mode operations. Comment if mixed-mode usage is necessary.	10
v.2: 5.4.2.o	**Exit() message**	Upon exit() at any point, presents a message to the user indicating the reason for the exit ().	0
v.2: 5.4.2.p	**Format of messages**	Separate and consistent formats to distinguish between normal status and error or exception messages	21
v.2: 5.4.2.q	**References variables**	References variables by fewer than five levels of indirection (i.e. a.b.c.d or a[b].c->d)	0
v.2: 5.4.2.r	**Levels of indented scope**	Functions with fewer than six levels of indented scope	3
v.2: 5.4.2.s	**Variable initialization**	Initializes every variable upon declaration where permitted.	0
v.2: 5.4.2.t	**Constant Definitions**	All constants other than “0” and “1” defined or enumerated	82
v.2: 5.4.2.u	**Ternary Operator**	Only contains the minimum implementation of the “a = b ? c : d” syntax. Expansions such as “j=a?(b?c:d):e;” are prohibited.	0
v.2: 5.4.2.v	**Assert() statement**	All assert() statements coded such that they are absent from a production compilation	0
Vol. 1 Section 5.2.7 –Comment Conventions			**Instances**
v.1: 5.2.7.b	**Variables**	All variables shall have comments at the point of declaration	2
v.1: 5.2.7.c	**In-Line Comments**	In-line comments shall be provided to facilitate interpretation of functional operations, tests, and branching	26
v.1: 5.2.7.d	**Assembly code**	Assembly code shall contain descriptive and informative comments	0
v.1: 5.2.7.e	**Comments in uniform format**	All comments formatted in a uniform manner	0
Vol. 1 Section 7.4.2 –Protection Against Malicious Software			**Instances**
v.1: 7.4.2	**Malicious Software**	Susceptibility to file or macro viruses, worms, Trojan horses, logic bombs, or hardcoded passwords	2

Software related source code discrepancy detail is in the Addendum to Appendix B.

File Function Line Counts

v.1: 5.2.3.d v.2: 5.4.2.i	**File’s functions’ line count**	On the Application level, no more than 50% exceeding 60 lines, no more than 5% exceeding 120 lines, and none exceeding240 lines without justification.	**< 60**	**60 to 120**	**120 to 240**	**> 240**	**Total**
Infinity	**4.00**	C (Borland C++ 5.02 compiler)	483 81.04%	74 12.42%	25 4.19%	14 2.35%	596 100.00%

7.2.2 EMS 4.0 VB.Net Source Code Review Data

Voting System:	Election Management System	**Report Date:**	9/10/2008
Component:	EMS	**Version:**	4.0.21.0
Programming Language:		VB.Net	

VVSG	Requirement	Definition	
Vol. 1 Section 5.2.2-Software Integrity			**Instances**
v.1: 5.2.2	**Self-modifying code**	Self-modifying, dynamically loaded, or modification of compiled or interpreted code is prohibited	0
Vol. 1 Section 5.2.3- Software Modularity and Programming			**Instances**
v.1: 5.2.3.a	**Specific function**	Module performs a specific function	2
v.1: 5.2.3.b	**Module has unique name**	Uniquely and mnemonically named using names that differ by more than a single character	0
v.1: 5.2.3.b 5.2.7 (a, a.1-a.6)	**Module has header**	Header describes purpose, other units needed, inputs, outputs, files read or written, globals, revision records (for modules greater than 10 lines) Header comments shall provide the following information: 1) The purpose of the unit and how it works; 2) Other units called and the calling sequence 3) A description of input parameters and outputs 4) File references by name and method of access 5) Global variables used 6) Date of creation and a revision record	189
v.1: 5.2.3.c	**Required resources**	All required resources, such as data accessed by the module, should either be contained within the module or explicitly identified	2
v.1: 5.2.3.e	**Single Entry Point**	Module has a single entry point	1
v.1: 5.2.3.e	**Single Exit Point**	Module has a single exit point	38
v.1: 5.2.3.f	**Control structures**	Support the modular concept and apply to any language feature where program control passes from one activity to the next.	1
Vol. 1 Section 5.2.4-Control Constructs			**Instances**
v.1: 5.2.4.a	**Acceptable Constructs**	Acceptable constructs are Sequence, If-Then-Else, Do-While, Do-Until, Case, and the General loop (including the special case for loop);	8
v.1: 5.2.4.a.i	**Vendor Defined Constructs with Justification**	If the programming language used does not provide these control constructs, the vendor shall provide them (that is, comparable control structure logic). The constructs shall be used consistently throughout the code. No other constructs shall be used to control program logic and execution	0
v.1: 5.2.4.a.ii	**Execution through Control Constructs**	While some programming languages do not create programs as linear processes, stepping from an initial condition, through changes, to a conclusion, the program components nonetheless contain procedures (such as “methods” in object-oriented languages). Even in these programming languages, the procedures must execute through these control constructs.	1
v.1: 5.2.4.a.iii	**Program re-direction**	Logic that evaluates received or stored data shall not re-direct program control	0
Vol. 1 Section 5.2.5-Naming Conventions			**Instances**
v1: 5.2.5.a	**Name Readability**	Names shall be selected so that their parts of speech represent their use. See Naming and Other Conventions table.	5
v.1: 5.2.5.b 5.2.5.c	**Class, function and variable names**	Consistent names are used. Names shall be unique within an application and differ by more than a single character. See Naming and Other Conventions table.	396
v.1: 5.2.5.d	**Keyword**	Keywords shall not be used as names of objects, functions, procedures, or variables	1
Vol. 1 Section 5.2.6-Coding Conventions			**Instances**
v.2: 5.4.2.a	**Uniform calling sequences**	Uses uniform calling sequences.	1
v.2: 5.4.2.a	**Parameters type and range validation**	All parameters shall either be validated for type and range on entry into each unit or the unit comments shall explicitly identify the types and ranges	18
v.2: 5.4.2.b	**Explicit return values**	The return is explicitly defined for functions and explicitly assigned	18
v.2: 5.4.2.c	**Macros**	Does not use macros that contain returns or pass control beyond	0

VVSG	Requirement	Definition	
		the next statement	
v.2: 5.4.2.d	**Unbound arrays**	Provides controls to prevent writing beyond the array, string, or buffer boundaries	31
v.2: 5.4.2.e	**Pointers**	Provides controls that prevent pointers from being used to overwrite executable instructions or to access areas where vote counts or audit records are stored	0
v.2: 5.4.2.f	**Case statements**	Default choice explicitly defined	2
v.2: 5.4.2.g	**Vote counter overflowing**	Provides controls to prevent any vote counter from overflowing	3
v.2: 5.4.2.h	**Indentation**	Code is indented consistently and clearly	16
v.2: 5.4.2.j	**Code generator**	Generated code should be marked as such with comments defining the logic invoked	1
v.2: 5.4.2.k	**Line length**	No line of code exceeding 80 columns in width without justification	12
v.2: 5.4.2.l	**Executable statement**	One executable statement for each line of source code	0
v.2: 5.4.2.m	**Embedded executable statement**	The single embedded statement may be considered a part of the conditional expression. Any additional executable statements should be split out to the other lines.	0
v.2: 5.4.2.n	**Mixed-mode operations**	Avoids mixed-mode operations. Comment if mixed-mode usage is necessary.	10
v.2: 5.4.2.o	**Exit() message**	Upon exit() at any point, presents a message to the user indicating the reason for the exit ().	1
v.2: 5.4.2.p	**Format of messages**	Separate and consistent formats to distinguish between normal status and error or exception messages	82
v.2: 5.4.2.q	**References variables**	References variables by fewer than five levels of indirection (i.e. a.b.c.d or a[b].c->d)	127
v.2: 5.4.2.r	**Levels of indented scope**	Functions with fewer than six levels of indented scope	0
v.2: 5.4.2.s	**Variable initialization**	Initializes every variable upon declaration where permitted.	0
v.2: 5.4.2.t	**Constant Definitions**	All constants other than “0” and “1” defined or enumerated	66
v.2: 5.4.2.u	**Ternary Operator**	Only contains the minimum implementation of the “a = b ? c : d” syntax. Expansions such as “j=a?(b?c:d):e;” are prohibited.	0
v.2: 5.4.2.v	**Assert() statement**	All assert() statements coded such that they are absent from a production compilation	0
Vol. 1 Section 5.2.7 –Comment Conventions			**Instances**
v.1: 5.2.7.b	**Variables**	All variables shall have comments at the point of declaration	22
v.1: 5.2.7.c	**In-Line Comments**	In-line comments shall be provided to facilitate interpretation of functional operations, tests, and branching	45
v.1: 5.2.7.d	**Assembly code**	Assembly code shall contain descriptive and informative comments	0
v.1: 5.2.7.e	**Comments in uniform format**	All comments formatted in a uniform manner	3
Vol. 1 Section 7.4.2 –Protection Against Malicious Software			**Instances**
v.1: 7.4.2	**Malicious Software**	Susceptibility to file or macro viruses, worms, Trojan horses, logic bombs, or hardcoded passwords	5

Software related source code discrepancy detail is in the Addendum to Appendix B.

File Function Line Counts

v.1: 5.2.3.d v.2: 5.4.2.i	**File's functions' line count**	On the Application level, no more than 50% exceeding 60 lines, no more than 5% exceeding 120 lines, and none is exceeds 240 lines without justification.	**< 60**	**60 to 120**	**120 to 240**	**> 240**	**Total**
EMS	**4.00 (4.0.21.0 minor)**	VB.Net	1859 94.08%	80 4.05%	23 1.16%	14 0.71%	1976 100.00%

7.2.3 EMS 4.0 SQL Source Code Review Data

Voting System:	Election Management System	**Report Date:**	9/23/2008
Component:	EMS	**Version:**	4.0.21.0
Programming Language:		SQL	

VVSG	Requirement	Definition	
Vol. 1 Section 5.2.2-Software Integrity			**Instances**
v.1: 5.2.2	**Self-modifying code**	Self-modifying, dynamically loaded, or modification of compiled or interpreted code is prohibited	0
Vol. 1 Section 5.2.3- Software Modularity and Programming			**Instances**
v.1: 5.2.3.a	**Specific function**	Module performs a specific function	0
v.1: 5.2.3.b	**Module has unique name**	Uniquely and mnemonically named using names that differ by more than a single character	0
v.1: 5.2.3.b 5.2.7 (a, a.1-a.6)	**Module has header**	Header describes purpose, other units needed, inputs, outputs, files read or written, globals, revision records (for modules greater than 10 lines) Header comments shall provide the following information: 1) The purpose of the unit and how it works; 2) Other units called and the calling sequence 3) A description of input parameters and outputs 4) File references by name and method of access 5) Global variables used 6) Date of creation and a revision record	134
v.1: 5.2.3.c	**Required resources**	All required resources, such as data accessed by the module, should either be contained within the module or explicitly identified	0
v.1: 5.2.3.e	**Single Entry Point**	Module has a single entry point	0
v.1: 5.2.3.e	**Single Exit Point**	Module has a single exit point	11
v.1: 5.2.3.f	**Control structures**	Support the modular concept and apply to any language feature where program control passes from one activity to the next.	0
Vol. 1 Section 5.2.4-Control Constructs			**Instances**
v.1: 5.2.4.a	**Acceptable Constructs**	Acceptable constructs are Sequence, If-Then-Else, Do-While, Do-Until, Case, and the General loop (including the special case for loop);	0
v.1: 5.2.4.a.i	**Vendor Defined Constructs with Justification**	If the programming language used does not provide these control constructs, the vendor shall provide them (that is, comparable control structure logic). The constructs shall be used consistently throughout the code. No other constructs shall be used to control program logic and execution	0
v.1: 5.2.4.a.ii	**Execution through Control Constructs**	While some programming languages do not create programs as linear processes, stepping from an initial condition, through changes, to a conclusion, the program components nonetheless contain procedures (such as “methods” in object-oriented languages). Even in these programming languages, the procedures must execute through these control constructs.	0
v.1: 5.2.4.a.iii	**Program re-direction**	Logic that evaluates received or stored data shall not re-direct program control	0
Vol. 1 Section 5.2.5-Naming Conventions			**Instances**
v1: 5.2.5.a	**Name Readability**	Names shall be selected so that their parts of speech represent their use. See Naming and Other Conventions table.	6
v.1: 5.2.5.b 5.2.5.c	**Class, function and variable names**	Consistent names are used. Names shall be unique within an application and differ by more than a single character. See Naming and Other Conventions table.	5
v.1: 5.2.5.d	**Keyword**	Keywords shall not be used as names of objects, functions, procedures, or variables	0
Vol. 1 Section 5.2.6-Coding Conventions			**Instances**
v.2: 5.4.2.a	**Uniform calling sequences**	Uses uniform calling sequences.	0
v.2: 5.4.2.a	**Parameters type and range validation**	All parameters shall either be validated for type and range on entry into each unit or the unit comments shall explicitly identify the types and ranges	0
v.2: 5.4.2.b	**Explicit return values**	The return is explicitly defined for functions and explicitly assigned	0
v.2: 5.4.2.c	**Macros**	Does not use macros that contain returns or pass control	0

VVSG	Requirement	Definition	
		beyond the next statement	
v.2: 5.4.2.d	**Unbound arrays**	Provides controls to prevent writing beyond the array, string, or buffer boundaries	0
v.2: 5.4.2.e	**Pointers**	Provides controls that prevent pointers from being used to overwrite executable instructions or to access areas where vote counts or audit records are stored	0
v.2: 5.4.2.f	**Case statements**	Default choice explicitly defined	1
v.2: 5.4.2.g	**Vote counter overflowing**	Provides controls to prevent any vote counter from overflowing	0
v.2: 5.4.2.h	**Indentation**	Code is indented consistently and clearly	33
v.2: 5.4.2.j	**Code generator**	Generated code should be marked as such with comments defining the logic invoked	0
v.2: 5.4.2.k	**Line length**	No line of code exceeding 80 columns in width without justification	47
v.2: 5.4.2.l	**Executable statement**	One executable statement for each line of source code	0
v.2: 5.4.2.m	**Embedded executable statement**	The single embedded statement may be considered a part of the conditional expression. Any additional executable statements should be split out to the other lines.	0
v.2: 5.4.2.n	**Mixed-mode operations**	Avoids mixed-mode operations. Comment if mixed-mode usage is necessary.	1
v.2: 5.4.2.o	**Exit() message**	Upon exit() at any point, presents a message to the user indicating the reason for the exit ().	0
v.2: 5.4.2.p	**Format of messages**	Separate and consistent formats to distinguish between normal status and error or exception messages	0
v.2: 5.4.2.q	**References variables**	References variables by fewer than five levels of indirection (i.e. a.b.c.d or a[b].c->d)	0
v.2: 5.4.2.r	**Levels of indented scope**	Functions with fewer than six levels of indented scope	0
v.2: 5.4.2.s	**Variable initialization**	Initializes every variable upon declaration where permitted.	1
v.2: 5.4.2.t	**Constant Definitions**	All constants other than "0" and "1" defined or enumerated	8
v.2: 5.4.2.u	**Ternary Operator**	Only contains the minimum implementation of the "a = b ? c : d" syntax. Expansions such as "j=a?(b?c:d):e;" are prohibited.	0
v.2: 5.4.2.v	**Assert() statement**	All assert() statements coded such that they are absent from a production compilation	0
Vol. 1 Section 5.2.7 –Comment Conventions			**Instances**
v.1: 5.2.7.b	**Variables**	All variables shall have comments at the point of declaration	63
v.1: 5.2.7.c	**In-Line Comments**	In-line comments shall be provided to facilitate interpretation of functional operations, tests, and branching	25
v.1: 5.2.7.d	**Assembly code**	Assembly code shall contain descriptive and informative comments	0
v.1: 5.2.7.e	**Comments in uniform format**	All comments formatted in a uniform manner	0
Vol. 1 Section 7.4.2 –Protection Against Malicious Software			**Instances**
v.1: 7.4.2	**Malicious Software**	Susceptibility to file or macro viruses, worms, Trojan horses, logic bombs, or hardcoded passwords	1

Software related source code discrepancy detail is in the Addendum to Appendix B.

File Function Line Counts

v.1: 5.2.3.d v.2: 5.4.2.i	**File's functions' line count**	On the Application level, no more than 50% exceeding 60 lines, no more than 5% exceeding 120 lines, and none exceeding 240 lines without justification.	**< 60**	**60 to 120**	**120 to 240**	**> 240**	**Total**
EMS	**4.00 (4.0.21.0 minor)**	SQL	192 90.14%	18 8.45%	3 1.41%	0 0.00%	213 100.00%

	PCA Document Review TDP Configuration & QA Practices		
	classify configuration items into categories and subcategories, uniquely number or otherwise identify configuration items and name configuration items.		
9.3.2	***Versioning Conventions***		
	When a system component is part of a higher level system element such as a subsystem, the vendor shall describe the conventions used to: a. Identify the specific versions of individual configuration items and sets of items that are incorporated in higher level system elements such as subsystems b. Uniquely number or otherwise identify versions c. Name versions	**Accept**	
9.4	***Baseline, Promotion and Demotion Procedures***		
	The vendor shall establish formal procedures and conventions for establishing and providing a complete description of the procedures and related conventions used to: a. Establish a particular instance of a component as the starting baseline b. Promote subsequent instances of a component to baseline status as development progresses through to completion of the initial completed version released to the accredited test lab for testing c. Promote subsequent instances of a component to baseline status as the component is maintained throughout its life cycle until system	**Accept**	
9.5	***Configuration Control Procedures***		
	Configuration control is the process of approving and implementing changes to a configuration item to prevent unauthorized additions, changes or deletions. The vendor shall establish such procedures and related conventions, providing a complete description of those procedures used to: a. Develop and maintain internally developed items b. Acquire and maintain third-party items c. Resolve internally identified defects for items regardless of their origin d. Resolve externally identified and reported defects (i.e., by customers and accredited test labs)	**Accept**	
9.6	***Release Process***		
a. & b	The release process is the means by which the vendor installs, transfers or migrates the system to the accredited test lab and, eventually, to its customers. The vendor shall establish such procedures and related conventions, providing a complete description of those used to: a. Perform a first release of the system to an accredited test lab b. Perform a subsequent maintenance or upgrade release of the system or particular components, to an accredited test lab c. Perform the initial delivery and installation of the system to a customer, including confirmation that the installed version of the system matches exactly the certified system version d. Perform a subsequent maintenance or upgrade release of the system or a particular component to a customer, including confirmation that the installed version of the system matches exactly the certified system version	**Accept**	
Req. #	**VSS Volume 2 Testing Requirement**		Note & Discrepancy #
2.1	***Scope***		
2.1.1	***Content & Format***		
	The vendor has listed all documents controlling the design, construction, operation and maintenance of the system.	**Accept**	
2.1.1.3	The TDP shall include a detailed table of contents for the required documents, an abstract of each document, and a list of each of the informational sections and appendices presented. A cross index shall be provided indicating the portions of the documents that responsive to the documentation requirements for any item presented.	**Accept**	

7.3.2 PCA TDP Document Review

Information listed summarizes the TDP documents reviewed and the results of their review to the requirements of the VVSG 2005 Section 2.

Section 2.11 CONFIGURATION MANAGEMENT PLAN Election Management System
Section 2.12 QUALITY ASSURANCE PROGRAM Election Management System
Section 2.13 SYSTEM CHANGE NOTES Election Management System
Section 2.2 System Overview – Election Management System
Section 2.3 SYSTEM FUNCTIONALITY DESCRIPTION Election Management System
Section 2.4 SYSTEM HARDWARE SPECIFICATION Election Management System
Section 2.5 SOFTWARE DESIGN AND SPECIFICATION Election Management System
Section 2.6 SYSTEM SECURITY SPECIFICATION Election Management System
Section 2.7 SYSTEM TEST AND VERIFICATION SPECIFICATION Election Management System
Section 2.8 SYSTEM OPERATIONS PROCEDURES Election Management System
Section 2.9 SYSTEM MAINTENANCE PROCEDURES Election Management System

	PCA Document Review Summary
Manufacturer	MicroVote General Corp.
Voting System	Election Management System (EMS) v4.0
Review Scope	Full certification to the 2005 VVSG

Section Trace	Document Name & Version #	Review Date	Reviewer	Revw. Ver.#
2.2 A:	Section 2.2 System Overview v1.2	6/11/07	dharwood	2
2.2 B:	Appendix B1 Infinity Voting Panel Technical Reference Manual v0.2	4/30/07	dharwood	1
2.2 C:	Appendix B3 Infinity Firmware Functional Specification v0.2	4/30/07	dharwood	1
2.2 D:	Appendix C – COTS Specifications v1.0	4/30/07	dharwood	1
2.2 E:	Appendix H ACP-2200 OPTICAL SCANNER QUICK START GUIDE EMS v1.0	4/30/07	dharwood	1
2.2 F:	Appendix I ACP 2200 Dual Sided Optical Mark Reader v1.0	5/1/07	dharwood	1
2.2 G:	Appendix J User's Guide Thermal Printer DPU-3445-20 v1.0	5/1/07	dharwood	1
2.2 H	Appendix K DPU-414 Operation Manual v1.0	5/1/07	dharwood	1
2.2 I:	Appendix L GemCore V1.21-Based Reader Reference Manual v1.0	5/1/07	dharwood	1
2.2 J:	Appendix N DoubleTalk PC/LT Users Manual (no version)	10/15/07	M Ricketts	2
2.2 K:	Appendix O1 3.5_BAY 7 in 1 USB 2.0 Flash card reader specification (no version)	5/1/07	dharwood	1
2.2 L:	Appendix W Sample County Invoice v1.1	5/1/07	dharwood	1
2.2 M:	Appendix X Source Code Files List v1.1	5/9/07	dharwood	1
2.3 A:	Section 2.3 System Functionality Description v1.1	4/24/07	M Ricketts	1
2.3 B:	Appendix F VOTING VARIATIONS Election Management System, Ver 1.3	7/12/07	M Ricketts	2
2.4 A:	Section 2.4 System Hardware Specification for EMS v1.1	6/11/07	dharwood	2
2.4 B:	Appendix B1 Infinity Voting Panel Technical Reference Manual v0.2	4/26/07	dharwood	1
2.4 C:	Section 2.2 System Overview v1.2	6/11/07	dharwood	1
2.4 D:	Section 2.3 System Functionality Description v1.2	6/11/07	dharwood	1
2.4 E:	Appendix C – COTS Specifications v1.0	6/11/07	dharwood	1
2.4 F:	Appendix E – Completed COTS Testing Forms v1.0	6/11/07	dharwood	1
2.4 G:	Appendix G COTS Iinvoices and Certifications v1.0	6/11/07	dharwood	1
2.5 A:	Section 2.5 SOFTWARE DESIGN AND SPECIFICATION, v2.1	8/14/07	G. Audette	5
2.5 B:	Appendix T Program Specifications, v1.1	4/26/07	K.Wilson	1
2.5 C:	Appendix R GUI Specifications, v1.2	4/26/07	K.Wilson	1

Section Trace	Document Name & Version #	Review Date	Reviewer	Revw. Ver.#
2.5 D:	Appendix B-1 Infinity Voting Panel Technical Reference, v0.2	4/26/07	K.Wilson	1
2.5 E:	Appendix A11 Test Execution Plan for Security. V1.1	5/9/07	G. Audette	1
2.6 A:	Section 2.6 System Security Specification for Election Management System v1.5	8/8/07	M Ricketts	2
2.6 B:	Appendix AA MicroVote System Identification Tool Users Manual v1.0	4/24/07	dharwood	1
2.6 C:	Infinity Communication Specification Version 1.06 v0.1	8/13/07	K wilson	1
2.6 D:	Appendix U -MicroVote Infinity Poll Worker's Manual Version 4.0.0.0, v1.9	9/23/08	K. Wilson	4
2.6 E:	Infinity Encryption Algorithms v.1.01	10/10/08	K.Wilson	1
2.7 A:	Section 2.7 System Test and Verification Specifications – v1.0	4/26/07	dharwood	1
2.7 B:	Appendix A Test Cases	4/26/07	dharwood	1
2.7 C:	Appendix Q – MS Access database – v0.2	4/26/07	dharwood	1
2.8 A:	Section 2.8 SYSTEM OPERATIONS PROCEDURES Election Management System, v1.2	8/8/07	M Ricketts	3
2.8 B:	Appendix U –MicroVote Infinity Poll Worker's Manual Version 4.0.0.0, v1.3	8/8/07	M Ricketts	3
2.8 C:	Appendix V – Microvote General Corporation Election Management System User Manual, v1.5	8/8/07	M Ricketts	4
2.8 D:	Appendix A Test Cases	5/3/07	dharwood	1
2.8 E:	App. B1-Infinity Voting Panel Technical Reference Manual , v0.2	5/3/07	dharwood	1
2.8 F:	Appendix D – Glossary of Terms EMS v1.0	5/3/07	dharwood	1
2.8 G:	Section 2.6 System Security Specification EMS v1.0	5/3/07	dharwood	1
2.8 H:	Section 2.7 System Test and Verification Specification EMS D01.0TDP-2.7 v1.0	5/3/07	dharwood	1
2.8 I:	Section 2.11 CONFIGURATION MANAGEMENT PLAN, v1.2	6/14/07	M Ricketts	1
2.8 J:	Appendix Z – Machine Technician Manual Election Management System v0.1	10/11/07	M Ricketts	1
2.9 A:	Section 2.9 System Maintenance Procedures EMS v1.1	6/11/07	dharwood	2
2.9 B:	Appendix B1 Infinity Voting Panel Technical Reference Manual v0.2	4/25/07	dharwood	1
2.9 C:	Appendix H ACP-2200 OPTICAL SCANNER QUICK START GUIDE EMS v1.0	4/25/07	dharwood	1
2.9 D:	Appendix I ACP 2200 Dual Sided Optical Mark Reader v1.0	4/25/07	dharwood	1
2.9 E:	Appendix J User's Guide Thermal Printer DPU-3445-20 v1.0	4/25/07	dharwood	1
2.9 F:	Appendix K DPU-414 Operation Manual DO1.0TDP-K v1.0	4/25/07	dharwood	1
2.9 G:	Appendix Z Screen 1 v1.0	4/25/07	dharwood	1
2.10 A:	Personnel Deployment and Training Requirements v.1.0	4/23/07	dharwood	1
2.11 A:	Section 2.11 CONFIGURATION MANAGEMENT PLAN Election Management System, v.1.2	6/15/07	M Ricketts	2
2.11 B:	Appendix A Test Cases	4/30/07	M Ricketts	1
2.11 C:	Appendix P-1 INSTALLATION CHECKLIST Election Management System, v.1.0	4/30/07	M Ricketts	1
2.11 D:	Appendix P-2 DATABASE CREATION CHECKLIST Election Management System, v.1.0	4/30/07	M Ricketts	1
2.11 E:	Appendix P-3 INFINITY PROGRAMMING CHECKLIST, v1.0	4/30/07	M Ricketts	1
2.11 F:	Appendix Q DEFECT TRACKING SYSTEM Election Management System, v0.2	4/30/07	M Ricketts	1
2.12 A:	Section 2.12 QUALITY ASSURANCE PROGRAM. V.1.1	4/27/07	dharwood	1
2.12 B:	Appendix A Test Cases	4/27/07	dharwood	1
2.12 C:	Appendix B1 Infinity Voting Panel Technical Reference Manual v0.2	4/27/07	dharwood	1
2.12 D:	Appendix C – COTS Specifications v1.0	4/27/07	dharwood	1
2.12 E:	Appendix E – Completed COTS Testing Forms v1.0	4/27/07	dharwood	1
2.13 A:	Section 2.13 System Change Notes v1.0	4/23/07	dharwood	1

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2.1	*Scope*												
2.1.1.2	***Required Content for System Changes and Re-qualification***												
	If the scope of this certification is a change verify that the vendor has submitted appropriate System	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**

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	Change Notes covering this document. If this is not a change, no change notes are required.												
2.1.1.3	***Format***												
	The TDP shall include a detailed table of contents for the required documents.	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**
2.1.3	***Protection of Proprietary Information***												
	Verify that if the vendor considers this document proprietary, they have marked it as such. Documents that are approve by the vendor for public release do not need to be marked. .	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**	**Accept**
2.1.3	***System Overview***												
	In the system overview, the vendor shall provide information that enables the accredited test lab to identify the functional and physical components of the system, how the components are structured, and the interfaces between them.	**Accept**	***	***	***	***	***	***	***	***	***	***	*
2.2.1	**System Description -** The system description shall include written descriptions, drawings and diagrams that present:												
a	A description of the functional components (or subsystems) as defined by the vendor (e.g., environment, election management and control, vote recording, vote conversion, reporting, and their interconnection)	**Accept**	***	***	***	***	***	***	***	***	***	***	*
b.	A description of the operational environment of the system that provides an overview of the hardware, software, and communications structure	**Accept**	***	***	***	***	***	***	***	***	***	***	*
c.	A concept of operations that explains each system function, and how the function is achieved in the design	**Accept**	***	***	***	***	***	***	***	***	***	***	*
d.	Descriptions of the functional and physical interfaces between subsystems and components	**Accept**	***	***	***	***	***	***	***	***	***	***	*
e.	Identification of all COTS hardware and software products and communications services used in the development and/or operation of the voting system, identifying the name, vendor, and version used for each such component, including:	**Accept**	***	***	***	***	***	***	***	***	***	***	*
i.	Operating Systems	**Accept**	***	***	***	***	***	***	***	***	***	***	*
ii.	Database software	**Accept**	***	***	***	***	***	***	***	***	***	***	*
iii.	Communications routers	**Accept**	***	***	***	***	***	***	***	***	***	***	*
iv.	Modem drivers	**Accept**	***	***	***	***	***	***	***	***	***	***	*
v.	Dial-up networking software	**Accept**	***	***	***	***	***	***	***	***	***	***	*
f.	Interfaces among internal components, and interfaces with external systems. For components that interface with other components for which multiple products may be used, the TDP shall	**Accept**	***	***	***	***	***	***	***	***	***	***	*

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	provide an identification of:												
i.	File specifications, data objects, or other means used for information exchange	**Accept**	***	***	***	***	***	***	***	***	***	***	*
ii.	The public standard used for such file specifications, data objects, or other means	**Accept**	***	***	***	***	***	***	***	***	***	***	*
g.	Benchmark directory listings for all software (including firmware elements) and associated documentation included in the vendor's release in order of how each piece of software would normally be installed upon setup and installation.	**Accept**	***	***	***	***	***	***	***	***	***	***	*
2.2.2	**System Performance -** The vendor shall provide system performance information including:												
a	The performance characteristics of each operating mode and function in terms of expected and maximum speed, throughput capacity, maximum volume (maximum number of voting positions and maximum number of ballot styles supported), and processing frequency	**Accept**	***	***	***	***	***	***	***	***	***	***	*
b.	Quality attributes such as reliability, maintainability, availability, usability, and portability	**Accept**	***	***	***	***	***	***	***	***	***	***	*
c.	Provisions for safety, security, privacy, and continuity of operation	**Accept**	***	***	***	***	***	***	***	***	***	***	*
d.	Design constraints, applicable standards, and compatibility requirements	**Accept**	***	***	***	***	***	***	***	***	***	***	*
2.3	***System Functionality Description***												
	The vendor shall declare the scope of the system's functional capabilities, thereby establishing the performance, design, test, manufacture, and acceptance context for the system.	***	**Accept**	***	***	***	***	***	***	***	***	***	*
	The vendor shall provide a listing of the system's functional processing capabilities, encompassing capabilities required by the Guidelines and any additional capabilities provided by the system. This listing shall provide a simple description of each capability. Detailed specifications shall be provided in other documentation required for the TDP.	***	**Accept**	***	***	***	***	***	***	***	***	***	*
a.	The vendor shall organize the presentation of required capabilities in a manner that corresponds to the structure and sequence of functional capabilities indicated in Volume I, Section 2. The contents of Volume I, Section 2 may be used as the basis for a checklist to indicate the specific functions provided and those not provided by the system.	***	**Accept**	***	***	***	***	***	***	***	***	***	*
b.	Additional capabilities shall be clearly indicated.	***	**Accept**	***	***	***	***	***	***	***	***	***	*

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c.	Required capabilities that may be bypassed or deactivated during installation or operation by the user shall be clearly indicated	***	**Accept**	***	***	***	***	***	***	***	***	***	*
d.	Additional capabilities that function only when activated during installation or operation by the user shall be clearly indicated	***	**Accept**	***	***	***	***	***	***	***	***	***	*
e.	Additional capabilities that normally are active but may be bypassed or deactivated during installation or operation by the user shall be clearly indicated.	***	**Accept**	***	***	***	***	***	***	***	***	***	*
2.4	*System Hardware Specifications*												
	The vendor shall expand on the system overview by providing detailed specifications of the hardware components of the system, including specifications of hardware used to support the telecommunications capabilities of the system, if applicable.	***	***	**Accept**	***	***	***	***	***	***	***	***	*
2.4.1	**System Hardware Characteristics**												
	The vendor shall provide a detailed discussion of the characteristics of the system, indicating how the hardware meets individual requirements defined in Volume I, Section 4, including	***	***	**Accept**	***	***	***	***	***	***	***	***	*
	Performance Characteristics: This discussion addresses basic system performance attributes and operational scenarios that describe the manner in which system functions are invoked, describes environmental capabilities, describes life expectancy, and describes any other essential aspects of system performance	***	***	**Accept**	***	***	***	***	***	***	***	***	*
	Physical Characteristics: This discussion addresses suitability for intended use, requirements for transportation and storage, health and safety criteria, security criteria, and vulnerability to adverse environmental factors	***	***	**Accept**	***	***	***	***	***	***	***	***	*
	Reliability: This discussion addresses system and component reliability stated in terms of the systems operating functions, and identification of items that require special handling or operation to sustain system reliability	***	***	**Accept**	***	***	***	***	***	***	***	***	*
	Maintainability: The discussion addresses maintainability. Maintainability represents the ease with which maintenance actions can be performed based on the design characteristics of equipment and software and the processes the vendor and election officials have in place for preventing failures and for reacting to failures. Maintainability includes the ability of equipment and software to self-diagnose problems and to make non-technical election workers aware of a	***	***	**Accept**	***	***	***	***	***	***	***	***	*

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	problem. Maintainability also addresses a range of scheduled and unscheduled events												
	Environmental Conditions: This discussion addresses the ability of the system to withstand natural environments, and operational constraints in normal and test environments, including all requirements and restrictions regarding electrical service, telecommunications services, environmental protection, and any additional facilities or resources required to install and operate the system	***	***	**Accept**	***	***	***	***	***	***	***	***	*
2.4.2	**Design and Construction**												
	The vendor shall provide sufficient data, or references to data, to identify unequivocally the details of the system configuration submitted for testing.	***	***	**Accept**	***	***	***	***	***	***	***	***	*
	The vendor shall provided a list of materials and components used in the system, a description of their assembly into major system components and the system as a whole. Paragraphs and diagrams shall be provided that describe:	***	***	**Accept**	***	***	***	***	***	***	***	***	*
a.	Materials, processes, and parts used in the system, their assembly, and the configuration control measures to ensure compliance with the system specification	***	***	**Accept**	***	***	***	***	***	***	***	***	*
b.	The electromagnetic environment generated by the system	***	***	**Accept**	***	***	***	***	***	***	***	***	*
c.	Operator and voter safety considerations, and any constraints on system operations or the use environment	***	***	**Accept**	***	***	***	***	***	***	***	***	*
d.	Human engineering considerations, including provisions for access by disabled voters	***	***	**Accept**	***	***	***	***	***	***	***	***	*
2.5	***Software Design and Specification***												
	The vendor shall expand on the system overview by providing detailed specifications of the software components of the system, including software used to support the telecommunications capabilities of the system, if applicable.	***	***	***	**Accept**	***	***	***	***	***	***	***	*
2.5.1	**Purpose and Scope**												
	The vendor shall describe the function or functions that are performed by the software programs that comprise the system, including software used to support the telecommunications capabilities of the system, if applicable.	***	***	***	**Accept**	***	***	***	***	***	***	***	*
2.5.2	**Applicable Documents**												
	The vendor has listed all documents controlling the development of the software and its specifications. Documents shall be listed in order of precedence.	***	***	***	**Accept**	***	***	***	***	***	***	***	*

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	that can be used to examine and test the software. These documents include standards for program flow and control charts, program documentation, test planning, and for test data acquisition and reporting												
2.5.5	**Software Operating Environment**												
	This section shall describe or makes reference to all operating environment factors that influence the software design.	***	***	***	**Accept**	***	***	***	***	***	***	***	*
2.5.5.1	**Hardware Environment and Constraints** The vendor shall identify and describe the hardware characteristics that influence the design of the software, such as												
a.	The logic and arithmetic capability of the processor	***	***	***	**Accept**	***	***	***	***	***	***	***	*
b.	Memory read-write characteristics	***	***	***	**Accept**	***	***	***	***	***	***	***	*
c.	External memory device characteristics	***	***	***	**Accept**	***	***	***	***	***	***	***	*
d.	Peripheral device interface hardware	***	***	***	**Accept**	***	***	***	***	***	***	***	*
e.	Data input/output device protocols	***	***	***	**Accept**	***	***	***	***	***	***	***	*
f.	Operator controls, indicators, and displays	***	***	***	**Accept**	***	***	***	***	***	***	***	*
2.5.5.2	**Software Environment**												
	The vendor shall identify the compilers or assemblers used in the generation of executable code, and described the operating system or system monitor.	***	***	***	**Accept**	***	***	***	***	***	***	***	*
2.5.6	**Software Functional Specification**												
	The vendor shall provide a description of the operating modes of the system and of software capabilities to perform specific functions.	***	***	***	**Accept**	***	***	***	***	***	***	***	*
2.5.6.1	**Configurations and Operating Modes**												
	The vendor shall describe all software configurations and operating modes of the system, such as ballot preparation, election programming, preparation for opening the polling place, recording votes and/or counting ballots, closing the polling place, and generating reports. For each software function or operating mode, the vendor shall provide:	***	***	***	**Accept**	***	***	***	***	***	***	***	*
a.	A definition of the inputs to the function or mode (with characteristics, tolerances or acceptable ranges, as applicable)	***	***	***	**Accept**	***	***	***	***	***	***	***	*
b.	An explanation of how the inputs are processed	***	***	***	**Accept**	***	***	***	***	***	***	***	*
c.	A definition of the outputs produced (again, with characteristics, tolerances, or acceptable ranges as applicable).	***	***	***	**Accept**	***	***	***	***	***	***	***	*
2.5.6.2	**Software Functions The vendor shall describe the software's capabilities or methods for detecting or handling**												

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a.	Exception conditions	***	***	***	Accept	***	***	***	***	***	***	***	*
b.	system failures	***	***	***	Accept	***	***	***	***	***	***	***	*
c.	Data input/output errors	***	***	***	Accept	***	***	***	***	***	***	***	*
d.	Error logging for audit record generation	***	***	***	Accept	***	***	***	***	***	***	***	*
e.	Production of statistical ballot data	***	***	***	Accept	***	***	***	***	***	***	***	*
f.	Data quality assessment	***	***	***	Accept	***	***	***	***	***	***	***	*
g.	Security monitoring and control.	***	***	***	Accept	***	***	***	***	***	***	***	*
2.5.7	**Programming Specifications**												
	The vendor shall provide in this section an overview of the software design, its structure, and implementation algorithms and detailed specifications for individual software modules.	***	***	***	Accept	***	***	***	***	***	***	***	*
2.5.7.1	**Programming Specifications Overview**												
	The overview shall include such items as flowcharts, data flow diagrams, and other graphical techniques that facilitate understanding of the programming specifications. This section shall be prepared to facilitate understanding of the internal functioning of the individual software modules. Implementation of the functions shall be described in terms of the software architecture, algorithms, and data structures.	***	***	***	Accept	***	***	***	***	***	***	***	*
2.5.7.2	**Programming Specifications Details** The programming specifications shall describe individual software modules and their component units, if applicable and for each module and unit, the vendor shall provide:												
a.	Module and unit design decisions, if any, such as algorithms used	***	***	***	Accept	***	***	***	***	***	***	***	*
b.	Any constraints, limitations, or unusual features in the design of the software module or unit	***	***	***	Accept	***	***	***	***	***	***	***	*
c.	The programming language to be used and rationale for its use if other than the specified module or unit language	***	***	***	Accept	***	***	***	***	***	***	***	*
d.	If the software module or unit consists of or contains procedural commands, (such as menu selections in a database management system (DBMS) for defining forms and reports, on-line DBMS queries for database access and manipulation, input to a graphical user interface (GUI) builder for automated code generation, commands to the operating system, or shell scripts) a list of the procedural commands and reference to user manuals or other documents that explain them	***	***	***	Accept	***	***	***	***	***	***	***	*
e.	If the software module or unit contains, receives, or outputs data, a description of its inputs, outputs, and other data elements as applicable. (Section 2.5.9 describes the requirements for	***	***	***	Accept	***	***	***	***	***	***	***	*

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	documenting system interfaces.) Data local to the software module or unit shall be described separately from data input to or output from the software module or unit\												
f.	If the software module or unit contains logic, verify the logic to be used by the software unit, including, as applicable:	***	***	***	**Accept**	***	***	***	***	***	***	***	*
i.	Conditions in effect within the software module or unit when its execution is initiated	***	***	***	**Accept**	***	***	***	***	***	***	***	*
ii.	Conditions under which control is passed to other software modules or units	***	***	***	**Accept**	***	***	***	***	***	***	***	*
iii.	Response and response time to each input, including data conversion, renaming, and data transfer operation	***	***	***	**Accept**	***	***	***	***	***	***	***	*
iv.	Sequence of operations and dynamically controlled sequencing during the software module's or unit's operation, including:	***	***	***	**Accept**	***	***	***	***	***	***	***	*
v.	The method for sequence control	***	***	***	**Accept**	***	***	***	***	***	***	***	*
vi.	The logic and input conditions of that method, such as timing variations, priority assignments	***	***	***	**Accept**	***	***	***	***	***	***	***	*
vi.	Data transfer in and out of memory	***	***	***	**Accept**	***	***	***	***	***	***	***	*
vi.	The sensing of discrete input signals, and timing relationships between interrupt operations within the software module or unit	***	***	***	**Accept**	***	***	***	***	***	***	***	*
g.	Exception and error handling	***	***	***	**Accept**	***	***	***	***	***	***	***	*
h	If the software module is a database, the vendor provides the information described in subsection 2.5.8.	***	***	***	**Accept**	***	***	***	***	***	***	***	*
2.5.8	**System Database**												
	The vendor shall identify and provide a diagram and narrative description of the system's databases, and any external files used for data input or output. The information provided shall include for each database or external file:	***	***	***	**Accept**	***	***	***	***	***	***	***	*
a	The number of levels of design and the names of those levels (such as conceptual, internal, logical, and physical)	***	***	***	**Accept**	***	***	***	***	***	***	***	*
b.	Design conventions and standards (which may be incorporated by references) needed to understand the design	***	***	***	**Accept**	***	***	***	***	***	***	***	*
c.	Identification and description of all database entities and how they are implemented physically (e.g., tables, files)	***	***	***	**Accept**	***	***	***	***	***	***	***	*
d.	Entity relationship diagram and description of relationships	***	***	***	**Accept**	***	***	***	***	***	***	***	*
e.	Details of table, record or file contents (as applicable) to include individual data elements and their specifications, including:	***	***	***	**Accept**	***	***	***	***	***	***	***	*
i.	Names/identifiers	***	***	***	**Accept**	***	***	***	***	***	***	***	*

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ii.	Data type (alphanumeric, integer, etc.)	***	***	***	Accept	***	***	***	***	***	***	***	*
iii.	Size and format (such as length and punctuation of a character string)	***	***	***	Accept	***	***	***	***	***	***	***	*
iv.	Units of measurement (such as meters, dollars, nanoseconds)	***	***	***	Accept	***	***	***	***	***	***	***	*
v.	Range or enumeration of possible values (such as 0-99)	***	***	***	Accept	***	***	***	***	***	***	***	*
vi.	Accuracy (how correct) and precision (number of significant digits)	***	***	***	Accept	***	***	***	***	***	***	***	*
vii.	Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply	***	***	***	Accept	***	***	***	***	***	***	***	*
viii.	Security and privacy constraints	***	***	***	Accept	***	***	***	***	***	***	***	*
ix	Sources (setting/sending entities) and recipients (using/receiving entities).	***	***	***	Accept	***	***	***	***	***	***	***	*
f.	For external files, a description of the procedures for file maintenance, management of access privileges, and security.	***	***	***	Accept	***	***	***	***	***	***	***	*
2.5.9	**Interfaces**												
	The vendor shall identify and provides a complete description of all internal and external interfaces, using a combination of text and diagrams	***	***	***	Accept	***	***	***	***	***	***	***	*
2.5.9.1	**Interface Identification** For each interface identified in the system overview, the vendor shall:												
a.	Provide a unique identifier assigned to the interface	***	***	***	Accept	***	***	***	***	***	***	***	*
b.	Identify the interfacing entities (systems, configuration items, users, etc.) by name, number, version, and documentation references, as applicable	***	***	***	Accept	***	***	***	***	***	***	***	*
c.	Identify which entities have fixed interface characteristics (and therefore impose interface requirements on interfacing entities) and which are being developed or modified (thus having interface requirements imposed on them).	***	***	***	Accept	***	***	***	***	***	***	***	*
2.5.9.2	**Interface Description** For each interface identified in the system overview, the vendor shall provide information that describes:												
a.	The type of interface (such as real-time data transfer, storage-and-retrieval of data, etc.) to be implemented	***	***	***	Accept	***	***	***	***	***	***	***	*
b.	Characteristics of individual data elements that the interfacing entity(ies) will provide, store, send, access, receive, etc., such as:	***	***	***	Accept	***	***	***	***	***	***	***	*
i.	Names/identifiers	***	***	***	Accept	***	***	***	***	***	***	***	*
ii.	Data type (alphanumeric, integer, etc.)	***	***	***	Accept	***	***	***	***	***	***	***	*

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iii.	Size and format (such as length and punctuation of a character string)	***	***	***	Accept	***	***	***	***	***	***	***	*
iv.	Units of measurement (such as meters, dollars, nanoseconds)	***	***	***	Accept	***	***	***	***	***	***	***	*
v.	Range or enumeration of possible values (such as 0-99)	***	***	***	Accept	***	***	***	***	***	***	***	*
vi.	Accuracy (how correct) and precision (number of significant digits)	***	***	***	Accept	***	***	***	***	***	***	***	*
vii.	Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply	***	***	***	Accept	***	***	***	***	***	***	***	*
viii.	Security and privacy constraints and	***	***	***	Accept	***	***	***	***	***	***	***	*
ix	Sources (setting/sending entities) and recipients (using/receiving entities)	***	***	***	Accept	***	***	***	***	***	***	***	*
c.	Characteristics of communication methods that the interfacing entity(ies) will use for the interface, such as:	***	***	***	Accept	***	***	***	***	***	***	***	*
i.	Communication links/bands/frequencies/media and their characteristics	***	***	***	Accept	***	***	***	***	***	***	***	*
ii.	Message formatting	***	***	***	Accept	***	***	***	***	***	***	***	*
iii.	Flow control (such as sequence numbering and buffer allocation)	***	***	***	Accept	***	***	***	***	***	***	***	*
iv.	Data transfer rate, whether periodic/aperiodic, and interval between transfers	***	***	***	Accept	***	***	***	***	***	***	***	*
v.	Routing, addressing, and naming conventions	***	***	***	Accept	***	***	***	***	***	***	***	*
vi.	Transmission services, including priority and grade and	***	***	***	Accept	***	***	***	***	***	***	***	*
vii.	Safety/security/privacy considerations, such as encryption, user authentication, compartmentalization, and auditing	***	***	***	Accept	***	***	***	***	***	***	***	*
d.	Characteristics of protocols the interfacing entity(ies) will use for the interface, such as:	***	***	***	Accept	***	***	***	***	***	***	***	*
i.	Priority/layer of the protocol	***	***	***	Accept	***	***	***	***	***	***	***	*
ii.	Packeting, including fragmentation and reassembly, routing, and addressing	***	***	***	Accept	***	***	***	***	***	***	***	*
iii.	Legality checks, error control, and recovery procedures	***	***	***	Accept	***	***	***	***	***	***	***	*
iv.	Synchronization, including connection establishment, maintenance, termination	***	***	***	Accept	***	***	***	***	***	***	***	*
v.	Status, identification, and any other reporting features	***	***	***	Accept	***	***	***	***	***	***	***	*
e.	Other characteristics, such as physical compatibility of the interfacing entity(ies) (dimensions, tolerances, loads, voltages, plug compatibility, etc.).	***	***	***	Accept	***	***	***	***	***	***	***	*
2.5.10	**Appendices** The vendor may provide descriptive material and												

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	data supplementing the various sections of the body of the Software Specifications. The content and arrangement of appendices shall be at the discretion of the vendor. Topics recommended for amplification or treatment in appendix form includes: Glossary: A listing and brief definition of all software module names and variable names, with reference to their locations in the software structure. Abbreviations, acronyms, and terms should be included, if they are either uncommon in data processing and software development or are used in an unorthodox semantic References: A list of references to all related vendor documents, data, standards, and technical sources used in software development and testing Program Analysis: The results of software configuration analysis algorithm analysis and selection, timing studies, and hardware interface studies that are reflected in the final software design and coding												
2.6	***System Security Specification***												
	The vendor shall submit a system security specification that addresses the security requirements of Volume I, Section 7This specification shall describes the level of security provided by the system in terms of the specific security risks addressed by the system, the means by which each risk is addressed, the process used to test and verify the effective operation of security capabilities and, for systems that use public telecommunications networks as defined in Volume I, Section 6, the means used to keep the security capabilities of the system current to respond to the evolving threats against these systems.	***	***	***	***	**Accept**	***	***	***	***	***	***	*
2.6.1	**Access Control Policy**												
	The vendor shall specify the features and capabilities of the access control policy recommended to purchasing jurisdictions to provide effective voting system security. The access control policy shall address the general features and capabilities and individual access privileges indicated in Volume I, Subsection.7.2.	***	***	***	***	**Accept**	***	***	***	***	***	***	*
2.6.2	**Access Control Measures**												
	The vendor shall provide a detailed description of all system access control measures and mandatory procedures designed to permit access to system states in accordance with the access	***	***	***	***	**Accept**	***	***	***	***	***	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
	policy, and to prevent all other types of access to meet the specific requirements of Vol. I, Subsection 7.2.												
	The vendor shall also define and provide a detailed description of the methods used to preclude unauthorized access to the access control capabilities of the system itself.	***	***	***	***	**Accept**	***	***	***	***	***	***	*
2.6.3	**Equipment and Data Security**												
	The vendor shall provide a detailed description of system capabilities and mandatory procedures for purchasing jurisdictions to prevent disruption of the voting process and corruption of voting data to meet the specific requirements of Vol. I, Subsection 7.3. This information shall address measures for polling place security and central count location security.	***	***	***	***	**Accept**	***	***	***	***	***	***	*
2.6.4	**Software Installation**												
	The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure software (including firmware) installation to meet the specific requirements of Vol. I, Subsection 7.4. This information shall address software installation for all system components.	***	***	***	***	**Accept**	***	***	***	***	***	***	*
2.6.5	**Telecommunications and Data Transmission Security**												
	The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure data transmission to meet the specific requirements of Vol. I, Subsection 7.5:	***	***	***	***	**Accept**	***	***	***	***	***	***	*
a.	For all systems, this information shall address access control, and prevention of data interception	***	***	***	***	**Accept**	***	***	***	***	***	***	*
b.	For systems that use public communications networks as defined in Volume I, Section 6, this information shall also include:	***	***	***	***	**Accept**	***	***	***	***	***	***	*
i.	Capabilities used to provide protection against threats to third party products and services	***	***	***	***	**Accept**	***	***	***	***	***	***	*
ii.	Policies and processes used by the vendor to ensure that such protection is updated to remain effective over time	***	***	***	***	**Accept**	***	***	***	***	***	***	*
iii.	Policies and procedures used by the vendor to ensure that current versions of such capabilities are distributed to user jurisdictions and are installed effectively by the jurisdiction	***	***	***	***	**Accept**	***	***	***	***	***	***	*
iv.	A detailed description of the system capabilities and procedures to be employed by the jurisdiction to diagnose the occurrence of a denial of service	***	***	***	***	**Accept**	***	***	***	***	***	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
	attack, to use an alternate method of voting, to determine when it is appropriate to resume voting over the network, and to consolidate votes cast using the alternate method												
v.	A detailed description of all activities to be performed in setting up the system for operation that are mandatory to ensure effective system security, including testing of security before an election and	***	***	***	***	Accept	***	***	***	***	***	***	*
vi.	A detailed description of all activities that should be prohibited during system setup and during the timeframe for voting operations, including both the hours when polls are open and when polls are closed.	***	***	***	***	Accept	***	***	***	***	***	***	*
2.6.6	**Other Elements of an Effective Security Program**												
	The vendor shall provide a detailed description of additional procedures required for use by the purchasing jurisdiction including:	***	***	***	***	Accept	***	***	***	***	***	***	*
a.	Administrative and management controls for the voting system and election management, including access controls	***	***	***	***	Accept	***	***	***	***	***	***	*
b.	Internal security procedures, including operating procedures for maintaining the security of the software for each system function and operating mode	***	***	***	***	Accept	***	***	***	***	***	***	*
c.	Adherence to, and enforcement of, operational procedures (e.g., effective password management)	***	***	***	***	Accept	***	***	***	***	***	***	*
d.	Physical facilities and arrangements	***	***	***	***	Accept	***	***	***	***	***	***	*
e.	Organizational responsibilities and personnel screening.	***	***	***	***	Accept	***	***	***	***	***	***	*
2.7	***System Test and Verification Specification*** The vendor shall provide test and verification specifications for:												
a.	Development test specifications	***	***	***	***	***	Accept	***	***	***	***	***	*
b.	National certification test specifications.	***	***	***	***	***	Accept	***	***	***	***	***	*
2.7.1	**Development Test Specifications**												
	The vendor shall describe the plans, procedures, and data used during software development and system integration to verify system logic correctness, data quality, and security. This description shall include:	***	***	***	***	***	Accept	***	***	***	***	***	*
a.	Test identification and design, including:	***	***	***	***	***	Accept	***	***	***	***	***	*
i.	Test structure	***	***	***	***	***	Accept	***	***	***	***	***	*
ii.	Test sequence or progression	***	***	***	***	***	Accept	***	***	***	***	***	*
iii.	Test conditions	***	***	***	***	***	Accept	***	***	***	***	***	*
b.	Standard test procedures, including any assumptions or constraints	***	***	***	***	***	Accept	***	***	***	***	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
c.	Special purpose test procedures including any assumptions or constraints	***	***	***	***	***	Accept	***	***	***	***	***	*
d.	Test data, test data source, whether it is real or simulated, and control of test data	***	***	***	***	***	Accept	***	***	***	***	***	*
e.	Expected test results	***	***	***	***	***	Accept	***	***	***	***	***	*
f.	Criteria for evaluating test results.	***	***	***	***	***	Accept	***	***	***	***	***	*
	Additional details for these requirements are provided by MIL-STD-498, Software Test Plan and Software Test description. In the event that test data are not available , the accredited test lab shall design test cases and procedures equivalent to those ordinarily used during product verification.												
2.7.2	**Qualification Test Specifications**												
	The vendor shall provide specifications for verification and validation of overall software performance. The specifications shall cover:	***	***	***	***	***	Accept	***	***	***	***	***	*
a	Control and data input/output	***	***	***	***	***	Accept	***	***	***	***	***	*
b.	Acceptance criteria	***	***	***	***	***	Accept	***	***	***	***	***	*
c.	Processing accuracy	***	***	***	***	***	Accept	***	***	***	***	***	*
d.	Data quality assessment and maintenance	***	***	***	***	***	Accept	***	***	***	***	***	*
e.	Ballot interpretation logic	***	***	***	***	***	Accept	***	***	***	***	***	*
f.	Exception handling	***	***	***	***	***	Accept	***	***	***	***	***	*
g.	Security	***	***	***	***	***	Accept	***	***	***	***	***	*
h.	Production of audit trails and statistical data.	***	***	***	***	***	Accept	***	***	***	***	***	*
	The specifications shall identify procedures for assessing and demonstrating the suitability of the software for elections use.	***	***	***	***	***	Accept	***	***	***	***	***	*
2.8	**System Operations Procedures**												
	This documentation shall provide all information necessary for system use by all personnel who support pre-election and election preparation, polling place activities and central counting activities, as applicable, with regard to all system functions and operations identified in Section 2.3 above. The nature of instructions for operating personnel will depend upon the overall system design and required skill level of system operations support personnel.	***	***	***	***	***	***	Accept	***	***	***	***	*
	The system operations procedures shall contain all information that is required for the preparation of detailed system operating procedures, and for operator training, as described below:	***	***	***	***	***	***	Accept	***	***	***	***	*
2.8.1	**Introduction**												
	The vendor shall provide a summary of system operating functions and modes, in sufficient detail to permit understanding of the system's capabilities and constraints. The roles of operating personnel shall be identified and related	***	***	***	***	***	***	Accept	***	***	***	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
	to the operating modes of the system. Decision criteria and conditional operator functions (such as error and failure recovery actions) shall be described.												
	The vendor shall also list all reference and supporting documents pertaining to the use of the system during elections operations.	***	***	***	***	***	***	**Accept**	***	***	***	***	*
2.8.2	**Operational Environment**												
	The vendor shall describe the system environment, and the interface between the user or operator and the system.	***	***	***	***	***	***	**Accept**	***	***	***	***	*
a.	The vendor shall identify all facilities, furnishings, fixtures, and utilities that will be required, including equipment that operates at the: Polling place	***	***	***	***	***	***	**Accept**	***	***	***	***	*
b.	Central count facility	***	***	***	***	***	***	**Accept**	***	***	***	***	*
c.	Other locations	***	***	***	***	***	***	**Accept**	***	***	***	***	*
2.8.3	**System Installation and Test Specification**												
	The vendor shall provide specifications for validation of system installation, acceptance, and readiness. These specifications address all components of the system, all locations of installation (e.g., polling place central count facility), and all elements of system functionality and operations identified in Section 2.3 above, including:	***	***	***	***	***	***	**Accept**	***	***	***	***	*
a.	Pre-voting functions	***	***	***	***	***	***	**Accept**	***	***	***	***	*
b.	Voting functions	***	***	***	***	***	***	**Accept**	***	***	***	***	*
c.	Post-voting functions	***	***	***	***	***	***	**Accept**	***	***	***	***	*
d.	General capabilities	***	***	***	***	***	***	**Accept**	***	***	***	***	*
2.8.4	**Operational Features** The vendor shall provide the documentation of system operating features that meets the following requirements:												
a.	A detailed description of all input, output, control, and display features accessible to the operator or voter	***	***	***	***	***	***	**Accept**	***	***	***	***	*
b.	Examples of simulated interactions in order to facilitate understanding of the system and its capabilities	***	***	***	***	***	***	**Accept**	***	***	***	***	*
c.	Sample data formats and output reports	***	***	***	***	***	***	**Accept**	***	***	***	***	*
d.	Illustrate and describe all status indicators and information messages.	***	***	***	***	***	***	**Accept**	***	***	***	***	*
2.8.5	**Operating Procedures** The vendor shall provide the documentation of system operating procedures that meets the following requirements:												
a.	Provides a detailed description of procedures required to initiate, control, and verify proper system operation	***	***	***	***	***	***	**Accept**	***	***	***	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
b.	Provides procedures that clearly enable the operator to assess the correct flow of system functions (as evidenced by system-generated status and information messages)	***	***	***	***	***	***	**Accept**	***	***	***	***	*
c.	Provides procedures that clearly enable the operator to intervene the system operations to recover from an abnormal system state	***	***	***	***	***	***	**Accept**	***	***	***	***	*
d.	Defines and illustrates the procedures and system prompts for situations where operator intervention is required to load, initialize, and start the system	***	***	***	***	***	***	**Accept**	***	***	***	***	*
e.	Defines and illustrates procedures to enable and control the external interface to the system operating environment if supporting hardware and software are involved (such information shall be provided for the interaction of the system with other data processing systems or data interchange protocols as well)	***	***	***	***	***	***	**Accept**	***	***	***	***	*
f.	Provides administrative procedures and off-line operator duties (if any) if they relate to the initiation or termination of system operations, to the assessment of system status, or to the development of an audit trail	***	***	***	***	***	***	**Accept**	***	***	***	***	*
g.	Supports successful ballot and program installation and control by election officials, provide a detailed work plan or other form of documentation providing a schedule and steps for the software and ballot installation, which includes a table outlining the key dates, events and deliverables	***	***	***	***	***	***	**Accept**	***	***	***	***	*
h.	Supports diagnostic testing, specify diagnostic tests that may be employed to identify problems in the system verify the correction of maintenance problems and isolate and diagnose faults from various systems states.	***	***	***	***	***	***	**Accept**	***	***	***	***	*
2.8.6	**Operations Support** The vendor shall provide the documentation of system operating procedures that meets the following requirements:												
a.	Defines the procedures required to support system acquisition, installation, and readiness testing. These procedures may be provided by reference, if they are contained either in the system hardware specifications, or in other vendor documentation	***	***	***	***	***	***	**Accept**	***	***	***	***	*
b.	Describes procedures for providing technical support, system maintenance and correction of defects, and for incorporating hardware upgrades and new software releases.	***	***	***	***	***	***	**Accept**	***	***	***	***	*
2.8.7	**Appendices**												

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
	The vendor may provide descriptive material and data supplementing the various sections of the body of the System Operations Manual. The content and arrangement of appendices shall be at the discretion of the vendor. Topics recommended for amplification or treatment in appendix form include: Glossary: A listing and brief definition of all terms that may be unfamiliar to persons not trained in either voting systems or computer operations. References: A list of references to all vendor documents and to other sources related to the operation of the system Detailed Examples: Detailed scenarios that outline correct system responses to faulty operator input; Alternative procedures may be specified depending on the system state Manufacturer's Recommended Security Procedures: This appendix shall contain the security procedures that are to be executed by the system operator.												
2.9	***System Maintenance Procedures***												
	The system maintenance procedures shall provide information in sufficient detail to support election workers, information systems personnel, or maintenance personnel in the adjustment or removal and replacement of components or modules in the field. Technical documentation needed solely to support the repair of defective components or modules ordinarily done by the manufacturer or software developer is not required.	***	***	***	***	***	***	***	**Accept**	***	***	***	*
	Recommended service actions to correct malfunctions or problems shall be discussed, along with personnel and expertise required to repair and maintain the system; and equipment, materials, and facilities needed for proper maintenance. This manual shall include the sections listed below.	***	***	***	***	***	***	***	**Accept**	***	***	***	*
2.9.1	**Introduction**												
	The vendor shall describe the structure and function of the equipment (and related software) for election preparation, programming, vote recording, tabulation, and reporting in sufficient detail to provide an overview of the system for maintenance, and for identification of faulty hardware or software. The description includes a concept of operations that fully describes such items as:	***	***	***	***	***	***	***	**Accept**	***	***	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
a	The electrical and mechanical functions of the equipment	***	***	***	***	***	***	***	Accept	***	***	***	*
b.	How the processes of ballot handling and reading are performed (paper-based systems)	***	***	***	***	***	***	***	Accept	***	***	***	*
c.	How vote selection and casting of the ballot (DRE systems)	***	***	***	***	***	***	***	Accept	***	***	***	*
d.	How transmission of data over a network (DRE systems, where applicable)	***	***	***	***	***	***	***	Accept	***	***	***	*
e.	How data handling in the processor and memory units	***	***	***	***	***	***	***	Accept	***	***	***	*
f.	How data outputs are initiated and controlled	***	***	***	***	***	***	***	Accept	***	***	***	*
g.	How power is converted or conditioned	***	***	***	***	***	***	***	Accept	***	***	***	*
h.	How test and diagnostic information is acquired and used	***	***	***	***	***	***	***	Accept	***	***	***	*
2.9.2	**Maintenance Procedures**												
	The vendor shall describe preventative and corrective, maintenance procedures for hardware and software.	***	***	***	***	***	***	***	Accept	***	***	***	*
2.9.2.1	**Preventative Maintenance Procedures** The vendor shall identify and describe:												
a.	All required and recommended preventive maintenance tasks, including software tasks such as software backup, database performance analysis, and database tuning	***	***	***	***	***	***	***	Accept	***	***	***	*
b.	Number and skill levels of personnel required for each task	***	***	***	***	***	***	***	Accept	***	***	***	*
c.	Parts, supplies, special maintenance equipment, software tools, or other resources needed for maintenance	***	***	***	***	***	***	***	Accept	***	***	***	*
d.	Any maintenance tasks that must be coordinated with the vendor or a third party (such as coordination that may be needed for off-the-shelf items used in the system).	***	***	***	***	***	***	***	Accept	***	***	***	*
2.9.2.2	**Corrective Maintenance Procedures**												
	The vendor shall provide fault detection, fault isolation, correction procedures, and logic diagrams for all operational abnormalities identified by design analysis and operating experience.	***	***	***	***	***	***	***	Accept	***	***	***	*
	The vendor shall identify specific procedures to be used in diagnosing and correcting problems in the system hardware (or user-controlled software). Descriptions shall include:	***	***	***	***	***	***	***	Accept	***	***	***	*
a	Steps to replace failed or deficient equipment	***	***	***	***	***	***	***	Accept	***	***	***	*
b.	Steps to correct deficiencies or faulty operations in software	***	***	***	***	***	***	***	Accept	***	***	***	*
c.	Modifications that are necessary to coordinate any modified or upgraded software with other software modules	***	***	***	***	***	***	***	Accept	***	***	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
d.	The number and skill levels of personnel needed to accomplish each procedure	***	***	***	***	***	***	***	Accept	***	***	***	*
e.	Special maintenance equipment, parts, supplies, or other resources needed to accomplish each procedure	***	***	***	***	***	***	***	Accept	***	***	***	*
f.	Any coordination required with the vendor, or other party for off the shelf items.	***	***	***	***	***	***	***	Accept	***	***	***	*
2.9.3	**Maintenance Equipment**												
	The vendor shall identify and describe any special purpose tests or maintenance equipment recommended for fault isolation and diagnostic purposes.	***	***	***	***	***	***	***	Accept	***	***	***	*
2.9.4	**Parts and Materials**												
	The vendor shall provide detailed documentation of parts and materials needed to operate and maintain the system. Additional requirements apply for paper based systems.	***	***	***	***	***	***	***	Accept	***	***	***	*
2.9.4.1	**Common Standards**												
	The vendor shall provide a complete list of approved parts and materials needed for maintenance. This list shall contain sufficient descriptive information to identify all parts by:	***	***	***	***	***	***	***	Accept	***	***	***	*
a	Type	***	***	***	***	***	***	***	Accept	***	***	***	*
b.	Size	***	***	***	***	***	***	***	Accept	***	***	***	*
c.	Value or range	***	***	***	***	***	***	***	Accept	***	***	***	*
d.	Manufacturer's designation	***	***	***	***	***	***	***	Accept	***	***	***	*
e.	Individual quantities needed	***	***	***	***	***	***	***	Accept	***	***	***	*
f.	Source from which they may be obtained	***	***	***	***	***	***	***	Accept	***	***	***	*
2.9.4.2	**Paper-Based Systems**												
	For marking devices manufactured by multiple external sources, the vendor shall provide a listing of sources and model numbers that are compatible with the system.	***	***	***	***	***	***	***	Accept	***	***	***	*
	The TDP shall specify the required paper stock, size, shape, opacity, color, watermarks, field layout, orientation, size and style of printing, size and location of punch or mark fields used for vote response fields and to identify unique ballot formats, placement of alignment marks, ink for printing, and folding and bleed-through limitations for preparation of ballots that are compatible with the system	***	***	***	***	***	***	***	Accept	***	***	***	*
2.9.5	**Maintenance Facilities and Support**												
	The vendor shall identify all facilities, furnishings, fixtures, and utilities that will be required for equipment maintenance. In addition, vendors shall specify the assumptions made with regard to any parameters that impact the mean time to repair.	***	***	***	***	***	***	***	Accept	***	***	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
a.	Recommended number and locations of spare devices or components to be kept on hand for repair purposes during periods of system operation	***	***	***	***	***	***	***	**Accept**	***	***	***	*
b.	Recommended number and locations of qualified maintenance personnel who need to be available to support repair calls during system operation	***	***	***	***	***	***	***	**Accept**	***	***	***	*
c.	Organizational affiliation (i.e., jurisdiction, vendor) of qualified maintenance personnel.	***	***	***	***	***	***	***	**Accept**	***	***	***	*
2.9.6	**Appendices** The vendor may provide descriptive material and data supplementing the various sections of the body of the System Maintenance Manual. The content and arrangement of appendices shall be at the discretion of the vendor. Topics recommended for amplification or treatment in appendices include: Glossary: A listing and brief definition of all terms that may be unfamiliar to persons not trained in either voting systems or computer maintenance. References: A list of references to all vendor documents and to other sources related to the maintenance of the system Detailed Examples: Detailed scenarios that outline correct system responses to every conceivable faulty operator input; alternative procedures may be specified depending on the system state Maintenance and Security Procedures: This appendix shall contain technical illustrations and schematic representations of electronic circuits unique to the system.												
2.10	***Personnel Deployment and Training Requirements***												
	Verify that the vendor has described the personnel resources and training required for a jurisdiction to operate and maintain the system.	***	***	***	***	***	***	***	***	**Accept**	***	***	*
2.10.1	**Personnel** The vendor shall specify the number of personnel and skill levels required to perform each of the following functions:												
a.	Pre-election or election preparation functions	***	***	***	***	***	***	***	***	**Accept**	***	***	*
b.	System operations for voting system functions performed at the polling place	***	***	***	***	***	***	***	***	**Accept**	***	***	*
c.	System operations for voting system functions performed at the central count facility	***	***	***	***	***	***	***	***	**Accept**	***	***	*
d.	Preventive maintenance tasks	***	***	***	***	***	***	***	***	**Accept**	***	***	*
e.	Diagnosis of faulty hardware or software	***	***	***	***	***	***	***	***	**Accept**	***	***	*
f.	Corrective maintenance tasks	***	***	***	***	***	***	***	***	**Accept**	***	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
g.	Test corrected problems.	***	***	***	***	***	***	***	***	**Accept**	***	***	*
	A description identifies functions that may be carried out by user personnel, and those that must be performed by vendor personnel.	***	***	***	***	***	***	***	***	**Accept**	***	***	*
2.10.2	**Training** The vendor shall specify the requirements for orientation and training of the following personnel:												
a.	Poll workers supporting polling place operations	***	***	***	***	***	***	***	***	**Accept**	***	***	*
b.	System support personnel involved in election programming	***	***	***	***	***	***	***	***	**Accept**	***	***	*
c.	User system maintenance technicians	***	***	***	***	***	***	***	***	**Accept**	***	***	*
d.	Network/system administration personnel (if a network is used)	***	***	***	***	***	***	***	***	**Accept**	***	***	*
e.	Data personnel	***	***	***	***	***	***	***	***	**Accept**	***	***	*
f.	Vendor personnel.	***	***	***	***	***	***	***	***	**Accept**	***	***	*
2.11	***Configuration Management Plan***												
	Vendors shall submit a Configuration Management Plan that addresses the configuration management requirements of Volume I, Section 9. This plan shall describe all policies, processes and procedures employed by the vendor to carry out these requirements. The Configuration Management Plan shall contain the sections identified below.	***	***	***	***	***	***	***	***	***	**Accept**	***	*
2.11.1	**Configuration Management Policy**												
	The vendor shall provide a description of its organizational policies for configuration management, per Vol. I, Subsection 9.2. These requirements pertain to:	***	***	***	***	***	***	***	***	***	**Accept**	***	*
a.	Scope and nature of configuration management program activities	***	***	***	***	***	***	***	***	***	**Accept**	***	*
b.	Breadth of application of vendor’s policy and practices to the voting system.	***	***	***	***	***	***	***	***	***	**Accept**	***	*
2.11.2	**Configuration Identification**												
	The vendor shall provide a description of the procedures and naming conventions used to address the specific requirements of Vol. I, Subsection 9.3. These requirements pertain to:	***	***	***	***	***	***	***	***	***	**Accept**	***	*
a.	Classifying configuration items into categories and subcategories	***	***	***	***	***	***	***	***	***	**Accept**	***	*
b.	Uniquely numbering or otherwise identifying configuration items	***	***	***	***	***	***	***	***	***	**Accept**	***	*
c.	Naming configuration items.	***	***	***	***	***	***	***	***	***	**Accept**	***	*
2.11.3	**Baseline, Promotion, and Demotion Procedures**												
	The vendor shall provide a description of the procedures and naming conventions used to address the specific requirements of Vol. I, Subsection 9.4. These requirements pertain to:	***	***	***	***	***	***	***	***	***	**Accept**	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
a.	Establishing a particular instance of a system component as the starting baseline	***	***	***	***	***	***	***	***	***	**Accept**	***	*
b.	Promoting subsequent instances of a component to baseline throughout the system development process for the first complete version of the system submitted for testing	***	***	***	***	***	***	***	***	***	**Accept**	***	*
c.	Promoting subsequent instances of a component to baseline status as the component is maintained throughout its life cycle until system retirement (i.e., the system is no longer sold or maintained)	***	***	***	***	***	***	***	***	***	**Accept**	***	*
2.11.4	**Configuration Control Procedures**												
	The vendor shall provide a description of the procedures used by the vendor to approve and implement changes to a configuration item to prevent unauthorized additions, changes, or deletions to address the specific requirements of Vol. I, Subsection 9.5. These requirements pertain to:	***	***	***	***	***	***	***	***	***	**Accept**	***	*
a.	Developing and maintaining internally developed items	***	***	***	***	***	***	***	***	***	**Accept**	***	*
b.	Developing and maintaining third-party items	***	***	***	***	***	***	***	***	***	**Accept**	***	*
c.	Resolving internally identified defects	***	***	***	***	***	***	***	***	***	**Accept**	***	*
d.	Resolving externally identified and reported defects.	***	***	***	***	***	***	***	***	***	**Accept**	***	*
2.11.5	**Release Process**												
	The vendor shall provide a description of the contents of a system release, the procedures and related conventions by which the vendor installs, transfers, or migrates the system to accredited voting system testing laboratories and customers to address the specific requirements of Vol. I, Subsection 9.6. These requirements pertain to:	***	***	***	***	***	***	***	***	***	**Accept**	***	*
a.	A first release of the system to an accredited test lab	***	***	***	***	***	***	***	***	***	**Accept**	***	*
b.	A subsequent maintenance or upgrade releases of a system or component to an accredited test lab	***	***	***	***	***	***	***	***	***	**Accept**	***	*
c.	The initial delivery and installation of the system to a customer	***	***	***	***	***	***	***	***	***	**Accept**	***	*
d.	The subsequent maintenance or upgrade release of a system or component to a customer.	***	***	***	***	***	***	***	***	***	**Accept**	***	*
2.11.6	**Configuration Audits**												
	The vendor shall provide a description of the procedures and related conventions for the two audits required by Vol. I, Subsection 9.7. These requirements pertain to:	***	***	***	***	***	***	***	***	***	**Accept**	***	*
a.	Physical configuration audit that verifies the voting system components submitted for qualification to the vendor's technical documentation	***	***	***	***	***	***	***	***	***	**Accept**	***	*

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
b.	Functional configuration audit that verifies the system performs all the functions described in the system documentation.	***	***	***	***	***	***	***	***	***	Accept	***	*
2.11.7	**Configuration Management Resources**												
	The vendor shall provide a description of the procedures and related conventions for maintaining information about configuration management tools required by Vol. I, Sect. 8.9. These requirements pertain to:	***	***	***	***	***	***	***	***	***	Accept	***	*
a.	Specific tools used, current version, and operating environment	***	***	***	***	***	***	***	***	***	Accept	***	*
b.	Physical location of the tools, including designation of computer directories and files	***	***	***	***	***	***	***	***	***	Accept	***	*
c.	Procedures and training materials for using the tools.	***	***	***	***	***	***	***	***	***	Accept	***	*
2.12	***Quality Assurance Program***												
	The vendor shall submit a Quality Assurance Program that addresses the quality assurance requirements of Volume I, Section 8. This plan describes all policies, processes and procedures employed by the vendor to ensure the overall quality of the system for its initial development, release and for subsequent modifications and releases. The Quality Assurance Program shall, at a minimum, address the topics indicated below.	***	***	***	***	***	***	***	***	***	***	Accept	*
2.12.1	**Quality Assurance Policy**												
	The vendor shall provide a description of its organizational policies for quality assurance, including:	***	***	***	***	***	***	***	***	***	***	Accept	*
a.	Scope and nature of QA activities	***	***	***	***	***	***	***	***	***	***	Accept	*
b.	Breadth of application of vendor's policy and practices to the voting system.	***	***	***	***	***	***	***	***	***	***	Accept	*
2.12.2	**Parts & Materials Special Tests and Examinations**												
	The vendor shall provide a description of its practices for parts and materials tests and examinations that meet the requirements of Vol. I, Subsection 8.5.	***	***	***	***	***	***	***	***	***	***	Accept	*
2.12.3	**Quality Conformance Inspections**												
	The vendor shall provide a description of its practices for quality conformance inspections that meet the requirements of Volume 1, Subsection 8.6. For each test performed , the record of tests provided shall include:	***	***	***	***	***	***	***	***	***	***	Accept	*
a.	Test location	***	***	***	***	***	***	***	***	***	***	Accept	*
b.	Test date	***	***	***	***	***	***	***	***	***	***	Accept	*
c.	Tester name	***	***	***	***	***	***	***	***	***	***	Accept	*
d.	Test outcomes.	***	***	***	***	***	***	***	***	***	***	Accept	*
2.12.4	**Documentation**												

VVSG	Volume II Testing Requirement- Section 2	Section 2.2	Section 2.3	Section 2.4	Section 2.5	Section 2.6	Section 2.7	Section 2.8	Section 2.9	Section 2.10	Section 2.11	Section 2.12	Section 2.13
	The vendor shall provide a description of its practices for documentation of the system and system development process that meet the requirements of Vol. I, Subsection 8.7	***	***	***	***	***	***	***	***	***	***	**Accept**	*
2.13	***System Change Notes***												
	Vendors submitting modifications for a system that has been tested previously and received national certification shall submit system change notes. The system change notes shall include the following information:	***	***	***	***	***	***	***	***	***	***	***	**Accept**
a.	A summary description of the nature, scope and reasons for each change	***	***	***	***	***	***	***	***	***	***	***	**Accept**
b.	A listing of the specific changes made, citing the specific system configuration items changed and providing detailed references to the sections of documentation changed	***	***	***	***	***	***	***	***	***	***	***	**Accept**
c.	The specific sections of the documentation that are changed (or complete revised documents, if more suitable to address a large number of changes)	***	***	***	***	***	***	***	***	***	***	***	**Accept**
d.	Documentation of the test plan and procedures executed by the vendor for testing the individual changes and the system as a whole, and records of test results.	***	***	***	***	***	***	***	***	***	***	***	**Accept**

7.4 *Appendix D: FCA Testing*

This appendix contains the detail of the Functional Configuration Audit. It encompasses the testing detail for the Functional/System Level, Environmental, Accuracy, Security, Accessibility and Usability tests. System functions describe the MicroVote EMS voting system functionality required by the VVSG 2005. These functions are traced to one or more Test Cases. A description of the identified Test Case is found in the corresponding Test Method found in this appendix. The detailed test steps, test data and test results were recorded in the individual Test Cases. These are maintained separate documents that are part of the comprehensive test record.

System Function	Test Case
a. Ballot Preparation Subsystem	
1) Creation of an Installation and Election database; set administrative preferences, parties, vote types, precincts, ballot text/graphics, equipment, access security levels and election reports 2) Setting up an election; enter election data: offices, candidates, secondary vote limits and reports 3) Setting up a ballot; enter, lay out and edit ballots and ballot styles; activate and assign ballots; view ballots for proofing 4) Programming and printing election media and ballots; installing ballots on the Infinity Voting Panel; process paper ballot cards	General 1 & 2, Primary 1, Accuracy, Security
b. Test operations performed prior to , during and after processing of ballots, including:	
1) Logic Test – Interpretation of Ballot Styles & recognition of precincts; displaying ballot styles correctly by election type, precinct, precinct splits and party	General 1 & 2, Primary 1
2) Accuracy Tests- Clearly identifiable voting fields associated with candidates and measures; correctly mark, record and report an Infinity ballot in visual and audio modes; correctly read and report a voted paper ballot card	General 1 & 2, Primary 1, Accuracy
3) Status Tests- Initialize the Infinity; confirm operational status of the Infinity and Ready mode; check buttons, display and ballot	General 1 & 2, Primary 1, Accuracy
4) Report Generation – Produce, view and print Infinity precinct reports; produce consolidated Infinity and optical mark reader central count reports	General 1 & 2, Primary 1, Accuracy
5) Report Generation- Produce, view and print ballot preparation, Infinity and central count audit reports	General 1 & 2, Primary 1, Accuracy
c. Procedures applicable to equipment used in a Polling Place for:	
1) Opening the polls, confirm security code; print zero proof report; enable voting; activate voter sessions; display, vote and cast ballots	General 1 & 2, Primary 1, Accuracy, Security
2) Monitoring equipment status ready and non-ready modes; voting booths provide privacy;	General 1 & 2, Primary 1, Accuracy, Characteristics
3) Equipment response to commands; confirm voting enabled; audio and visual ballots activated; adjust ballot visual and audio display (contrast, magnification, alternative language, volume, speed); write-in, review of votes, casting the ballot; activation of authorized ballot content (election information, election type, precinct, precinct split, party, supported voting variations); usable and accessible generation/display of all voter facing messages and notifications;	General 1 & 2, Primary 1, Accuracy, Characteristics
4) Generating real-time audit messages for election installation, equipment status checks, polls open, vote activations, power recovery, poll closings; report processing	General 1 & 2, Primary 1, Accuracy, Characteristics
5) Polls are closed; ballot activation is disabled; visible indication of system status	General 1 & 2, Primary 1, Accuracy, Security
6) Infinity election data reports are generated	General 1 & 2, Primary 1, Accuracy

System Function	Test Case
7) Transfer ballot count to central counting location via smart card and direct download from the Infinity	General 1 & 2, Primary 1, Accuracy, Security
8) Electronic network transmission is not available, no wireless capabilities	Telephony and Cryptographic
d. Procedures applicable to equipment used in a Central Count Place	
1) Read and process paper ballot cards for >1 precinct with the optical mark reader	General 1 & 2, Primary 1, Accuracy
2) Monitoring equipment status; optical mark reader is correctly connected to the EMS and ready to process cards	General 1 & 2, Primary 1, Accuracy
3) Equipment response to commands; optical mark readers transfer votes to the EMS software; write-in identified; unreadable cards are Reject	General 1 & 2, Primary 1, Accuracy
4) Integration with peripherals equipment or other data processing systems;	General 1 & 2, Primary 1, Accuracy
5) Generating real-time audit messages; election installation; reader activation; equipment status checks, power recovery, report processing	General 1 & 2, Primary 1, Accuracy
6) Generating precinct-level election data reports; view and print reports with partial and complete precinct votes	General 1 & 2, Primary 1, Accuracy
7) Generating summary election data reports; view and print zero proof reports; view and print vote summary reports with partial and complete votes	General 1 & 2, Primary 1, Accuracy

7.4.1 FCA Functional and System Level Testing

Items identified as voting variations are either VVSG 2005 optional functionality or MicroVote specific supported functions outside the scope of the VVSG. Two General and One Primary end-to-end mock elections were created to test the supported voting variations. The table below provides a description of the voting variation, whether it is supported and where it is tested. Detail for the Test Cases is found in the Test Methods 7.4.1.1 through 7.4.1.3.

Supported Voting Variations of the VVSG 2005 Section 2.1.7.2		Test Cases & Comments
Closed Primary		
Primary: Closed	Supported	Primary 1
Open Primary		
Primary: Open – Public Selection: A primary election in which voters, regardless of political affiliation, may choose in which party's primary they will vote. Voters publicly declare their choice of party ballot to the poll worker who provides or activates the appropriate ballot. Voters also are permitted to vote on non-partisan offices and ballot issues that are presented at the same election.	Supported	Primary 1
Primary: Open – Private Selection: A primary election in which voters, regardless of political affiliation, may choose in which party's primary they will vote. The voter makes their choice of party ballot within the privacy of the voting booth. Voters also are permitted to vote on non-partisan offices and ballot issues that are presented at the same election.	Unsupported	
Partisan Offices v		
Handles vote for 1 races	Supported	General 1, 2 & Primary 1
Handles N of M races	Supported	General 1, 2 & Primary 1
Handles partisan contests in a primary election	Supported	Primary 1
Handles partisan contests in a general election	Supported	General 1, 2
Non-partisan Offices		
Handles vote for 1 races	Supported	General 1, 2 & Primary 1
Handles N of M races	Supported	General 1, 2 & Primary 1
Handles non-partisan contests in a primary election	Supported	Primary 1
Handles non-partisan contests in a general election	Supported	General 1, 2
Write-In Voting:		
A separate voting position is identified for write-ins.	Supported	General 1
Write-in for an N of M contest has M write-in positions.	Supported	General 1
Write-in for a contest with no candidates (partisan & non-partisan contests)	Supported	General 1

Supported Voting Variations of the VVSG 2005 Section 2.1.7.2		Test Cases & Comments
Method to flag write-ins for resolution at central count	Supported	General 1
Primary Presidential Delegation Nominations		
Slates of delegates are displayed for each presidential primary candidate	Supported	Primary 1 Create the slate using the Ballot Text feature
Slates of delegates are chosen with one selection.	Supported	Primary 1
Ballot Rotation:		
Names of candidates rotate.	Unsupported	
Straight Party Voting:		
Make one selection to vote for all candidates of one party in a general election	Supported	General 2
Undervote the straight party selection and choose each candidate individually	Supported	General 2
Vote straight party and then change votes to cross over to another party's candidate.	Supported	General 2
Vote straight party for a party without a candidate in one of the races.	Supported	General 2
Votes straight party in an: N of M contest (N>1)	Supported	General 2
Cross-Party Endorsement:		
One candidate is endorsed by multiple parties.	Supported	General & Primary 1
Cross Party Endorsement is supported in straight party contests	Supported	General 2
Split Precincts:		
Precincts splits with multiple ballot styles	Supported	General 1 & Primary 1
The number of voters is identified for the precinct split.	Supported	General 1 & Primary 1
The vote totals are not reported for the precinct split.	Supported	General 1 & Primary 1
Ballot faces match the correct contests and ballot identification for each split.	Supported	General 1 & Primary 1
The correct contests are presented for the appropriate ballot split.	Supported	General 1 & Primary 1
Vote N of M:		
Counts each selected candidate, if less than or equal to "M" candidates are selected. (Overvote if >M)	Supported	
Identifies an undervote if less than "M" candidates are selected.	Supported	
Recall Issues, with options:		
The recall vote is a Yes or No question.	Supported	General 1 – Tested a Y/N question
The recall is a vote for 1 of M vote with the Retain one choice and each replacement candidate a separate choice.	Supported	General 1 – Tested a vote for 1 of M
Two contests are on the ballot. The voter must vote "Yes" in order to cast a vote in the replacement candidate contest. A "No", undervote or overvote will not allow a vote in the second contest to be counted.	Unsupported	
Two contests are on the ballot. If a voter votes "Yes" or "No" they may vote in the contest for the replacement candidate. An undervote or overvote will not allow a vote in the second contest to be counted.	Unsupported	
Cumulative Voting		
Voting method exclusive to multi-member boards. Each voter may cast as many votes as there are seats to be filled and may cast two or more of those votes for a single candidate.	Unsupported	
Ranked Order Voting		
Voters rank candidates in a contest in order of choice (1,2,3, etc.)	Unsupported	
A write in vote can be ranked.	Unsupported	
Tabulation of Ranked Order Votes		
Ballots are sorted according to the 1st ranked choice. If no candidate receives a majority of first ranked choice the candidate with the least 1st ranks is eliminated. Votes are recounted and are distributed to the remaining candidates according to the 2nd ranked choice. If still no candidate has a majority the candidate with the process repeats to next rank choice s until a candidate has obtained a majority.	Unsupported	
A ballot is not longer counted if all ranked choices have been eliminated	Unsupported	
Once candidates are eliminated no votes can be transferred to them. Ballots being recounted which identify an eliminated candidate go to the next ranked candidate.	Unsupported	
If a rank is skipped the vote for the next rank is counted.	Unsupported	

Supported Voting Variations of the VVSG 2005 Section 2.1.7.2		Test Cases & Comments
Provisional or Challenged Ballots		Requires a dedicated DRE
Provisional ballots maintain the secrecy of the ballot.	Supported	General 2 & Primary 1
A voted provisional ballot that is not included in the poll close report can be identified for determination.	Unsupported	
Valid provisional votes can be added in the central count report.	Supported	General 2 & Primary 1
A voted provisional ballot included in the poll close report can be identified and subtracted in the central count.	Supported	General 2 & Primary 1 Challenged votes are retracted before central count consolidation

MicroVote Requirements – Outside the VVSG		
Secondary Vote Limit		
An additional vote limit that can be placed on grouped contests, so that multiple limits are placed on the vote.	Supported	General 2
If contests are grouped with a Secondary Vote Limit, a voter may select no more than the maximum of the secondary limit from among all the grouped contests, additionally they may select no more than the individual contest limit from any single contest.	Supported	General 2

7.4.1.1 *General 1 Test Method*

Testing was conducted on the system configuration identified in section 3. Specific software and firmware builds are identified for each test iteration.

Run	Builds	Test Result	Issues Opened	Issues Closed	Notes
9/4/07	EMS v.4.0.8.0 Infinity v.9.61	Reject	# 38, 41, 42, 44, 45, 49, 50, 51, 54, 55, 56, 60, 62, 64, 68, 78	#38	# 38 closed per vendor clarification and # 78 was opened.
10/3/07	EMS v.4.0.9.0 Infinity v.9.61	Accept	#79,80	#41, 44, 49, 50, 51, 54, 55, 56, 62, 68	Discrepancies # 42, 45, 60, 64, 79, & 80 were not specific to General 1 and were moved to General 2 for regression testing.

Only functional issues are identified. While documentation discrepancies may be encountered in testing they do not result in the rejection of a functional test. All issues are documented in Appendix E.

Method Detail	General Election 1 Test Method
Test Case Name	General 1
Scope – identifies the type of test	A system level test incorporating validations of the 2005 Voluntary Voting System Guidelines required functionality. Testing includes validation of measurable performance including accuracy, processing rate, and ballot format handling capability. Functional aspects include error recovery, security, and usability of the hardware, software and procedures in the pre-vote, voting, and post-voting operations of a voting system.
Test Objective	Validate the ability to accurately and securely create, install, vote, count and report the results of a general election including the identified voting variations.
Test Variables: Voting Variations (as supported by the voting system)	Create New Election: • General elections • Partisan/non-partisan offices • Contest Write-in votes (Not Candidate level) • Cross –party endorsement • Vote for N of M • Provisional ballots • Party Logos • 2 Precincts; 1 with 2 splits • Candidate Sorting – By name within Party • Candidate Stacking – Always • Ballot Style – Absentee and Infinity (DRE) • Manual Vote Entry – in central count reports

Method Detail	General Election 1 Test Method
A description of the voting system type and the operational environment	MicroVote Election Management System voting system includes: • Ballot preparation & central count software (EMS) installed on a Windows OS PC running XP Professional • The DRE Infinity Voting Panel running the Infinity Voting Panel Firmware • A COTS scanner for absentee ballots • Smart cards for ballot installation, poll management, voter access, and transfer of results • COTS smart card reader/writer connected to central count (see below for test configuration detail)
VVSG 2005 vol.1	2.1 thru 2.4.3, 2.5
VVSG 2005 vol.2	6.2 thru 6.4.1, 6.6 & 6.7
Hardware, Software voting system configuration and test location	• Election Management System (EMS v4.0) voting system • Ballot Prep/Central Count SW: Election Management System (see above) • DRE HW: Infinity Voting Panel Model VP-1 Rev: C • DRE SW: Infinity Voting Panel Firmware v 3.1x, • COTS Smart Card Reader/Writer: GEMPLUS • COTS Optical Scanner: ACP2200 OMR Test Location: iBeta, Aurora, CO
Pre-requisites and preparation for execution of the test case.	Prior to execution of testing the following prerequisites must be completed. • Record the testers & date • System has been set up as identified in the user documentation • Install a witnessed build from the EMS software and Infinity firmware source code submitted for review • Reference the system configuration recorded in the PCA Configuration • Document versions of the EMS User, Infinity Poll Worker's, & Infinity Voting Panel Technical Reference Manuals • Ensure customization of the test case template is complete • Create a supervisory level access user and password • Obtain Green Start and Blue Vote Cards
Getting Started Checks	Check the voting system to : • Verify the test environment and system configuration is documented in the PCA Configuration and matches the system used in the 48 hr. temp & power variation test and manufacturer described configuration. • Validate installation of the witnessed build • Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager. • During testing an operational readiness test will be performed.
Documentation of Test Data & Test Results	Test Data: • Record all programmed & observed election, ballot & vote data fields and field contents on the corresponding tabs to provide a method to repeat the test • Preserve all tabs for each instance the test is run. Test Results: • Enter Accept/Reject on the Test Steps (see "Expected Results are observed" for definitions) • In Comments enter deviations, discrepancies, or notable observations • Log discrepancies on the Discrepancy Report and insert the number in the Comments
Pre-vote: Ballot Preparation procedures verifications	Ballot Prep: • Installation and Election databases can be accurately/securely defined & formatted. • A ballot (candidates & propositions) can be accurately/securely defined & generated. • A ballot can be accurately/securely programmed & installed onto the Vote card via the GEMPLUS card reader/writer.
Pre-vote: Ballot Preparation Security	Note: While execution of some security testing occurs in the General 1 test case the detail of all security testing is compiled in the Security Test Method. Ballot Prep: For the identified user entity confirm access and use to only the permitted functions and data COTS • Authentication is configured on the local terminal & external connection devices, • Operating systems are enabled for all session & connection openings, & closings, all process executions & terminations & for the alteration or detection of any memory or file

Method Detail	General Election 1 Test Method
	object • Configure the system to only execute intended & needed processes during the execution election software. Processes are halted until termination of critical system processes (such as audit).
Readiness Testing and Poll Verification	Voting system is ready for the election: • Status & data reports are generated • The election is correctly installed • Start Card Functions Screen validates voting system functions correctly • Test data is segregated from voting data, with no residual effect' The polling place voting system functions properly including a formal record of: • Election, polling place, voting system & ballot format identification (Show Ballot) • Zero count report (Print Zero Proof) • A list of all ballot fields • Test confirmation that there are: • No hardware/software failures • The device is ready to be activated to accept votes
Pre- vote: Opening the Polls Verification	DRE • Green Start Card and Security Password prevent inadvertent or unauthorized poll opening • Start Card Functions screen enforces the proper sequence of steps to open the polls • Display of Start Election Confirmation and Status Screen verifies correct activation • Identification of any failures & corrective action
Voting: Ballot Activation and Casting Verifications	Protects secrecy of ballot/vote • Records selection/non-selection for each contest Paper-based (Absentee & Provisional) • Allow voter to identify & mark candidates • Gives feedback & an opportunity to correct, before the ballot is counted (under/overvotes) DRE • Voter can make selections based on ballot programming & indicate selection/non-selection (undervotes) & cancellation • Alert overvotes; permit review & change before casting • Alert selection's complete; prompt confirmation as casting is irrevocable, • Alert successful/unsuccessful storage of cast ballot; give instruction to resolve unsuccessful casting • Prevent vote modification & access until polls close • Increment the ballot counter
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	System audit provides a time stamped always available, report of normal / abnormal events that can't be turned off when the system is in operating mode. • Status message are part of the real time audit record. • Critical status messages requiring operator intervention use clear indicators or text Error messages are: • Generated, stored & reported as they occur • Errors requiring intervention by voter or poll worker clearly display issues & action instructions in easily understood text language or with indicators • The text for any numeric codes is contained in the error or affixed to the inside of the voting system • Incorrect responses will not lead to irreversible errors. • Nested conditions are corrected in the sequence to restore the system to the state before the error occurred Note: While execution of some security testing occurs in the General 1 test case the detail of all security testing is compiled in the Security Test Method.
Post-vote: Closing the Polls	• While the polls are open but before Tally confirm the panel cannot be put into pretest or reset mode by action of the buttons or the poll worker card. Once the polls are closed the voting system • prevents further casting of ballots or reopening of the polls • internally tests and verifies that the closing procedures has been followed and the device status is normal • visibly displays the status • produces a test record that verifies the sequence of events and indicates the extraction of vote data is activated

Method Detail	General Election 1 Test Method
Post-vote: Central Count	Paper Based: The central count voting system includes: • Election identification • Zero count report • Information to confirm readiness & accommodate administrative reporting requirements • Vote Consolidation: Consolidated reported votes match predicted votes from polling places, & optionally other sources (absentee, provisional, etc) Reports include: • Geographic reports of votes; each contest by precinct & other jurisdictional levels • Printed reports of ballots counted by tabulator, with votes, undervotes & overvotes • Report of system audit information printed or in electronic memory • Report identifying the combination of candidates receiving overvotes • Prevent data from being altered or destroyed by report generation, transmission over telecommunication lines or extraction from portable media • Permit extraction & consolidate votes from programmable memory services or data storage medium • Consolidate the votes from multiple voting systems into a single polling place report DRE • Electronic ballot images of votes cast by each voter, extracted from a separate process & storage location, is reported in a human readable form
Post-vote: Security	Note: While execution of some security testing occurs in the General 1 test case the detail of all security testing is compiled in the Security Test Method. • The Infinity voting panel utilizes 2-factor authentication, possession of a token and knowledge of a password to access results after the polls are closed. The central count: COTS systems • Authentication is configured on the local terminal and external connection devices, • Operating system audit logs are enabled for all session and connection openings, and closings, all process executions and terminations and for the alteration or detection of any memory or file object • Configure the system to only execute the intended and necessary processes during the execution of the election software. Election software process are halted until the termination of any critical system process, such as system audit.
Post-vote: System Audit	The system audit provides a central count time stamped always available, report of normal and abnormal events that cannot be turned off when the system is in operating mode. Status message are part of the real time audit record.
Expected Results are observed	Review the test result against the expected result: • Accept: expected result is observed • Reject: expected result of the test case is not observed • Not Testable (NT): rejection of a previous test step prevents execution of this step, or tested in another TC. • Not Applicable (NA): not applicable to test scope
Record observations and all input/outputs for each election;	All inputs, outputs, observations, deviations and any other information impacting the integrity of the test results are recorded in the test case. • Any failure against the requirements of the EAC guidelines means the failure of the system and is reported. • Failures are reported to the manufacturer as Defect Issues in the Discrepancy Report. • The manufacturer has the opportunity to cure all discrepancies prior to issuance of the Certification Report. • If cures are submitted the applicable test is rerun. Complete retest information is preserved in the test case. Retest cure and results are noted in the – Discrepancy Report and as an appendix of the Certification Report. • Operations which do not fail the requirements but could be deemed defects or inconsistent with standard software practices or election practices are logged as Informational Issues on the Discrepancy Report. It is the manufacturer's option to address these issues. Open items are identified in the report.

7.4.1.2 *General 2 Test Method*

Testing was conducted on the system configuration identified in section 3. Specific software and firmware builds are identified for each test. General 2 was used as a standard functional regression test when any new build was received.

Run	Builds	Test Result	Issues Opened	Issues Closed	Notes
9/19/2007	EMS v.4.0.8.0 Infinity v.9.61	Reject	# 71 & 72	None	
10/8/2007	EMS v.4.0.9.0 Infinity v.9.61	Reject	#81, 82, 83, 84, 85, 86, 87, 88, & 89	#64	
11/06/2007	EMS v.4.0.11.0 Infinity v.9.62	Reject		#42,45,60, 71, 72 75, 76, 79, 81, 80 82, 83, 84, 85, 86, 87	#88 & 89 remains open
12/5/2007	EMS v.4.0.12.0 Infinity v.9.63	Reject	103,104 &105	#88	#89 remains open
12/12/2007	EMS v.4.0.14.0 Infinity v.9.64	Accept		#89, 103, 104, &105	
2/29/2007	EMS v.4.0.16.0 Infinity v.9.66	Reject	#113		Functional regression for changes submitted
3/11/2007	EMS v.4.0.17.0 Infinity v.9.67	Accept		#109, 113	Current production inspected against ECNs, #109 closed
3/24/2007	EMS v.4.0.18.0 Infinity v.9.67	Reject	#121		Functional regression for changes submitted
6/2/08	EMS v.4.0.20 Infinity v.4.0	Accept		#121	
9/25/08	EMS v.4.0.21 Infinity v.4.0	Accept			Functional regression for a submitted change

Only functional issues are identified. While documentation discrepancies may be encountered in testing they do not result in the rejection of a functional test. All issues are documented in Appendix E

Method Detail	General Election 2 Test Method
Test Case Name	General 2
Scope – identifies the type of test	A system level test incorporating validations of the 2005 Voluntary Voting System Guidelines required and manufacturer identified functionality. Testing includes validation of measurable performance including accuracy; processing rate, and ballot format handling capability, Functional aspects include error recovery, security, and usability of the hardware, software and procedures in the pre-vote, voting, and post-voting operations of a voting system. Functional accessibility (audio, mobility and dexterity) in the voting mode is included.
Test Objective	Validation of the ability to accurately and securely create visual and audio ballots, install, vote with mobility and non-mobility restrictions, count and report the results of a general election including the identified voting variations.
Test Variables: Voting Variations (as supported by the voting system)	Create New Election • General elections • Straight party voting

Method Detail	General Election 2 Test Method
	• Partisan/non-partisan offices • Write-in votes – Contest and Candidate level • Audio ballots • Multi-lingual visual and audio ballots • Secondary Vote Limit • 2 Precincts • Candidate Sorting – By Name • Candidate Stacking – Only within race when required • Auto Straight Party Crossover • Ballot Graphics (verify not available) • Dexterity Assistive Device Ballots – non-electronic mouth stick and toe entry
A description of the voting system type and the operational environment	Same as General 1 except: • -COTS Smart Card Reader/Writer is not used • -Tally results are directly transferred to the central count software via a port on the panel • A COTS voice synthesis/sound system (text-to-speech converter) for Audio ballots • Audio: Headphones • Mobility: Accessible voting booth • -Dexterity: non-electronic entry mouth stick and toe
VVSG 2005 vol.1	2.1 thru 2.4.3, 2.5, 3.1, 3.1.2, 3.1.3, 3.2 HAVA a thru c2
VVSG 2005 vol.2	6.2 thru 6.4.1, 6.5 thru 6.7
Hardware, Software voting system configuration and test location	Same as General 1 except: • COTS Smart Card Reader/Writer is not used • COTS voice synthesis/sound system (text-to-speech converter): DoubleTalk LT • Radioshack Headphones • MicroVote Accessible voting booth • Mouth and head stick (non-manual voting)
Pre-requisites and preparation for execution of the test case.	Same as General 1, plus: • Use the "Preferences" settings from General 1
Getting Started Checks	Same as General 1
Documentation of Test Data & Test Results	Same as General 1
Pre-vote: Ballot Preparation procedures verifications	Same as General 1except: • A ballot can be accurately/securely programmed & installed onto the Infinity Voting Panel via a port on the panel.
Pre-vote: Ballot Preparation Security	Same as General 1
Readiness Testing and Poll Verification	Same as General 1
Pre- vote: Opening the Polls Verification	Same as General 1
Voting: Ballot Activation and Casting Verifications	Same as General 1 • Accessible Spanish ballots can be accessed • English or Spanish accessible ballots can be audibly accessed • Accessible ballots contain all visual ballot content • Instructions, status and error messages display in the accessible manner • Accessible ballots can be voted securely, privately and independently • Accessible ballots can be changed or correct errors prior to casting • Ballots can be voted with non-manual input
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	Same as General 1
Post-vote: Closing the Polls	Same as General 1 • Votes are not identifiable as being cast via accessible means
Post-vote: Central Count	Same as General 1 • Votes are not identifiable as being cast via accessible means
Post-vote: Security	Same as General 1
Post-vote: System Audit	Same as General 1

Method Detail	General Election 2 Test Method
Expected Results are observed	Same as General 1
Record observations and all input/outputs for each election;	Same as General 1

7.4.1.3 *Primary 1 Test Method*

Testing was conducted on the system configuration identified in section 3. The specific software and firmware builds are identified.

Run	Builds	Test Result	Issues Opened	Issues Closed	Notes
10/22/2008	EMS v.4.0.9.0 Infinity v.9.61	Accept	#79, 81, 82, 83, 84	#41, 44, 48, 50, 51, 54	Discrepancies #79, 81, 82, 83, 84 were not specific to primary functions and were consolidated in General 2 for Regression testing

Only functional issues are identified. While documentation discrepancies may be encountered in testing they do not result in the rejection of a functional test. All issues are documented in Appendix E

Method Detail	Primary Election 1 Test Method
Test Case Name	Primary 1
Scope – identifies the type of test	A system level test incorporating validations of the VVSG 2005 required functionality. Testing includes validation of measurable performance including accuracy; processing rate, and ballot format handling capability, Functional aspects include error recovery, security, and usability of the hardware, software and procedures in the pre-vote, voting, and post-voting operations of a voting system. Functional aspects include error recovery, security, and usability of the hardware, software and procedures in the pre-vote, voting, and post-voting operations of a voting system. Functional accessibility (audio, mobility and dexterity) in the voting mode is included.
Test Objective	Validate the ability to accurately and securely create, install, vote, count and report the results of a closed primary election or an open primary election with public party declaration including the identified voting variations. Validate that the Primary ballot operates in the identical mode as a General ballot. Validate that Primary ballots are separate static ballots individually configured in the EMS. Validate that the selection of a Primary ballot is performed by the poll worker and requires no private or independent action by the voter so that specific “Primary only” accessible functionality is required
Test Variables: Voting Variations (as supported by the voting system)	Closed/open primaries public declaration • Partisan/non-partisan offices • Write-in votes • Primary presidential delegation nominations • Ballot rotation is not supported • Cross –party endorsement • Multiple and Split precincts • Vote for N of M • Provisional or challenged ballots • Candidate Sorting – None • Candidate Stacking – On entire ballot when required • Audio ballots • Multi-lingual visual and audio ballots • Dexterity Assistive Device Ballots – non-electronic mouth stick and toe entry
A description of the voting system type and the operational environment	Same as General 1
VVSG 2005 vol.1	2.1 thru 2.4.3, 2.5, 3.1, 3.1.2, 3.1.3
VVSG 2005 vol.2	6.2 thru 6.4.1, 6.6 & 6.7
Hardware, Software voting system configuration and test location	Same as General 1 • A COTS voice synthesis/sound system (text-to-speech converter) for Audio ballots • Audio: Headphones

Method Detail	Primary Election 1 Test Method
	• Mobility: Accessible voting booth • Dexterity: non-electronic entry mouth stick and toe
Pre-requisites and preparation for execution of the test case.	Same as General 1
Getting Started Checks	Same as General 1
Documentation of Test Data & Test Results	Same as General 1
Pre-vote: Ballot Preparation procedures verifications	Same as General 1
Pre-vote: Ballot Preparation Security	Same as General 1
Readiness Testing and Poll Verification	Same as General 1
Pre- vote: Opening the Polls Verification	Same as General 1
Voting: Ballot Activation and Casting Verifications	Same as General 1 • Accessible Spanish ballots can be accessed • English or Spanish accessible ballots can be audibly accessed • Accessible ballots contain all visual ballot content • Instructions, status and error messages display in the accessible manner • Accessible ballots can be voted securely, privately and independently • Accessible ballots can be changed or correct errors prior to casting • Ballots can be voted with non-manual input
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	Same as General 1
Post-vote: Closing the Polls	Same as General 1
Post-vote: Central Count	Same as General 1
Post-vote: Security	Same as General 1
Post-vote: System Audit	Same as General 1
Expected Results are observed	Same as General 1
Record observations and all input/outputs for each election;	Same as General 1

7.4.2 FCA Security Test Method

Detail for the security testing was incorporated into iBeta standards testing, source code review and document reviews. See Appendix B and C for these source code and document reviews and Appendix D General 1, General 2, Primary 1 and Telephony and Cryptographic Test Methods for these test results.

Run	Builds	Result	Issues Opened	Issues Closed	Notes
9/21/07	NA-document review	Accept			v.1: 2.1.4.g Document Review to only install specified software
9/21/07	NA-document review	Accept			v.1: 2.1.4.i Document Review instructs how to confirm correct configuration
9/21/07	NA-document review	Reject	#74		v.1: 7.4.2 Document Review configuration to avoid network attack
10/11/07	NA-document review	Accept		#74	v.1: 7.4.2 Document Review configuration to avoid network attacks
10/15/07	EMS 4.0.9.0 Infinity 9.61	Accept			v.1: 2.1.4. f & 7.4.1.c Vote data cannot be retrieved from the com

Run	Builds	Result	Issues Opened	Issues Closed	Notes
					ports
10/15/07	EMS 4.0.9.0 Infinity 9.61	Accept			v.1: 7.3 Source Code Review: Replacement of Infinity software is restricted to expert technicians
10/15/07	EMS 4.0.9.0 Infinity 9.61	Accept			v.1: 7.3 Non-system administrators are blocked from installing a virus
10/15/07	EMS 4.0.9.0 Infinity 9.61	Accept			v.1: 2.1.2 d Source code review to verify checksum validation
10/18/08	EMS 4.0.9.0 Infinity 9.61	Accept			v.1: 2.1.4.f & 7.3.1The vote table (tblPrecinctVote) cannot be accessed
10/19/07	EMS 4.0.9.0 Infinity 9.61	Reject	#92		v.1: 2.1.1.f & 7.3.1Tally card results can be modified without detection
10/19/07	EMS 4.0.9.0 Infinity 9.61	Accept			v.1: 2.1.1.f & 7.3.1 Unable to alter Vote card
10/22/07	EMS 4.0.9.0 Infinity 9.61	Accept			v.1: 7.3.1 Tamper evidence in seal removal
11/14/07	NA – Document Review	Accept		#92	v.1:2.1.1.f Assessment of risk and document review of Tally card chain of evidence procedures
6/13/08	NA- Document Review	Accept			v.1: 7.4.1.a Review the System Identification User manual and validate procedures to retest ROM prior to elections documented.
6/13/08	EMS 4.0.20.0 Infinity 4.0	Accept			v.1: 7.4.1.b Inspect the chip and confirm all election specific executable code is only present on non-permanent memory.
6/13/08	EMS 4.0.20.0 Infinity 4.0	Accept			v.1: 7.4.1.d Review and confirm separate memory chips are documented. Remove the chip with the firmware. Boot up the Infinity panel and confirm the BIOS runs but no election is accessible.
6/13/08	EMS 4.0.20.0 Infinity 4.0	Accept			v.1: 7.4.1.e Inspect the chip and confirm that no source code, compilers or assemblers are resident or accessible
8/19/08	EMS 4.0.20.0	Reject	#135		v1: 7.5.1.a Source Code

Method Detail	Security Test Method
	Source code review for security is completed with no outstanding issues Same as General 1
Getting Started Checks	Follow steps in the System Level and Telephony and Cryptographic Test Cases. The vendor supplied security documentation is reviewed against the requirements for Access Controls, Physical Security and Software Security. Complete the prerequisites; - Record the reviewer & date - Gather any necessary materials or manuals.
Documentation of Test Data & Test Results	Record the results of the security & source code reviews. • Enter Accept/Reject against each review requirement. • Log discrepancies on the appropriate Discrepancy Report Same as General 1
Pre-vote: Ballot Preparation procedures verifications	Follow the test steps in the General 1test case to validate: • Users are forced to change the initial hard-coded username and password • User Manual identifies the system configuration for only executing election software
Pre-vote: Ballot Preparation Security	Follow the test steps in the General 1, 2 & Primary 1 cases to validate: • Security access controls limit or detect access to critical systems & the loss of system integrity, availability, confidentiality & accountability • Power can be interrupted & restored without loss of election data • Audit logs contain entries for failed attempts, normal & abnormal events. • Functions don't execute if preconditions are not met • Functions are only executable in the intended manner, order & under intended conditions outlined in the user manual, test steps, & test data • System access controls are implemented for ballot preparation; for the identified entity confirm access and use to only the permitted functions and data • Security provisions are implemented for ballot preparation • Pre-vote communication errors are reported to the user & require corrective action to continue operation • Pre-vote errors restore the system to the prior condition without losing data • There is no use of public networks to transfer data • Provided documentation of mandatory administrative procedures. • Verify that a virus or other malicious software cannot be installed on the EMS computer without Administrator privileges. •
Readiness Testing and Poll Verification	Follow test steps in the General 1, 2 & Primary 1 test cases to validate for the Ballot Installation functions: • Security access controls limit or detect access to critical systems & the loss of system integrity, availability, confidentiality & accountability • Audit logs contain entries for failed attempts, normal & abnormal events. • Ballot installation, readiness testing and poll verification functions don't execute if preconditions are not met and are only executable in the intended manner, order & under intended conditions outlined in the user manual, test steps, & test data • System access controls are implemented for ballot installation, readiness testing and poll verification; for the identified entity confirm access and use to only the permitted functions and data • Security provisions are implemented for ballot installation, readiness and poll verification • Readiness and poll verification communication errors are reported to the user & require corrective action to continue operation • Readiness and poll verification errors restore the system to the prior condition without losing data • There is no use of public networks to transfer data during installation and readiness Security
Pre- vote: Opening the Polls Verification	Follow test steps in the General 1, 2 & Primary 1 test cases to validate for the Poll Opening functions • Prior to opening polls, confirm Vote, Tally and non-election smart cards do not open polls

	Infinity 9.64	Accuracy			check failure did not impact the accuracy of the Infinity Voting Panel
4/29/08	EMS v.4.0.18.1 Infinity 9.67	Accept - Reliability		#106 & 107	Operation included validation of the accuracy of votes cast

Only functional issues are identified. While documentation discrepancies may be encountered in testing they do not result in the rejection of a functional test. All issues are documented in Appendix E.

iBeta Definition	Accuracy DRE(Accuracy, Reliability, Availability, Volume, and Stress)
Test Case Name	Accuracy- (DRE) Infinity Voting Panel
Scope - identifies the type of test	Accuracy testing validates the individual ballot positions in terms of a maximum error rate while processing a specified volume of date. Maximization of ballot positions and large numbers of votes incorporate stress and volume test conditions. Reliability and availability is measured in the results of the Accuracy Test.
Test Objective	Validation of the ability to capture, record, store consolidate and report a predicted total of vote selections and the absence of vote selection for a minimum of 1,549.703 ballot positions without error or with an acceptable level of error.
Test Variables: Accuracy Reliability Volume Stress	Ballot Preparation Variable: Test ballot using more than 80% of ballot location capacity with the system maximum of 10 Parties. Configure: 10 Contests (8 @Vote for 5, 2@ Vote for 1) = 420 ballot positions/ballots. Contest headers and ballot text a ballot layout to 502 Infinity ballot locations (83.7%) Ballots shall be voted manually and using an automated script. 10% of the required ballot positions are entered manually. Manual entry occurs in approximately 2% blocks (each exceeding the 26,997 Go/No Go minimum) in each of the 5 intervals (beginning, intervals 2 through 4, and end). During 3 cycles an automated script is run to exceed the minimum of 1,549,703 ballot positions. The VVSG permits a simulation for the purpose of eliminating human error in casting test ballots. During testing ballots are cast in up to 20 precincts (Vote Consolidation and Reporting Variables: Interval 1 will incorporate the Go/No Go minimum. Interval 5 will incorporate all results. Consolidate and validate tallies meet the predicted result. Chamber operation: Four units will run 48 hours through two Temperature and Power variation cycles, exceeding the minimum 163 hours **Test Plan Change:** The regression test will include 4 units run for 48 hours through Temperature and Power variations cycles and 16 hour ambient. Operation will include panel programming, readiness, automated ballot generation, reporting. The panels shall remain powered during test administration. (Interpretation 2008-01)
A description of the voting system type and the operational environment	MicroVote Election Management System voting system includes: • Ballot preparation & central count software (EMS) installed on a Windows OS PC running XP Professional • The DRE Infinity Voting Panel running the Infinity Voting Panel Firmware • Smart cards for ballot installation, poll management, voter access, and transfer of results • COTS smart card reader/writer connected to central count
VVSG 2005 vol.1	2.1.2, 2.1.5. 4.1.1.a thru d.i, 4.1.5.2.a thru 4.1.6.1.a, 4.3.3, 4.3.5.a thru d Interpretation 2008-01
VVSG 2005 vol.2	1.7.1.1, 1.8.2.2, 1.8.2.3, 4.7.1.1, 4.7.3 thru 4.7.4.d.i, 6.1, 6.2.3
Hardware, Software voting system configuration and test location	Election Management System (EMS v4.0) voting system Ballot Prep/Central Count SW: Election Management System v.4.0 DRE HW: Infinity Voting Panel Model VP-1 Rev: C DRE SW: Infinity Voting Panel Firmware v 3.1x, Test Location: Temperature and Power variation- environmental HW lab Test will be run in conjunction with the Temperature and Power Variation as described in the Test Variables
Pre-requisites and preparation for execution of the test case.	Confirm Wyle can provide a chamber to permit initiation of ballot counting cycles in the chamber by a method that ensures the integrity of the test temperature environment. Complete the prerequisites;

iBeta Definition	Accuracy OMR (Accuracy, Reliability, Availability, Volume, and Stress)
	environmental chamber hardware operating test..
A description of the voting system type and the operational environment	MicroVote Election Management System voting system includes: • Ballot preparation & central count software (EMS) installed on a Windows OS PC running XP Professional • COTS scanner for absentee/provisional ballots
VVSG 2005 vol.1	2.1.2, 2.1.5. 4.1.1 .a thru d.i, 4.1.5.2.a thru 4.1.6.1.a, 4.3.3, 4.3.5.a thru d
VVSG 2005 vol.2	1.7.1.1, 1.8.2.2, 4.7.1.1, 4.7.3 thru 4.7.4.d.i, 6.1, 6.2.3
Hardware, Software voting system configuration and test location	Election Management System (EMS v4.0) voting system Ballot Prep/Central Count SW: Election Management System v.4.0.0.0 COTS Optical Scanner: OMR /ACP2200 Test Location: Test will be run on confirmed COTS equipment (see h. Description of Procedure - preparation of items) at room temperature
Pre-requisites and preparation for execution of the test case.	Confirm the equipment meets the COTS exemption by reviewing: • the device and product specifications to confirm that it has not been modified in any manner to support use as a voting system • the documentation to confirm a record of performance under the conditions defined in the VVSG (v.1:4.1.2) Complete the prerequisites; • Record the testers • System has been set up as identified in the user manual • Ensure customization of the test case template is complete
Getting Started Checks	Check the voting system to : • Verify the test environment and system configuration is documented in the PCA Configuration and matches the vendor documented configuration. • Validate installation of the witnessed build • Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager. • Initiate an operational status to confirm the correct function of the voting system prior to initiation of Accuracy testing. • Record start time.
Documentation of Test Data & Test Results	Same as General 1 Total time of operation shall be recorded and compiled
Accuracy: Paper-based voting systems Processing	Paper-based voting systems, verify: • All ballot positions on paper ballots can be scanned and detect selections for individual candidates and contests, converting them to digital data. (Receive electronic signals produced by punches, vote marks and timing information; perform logical and numerical operations upon the data; and reproduce the contents of memory without error (including ballot style/precinct, a vote for a specific candidate/contest or other source.) • The voting system does not record extraneous marks, smudges or folds. (Extraneous marks are outside programmed ovals.) • The voting system rejects more than 2% of ballots that meet the vendor's specifications for marking. • Vote selection data from multiple precinct-based voting machines is stored with the generated jurisdiction-wide vote counts • Consolidated reports are accurate against a predicted vote total
Accuracy: DRE Voting Systems Processing	Verify the Optical Mark Readers are not a DRE
Accuracy: Error Rate	Same as Accuracy - Infinity Voting Panel
Reliability	Same as Accuracy - Infinity Voting Panel Accumulation of the 163 hours shall include Accuracy and System Level testing. Verify that the system is not a DRE with a VVPAT and exempt from VVSG vol. 1 sect. 7.9.4
Availability	Same as Accuracy - Infinity Voting Panel
Expected Results are observed	Same as General 1
Record observations and all input/outputs for each election;	Same as General 1 • System failures will be logged with the MTTR. The log will be used to determine Availability.

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

Testing was conducted on the system configuration identified in section 3. The specific software and firmware builds are identified for each test iteration.

Run	Builds	Test Result	Issues Opened	Issues Closed	Notes
9/20/2007	EMS 4.0.8.0 Infinity 9.61	Accept- Usability			
9/20/2007	EMS 4.0.8.0 Infinity 9.61	Reject - Accessibility/ Maintainability	#75, 76, 77, 94, 95, 96, 97		
11/12/2007	EMS 4.0.11.0 Infinity 9.62	Accept Accessibility		#75, 76	#75 & 76 results are recorded in General 2
5/1/2008	EMS 4.0.18.0	Accept - Recovery			Optical scanner back-up
5/2/2008	EMS 4.0.18.0 Infinity 9.67	Accept - Recovery			DRE back up
Various dates	NA- Document Review	Accept - Maintainability		#77, 94, 95, 96 & 97	See Appendix E for regression validations & dates

All issues are documented in Appendix E.

Method Detail	Characteristics Test Method
Test Case Name	FCA Voting System Characteristics Test Case (Recovery, Accessibility, Usability & Maintainability)
Scope - identifies the type of test	Accessibility, usability, maintainability and recovery are characteristics of the voting system. These characteristics are performed as a single combined functional test during a mock election. Validation of the integration of security and accuracy functions of the usability and accessibility features are tested in the system level tests.
Test Objective	The objective of characteristics testing is to verify the accessibility, usability, maintainability and recovery requirements of the VVSG 2005 guidelines and HAVA are met.
Test Variables: Voting Variations (as supported by the voting system)	An audio/visual straight party ballot with multi-lingual capabilities will be used. • One contest shall have a write-in vote. • One contest shall have more candidates or text than can be displayed on the screen. • Restricting visual access will be handled by blindfolding the tester
A description of the voting system type and the operational environment	Same as General 2
VVSG 2005 vol.1	2.1.5.1.a.vi & vii, 2.3.3.1.a & e, 2.3.3.3, 3.1.4 thru 3.1.7.2.b, 3.2.1 thru 3.2.6, 4.1.2.4.c, 4.2.1 thru 4.2.3.b. ii, 4.3.1 thru 4.3.2, 4.3.4.1 thru 4.3.4.2. g, 4.3.6 a thru c & 7.9.6.a thru 7.9.7 b. HAVA 301a.3 & 4
VVSG 2005 vol.2	4.7.2, 6.5, 6.7
Hardware, Software voting system configuration and test location	Same as General 2
Pre-requisites and preparation for execution of the test case.	A test election (including parameters listed in section d) is prepared and installed on the polling place device • During installation of the election confirm the operational readiness of the voting system. • System has been set up as identified in the user manual • Record the testers & date • Gather any necessary materials including accessibility equipment, and manuals • Ensure customization of the test case template is complete
Getting Started Checks	Check the voting system to : • Verify the test environment and system configuration is documented in the PCA

Method Detail	Characteristics Test Method
	Configuration and matches the vendor described configuration. • Validate installation of the witnessed build • Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager. • Install the Election and Installation databases, and open the polls using the process defined on the Test Data tab.
Documentation of Test Data & Test Results	Test Data: • Record all programmed & observed election & ballot data fields and field contents on the corresponding tabs to provide a method to repeat the test • Preserve all tabs for each instance the test is run. Test Results: • Enter Accept/Reject on the Test Steps • In Comments enter any deviations, discrepancies, or notable observations • Log discrepancies on the Discrepancy Report and insert the number in the Comments
Polling Place Hardware & Recovery	Validations of operations in the voting mode: • DRE operates for a minimum of 2 hours on backup power • Adjust or magnify the font size, color, contrast, and audio volume • Power supply interruption without corruption of data • Telecommunications interruption without corruption of data • Three second response time • Review the transportation and storage features for safe and easy handling • Examine the voting system devices for caution and warning labels (exposure to electrical voltages and moving parts)
Usability- Cognitive & Perceptual	Cognitive Issues: • Presentation of Contest Choice does not introduce any bias in both visual and aural formats. • Instruction presentation provides clear instructions and assistance: to allow voters to independently execute and cast; obtain help and instruction for all voter available operations • Color use agrees with common conventions for operational status, warnings and errors. Perceptual Issues- • Flicker display frequency is between 2 Hz and 55 Hz • Reset for each voter any voter adjustable feature • Reset to default any voter adjustable feature • Text font size is a minimum of 3.0 mm • Poor Reading Vision is addressed in the voting system • Contrast and Use of Color adjustment for color blindness • Multiple Methods for conveying action instructions (color, shape or text.) • Sans serif font is used for voter presented text • Text to Graphics Ratio (including icons) intended for the voter is 3:1.
Usability- Interaction, Privacy and Identification	Interaction Issues • No page scrolling shall be required by the voter (move to the next or prior page.) • A marked vote selection is unambiguously displayed • Any time out functionality issues an alert at least 20 seconds before the time expires and provides a means by which the voter may receive additional time. • Touch screen and key mechanisms are designed to minimize accidental activation. Privacy • Visual access to the ballot and input controls are visible only to the voter during the voting session and ballot submission. • Audio access is audible only to the voter • Overvote warnings preserves the privacy of the voter and the confidentiality of the ballot. • Alternative language information used by the voter is not kept within an electronic cast vote record • Accessible features are not identified in the electronic cast vote record. Biometric Identification • If voter authentication uses biometric measures requiring particular biological characteristics, a secondary means that does not depend on those characteristics must be provided.
Accessibility- Partial Vision	Partial Vision

Method Detail	Characteristics Test Method
	• Font size of an electronic image display is voter adjustable, between 3.0-4.0 & 6.3-9.0 mm. • Contrast of a monochrome-only electronic image display shows information in high contrast either by default or under the control of the voter/poll worker (figure-to-ground ambient contrast ratio 6:1) • Contrast adjustments of a color electronic image display allows the voter to adjust the color or the figure-to-ground ambient contrast ratio • Controls are distinguished by both shape and color controls • -Audio output is synchronized to the visual display
Accessibility- Blindness	Blindness • Audio headphone jacks support standard 3.5 mm stereo connectors. • Audio/tactile operational support is provided for all instructions and functionality • Voting system does not use a telephone handset (Wireless interference - T4 rating shall be achieved (ANSI C63.19). • Methods to sanitized headphones are available to each voter. • Default volume is set between 40 and 50 dB SPL. • The controllable volume range is 20dB SPL to 100 dB SPL, in increments less than 10 dB. • Speech frequencies produced are in the audible speech range of 315 Hz to 10 KHz. • Audio presentation is comprehensible by language proficient voters with normal hearing • Rate of speed supported ranges are 75% to 200% of the nominal rate. • Voting systems with ballot initialization by sighted voters provide this feature to blind voters. • Voting systems with ballot submission by sighted voters provide this feature to blind voters. • All mechanically operated controls or keys are tactilely discernible without activating the control or key. • Sound or tactile controls identify any voting system shift/lock and non-shift/unlocked positions.
Accessibility - Dexterity	Dexterity • All keys and controls are operable with one hand and do not require tight grasping, pinching, or twisting of the wrist. The force required to activate controls and keys is no greater 5 lbs. (22.2 N). • Direct body contact is not required to operate the voting system. • Non-manual input is required to be functionally equivalent to tactile input. • A voter who lacks fine motor control or the use of their hands can submit their ballot
Accessibility- Mobility	Mobility: The voting station provides • Level clear floor space of 30 in min X 48 in min with no slope exceeding 1:48; positioned for a forward or parallel approach. • All controls necessary for voter operation are within reach • Forward reach w/ no obstruction: max high reach 48 in, min low reach 15 in. • Forward approach w/ a forward obstruction less than 25 in depth, 34 in height and bottom surface no lower than 27 in. • Max high reach for obstructions less than 20 in deep: 48 in, all others 44 in. • Toe clearance is space under the obstruction between the floor and 9 in above the floor, extending max 25 in under the obstruction and min 30 in wide. Min toe clearance under the obstruction is the greater of: 17 in or the depth required to reach over the obstruction to operate the voting station. • Knee clearance is the space under the obstruction between 9 & 27 in above the floor: extending max 25 in under the obstruction at 9 in above the floor. Knee clearance is min 30 in wide. Min knee clearance at 9 in above the floor is the greater of: 11in or 6 in less than the toe clearance. Knee clearance may reduce at a rate of 1 inch in depth for 6 inches in height between 9 & 27 in above the floor. • Parallel Approach w/ no side reach obstruction: max high reach is 48 in; min low reach is 15 in • Parallel Approach w/ a side reach obstruction: max high reach is less than 24 in in-depth and its top is less then 34 in high. Max high reach for obstructions less than 10 in deep is 48 in, otherwise 46 in. • -For normal sighted wheelchair voters in a correctly oriented position (better than 20/40, corrected) all labels, displays, & controls to operate the voting machine are

Method Detail	Environmentatl Test Method (DRE)
	performed under an appropriate mode as a voting system and to determine acceptance or rejection of some or all testing.
Test Objective	Validation of the polling place hardware to meet the Non-Operating/Operating Environmental test standards of the EAC VVSG 2005.
Test Variables: Voting Variations (as supported by the voting system)	Tests conducted in compliance with the identified standard : Power disturbance disruption - IEC 61000-4-11 (1994-06). Electromagnetic radiation- FCC Part 15 Class B requirements - ANSI C63.4. Electrostatic disruption - IEC 61000-4-2 (1995-01). Electromagnetic susceptibility - IEC 61000-4-3 (1996). Electrical fast transient protection - IEC 61000-4-4 (1995-01). Lightning surge protection - IEC 61000-4-5 (1995-02). RF immunity - IEC 61000-4-6 (1996-04). AC magnetic fields RF immunity - IEC 61000-4-8 (1993-06). MIL-STD810-D: High temperature method 501.2 Procedures I-Storage maximum 140 F degrees Low temperature - method 502.2, Procedure I-Storage minimum -4 F degrees Temperature & power variations - method 501.2 & 502.2 Humidity - method 507.2 Vibration - method 514.3-1 Category 1 - Basic Transportation Common Carrier Bench handling - method 516.3 procedure VI Safety - OSHA CFR Title 29, part 1910 The operating modes shall include both visual and audio operations.
A description of the voting system type and the operational environment	DRE HW: Infinity Voting Panel Model VP-1 Rev: C DRE SW: Infinity Voting Panel Firmware v 3.11 COTS voice synthesis/sound system (text-to-speech converter): DoubleTalk LT Radioshack Headphones MicroVote Accessible voting booth
VVSG 2005 vol.1	4.3.8, 4.1.2 thru 4.1.2.14 (see Characteristics for 4.1.2.4.c)
VVSG 2005 vol.2	4.6.1.5 thru 4.7.1 & 4.8
Hardware, Software voting system configuration and test location	DRE HW: Infinity Voting Panel Model VP-1 Rev: C DRE SW: Infinity Voting Panel Firmware v.3.1x COTS voice synthesis/sound system (text-to-speech converter): DoubleTalk LT Radioshack Headphones MicroVote Accessible voting booth Test Location: Wyle Laboratories, Huntsville AL • iBeta provides Wyle with the environmental hardware test case outlining methods, instructions to document the configuration, test environment, lab accreditations, tester qualifications, and operational status check performance. • iBeta personnel execute the accuracy testing in conjunction with the Temperature and Power Variations provide and oversee the operational status checks. Wyle VSTL qualified test staff are trained on voting system operation and the operational status check.
Pre-requisites and preparation for execution of the test case.	Complete the prerequisites: • Record the testers & date • System has been set up as identified in the user manual • Gather any necessary materials or manuals. • Ensure customization of the test case template is complete The iBeta approved Operational Status Check script is provided that includes: Setup of Infinity Vote Panel and Attach Printer • Install a test election with two contests: candidate and referendum • Verify Online/Offline printer operation Pre-vote Polling Place Verification • Panel Starting Message displays after 10 seconds • Status Screen displays: current date, time; current panel mode; jurisdiction; election name, date; precinct name; panel serial number and firmware version; votes recorded in current election, protective count and security id and memory used. • Security code required for entry • Panel displays 'start card functions' • Check Button - all buttons function correctly • Check Display - no gaps in the black areas • Show Ballot- view the ballot; ballot can't be voted in this mode

Method Detail	Environmentatl Test Method (DRE)
	• Print Zero Proof- print tally tape with zeros; completion of print system alert (beep) • Open the polls Vote Process - Voter #1 - Visual ballot checks • Insertion of vote card activates precinct/ballot selection • Selected ballot is presented • Perform visual checks: lighten/darken display, change contrast, magnification on/off • Perform ballot functions: next/previous page, candidate vote, referendum vote, confirm ballot, cast vote • View vote successfully submitted Vote Process -Voter #2 Audio ballot checks • Double talk unit is attached and activated • Poll worker Insertion of vote card activates precinct/ballot selection • Selected ballot is presented • Perform audio playback checks: louder/softer, faster/slower, contest, candidate, referendum, yes/no • Initial playback voting options does not select voting options; subsequent playback(s) selects/deselects voting options • Perform ballot functions contain appropriate audio playback: next/previous page, candidate vote, referendum vote, undervote, confirm ballot, cast vote • Hear vote successfully submitted • Visual and audio presentation are synchronized Post Vote • Insertion of Tally card prompts Security Code entry • Entry of security presents the Close and Tally screen • Selection of Tally presents Tally Review • Selection of Print generates Tally Report; matches votes cast • Write Tally card; Tally card results read in EMS match printed Tally Report
Getting Started Checks	Check the voting system to : • Verify the test environment and system configuration is documented in the PCA Configuration and matches the manufacturer described configuration. • Validate installation of the witnessed build • Testers understand that no change shall occur to the test environment without documentation in the test record and the authorization of the project manager. • Confirm the tester understands the recording requirements of the iBeta test case. • Operational status check procedures are available and successfully run. • An automated script for use during the EMC operational tests exercises necessary functionality.
Documentation of Test Data & Test Results	Test Results: • Enter Accept/Reject on the Test Steps • In Comments enter any deviations, discrepancies, or notable observations • Log discrepancies on the Discrepancy Report and insert the number in the Comments
Standard Environmental Tests	Follow test method in the identified international standard. The operating modes shall include both visual and audio ballot operations.
Expected Results are observed	Review the test result against the expected result: • Pass: meets the requirements • Fail: does not meet the requirements; document the failure in the comments • Not Testable (NT): not testable; provide a reason in the comments
Record observations and all input/outputs for each election;	All test results will be recorded in the test case. • Any failure against the requirements will mean the failure of the system and shall be reported as such. • Failures will be reported to the manufacturer as Defect Issues in the Discrepancy Report. • The manufacturer shall have the opportunity to cure all discrepancies prior to issuance of the Certification Report. • If cures are submitted the applicable test will be rerun. Complete information about the rerun test will be preserved in the test case. The cure and results of the retest will be noted in the - Discrepancy Report and submitted as an appendix of the Certification Report. • Operations which do not fail the requirements but could be deemed defects or inconsistent with standard software practices or election practices will be logged as Informational Issues on the Discrepancy Report. It is the manufacturer's option to

Method Detail	Environmentatl Test Method (DRE)
	address these issues. Open items will be identified in the report.

Hardware tests that required system operation were

7.4.5.2 *Environmental Test Method (COTS OMR)*

An inspection and document review was conducted on the system configuration identified in section 3.

Document Review	COTS	Result	Issues Opened	Issues Closed	Notes
6/21/07	OMR ACP2200	Reject	#26		
2/26/08	OMR ACP2200	Reject	#111 & 112	#26	
3/25/08	OMR ACP2200	Accept		#112	
5/3/08	OMR ACP2200	Accept		#111	

All issues are documented in Appendix E.

Method Detail	Environmental Test Method (COTS OMR)
Test Case Name	Environmental Test – COTS Optical Mark Reader
Scope - identifies the type of test	Confirm that the COTS equipment shall have FCC Class B and CE Marks affixed to each unit indicating that the product has been certified to meet these requirements and a copy of the COTS manufacturer's Declaration of Conformity confirming that the manufacturer is claiming compliance with the standards stated.
Test Objective	Validation of the COTS central count optical mark reader hardware provides evidence CE and FCC marks and declaration of conformance.
Test Variables: Voting Variations (as supported by the voting system)	COTS equipment tendered for certification testing bears CE and FCC marks and provides documentation of conformance.
A description of the voting system type and the operational environment	MicroVote Election Management System voting system includes: • Ballot preparation & central count software (EMS) installed on a Windows OS PC running XP Professional COTS scanner for absentee/provisional ballots
VVSG 2005 vol.1	4.3.8, 4.1.2 thru 4.1.2.14, Interpretation 2007-05
VVSG 2005 vol.2	4.6.1.5 thru 4.7.1 & 4.8
Hardware, Software voting system configuration and test location	Election Management System (EMS v4.0.0.0) voting system Ballot Prep/Central Count SW: Election Management System v.4.0.0.0 COTS Optical Scanner: OMR ACP2200 Test Location: iBeta, Aurora, CO
Pre-requisites and preparation for execution of the test case.	Complete the prerequisites; • Record the reviewer & date • System matches the Chatsworth COTS specification • Gather any necessary materials or manuals. • Ensure customization of the assessment template is complete
Getting Started Checks	Check the COTS hardware to : • Verify the system configuration is documented in the PCA Configuration and matches the COTS manufacturer's described configuration.
Documentation of Test Data & Test Results	Review the hardware marks and documentation of compliance: • Enter Accept/Reject on the Environmental Assessment tab • In Comments enter any deviations, discrepancies, or notable observations • Log discrepancies on the Discrepancy Report and insert the number in the Comments
Standard Environmental Tests	Verify the test method is under the conditions identified in Interpretation 2007-05
Expected Results are observed	Review the test result against the expected result: • Accept meets the guideline • Reject does not meet the guideline • NA the guideline does not apply
Record observations and all input/outputs for each election;	All review results will be recorded in the Environmental Assessment tab. • Any gaps or deficiencies in the record of performance per Interpretation 2007-05 will be identified as a deficiency.

Method Detail	Environmental Test Method (COTS OMR)
	• Deficiencies will be reported to the vendor as Defect Issues in the Discrepancy Report. • The vendor shall have the opportunity to cure all discrepancies prior to issuance of the Certification Report. • If cures are submitted the applicable review will be repeated. Complete information about the re-review will be preserved in the Environmental Assessment. The cure and results of the re-review will be noted in the - Discrepancy Report and submitted as an appendix of the Certification Report.

7.4.6 FCA Telephony and Cryptographic Review and Testing

Testing was conducted on the system configuration identified in section 3. The specific software and firmware builds are identified for each test iteration.

Run	Builds	Test Result	Issues Opened	Issues Closed	Notes
9/14/07	EMS v.4.0.8.0 Infinity v.9.61	Accept			

No issues were identified.

Method Detail	Telephony and Cryptographic Test Method
Test Case Name	Telephony and Cryptographic
Scope - identifies the type of test	Validation that there is no use of the public networks and the voting system is exempt
Test Objective	Validation that there is no use of the public networks
Test Variables: Voting Variations (as supported by the voting system)	Based upon security document reviews and inspection during General 1 confirm that the system does not use the public networks
A description of the voting system type and the operational environment	Same as General 1
VVSG 2005 vol.1	6.1.3 thru 6.2.7, 7.4.5.1, 7.7 thru 7.7.4
VVSG 2005 vol.2	6.4.2
Hardware, Software voting system configuration and test location	Same as General 1 Wireless technology is not present
Pre-requisites and preparation for execution of the test case.	Same as General 1
Getting Started Checks	Same as General 1
Documentation of Test Data & Test Results	Same as General 1
Pre-vote: Ballot Preparation procedures verifications	Not applicable, no use of the public networks
Pre-vote: Ballot Preparation Security	Not applicable, no use of the public networks
Readiness Testing and Poll Verification	Not applicable, no use of the public networks
Pre- vote: Opening the Polls Verification	Not applicable, no use of the public networks
Voting: Ballot Activation and Casting Verifications	Not applicable, no use of the public networks
Voting: Voting System Integrity, System Audit, Errors & Status Indicators	Not applicable, no use of the public networks
Post-vote: Closing the Polls	Not applicable, no use of the public networks
Post-vote: Central Count	Not applicable, no use of the public networks
Post-vote: Security	Not applicable, no use of the public networks
Post-vote: System Audit	Not applicable, no use of the public networks
Expected Results are observed	Same as General 1

Method Detail	Telephony and Cryptographic Test Method
Record observations and all input/outputs for each election;	Same as General 1

7.5 *Appendix E: Discrepancy Report*

MicroVote General Corporation Election Management System (EMS) voting system v.4.0.
Applicable Standards: 2005 VVSG (Voluntary Voting System Guidelines) and United States Election Assistance Commission Testing & Certification Program Manual v. 1.0
Issues identified in testing or reviews are logged on the Discrepancy Report. Issue Types include:

- **Document Defects:** a documentation element of the voting system did not meet the applicable standard. Resolution of the defect is required for certification.
- **Functional Defects:** a hardware or software element of the voting system did not meet the applicable standard. Resolution of the defect is required for certification.
- **Informational:** an element of the voting system which meets the applicable standard but may be significant to either the vendor or the jurisdiction. Resolution of Informational issues is optional. Open issues are identified for purpose of disclosure.

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
1	5/8/07	D Harwood	Doc Defect	Closed	Section 2.4 SYSTEM HARDWARE SPECIFICATION Election Management System v.1.1	The hardware specification and referenced documents address the Infinity Voting Panel only. The identified documentation does not specify the other required voting system hardware, including the EMS Ballot Preparation and Central Count, OMR or Gemsplus hardware	v2: 2.4.1 The vendor shall provide a detailed discussion of the characteristics of the system, indicating how the hardware meets individual requirements defined in Volume I, Section 4.	Updated Section 2.4 to version 1.2 to fix the discrepancy. Referenced other sections and appendices per v2 2.4.1: EMS • Section 2.2 (System Overview) • Section 2.3 (System Functionality Description) • Appendix C (COTS Specifications) • Appendix E (Completed COTS Testing Forms) • Appendix G (COTS Invoices and Certifications)	Accepted D Harwood 6/11/2007 Verified v.1.2 (Sect 2.4) refers to: Sect 2.2 Sys Overview v1.2, Sect 2.3 Sys Func Desc v1.1, Appx C COTS Spec v1.0. Docs address EMS Ballot Prep & Central Count, OMR or Gemsplus HW spec. Appx G (COTS Invoices &Cert v1.0 & Appx E v1.0 are not relevant to this discrepancy.
2	5/9/07	M Ricketts	Informational	Closed	Various TDP Documents	The title page of several MicroVote documents contains a dynamic date field which inserts the current date when viewed. While the correct document date is identified in the Revision History table, the dynamic date field adds a level of confusion to the documentation.		The title page contains the current date using a dynamic date field. The revision history contains the actual date the document was revised. 8/15/07: Modified various TDP documents. Removed dynamic date and replaced with static date of last revision on both title page and in footer where appropriate. (BDH) ***Note changes to Appendix A will be included in the future.	Accepted M Ricketts 10/11/2007 Verified TDP documents have been updated to replace the dynamic date field with the static document date.
3	5/9/07	M Ricketts	Doc Defect	Closed	Section 2.11 CONFIGURATION MANAGEMENT PLAN	MicroVote utilizes a scheme of cataloging the Appendices into folders with individual or multiple files, making up a document. A description of this scheme is not contained in the Configuration Management Plan or the referenced appendices.	v2:2.11.2 a The vendor shall provide a description of the procedures and naming conventions used to address the specific requirements of Volume I, Subsection 9.3. These	Updated Section 2.11 to version 1.2 to reflect changes to fix the discrepancy. Added description of the scheme we used to catalog	Accepted M Ricketts 6/12/2007 Verified v.1.2(Section 2.11) includes a description of the scheme to catalog

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					NS PROCEDURES Election Management System, v1.0	preparation installation and release information. (This information is contained in the Section 2.11 Configuration Management Plan document.)	acceptance, and readiness. These specifications address all components of the system ... including: Pre-voting functions v2:2.8.6 a - Defines the procedures required to support system acquisition, installation, and readiness testing ... v2:2.8.6 b.- Describes procedures for providing technical support, system maintenance and correction of defects, and for incorporating hardware upgrades and new software releases.	reference to: • Configuration Management Plan: See section 2.11, Configuration Management Plan	2.8) includes the reference to the Configuration Management Plan, Section 2.11.
7	5/9/07	D Harwood	Doc Defect	Closed	Section 2.4 SYSTEM HARDWARE SPECIFICATION Election Management System v.1.1	The documentation does not address the OMR (absentee ballot reader) in the system configuration, the electromagnetic environment generated or any constraints on system operations.	v2:2.4.2 The vendor shall provide sufficient data, or references to data, to identify unequivocally the details of the system configuration submitted for testing…provide a list of materials and components used in the system…a) materials, processes and parts...b) the electromagnetic environment...	Updated Section 2.5 to version 1.4 to fix the discrepancy. Added text to section 5 Vote Tabulation Mode(5.2 OMR Ballot Cards and 5.3 Tally Cards) to clarify quality of database records. The text describes what to do if a OMR Ballot Card is read in twice or what happens when a Tally Card is read in twice.	Accepted D Harwood 6/11/2007 Verified Section 2.4 (SysHW Spec),v.1.2, Section 2.2 (Sys Over-view) v1.2, Section 2.3 Sys Func Desc v1.1 and Appx C (COTS Spec)v1.0 include references to all required voting system hardware. Referenced documents address the OMR (absentee ballot reader) in the system configuration, the electromagnetic environment generated or any constraints on system operations in regards to v2:2.4.2. Appx E v1.0 & Appx G v1.0 are not relevant to this requirement.
8	5/9/07	D Harwood	Doc Defect	Closed	Section 2.2 SYSTEM OVERVIEW EMS v.1.1	On pg 2 the statement 'The EMS software does not interface with external systems." is contradicted by the subsequent pg 2 statement "Several off-the-shelf hardware items, software and certain communication services are used with the EMS software".	v2.2.1 The system description shall include written descriptions, drawings and diagrams that present... Interfaces among internal components, and inter-faces with external systems…	Updated Section 2.2 to version 1.2 to fix the discrepancy. Updated sentence to not contradict previous statement.	Accepted D Harwood 6/11/2007 Verified v.1.2 (Section 2.2) i clarifies the interfacing of EMS w/ external systems.
9	5/9/07	D Harwood	Doc Defect	Closed	Section 2.2 SYSTEM OVERVIEW EMS v.1.1	On pg 6, in describing performance characteristics, the user is referred to Appendices H thru O. Appendix M was not delivered in the TDP	v2:2.1 …vendor documentation relating to the voting system …shall be submitted with the system as a precondition of national certification testing.	Updated Section 2.2 to version 1.2 to fix the discrepancy. Updated reference to Appendices H,I,J,K,L,N and O since we do not have an appendix M.	Accepted D Harwood 6/11/2007 Verified v.1.2 (Section 2.2) includes updated reference to exclude Appendix M.
10	5/9/07	D Harwood	Doc Defect	Closed	Section 2.2 SYSTEM OVERVIEW	The Figure 1 diagram does not address the USB flash card reader specified in "Appendix O1 3.5_BAY 7 Flash Card	v2.2.1.i The system description shall include written descriptions, drawings and	Explained to iBeta that the Flash Card Reader is not part of the normal	Accepted D Harwood 6/11/2007 As the USB flash card

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					Election Management System v.1.1	*Reader USB 2.0".*	*diagrams that present…File specifications, data objects, or other means used for information exchange*	*operation of EMS. It is used to verify the system per our System Identification Tool. We felt it would complicate the diagram. It's purpose is explained in appendix D01.0TDP-AA.doc*	*reader is not part of the EMS functional system, it was removed from the fig. 1 diagram in v.1.2 Sect. 2.2 System Overview. Verified doc refers to Appendix AA. Appendix AA explains the USB flash card reader and its use as a verification tool for the software of the EMS.*
11	*5/10/07*	*D Harwood*	*Doc Defect*	*Closed*	*Section 2.9 SYSTEM MAINTENANCE MANUAL Election Management System v.1.1* *6/19/07: Correction - the version discrepancy was written against v1.0. It was erroneously noted as v1.1*	*System Maintenance Manual and referenced documentation only address the Infinity Voting Panel. The EMS and the PC it runs on, the printers , card readers and optical mark reader are not addressed. In the case of COTS equipment, there is no reference to COTS manuals or other technical.*	*v2: 2.9.2.2 Corrective maintenance procedures: The vendor shall provide fault detection, fault isolation, correction procedures, and logic diagrams for all operational abnormalities identified by design analysis and operating experience* *b) Steps to correct deficiencies or faulty operations in software* *e) Special maintenance equipment, parts, supplies, or other resources needed to accomplish each procedure and v2: 2.9.4.1The vendor shall provide a complete list of approved parts and materials needed for maintenance. This list shall contain sufficient descriptive information to identify all parts by: a) type b) size c) value or range d) manufacturers design e) individual quantities needed f) source in which they may be obtained*	*Updated Section 2.9 to version 1.1 to fix the discrepancy. Added references to appendices where maintenance information is located: Refer to the following for maintenance instructions:* *• ACP-2200 Optical Scanner Quick Start Guide (Appendix H) – Section OMR Maintenance* *• Seiko DPU-3445-20 Printer User's Manual (Appendix J) – Section 10 Thermal header Maintenance* *• Seiko DPU-414 Printer User's Manual (Appendix K) – Section 8 Caring for the DPU-414 Printer* *• OMR-9002 Card Reader (Appendix Z) – Section 4 Maintenance v1.0*	*Accepted* *D Harwood 6/8/2007* *Verified Section 2.9 v1.1 System Maint Manual references documentation addressing the EMS, the PC, printers, card readers and optical mark reader:* *• ACP-2200 Optical Scanner Quick Start Guide (Appx H) Sect OMR Main v1.0* *• Seiko DPU-3445-20 Printer User's Manual (Appx J) Sect 10 Thermal header Main v1.0* *• Seiko DPU-414 Printer User Manual Appx K Sect 8 v1.0* *• OMR-9002 Card Reader (Appendix Z) – Sect 4 Main. v1.0* *Verified doc addresses v2: 29.2.2 & 2.9.4*
12	*5/10/07*	*D Harwood*	*Doc Defect*	*Closed*	*Section 2.9 SYSTEM MAINTENANCE MANUAL Election Management System v.1.1* *6/19/07: Correction - version was v1.0. It was erroneously noted as v1.1*	*System Maintenance Manual and referenced documentation does not address the recommended spare devices or components to be kept "on hand"*	*v2: 2.9.5 a. Recommended number and locations of spare devices or components to be kept on hand for repair purposes during periods of system operation*	*Updated Section 2.9 to version 1.1 to fix the discrepancy. Added our suggested spares that customers keep "on hand" for components.* *Spare Devices* *MicroVote sells spare devices to customers as part of the initial sale.* *• GEMSPLUS Universal Card Reader(1 + Backup)* *• Optical Mark Reader(1 + Backup)* *MicroVote suggests Customers have:* *• Five extra Infinity panels per 100 panels.*	*Accepted* *D Harwood 6/8/2007* *Verified Section 2.9 v 1.1 contains suggested spares that customers keep "on hand" for components*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
								• Two extra Seiko Instruments Printers per 50 precincts.	
13	5/17/07	K Wilson	Doc Defect	Closed	Section 2.5 SOFTWARE DESIGN AND SPECIFICATIONS v1.3	Processor memory protection is not addressed in the documentation.	v2:2.5.5.1b : Hardware Environment and Constraints - The vendor shall identify and describe the hardware characteristics that influence the design of the software, such as b. Memory read-write characteristics	Updated Section 2.5 to version 1.4 to fix the discrepancy. Added text to explain "Operating systems supported by EMS are Microsoft Windows 2000 and Microsoft Windows XP Professional Editions. Processor memory protection is handled by the operating systems."	Accepted M Ricketts 6/18/2007 Verified v.1.4 (Section 2.5) added text to address processor memory protection.
14	5/17/07	K Wilson	Doc Defect	Closed	Section 2.5 SOFTWARE DESIGN AND SPECIFICATIONS v1.3	The document addresses the quality of the database records, but does not detail the quality of the data placed in the database. Quality of data examples: Descriptions of what happens if a Tally card or OMB card is read twice or a Tally card is read during voting and then again at vote completion time. If and how data on the tally card is verified for integrity.	v.2: 2.5.6.2f - Software Functions - The vendor shall describe the software's capabilities or methods for detecting or handling - f. Data quality assessment	Updated Section 2.5 to version 1.4 to fix the discrepancy. Added text to section 5 Vote Tabulation Mode(5.2 OMR Ballot Cards and 5.3 Tally Cards) to clarify quality of data-base records. The text describes what to do if a OMR Ballot Card is read in twice or what happens when a Tally Card is read in twice.	Accepted M Ricketts 6/18/2007 Verified v.1.4 (Sect 2.5) added text to section 5- Vote Tabulation Mode (5.2 OMR Ballot Cards and 5.3 Tally Cards) to address quality of the data placed in the database. Addresses OMR Ballot & Tally Card read twice.
15	5/17/07	K Wilson	Doc Defect	Closed	Section 2.5 SOFTWARE DESIGN AND SPECIFICATIONS v1.3	Database stored procedures and triggers are discussed but no design documentation concerning this code is included or referenced. A description of the trigger function is insufficient because the event causing the trigger is not described. Information on stored procedures is needed to adequately determine source code review scope.	v2: 2.5.7.2d - Programming Specifications Details- The programming specifications shall describe individual software modules and their component units, if applicable and for each module and unit, the vendor shall provide: If the software module or unit consists of or contains procedural commands, (such as menu selections in a database management system (DBMS) for defining forms and reports, on-line DBMS queries for database access and manipulation, input to a graphical user interface (GUI) builder for automated code generation, commands to the operating system, or shell scripts) a list of the procedural commands and reference to user manuals or other documents that explain them.	Updated Section 2.5 to version 1.4 to fix the discrepancy. Added a column "Trigger Event Raised" to section 15.0 Triggers to describe what event occurs to execute the trigger.	Accepted M Ricketts 6/18/2007 Verified v.1.4 (Section 2.5) includes the column "Trigger Even Raised" in Section 15.0
16	5/17/07	K Wilson	Doc Defect	Closed	Section 2.5 SOFTWARE DESIGN AND	Identification of entities with fixed Interface characteristics or interfaces which are developed or modified were not in evidence in the submitted documentation.	v2: 2.5.9.1c - Interface Identification For each interface identified in the system overview, the vendor shall:	A fixed interface is an interface we don't have control over. Examples are the Infinity and the	Accepted M Ricketts 6/18/2007 Verified v.1.4 (Section

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					SPECIFICATIONS v1.3		Identify which entities have fixed interface characteristics (and therefore impose interface requirements on interfacing entities) and which are being developed or modified (thus having interface requirements imposed on them).	Gemsplus card reader. Updated 2.5 to have a column of Interface Type in the table 25.0 Hardware Interfaces.	2.5) added column of Interface Type in table 25.0 Hardware Interfaces.
17	5/17/07	K Wilson	Doc Defect	Closed	Section 2.5 SOFTWARE DESIGN AND SPECIFICATIONS v1.3	The interface information: ii. Doesn't clarify 'Data Type' in tables 1.0-24.0 marked N/A iii. Doesn't provide string length of fields having N/A in the DB Field column; vii. Doesn't address sequence, frequency or timing of interfaces K Wilson 6/19/07 v.1.4: (Sect. 2.5) Partial Accepted: ii:"N/A" to updated to the correct data types. vii: "Trigger Event Raised" (see #15) satisfies "timing, frequency, etc." for trigger type interfaces. Other GUI type interfaces are satisfied in Appx R. Rejected - iii: While some string lengths appear in Appx R, they don't provide lengths related to interfaces. 24.0 Manual Vote Entry RqtID is FR-GUI-SP-0028204. No length appears in the only instance of this ID in the document. RqtID ending in 1201, 1202, 1203, 1204, 1205, 1206, 1207, 1208, 1211, 1212, ..., 28204 contain no string lengths. C Coggins 7/16/07 Verified v.1.8 (Sect. 2.5) Partial Accepted Tables 1-9, 11, 13-19, 21 thru 23 String lengths are identified for existing & date fields Rejected: Lengths or field x-reference to lengths set by a control weren't identified for Tables 10, 11, 12, 20, and 24	v2: 2.5.9.2 - Interface Description For each interface identified in the system overview, the vendor shall provide information that describes: ii. Data type (alphanumeric, integer, etc.) iii. Size and format (such as length and punctuation of a character string) vii. Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply	Updated Section 2.5 to version 1.4 to fix the discrepancy. Updated data types of "N/A" to correct data types. String Lengths etc... are in Appendix R (GUI Specifications) 7/11/07 Updated D01.8TDP-2.5 Software Design and Spec document with interface lengths.	Rejected (Incomplete) M Ricketts 6/19/2007 Rejected (Incomplete) C Coggins 7/16/07 Accepted C Coggins 8/7/07 Verified applicable fields were updated. Changes to the document included deletion of information that was identified as not being used.
18	6/6/07	C Coggins	Doc Defect	Closed	Election Management System User Manual v.4.0.0.0	Election set up of Open and Closed Primaries is the same. The method by which a voter makes a private selection of a party ballot is handled procedurally. The user manual does not have a definition of how Closed and Open Primaries with ballot selection by the poll worker or Open Primary with ballot selection by the voter are supported.	v1:2.1.7.2 The Technical Data Package accompanying the system shall specifically identify which of the following items can and cannot be supported by the voting system, as well as how the voting system can implement the items supported: Open primaries	Updated Table 3.2.1 Definitions of the Election Data screen fields. • Open, Closed and Secret Primary elections are setup the same in EMS. Their differences are handled procedurally by poll workers. Example: in an Open Primary, In some states a voter has to declare their party affiliation and the poll worker has to pick the activation belonging to that party on the infinity panel for the voter.	Accepted M Ricketts 6/18/2007 Verified v.1.4 (EMS User Manual) includes definitions of Open, Closed and Secret Primary elections.

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
19	*6/6/07*	*C Coggins*	*Doc Defect*	*Closed*	*Infinity Poll Workers Manual v.4.0.0.0*	*Ballot Selection and Activation Step 3: The method and sequence for polling place selection of parties on primary ballots is not clearly identified. The difference in the handling of Closed and Open Primaries with ballot selection by the poll worker or Open Primary with ballot selection by the voter is not referenced.*	*v2:2.8.4 The vendor shall provide documentation of system operating features that… provide examples of simulated interactions in order to facilitate understanding of the system and its capabilities*	*Updated Poll worker manual to version D01.2 TDP-U to describe the differences in primaries: • Open, Closed, Secret and Presidential Primary elections all have an election type of "P - Primary Election" in EMS. Their differences are mostly handled procedurally by poll workers. For example in an Open Primary, In some states a voter has to declare their party affiliation and the poll worker has to pick the activation belonging to that party on the infinity panel for the voter. In Closed primaries only registered party members can vote. In Secret primaries the voter not the poll worker chooses the activation in private. In Presidential Primaries it is simply a vote for one for President of an ele+J30cted party in one office and a vote for N for delegates for that President in another office.*	*Accepted M Ricketts 6/18/2007 Verified v.1.2 (Infinity Poll Worker's Manual) describes the differences in Open, Closed, Secret, and Presidential primaries.*
20	*6/6/07*	*C Coggins*	*Doc Defect*	*Closed*	*Election Manageme nt System User Manual v.4.0.0.0*	*Absentee and provisional paper ballots must be prepared by the election official for the purpose of controlling precincts, splits or partisan ballots. The user documentation does not contain a reference to this step in the process or information about how the jurisdiction acquires information about this process.*	*v2:2.8 The system operations procedures shall contain all information that is required for the preparation of detailed system operating procedures, and for operator training V2:2.8.5.f The vendor shall provide documentation of system operating procedures…To support successful ballot ...control by election officials*	*Updated Section 6.2 of the User Manual to reflect how you mark the absentee and provisional ballot cards.*	*Accepted M Ricketts 6/18/2007 Verified v.1.2 (EMS User Manual) includes information for the jurisdiction to manually identify precincts, splits & partisan ballots. The updated 6.2 section of the manual provides further detail about printing & marking the OMR/Absentee ballots.*
21	*6/6/07*	*C Coggins*	*Doc Defect*	*Closed*	*Appx F Voting Variations EMS v.1.2 EMS User Manual v.4.0.0.0*	*Secondary Vote Limit functionality is not fully documented in the TDP. Appendix F addresses the VVSG identified voting variations but does not address Secondary Vote Limits as a supported function. The user manual includes the operation for setting up secondary vote limits but does not provide a definition of when this functionality is used or a reference to a definition elsewhere in the TDP.*	*v2:2.8 This documentation shall provide all information necessary for system use by all personnel who support pre-election and election preparation… with regard to all system functions and operations*	*Updated Section 3.5 Secondary Vote Limit to describe a situation where a secondary vote limit is used.*	*Accepted M Ricketts 6/18/2007 Verified v.1.2 (EMS User Manual) includes definition and situation where a secondary vote limit is used.*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
22	6/6/07	C Coggins	Doc Defect	Closed	Infinity Poll Workers Manual v.4.0.0.0	Appendix 1 addresses the mobility and the audio ballot mode. It does not address manual dexterity.	v2:2.8.4 The vendor shall provide documentation of system operating features that… provide examples of simulated interactions in order to facilitate understanding of the system and its capabilities	Updated poll worker manual to version 1.3 and added information on how to use the infinity panel to address manual dexterity.	Accepted M Ricketts 8/7/2007 Verified v1.3 Infinity Poll Worker's Manual (App U) includes use of the panel with the manual dexterity voting features.
23	6/6/07	C Coggins	Inform ational	Closed	TDP Test Documentat ion	Usability testing performed and test results were not submitted to iBeta in the TDP. The VVSG only requires this information be submitted in the TDP sent to the EAC. There are similar requirements for blindness and dexterity usability testing.	v1:3.2.2.1.a The vendor shall provide conduct summative usability testing on the voting system using partially sighted individuals. The vendor shall document the testing performed and report the test results using the Common Industry Format. This documentation shall be included in the TDP submitted to the EAC for national certification.	Updated test plan to include all test results instead of just dexterity voters. DO0.2TDP-A54 and executed test plan results to DO0.2TDP-A54-E	Accepted M Ricketts 8/7/2007 Vendor submitted a test plan (v0.2 Appendix A54) & executed test plan results (v0.2 Appendix A54-E) addressing dexterity, blind and partially sighted individuals
24	6/6/07	C Coggins	Doc Defect	Closed	Election Manageme nt System User Manual v.4.0.0.0	The user manual does not specify how a primary presidential delegate nomination should be set up.	v1:2.1.7.2 The Technical Data Package accompanying the system shall specifically identify which of the following items can and cannot be supported by the voting system, as well as how the voting system can implement the items supported: Primary presidential delegate nominations	Updated user manual to describe the differences in primaries: • Open, Closed, Secret and Presidential Primary elections all have an election type of "P - Primary Election" in EMS. Their differences are mostly handled procedurally by poll workers. For example in an Open Primary, In some states a voter has to declare their party affiliation and the poll worker has to pick the activation belonging to that party on the infinity panel for the voter. In Closed primaries only registered party members can vote. In Secret primaries the voter not the poll worker chooses the activation in private. In Presidential Primaries it is simply a vote for one for President of an ele+J30cted party in one office and a vote for N for delegates for that President in another office.	Accepted M Ricketts 6/18/2007 Verified v.1.2 (EMS User Manual) includes description of the differences in primaries, to include information about presidential delegate nominations (Presidential Primaries).
25	5/9/07	M Ricketts	Inform ational	Closed	Section 2.8 System Op Procedures Election	A reference to document 2.11 was added to document 2.8. The trace of the reference is incorrect/unclear as it is listed. The reference addresses Vol. 2, Section 2.8.3.a		Updated document DO1.2TDP-2.8 TO reference the correct vol.2:2.8.3a, 2.8.6a & b.	Accepted M Ricketts 8/7/2007 Verified v1.2 Section 2.8 document updated

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					Manageme nt System, v.1.1	*and 2.8.6a & b, but is instead listed under "The following corresponds with Volume II, Section 2.8.7 – Appendices, of the Technical Data Package"*			*the trace reference of document 2.11 to Vol.2: 2.8.3a & b.*
26	*6/21/07*	*D Harwood*	*Doc Defect*	*Closed*	*Appendix C COTS SPECIFICATIONS Election Management System v.1.0*	*The Chatsworth Data Corporation central count optical scanners ACP 2200 and the OMR 9002, we're verified as unmodified COTS hardware. In order to exempt unmodified COTS equipment specifications/evidence of equivalent testing to the VVSG must be provided. The COTS manufacturer documentation submitted as part of the TDP did not address VVSG v.1:* *4.1.2.5 Electrical Power Disturbance* *4.1.2.6 Electrical Fast Transit* *4.1.2.7 Lightening Surge* *4.1.2.8 Electrostatic Disruption* *4.1.2.9 Electromagnetic Emission* *4.1.2.10 Electromagnetic Susceptibility* *4.1.2.11 Conducted RF Immunity* *4.1.2.12 Magnetic Fields Immunity*	*v2: 4.2.1 ... Unmodified COTS hardware will not be subject to all tests. Generally such equipment has been designed to rigorous industrial standards and has been in wide use, permitting an evaluation of its performance history. To enable reduced testing of such equipment, vendors shall provide the manufacturer specifications and evidence that the equipment has been tested to the equivalent of these Guidelines.*		*Accepted* *D Harwood 3/7/2008 Declaration of Conformity (dated 2/21/2008) was delivered by MicroVote as part of their TDP.*
27	*7/23/07*	*K Wilson*	*Doc Defect*	*Closed*	*Section 2.6 SYSTEM SECURITY SPECIFICATION Election Management System v.1.0*	*Page 8 "To ensure that the machines have not been tampered with, two types of tamper proof seals are used. A sticker seal is usually present on the Infinity machine itself." The use of the word "usually" contradicts the requirement in the first sentence that two types of seals are needed to prevent tampering.*	*v1: 2.1.1.d System security is achieved through a combination of technical capabilities and sound administrative practices. To ensure security, all systems shall: Provide safeguards to protect against tampering during system repair, or interventions in system operations, in response to system failure.*	*Updated document to version DO1.1TDP-2.6 and removed "Usually" from the sentence to not contradict the requirement.*	*Accepted* *M Ricketts 8/7/2007 Verified v1.1 Section 2.6 eliminated the contradiction by removing "usually"*
28	*7/23/07*	*K Wilson*	*Doc Defect*	*Closed*	*Section 2.6 SYSTEM SECURITY SPECIFICATION Election Management System v.1.0*	*The protocol between the EMS and Infinity over the serial port to load ballots into the Infinity is not identified.*	*v.1: 7.2.2.f Vendors shall provide a detailed description of all system access control measures designed to permit authorized access to the system and prevent unauthorized access, such as: Special Protocols*	*Updated document to version DO1.1TDP-2.6 and added the below information to describe the protocol between EMS and Infinity: The protocol of this serial port connection between EMS and the Infinity Voting Panel is described as follows:* *• Interface: RJ45 connector with RS-232 levels and special pin assignments for use with adapters connected to printer or PC, automatic baud rate selection for PC or printer Communication: 1 start bit, 8 data bits, no parity, baud rate = 38K for PC and 9600 for printer, hardware handshake (DTR/DSR) Added documents (directory AppB4_*	*Accepted* *K. Wilson 8/13/2007 The vendor submitted as a part of the TDP the document "Infinity Communication Specification Version 1.06" referred to in the document titled "Section 2.6 System Security Specification Election Management System v. 1.0" and "Section 2.5 Software Design and Specification Election Management System v.2.1" which details the special protocol providing authorized access to ballot and tally information between the EMS and the Infinity Voting Panel.*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
								Communications_Spec) to Appx B (Carson) to detail communications protocol.	
29	*7/23/07*	*K Wilson*	*Doc Defect*	*Closed*	*Section 2.6 SYSTEM SECURITY SPECIFICATION Election Management System v.1.0 or EMS User Manual v.4.0.0.0*	*Neither the EMS specification or user manual address the halt of the system software process upon termination of any critical system process such as system audit*	*v.1.:2.1.5.2 The system shall also be configured to halt election software processes upon the termination of any critical system process (such as system audit) during the execution of election software*	*Updated user manual to version D01.5TDP-V to describe procedure in Appendix A "Troubleshooting, Keyboard, Shortcuts (Alt Keys) and pop up messages" to reflect what to do when a database error occurs. Updated section 2.6 to version DO1.1TDP-2.6 also with the same procedure.*	*Accepted M Ricketts 8/7/2007 Verified v1.1 of Section 2.6 included statement indicating the EMS was designed to halt any election processes if a database error occurs. Verified v1.5 EMS User Manual (App V) was updated to include instructions for the user when a database error occurs.*
30	*7/23/07*	*K Wilson*	*Doc Defect*	*Closed*	*INFINITY FW Func-tional Spec v.3.11 or MicroVote Infinity Poll Worker's Manual v.4.0.0.0*	*Polling Place manuals do not address measures to enable poll workers to physically protect and perform orderly shutdown of voting equipment to counteract vandalism, civil disobedience, and similar occurrences.*	*v.1:7.3.1 For polling place operations, vendors shall develop and provide detailed documentation of measures to enable poll workers to physically protect and perform orderly shutdown of voting equipment to counteract vandalism, civil disobedience, and similar occurrences.*	*Updated poll worker manual to version DO1.3TDP-U with new section to describe emergency procedures in case of civil disobedience, vandalism etc...*	*Accepted M Ricketts 8/7/2007 Verified v1.3 Infinity Poll Worker's Manual (App U) addresses poll workers to protection and orderly shutdown of voting equipment in emergency situations.*
31	*7/28/07*	*C Coggins*	*Doc Defect*	*Closed*	*Appendix C COTS SPECIFICATIONS EMS v.1.1*	*The optional Data Switch COTS Hardware is not identified in the EMS COTS specification. While it is optional hardware, it was used in the test configuration.*	*v.2: 2.4 The vendor shall expand on the system overview by providing detailed specifications of the hardware components of the system.*	*Updated Appendix C to version 1.2 and added Serial Switch Box as COTS Hardware.*	*Accepted D Harwood 10/10/2007 Verified v.1.2 has serial Switch Box added as COTS HW.*
32	*7/28/07*	*C Coggins*	*Func Defect*	*Closed*	*EMS v.4.0.6.0 Political Parties screen*	*While the "Straight Party Button Tag" functionality is not available in this release, the field remains active. Users can enter data but it will not initiate functionality.*	*v.1: 2.1.4.f To ensure system integrity, all systems shall: Protect against any attempt at improper data entry or retrieval.*	*09/25/2007 Disabled field. (bh)*	*Accepted D Harwood 10/10/2007 v.4.0.9.0 Verified the Straight Party Button Tag field(s) has been disabled and is no longer an active field.*
33	*7/28/07*	*C Coggins*	*Func Defect*	*Closed*	*EMS v.4.0.6.0 Activating Vote Cards*	*When attempting to write a machine only election to the Vote Card an unhandled exception error occurred.* *Selected "Activate Vote Card" from the menu, during initiation of the screen the following unhandled exception appeared: Specified arrangement was out of the range of valid values. Parameter Name: '1' is not a valid value for index.*	*v.1: 2.2.2.e "All systems shall provide for the: generation of all required master and distributed copies of the voting program in conformance with the definition of the ballots for each voting device …*	*09/25/2007 Fixed. (bh)*	*Accepted D Harwood 10/8/07 v.4.0.9.0 Verified vote cards are written for a machine only election.*
34	*8/29/07*	*gaudette*	*Func Defect*	*Closed*	*Build Witness of Infinity*	*During the build witness, the "encrypt.exe" was executed but no source code for this executable was delivered for review.* *9/10/07 gaudette: Closed by receipt and review of version 2.14 of the C code file. No discrepancies were noted.*	*v2: 1.8.2.4: The accredited test lab…shall witness the final system build, encompassing hardware, software, and communications, and the version of associated records*		*Accepted G. Audette The vendor submitted the source file on 9/6/07 for review. The review was completed*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
							and documentation. v2:6.2.2 …the certified executable release of the system is built from tested components.		on 9/7/07 with no discrepancies.
35	8/29/07	gaudette	Func Defect	Closed	Build Witness of Infinity	During the build witness, "nfupdater100.exe" was executed but no source code for this executable was delivered for review. 9/10/07 gaudette: Closed by receipt and review of version 1.0.0 of the VB 6.0 code files. No discrepancies were noted.	v2: 1.8.2.4: The accredited test lab…shall witness the final system build, encompassing hardware, software, and communications, and the version of associated records and documentation. v2: 6.2.2 …the certified executable release of the system is built from tested components.		Accepted G. Audette 9/7/07 The vendor submitted the source file on 9/6/07 for review. The review was completed on 9/7/07 with no discrepancies.
36	8/31/07	C Coggins	Func Defect	Closed	EMS v.4.0.8.1 Utilities: Copying an Election Database	EMS does not permit the user to make a copy of the database from a database copy. An error message appears stating that a database error has been detected and to call Technical Support. A window provides detail of the error but it does not clearly state the action the operator needs to perform to resolve the error.	v1: 2.1.5.1.b.i All error messages requiring intervention by an operator … shall be displayed … in easily understood language text… v1: 2.1.5.1.b.v The message cue for all voting systems shall clearly state the action to be performed in the event that voter or operator response is required.	09/25/2007 Fixed. (bh)	Accepted D Harwood 10/02/2007 v4.0.9.0 Verified the ability to copy an election database and then make copy of the copied database; the database opens and functions as expected.
37	9/4/07	D Harwood	Informational	Closed	EMS v.4.0.8.1 Utilities: Copying an Election Database	The "Copy To" dialogue box generated from the "Database Utilities- Copy" tab does not permit the user to cancel or exit the copy operation. The user is forced to make a copy. That copy can then be deleted.		09/25/2007 Added Cancel. (bh)	Accepted D Harwood 10/02/2007 v4.0.9.0 Verified the cancel button was added.
38	9/5/07	C Coggins	Func Defect	Closed	EMS v.4.0.8.0 Installation Database-Administration: General Preferences screen	While the "Straight Party Button Crossover" functionality is not available in this release, the field remains active. Users can enter data but it will not initiate functionality.	v.1: 2.1.4.f To ensure system integrity, all systems shall: Protect against any attempt at improper data entry or retrieval.	009/25/2007 Straight Party Button Crossover is available in this release and functions properly. (bh)	Accepted D Harwood 9/28/2007 Straight Party Cross Over Functionality is active within the current release, opened #78 documentation states that this functionality is not active in the current release.
39	9/5/07	C Coggins	Doc Defect	Closed	Appendix V Election Management System User Manual v1.6	Pg 19 Table 2.1.1 The Jurisdiction field accepts a maximum of 32 characters, the manual states 50.	v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.	Updated User Manual (Appendix V) to version 1.7 and corrected that Jurisdiction accepts maximum of 32 characters.	Accept D Harwood 10/10/2007 Verified v.1.7 table 2.11 indicates that the jurisdiction field has been updated to a max of 32 characters.
40	9/5/07	C Coggins	Doc Defect	Closed	Appendix V EMS User Manual v1.6	Pg 19 Table 2.1.1 - No Vote text is supported in 4.0.8.0 . The manual states "Not supported in our current release".	v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.		Accepted D Harwood 10/26/2007 Verified v.1.7 table 2.11 indicates that the No Vote text is supported.

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
41	*9/5/07*	*C Coggins*	*Informational*	*Closed*	*EMS v.4.0.8.0 Installation Database-Administration: Political Parties screen*	*The display of the parties could not be resequenced.* *Tester attempted to drag and drop a selected party to a new sequence location. The following warning was generated. "Resequence failed" Selection of OK displayed the following "@seqOne is not a parameter for procedure sp_sequence_ party". (This does not impact ballot layout.)*		*Fixed. (dr)*	*Accepted* *D Harwood 10/3/2007 v4.0.9.0* *Verified Party resequence permits drag and drop to desired locations.*
42	*9/5/07*	*C Coggins*	*Func Defect*	*Closed*	*EMS v.4.0.8.0 Security - Password Change*	*Non-supervisor users must enter the EMS with a blank password.* *Testers created an "Open Other Elections" user. Signed on as the new user and attempted to set the password. Testers entered matched password. (a minimum of 6 characters with at least 1 number)* *- Warning dialogue generated: "A database error was detected while attempting to log error message. Please call MicroVote Tech Support".* *- Click OK: EMS dialogue: "Only member of the SysAdmin Role can use the loginname option. The password was not changed"* *- Click OK: Successful dialogue: "Password changed. Application must be restarted before changes."* *- Restarted EMS & login with the matched password; EMS dialogue: "Login to EMS failed. Please try again."* *- Click OK; login with blank password: user gained access to EMS with all permitted functions.* *Testers verified this was repeated with "Modify Ballot" role but not the "Supervisory" role. (Initial instance of the error occurred after entering 3 password mismatches followed by a valid password.)* *Rejected D Harwood/M Ricketts 10/02/2007 v4.0.9.0 Behavior outlined above is still observed. A non supervisory user is unable to set a password and is forced to use a blank password.*	*v.1: 2.1.1.a To ensure security all systems shall: Provide security access controls that limit or detect access to critical system components to guard against loss of system integrity…*	*09/25/2007 Fixed. (bh), 10/31 Was not able to duplicate issue description on our system. (TWB)*	*Rejected D Harwood/M Ricketts 10/02/2007 v4.0.9.0* *Accepted* *D Harwood 11/6/2007 v.4.0.11.0* *Verified that a user without supervisor privileges can create a password and log into EMS with the created password.*
43	*9/6/07*	*gaudette*	*Doc Defect*	*Closed*	*Appendix Y - Build and Installation Instructions Election Management System v.1.3*	*In Section 2.0 Step 5, the instruction to 'Execute SQL scripts. [EMS400.sql, model400.sql] was followed during the witness build but the step does not indicate where or how to execute the SQL. In addition, the model400.sql file has been replaced by six files so the reference is now incorrect.*	*v2: 9.7.1.b For the PCA, a vendor shall provide: a. Identification of all items that are to be a part of the software release Specification of compiler (or choice of compilers) to be used to generate executable programs.*		*Accepted* *G. Audette 10/29/07 v.1.6* *verified corrected in 'Setup EMS Databases' on page 28 of 49*
44	*9/7/07*	*C Coggins*	*Func Defect*	*Closed*	*EMS v.4.0.8.0 Installation*	*The audit log is not available to view in the Installation Database mode.*	*v.1: 2.1.5.1.a.iv The audit record shall be active whenever the system is in an operating mode.*	*09/25/2007 Audit log now functions in Installation Database mode. (bh)*	*Accepted* *D Harwood/M Ricketts 10/02/2007 v4.0.9.0*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					Database		*This record shall be available at all times, though it need not be continually visible.*		*Verified the Audit Log can be viewed in the Installation and Election Modes.*
45	*9/7/07*	*C Coggins*	*Func Defect*	*Closed*	*EMS v.4.0.8.0 System Audit - Recording Login*	*The successful and unsuccessful attempts to log into the EMS and operating system are not recorded in the system audit.* *D Harwood 10/02/2007 v4.0.9.0 Rejected - Failed login attempts are not recorded or are recorded as successful logins.* *K Wilson 10/29/07 v.4.0.9.0 Rejected Re-tested with TurnOnAudit.reg set. Unsuccessful attempts are logged but the procedure to run TurnOnAudit.reg precedes the installation of the database. When the database installation is performed it overwrites or ignores the setting done with the .reg file.*	*v.1: 2.1.5.2 …operating system audit shall be enabled for all session openings and closings, for all connection openings and closings, for all process executions and terminations and for the alteration or deletion of any memory or file object.*	*Completed. (dr)* *bhirsch 10/31/07 v.4.0.10.0 When TurnOnAudit.reg is executed in correct order according to current instructions failed login attempts are recorded in the Windows Application Event log. Updated Installation Instructions to Version 1.8.*	*Accepted* *D Harwood 11/6/2007 v.4.0.11.0* *Verified unsuccessful EMS application logins are logged in the system Event Viewer.*
46	*9/7/07*	*C Coggins*	*Doc Defect*	*Closed*	*Appendix V EMS User Manual v1.6*	*Pg 59 Table 3.2.1 The Election Title field accepts alpha-numeric and spaces. It does not accept special characters, as stated in the manual.*	*v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.*	*Updated User Manual (Appendix V) to version 1.7. Updated Election Title description to show that special characters are not allowed.*	*Accepted* *D Harwood 10/10/2007 Verified v1.7 table 3.2.1 shows that special characters are not allowed.*
47	*9/7/07*	*C Coggins*	*Doc Defect*	*Closed*	*Appendix V EMS User Manual v1.6*	*Pg 66 Table 3.3.2 The manual states the Non-Partisan option is automatically selected on a General Election. The application does not show Non-partisan automatically selected in a General Election.* *D Harwood 10/02/2007 v4.0.9.0 Rejected as this is a Doc Defect. Removing the check box from the application form does not address the defect.*	*v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.*	*Non-Partisan checkbox removed. Not used. (dr)*	*Accepted - C Coggins 10/29/07* *v.1.7 Table 3.3.2 verified reference to Non-Partisan is removed.* *Rejected-D Harwood 10/02/2007 v4.0.9.0*
48	*9/8/07*	*C Coggins*	*Doc Defect*	*Closed*	*Appendix V Election Manageme nt System User Manual v1.6*	*Pg 66 Table 3.3.2 Selecting 'Build Defaults' populates the "Phonetic" field with the "Office Title, Subtitle 1 & 2". The manual indicates that only "Office Title" data is used to populate this field. Additionally the manual indicates the "Phonetic" field has a maximum of 80 characters which is less than the 3 field maximums. (Validated maximum populated data appears correctly. The "Phonetic" field limit exceeds 180 characters.)*	*v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.*	*Updated Appendix V (User Manual) to version 1.7 to say Clicking this button automatically populate the Report Name, Tally Name, and Phonetics to be the same as the Office Title, Sub Title 1 and Sub Title 2. Also corrected the field limit on the Phonetic field to be 256.*	*Accepted* *D Harwood 10/11/2007 Verified v1.7 table 3.3.2, states "Clicking this button automa-tically populates Report Name, Tally Name, & Phonetics to be the same as Office Title, Sub Title 1 &Sub Title 2". Phonetic field - 256 character limit*
49	*9/8/07*	*C Coggins*	*Inform ational*	*Closed*	*EMS v.4.0.8.0 Office - Office Report Sequence*	*Users cannot properly resequence the Office Report. Resequencing the list moves two offices instead of one.* *When attempting to select a single office to drag and drop, the application grabs 2 offices. When the action is to move the office up in the list, the office above the*		*09/25/2007 Fixed. (bh)*	*Accepted* *D Harwood 10/03/2007 v4.0.9.0* *Verified Office resequence permits drag and drop to desired locations.*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
						selected office is also moved. If the action is to move down the list, the office below the selected office is moved.			
50	*9/8/07*	*C Coggins*	*Func Defect*	*Closed*	*EMS v.4.0.8.0 Office Add New Record-Nonpartisan field*	*The "Non-partisan" setting is incorrectly saved on the "Office Add New Record".* *On the "Office Add New Record" if the "Non-partisan" field is unchecked and "Build Defaults" is selected, the "Non-partisan" field is checked at the save.*	*v.1: 2.2.1.1.b.i All systems shall be capable of: collecting and maintaining … offices and their associated labels and instructions.*	*Non-Partisan checkbox removed. Not used. (dr)*	*Accepted D Harwood 10/02/2007 v4.0.9.0 Verified tthe Non Partisan Check box has been removed from the 'Office Add New Record'.*
51	*9/8/07*	*C Coggins*	*Func Defect*	*Closed*	*EMS v.4.0.8.0 Office Modify Record-Non-partisan field*	*The "Non-partisan" setting is incorrectly saved on the "Office Modify Record".* *On the "Office Modify Record" if a previously saved record with the "Non-partisan" field checked is edited with a change to the "Report Name", "Tally Name" or "Phonetic" fields (manually or through "Build Defaults") the "Non-partisan" field is unchecked at the save.*	*v.1: 2.2.1.1.b.i All systems shall be capable of: collecting and maintaining … offices and their associated labels and instructions.*	*Non-Partisan checkbox removed. Not used. (dr)*	*Accepted D Harwood/ 10/02/2007 v4.0.9.0 Verified that the Non Partisan Check box has been removed from the 'Office Modify Record'.*
52	*9/10/07*	*M Ricketts*	*Doc Defect*	*Closed*	*Appendix V EMS User Manual v1.6*	*Programming Vote Cards and Reading Vote Cards pg 98 and 99 screenshot text for the Activation field (01 All Voters) does not match the text in the application (00-All Activations)*	*v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.*	*Updated User Manual (Appendix V) to version 1.7 with correct screen shot.*	*Accepted D Harwood 10/11/2007 verified v1.7 screen shots match the Activate Vote Cards screen on the application.*
53	*9/10/07*	*M Ricketts*	*Doc Defect*	*Closed*	*Appendix V EMS User Manual v1.6*	*Table 5.1.1 (pg 100) Definitions Table of Activate Vote Card Screen. The description does not provide complete definitions of the "00-All Precincts" and "00-All Activations" and how selection of these settings impacts the information written to the cards.*	*v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.*	*Updated User Manual (Appendix V) to version 1.7 with correct screen shot.*	*Accepted D Harwood 10/11/2007 verified v1.7 Activate Vote Cards Definitions Table 5.1.1a correctly describes 00-All-Precincts & 00-All-Activations.*
54	*9/10/07*	*M Ricketts*	*Func Defect*	*Closed*	*EMS v.4.0.8.0 System Audit Log*	*The following activities were not recorded in the audit log:* *- Successful login and log off to the EMS* *- An abnormal shut down or relaunch after an abnormal shut down of EMS* *- Successful and unsuccessful writing or reading of vote cards in the Programming mode including Card errors such as unknown error from the card reader, check connection and card type is not supported from the utility* *on 9/12/2007 D Harwood added:* *- Successful reading and read errors of the Absentee Ballot with the OMR* *- Manual Vote entry procedures (documenting results that cannot be entered via the OMR, Tally Card or Infinity connection.)* *- All Report Generation* *-Audit Log did not log "Clear Votes"*	*v.1:2.1.4.g To ensure system integrity, all systems shall: Record and report the date and time of normal and abnormal events*	*Fixed. (bh)*	*Accepted D Harwood/M Ricketts 10/8/2007 v4.0.9.0 Verified in regression test of General 1 that all identified audit items were logged*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
						operation			
55	9/10/07	M Ricketts	Func Defect	Closed	EMS v.4.0.8.0 Activate Vote Cards	In the "Activate Vote Cards" no error message is generated when a user attempts to write to a "Start" or "Tally" card instead of the "Vote" card. If a users attempts to write to a "Start" or "Tally" card the system status refreshes and displays "Ready", the same status that appears when a "Vote" card is successfully written.	v.1: 2.1.5.1.b.i All voting systems shall meet the requirements for error messages below. The voting system shall generate, store, and report to the user all error messages as they occur.	Fixed. (bh)	Accepted D Harwood/M Ricketts 10/4/2007 v4.0.9.0 Verified an error message is generated when a user attempts to write to a "Start" or "Tally" card instead of the "Vote" card.
56	9/10/07	C Coggins	Func Defect	Closed	EMS v.4.0.8.0 Writing to Vote Cards	Status for the successful writing of a "Vote" cards is unclear. The system ready to write and successful completion of the write function are the same status ("Ready"). While the systems goes through other statuses during the write process they cannot be read by the user and there is no clear indicator of the "card successfully written" status.	v.1: 2.1.5.1.c The voting system shall display and report critical status messages using clear indicators or English language text.	Fixed. (dr)	Accepted D Harwood/M Ricketts 10/4/2007 v4.0.9.0 Verified the status for the successful writing of a "Vote" card is clear. Observed: "Writing Data to card", "Data Written to Card", & "Ready".
57	9/10/07	C Coggins	Doc Defect	Closed	Appendix V Election Manageme nt System User Manual v1.6	Programming Vote N Card pg 100 &102 screenshots & pg 102 Table 5.1.1 do not address the Vote Type field which is displayed on the Vote Card Screen (Card Type: Vote N Card) in the application	v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.	Updated User Manual (Appendix V) to version 1.7 updated table 5.1.1 with Vote Type and screenshot to have Vote Type.	Accepted D Harwood 10/11/07 verified v1.7 Activate Vote Cards Definitions Table 5.1.1b and the Note below describes the Vote N card and it's purpose.
58	9/10/07	C Coggins	Inform ational	Closed	Appendix V EMS User Manual v1.6	Pg 100 & 102 The name and number of the tables are duplicated.		Updated User Manual (Appendix V) to version 1.7 and changed names of table so they are not duplicated to: 5.1.1a Definitions Table of Activate Vote Cards Screen and 5.1.1b Definitions Table of Activate Vote N Cards Screen	Accepted D Harwood 10/11/2007 verified v1.7 Activate Vote Cards Definitions Tables are now named 5.1.1a and 5.1.1b.
59	9/10/07	C Coggins	Doc Defect	Closed	Appendix V EMS User Manual v1.6	Infinity Programming pg 109 step 8 states " A check mark appears on the connect button. The Reset and Begin buttons are inactive until connection is complete. " The check mark is displayed and the Begin button remains inactive but the Reset button becomes active.	v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.	The statement is accurate. The Reset and Begin buttons are inactive until connection is complete. Once the connection is complete, as indicated by a check mark appearing on the connect button, the button states of one of the controls changes (the Reset button becomes active). The statement never claimed the condition of the other two buttons once connection was complete, only their condition prior to the	Accepted D Harwood/M Ricketts 10/02/2007 v4.0.9.0 Tester error; verified functions as designed.

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
								connection being complete. (bh)	
60	9/10/07	C Coggins	Func Defect	Closed	EMS v.4.0.8.0 Security-Deleting the Election Database	Users, with read only permissions in the EMS application can delete an election database through the operating system file structure. D Harwood 10/16/07 Rejected Verified all users can delete an election database through the operating system file structure. C Coggins10/29/07 Clarification note: When the file was deleted the election database could not be accessed.	v.1: 2.1.1.a To ensure security, all systems shall: provide security access controls that limit or detect access to critical system components to guard against loss of system integrity, availability…	Fixed. (bh) bhirsch 10/31/07 v4.0.10.0 Instructions have been modified to prevent delete permissions from being added to the C:\EMS\DATA subdirectory.	Accepted D Harwood/ M Ricketts 11/6/2007 v.4.0.11.0 Verified users with EMS read only permissions can't delete an election database through the operating system file structure. Users receive an "access denied" error message.
61	9/11/07	M Ricketts	Doc Defect	Closed	Appendix V EMS User Manual v1.6	Pg 53-54, the Precinct Report does not identify the function of the Ballots Generated column.	v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.	Fixed. (dr)	Accepted - C Coggins 10/29/07 v.1.7 verified Precinct Report identifies the Ballots Generated column
62	9/11/07	M Ricketts	Func Defect	Closed	EMS v.4.0.8.0 Equipment screen and Infinity Panel Firmware version	The Infinity Panel EMS Equipment record can list a firmware version that is inconsistent with the version loaded on the panel. The version of the Infinity firmware is a required field on the Equipment page but there does not appear to be a validation of the integrity of this data. The firmware version listed in the EMS and the panel remains inconsistent after the election installation process of connecting the panel to the EMS. In this process the Equipment Assignment page updates to reflect the correct panel serial number and programming of the election.	v.1: 2.1.4.f To ensure system integrity, all systems shall: Protect against any attempt at improper data entry	Fixed. (dr) 10/4/07 Damon: After connecting and resetting an Infinity Panel but before actually programming the panel with the election, the system extracts the connected panel's firmware version as well as the serial number and... 1) Looks at the equipment table to see if the serial numbers and firmware versions match. 2) If there is no equipment listed, it checks all listed firmware versions in the firmware table'.	AcceptedD Harwood/ M Ricketts 10/4/2007-. EMS v.4.0.9.0 1) Verified an Infinity Voting Panel with a firmware version listed in the firmware table successfully updated the EMS Equipment & Assigned Equipment Screens Installation of the ballot was permitted. (s/n 3627 build 9.41 v.3.11) 2)Verified an Infinity Voting Panel with a firmware version not listed in firmware table generated a mismatch error and did not permit installation of the ballot (s/n 3630, v. 3.10)
63	9/11/07	M Ricketts	Doc Defect	Closed	Appendix V Election Manageme nt System User Manual v1.6	The fields and outputs of the General Preferences and Vote Type report screenshots in the EMS User Manual do not match the reports Pg 47-General Preferences Report, the screenshot is missing the Time Zone, Allow Blank Ballot and Card Type (OMR). The screen shot displays Running mate Stacking. This is not displayed on the report. Pg 50-Vote Type Report, the screenshot displays an "X" in the required to complete column, the report displays "True or False". Verbiage in the manual is does reflect the actual report detail.	v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.	Updated User Manual (Appendix V) to version 1.7 to reflect the correct screen shots for the General Preferences Report and the Vote Type Report.	Rejected D Harwood 10/11/07 (incomplete) Accepted D Harwood - 10/24/2007 verified v.1.7 all items have been corrected in screen shot

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
						D Harwood 10/11/2007 Partial Accepted - verified v1.7 correctly lists Time Zone, Blank Ballots and OMR Card Type in the General Preferences Report screenshot; verified vote Type Report screenshot displays "True or False". Rejected - The screen shot of the report still displays Running Mate Stacking.			
64	*9/11/07*	*M Ricketts*	*Func Defect*	*Closed*	*Infinity v.9.61 Cast a Blank Ballot*	*A Blank Ballot cannot be cast. In order to cast a ballot the red "Cast Vote Button" must be active. The button is not active until at least one candidate is selected.*	*v.1: 2.3.3.3.c … DRE systems shall: Allow the voter to select his or her preferences on the ballot in any legal number and combination*		*Accepted D Harwood 10/11/2007 v.9.62 Verified a blank ballot can be cast*
65	*9/12/07*	*D Harwood*	*Doc Defect*	*Closed*	*Appendix V Election Manageme nt System User Manual v1.6*	*Pg 118, Section 6.2.1 (Reading OMR Ballot Cards) and Pg 120, section 6.3.1 (Reading Tally Cards) do not advise the user to print the Election Summary or provide a reference to section 6.6 (Election Summary), to show evidence of "Zero" votes in the EMS system prior to inputting vote data.*	*v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.*	*Added section to User Manual (Appendix V) to version 1.7 to describe Suggested Election Day Procedures that detail times to print out reports etc…*	*Accepted D Harwood 10/11/2007 Verified in v.1.7 "Operating Procedures with Suggested Elec-tion Day Procedures" address verifying zero totals.*
66	*9/13/07*	*D Harwood*	*Doc Defect*	*Closed*	*Appendix U MicroVote Infinity Poll workers Manual v1.3*	*The manual provides no information about access or decoding the "Vote Record Report" (Ballot Image report).*	*v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.*	*I have removed info about the 9002 in appendix Z and have changed Appendix Z to "Machine Technician Manual. I have updated Appendix C to reflect this change also. The 9002 is no longer part of our equipment. This manual has steps on decoding the vote records report. I've also referenced this manual in the User Manual.*	*Accepted M Ricketts 10/11/07 Verified information about accessing or decoding the "Vote Record Report" was included in the new document Appendix Z v.0.1. Verified Appendix Z is referenced in the EMS User Manual v.1.7 (Appendix V)*
67	*9/13/07*	*D Harwood*	*Doc Defect*	*Closed*	*Appendix B1 Infinity Voting Panel Technical Reference Manual v.3.11 DO0.2TDP-B1*	*The manual identifies the "Vote Record Report" (Ballot Image report) but provides no information about decoding the report or a reference to the location of this information.*	*v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.*	*Now Appendix Z, See above.*	*Accepted M Ricketts 10/11/07 Verified information about decoding the "Vote Record Report" was included in the new document Appendix Z v.0.1 Verified Appendix Z is referenced in the EMS User Manual v.1.7 (Appendix V).*
68	*9/13/07*	*C Coggins*	*Func Defect*	*Closed*	*EMS v.4.0.8.0 Audit Log Detail Report*	*The Audit Log Detail Report is cumbersome and difficult to read. Entries are written in programming language and do not provide information in a format that would support use in the event of litigation.*	*v.1: 2.1.5 Election audit trails provide the supporting documentation for verifying the accuracy of reported election results. They …are essential for public confidence in the accuracy of the tally, for*	*Fixed. (bh)*	*Accepted C Coggins 10/8/07 v.4.0.9.0 Verified audit log entries are written in language more accessible to non-*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
							recounts, and for evidence in the event of criminal or civil litigation.		*technical staff.*
69	*9/14/07*	*M Ricketts*	*Doc Defect*	*Closed*	*TDP: Appendix Y - Build and Installation Instructions Election Manageme nt System v.1.3*	*An update to Section 3 (Infinity Build Instructions) of Appendix Y was provide on the build platform. This document contains additional information regarding the build process that is not in version 1.3 submitted by MicroVote General Corp.*	*v.1: 9.1.3 Requirements of configuration management apply to all components of voting systems… These components include: documentation*	*Added EMS Installation Instructions to Appendix Y version 1.4*	*Accepted M Ricketts 10/11/07 Verified the update to Section 3, Appendix Y v.1.3 (Infinity Build instructions) provided on the build platform was added to v.1.4 Appendix Y.*
70	*9/20/07*	*M Ricketts*	*Inform ational*	*Closed*	*EMS v.4.0.8.0 Create and Edit Ballots*	*A Referendum can be placed on the ballot without having referendum text attached.* *A Referendum (Office) can be created without attaching the referendum text. EMS does not issue an error when the user places this Referendum on the ballot.* *10/8/07 C Coggins - The reference to v.1: 2.2.1.2.b is removed. The issue is being restated as an Informational issue.* *A Referendum (Office) can be created without attaching referendum text. EMS does not issue a warning when the user places this Referendum on the ballot.*		*Blank referendum text can be used as a placeholder on the ballot and is allowed by design. (bh)*	*Accepted C Coggins 10/8/07 v.4.0.9.0 Verified functions as designed. Changed Type to Informational from Functional Defect as it is appropriate to permit a user to have a place holder.*
71	*9/20/07*	*M Ricketts*	*Func Defect*	*Closed*	*EMS v.4.0.8.0 Create and Edit Ballots-Infinity*	*When the Office Title and Referendum text exceeds a single Infinity ballot page, page 2 text is not displayed.* *An Infinity Referendum where the Office Title and referendum text exceeds a single page (30 button positions), the Referendum text is not displayed on the second page. The second page allots space for the (blank button positions) before inserting the Yes/No voting positions.*	*v.1: 2.2.1.2.b All voting systems shall provide a capability for: rapid and error-free definition of elections and their associated ballot layouts*	*bhirsch 10/31/07 v4.0.10.0 Referendum and Ballot Text exceeding a single page will correctly format and display on successive pages.*	*Accepted M Ricketts/D Harwood 11/8/07 v.4.0.11.0 Confirmed Office Title and Referendum text exceeding a single page display correctly In the EMS and on the Infinity Panel.*
72	*9/20/07*	*M Ricketts*	*Func Defect*	*Closed*	*EMS v.4.0.8.0 Create and Edit Ballots-Absentee*	*When the Office Title and Referendum text exceeds a single Absentee ballot column (20 rows), row 21-23 text is repeated after the Yes/No voting positions* *On an Absentee Referendum where the Office Title and referendum text exceeds a single column (20 rows), the text spreads across the two columns, but the complete text is not displayed. It is unclear if the full referendum text is being cut off or if the Yes/No voting positions are laid over the text. After the Yes/No voting positions text from row 21 to 23 is repeated.*	*v.1: 2.2.1.2.b All voting systems shall provide a capability for: rapid and error-free definition of elections and their associated ballot layouts*	*bhirsch 10/31/07 v4.0.10.0 Referendum and Ballot Text exceeding a single page will correctly format and display on successive pages.*	*Accepted M Ricketts/D Harwood 11/8/07 v.4.0.11.0 Confirmed when the Office Title and Referendum text exceeds a single Absentee ballot column (20 rows), the complete text is displayed.*
73	*9/20/07*	*M Ricketts*	*Doc Defect*	*Closed*	*Appendix V EMS User Manual*	*Section 3.3.4 Creating a Referendum: The EMS User Manual does not indicate any limitations for the size of the ballot text for a*	*v.2: 6.7.b The functional configuration …shall use and verify the accuracy and*	*Tbehler 10/31/2007 Ballot Text Size is limited by other restrictions in the*	*Accepted M Ricketts 11/13/200 This documentation*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					v1.6	*referendum.*	*completeness of the systems operations… manuals.*	*system such as the maximum number of positions on a ballot that can occur.*	*discrepancy was written due to Functional Defect #72. Regression testing of #72 confirmed that there is no limit on ballot text for a referendum.*
74	9/21/07	C Coggins	Doc Defect	Closed	Section 2.2 SYSTEM OVERVIEW Election Management System v.1.3	The Security Specification identifies the EMS ballot preparation and central count hardware using a central EMS computer or networked to an EMS server. The EMS hardware specification indicates the system configuration is identified in the System Overview. The description of the hardware configuration can be interpreted as a stand alone system or network but it does not clearly indicate the recommended configuration of the system to protect against network or Internet attacks.	v.1: 7.4.2 Voting systems shall deploy protection against the many forms of threats to which they may be exposed such as file and macro viruses, worms, Trojan horses, and logic bombs. Vendors shall develop and document the procedures to be followed to ensure that such protection is maintained in a current status.	Changed the System Overview 2.2 to version 1.4 to say :The EMS software does not interface with external systems. The computer EMS is installed on should not be connected to the internet or used for any purposes other than running the EMS software."	Accepted M Ricketts 10/11/07 Verified document Section 2.2 v.1.4 was updated to include language which clearly indicates the recommended configuration of the system, to protect against network or Internet attacks.
75	9/25/07	D Harwood	Func Defect	Closed	Infinity v.9.61 Polling Place Infinity/DoubleTalk/Headphones	The voting machine shall set the initial volume for each voter between 40 and 50 dB SPL. Although the Infinity Voting Panel resets to a default value after each voter, the DoubleTalk Unit and the Adjustable headphones do not. This allows the Voting system as a whole not to default to a value between 40 and 50 dbl SPL. With the DoubleTalk volume set to it's highest level and with the adjustable headphones set to their highest level, the 'system' resets at 57 dbl as defined in the 'step 38' tab within the Characteristics test case.	v.1 3.2.2.2.c.v - The accessible voting station shall be accessible to voters who are blind… c. All voting stations that provide audio presentation of the ballot shall conform to the following requirements: v. The voting machine shall set the initial volume for each voter between 40 and 50 dB SPL.	bhirsch 10/31/07 v4.0.10.0 The unmodified COTS DoubleTalk unit's dynamic range has been increased to allow for a wider number of volume settings through software commands alone.	Accepted M Ricketts and D Harwood 11/12/2007 v.9.62 Verified the voting machine resents within the acceptable range
76	9/25/07	D Harwood	Func Defect	Closed	Infinity v.9.61 Polling Place Infinity/DoubleTalk	The System does not allow the voter using the DoubleTalk to pause and resume the audio presentation.	v.1 3.2.2.2.c.v - The accessible voting station shall be accessible to voters who are blind… b. The accessible voting station shall provide an audio-tactile interface (ATI) that supports the full functionality of the visual ballot interface, as specified in Subsection 2.3.3. iii. The ATI shall allow the voter to pause and resume the audio presentation.	bhirsch 10/31/07 v4.0.10.0 The system now will pause and resume the audio presentation. Instead of going back to the beginning of the text, when resumed the system will begin speaking at the beginning of the current sentence.	Accepted M Ricketts/D Harwood 11/8/07 v.9.62 Confirmed that the voting system permits the voter to pause and resume the audio presentation.
77	9/25/07	D Harwood	Doc Defect	Closed	Appendix U MicroVote Infinity Poll workers Manual v1.3	The Voting system documentation provides no information on a procedure to provide sanitized headphones to voters.	v.1 3.2.2.2.c.iv - The accessible voting station shall be accessible to voters who are blind… C. All voting stations that provide audio presentation of the ballot shall conform to the following requirements: iv. A sanitized headphone or handset shall be made available	Update Appendix U to version 1.5. Added the following to instructions on using the double talk device: "Next we recommend that you use a common generic disposable ear covers on the headphones for each voter. This will provide	Accepted M Ricketts 10/11/2007 Verified Appendix U v.1.4 was updated to provide information on providing sanitized headphones to voters.

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
							to each voter.	sanitized headphones for each voter."	
78	9/28/07	D Harwood	Doc Defect	Closed	Appendix V EMS User Manual v1.6	Per discrepancy #38 - Auto Straight Party Cross Over functionality is active in the current release. Page 20 table 2.1.1 of The Election Management System User Manual states "this specific type of straight party functionality is not available in this release".	v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.		Accepted D Harwood 10/25/2007 Verified v.1.7 correctly describes available functionality.
79	10/4/07	C Coggins	Func Defect	Closed	EMS v. 4.0.9.0 DRE Opening the Polls - Internal Test	An election can be opened on the Infinity Voting Panel without the running of the zero count report and the readiness of the equipment test to confirm that the device is ready to be activated The Infinity Voting Panel does not require a poll worker to verify the readiness of the equipment or that there are no votes on the system prior to permitting the polls to be opened.	v.1: 2.3.1.1 To allow voting devices to be activated for voting, all precinct count systems shall provide: a. An internal test ... to verify that all of the polling place tests specified in Subsection 2.2.5 have been successfully completed b. Automatic disabling of any device that has not been tested until it has been tested v.1: 2.2.5 ... To prepare voting devices to accept voted ballots, all voting systems shall provide the capability to test each device prior to opening to verify that each is operating correctly. At a minimum, the tests shall include: h. Confirmation that there are no hardware or software failures i. Confirmation that the device is ready to be activated for accepting votes	bhirsch 10/31/07 The Infinity Voting Panel runs a series of software & hardware tests during boot. If any of these tests fail the panel will display an error. If they succeed the panel will display a READY status screen. At this point the poll worker can run any of the optional diagnostic tests which include the Check Buttons, Check Display, and Show Ballot tests. If the poll worker attempts to then start the election prior to printing a mandatory zero proof report the system will prompt them to do so and not allow the election to be started. Once the system has passed the startup diagnostics and the zero proof report is successfully run and the worker has confirmed its validity, the system will allow the poll worker to begin the process of starting the election by pressing the Start Election button. An election start confirmation page will then be displayed to the worker. When the poll worker presses the key to then start the election a final status page is displayed showing the panel in the Voting Enabled mode, along with the words "Election Started" and the date and time. At any time during the election the poll worker can repeat the Check Buttons, Check Display, or Show	Accepted M Ricketts/D Harwood 11/8/07 v.4.0.11.0 Verified an election cannot be opened on the Infinity Voting Panel without running the zero count report and the readiness of the equipment test to confirm the device is ready to be activated.

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
								Ballot tests.	
80	10/5/07	D Harwood	Func Defect	Closed	EMS v. 4.0.9.0 Post Voting - Consolidating and Reporting Votes	Precinct Summary Report displays the incorrect vote type data. On the Precinct Summary Report the Absentee generated votes are displayed under the Machine header and the Machine (DRE) generated votes are displayed under the Absentee header. (The votes are correctly tallied for each vote type. The Election Summary Report displays the votes under the correct vote type header.)	V.1:2.4.3 Producing Reports All systems shall be able to create reports summarizing the vote data on multiple levels. All systems shall provide capabilities to: b. Produce a printed report for each tabulator of the results of each contest that includes the votes cast for each selection...	bhirsch 10/31/07 v4.0.10.0 Headers have been corrected to match the vote type in the Precinct Summary Report.	Accepted M Ricketts/D Harwood 11/8/07 v.4.0.11.0 Confirmed the Precinct Summary Report displays the correct vote type data. Absentee generated votes display under the Absentee header and Machine generated votes display under the Machine header.
81	10/8/07	M Ricketts	Doc Defect	Closed	Appendix V Election Management System User Manual v1.6	Pg 32: Table 2.5.1 Ballot Text Screen. The manual states there is a Max of 500 alphanumeric characters in the Phonetic field. The field accepts over 500 alphanumeric characters.	v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.	Tbehler 10/31/2007 Ballot Text Size of characters allowed in the phonetic field is limited by other restrictions in the system such as the maximum number of positions on a ballot that can occur.. Tbehler 11/08/2007 Added clarification that "EMS has a limit of 600 ballot locations. Locations include ballot text, offices, candidates etc. If the Allow Blank Ballot option is selected in General Preferences the limit is 599, This takes into account the location that will have the No Vote Text selection at the end of the ballot. "	Accepted M Ricketts 11/13/2007 Verified v.2.0 EMS User Manual the reference to Max of 500 alphanumeric characters in the Phonetic field has been removed.
82	10/9/07	M Ricketts	Func Defect	Closed	EMS v. 4.0.9.0 Ballot Report	"No Vote" ballot object is not displayed on the Ballot Report. When the "No Vote" ballot object is inserted on an Infinity ballot it does not appear on the Infinity Ballot Report. The report displays all other ballot objects, ballot text, offices and referendums with their correct position number.	v.1: 2.1.6 An EMS shall generate and maintain a database, or one or more interactive databases, that enables election officials or their designees to perform the following functions: Test that ballots and programs have been properly prepared …	bhirsch 10/31/07 v4.0.10.0 "No Vote" is no longer a ballot object, and is instead an optional Infinity Panel setting, similar to the Autovote or Crossover settings. It is enabled in the Preferences section by checking the Allow Blank Ballot option. When this option is checked during ballot design and Infinity Panel programming, the No Vote location will automatically appear at the end of all ballot activations before the confirmation page, allowing the panel to accept a completely blank ballot when selected by the voter. If voting locations	Accepted M Ricketts/D Harwood 11/8/07 v.4.0.11.0 Confirmed that as the "No Vote" is not a Ballot Object but is instead a Preference "Allow Blank Ballot", that provides the voter with the option to cast a blank ballot, it is not required to appear on the Ballot Report.

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
								have already been selected, the button will prompt the voter to deselect votes first.	
83	*10/9/07*	*M Ricketts*	*Func Defect*	*Closed*	*EMS v. 4.0.9.0 Ballot Printing*	*The printed copy of the Infinity Ballot does not display the "No Vote" ballot object.* *When the "No Vote" ballot object is inserted on an Infinity ballot the printed ballot (Ballot Printing option) includes all ballot objects, except the "No Vote" All ballot text, offices and referendum are correctly printed.*	*v.1: 2.1.6 An EMS shall generate and maintain a database, or one or more interactive databases, that enables election officials or their designees to perform the following functions: Test that ballots and programs have been properly prepared …*	*bhirsch 10/31/07 v4.0.10.0 "No Vote" is no longer a ballot object, and is instead an optional Infinity Panel setting, similar to the Autovote or Crossover settings. It is enabled in the Preferences section by checking the Allow Blank Ballot option. When this option is checked during ballot design and Infinity Panel programming, the No Vote location will automatically appear at the end of all ballot activations before the confirmation page, allowing the panel to accept a completely blank ballot when selected by the voter. If voting locations have already been selected, the button will prompt the voter to deselect votes first.*	*Accepted M Ricketts/D Harwood 11/8/07 v.4.0.11.0 Confirmed that as the "No Vote" is not a Ballot Object but is instead a Preference "Allow Blank Ballot", that provides the voter with the option to cast a blank ballot, it is not required to appear on the Ballot.*
84	*10/9/07*	*M Ricketts*	*Func Defect*	*Closed*	*EMS v.4.0.9.0 & Infinity v.9.61 Ballot Display*	*When the "No Vote" ballot object is inserted on the ballot, ballot objects and contest content was repeated at the end of the ballot on the Infinity Voting Panel.* *The "No Vote" ballot object was inserted after the "Straight Party" ballot object. On a ballot that should have ended on page 3 of the Infinity, the header text repeated at the bottom of page 3 and top of page 4. The "Voter Control" ballot text, "Straight Party" ballot object, "No Vote" ballot object and the 1st Office (President) repeated on the 4th page after the header. (When the ballot was recreated with the "No Vote" ballot object removed it correctly displayed on the Infinity.)*	*v.1: 2.1.2.b To ensure vote accuracy, all systems shall: record the appropriate options for casting and recording votes.*	*bhirsch 10/31/07 v4.0.10.0 "No Vote" is no longer a ballot object, and will always appear on the last page of all activations prior to the confirmation page when the option is set in Preferences during programming.*	*Accepted M Ricketts/D Harwood 11/8/07 v.4.0.11.0 Confirmed that with the "Allot Blank Ballot" preference checked, the ballot objects and contest content do not at the end of the ballot on the Infinity Voting Panel.*
85	*10/16/07*	*D Harwood*	*Func Defect*	*Closed*	*EMS v.4.0.9.0 OMR Card Reading - Straight Party Overvote*	*Votes in non-partisan contests are not reported on ballots with a "Straight Party Overvote".* *A paper ballot containing a straight party overvote and a vote in a non-partisan contest is not counted or reported as unprocessed in the EMS. The "Recorded Marks" field displays the reading of the non-partisan selection, while "Error: Straight*	*v.1: 5.4.4.e At a minimum, vote tally data shall include: for paper-based systems only , the total number of ballots both able to be processed and unable to be processed*	*bhirsch 10/31/07 v4.0.10.0 The straight party overvoted paper ballots will now display an OK - Straight Party Overvote message to the operator, display all accepted and undervoted locations, and will correctly log and record the vote for non-partisan*	*Accepted - M Ricketts/D Harwood 11/8/07 v.4.0.11.0 Confirmed that an over-vote in a straight party selection reports as an error in all partisan contests unless there is a straight party cross-over vote. Nonpartisan*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
						Party Overvote" is displayed in the status. It is not clear from the information displayed in the "Status" field that the entire card is unprocessed. The Election Summary and Precinct Reports identifies the number of processed ballots but not the number of unprocessed ballots.		contests.	& referendum votes are correctly reported. Status displays "OK - Straight Party Over-vote". "OK" indicates the card is successfully processed. "Straight Party Overvote" identifies an error in the straight party selection.
86	10/16/07	C Coggins	Doc Defect	Closed	Appendix V Election Management System User Manual v1.7	Table 6.2 Definitions of OMR Ballot Card Screen fields: The manual states the "Status" field displays the status of the last card read and identifies if the card was successfully counted. The status displayed is inconsistent and the manual does not define what each status means. Observed status displays included "OK", Straight Party selections, "Error: Card Orientation" and "Error: Straight Party Overvote". It was not clear from the display what each status meant in terms of the ballot card being successfully counted.	v.2: 6.7.b The functional configuration …shall use and verify the accuracy and completeness of the systems operations… manuals.	Tbehler 11/08/2007 Added descriptions of statuses to the User Manual DO2.0TDP-V	Accepted M Ricketts 11/12/2007 Verified v.2.0 EMS User Manual contains descriptions of the OMR Ballot Card Screen Status field status messages and, which status messages indicate the ballot card was not counted.
87	10/16/07	C Coggins	Func Defect	Closed	EMS v. 4.0.9.0 Spanish Ballot Translations	The language accessible ballot demonstrated the capability to present both English and an alternative language in audio and visual presentation, except for the office title, contest name and party name. Capability to support all ballot content in an alternative language (Spanish) was not demonstrated. The office title and party names are fields that do not contain a translation option or permit direct entry of the special characters needed to support accents on vowels or the ñ. The candidate name fields do not contain a translation option but there is functionality to enter candidate names as free form ballot text. The ballot text feature provides a translation option; however when text was entered into the Spanish translation field of the ballot text and used for a candidate name, the English candidate name text was displayed on the Spanish ballot. For all other ballot content the system is capable of entering English and an alternative language.	v. 1: 3.1.3 The voting equipment shall be capable of presenting the ballot, ballot selections, review screens and instructions in any language required by state or federal law. EAC Decision on Request for Interpretation 2007-04, 2005 VVSG Vol. 1 Section 3.1.3 v. 1: 3.2.1.a When the provision of accessibility involves an alternative format for ballot presentation, then all information presented to voters including instructions, warnings, error and other messages, and ballot choices shall be presented in that alternative format.	bhirsch 10/31/07 v4.0.10.0 Our system has been modified to allow the proper name of a unique candidate, contest title or party name to be identified by characters which include the extended character ASCII set. The new capability will allow any part of the ballot to be displayed using characters such as an Ñ or É, at the discretion of the local jurisdiction.	Accepted M Ricketts 11/7/2007 v.4.0.11.0 11/7/07 Confirmed creation of Contest & Party names with "Spanish" characters and, correctly displays on the ballot.
88	10/17/07	C Coggins	Func Defect	Closed	EMS v.4.0.9.0 Undervote & Overvote Report Totals	The Undervote & Overvote Report does not provide an accumulation for each contest, for the full election (by "additional jurisdictional level") The Undervote & Overvote Report provides a list of undervotes and overvotes for each contest with the total grouped by vote type	v.1: 2.4.3.a All systems shall provide capabilities to: support geographic reporting, which require the report of all results for each contest at the precinct level and additional jurisdiction levels v.1: 5.4.4.e At a minimum, vote	bhirsch 11/25/07 v4.0.12.0 Modified the Undervote & Overvote Report to accumulate contest votes at both the precinct and election levels. Tbehler Updated Appendix V with the latest screen print of	Accepted D Harwood 12/6/07 Verified v.4.0.12.0 provided contest accumulation by precinct and by election.

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
						(machine, absentee and provisional) and precinct; a lump-sum total of all undervote and overvotes in the election is reported. The report does not provide: - a contest accumulation by precinct - a contest accumulation for the election. (The election-wide is interpreted to be an "Additional Jurisdictional level".)	*tally data shall include: separate accumulation of overvotes and undervotes for each contest, by tabulator, precinct and for additional jurisdictional levels*	*the undervote and overvote report.*	
89	*10/18/07*	*C Coggins*	*Func Defect*	*Closed*	*EMS v.4.0.9.0 Undervote Recording & Reporting*	*The recording and reporting of undervotes in the Tally Report, Undervote & Overvote Report and the Infinity Vote Record Report only account for a single undervote in an N of M contest (Vote for 2) If a voter submits a vote with no candidate selections in a contest with a "Vote for 2", the Infinity records a single undervote. The Tally Report, Infinity Vote Record Report (ballot image) and the Undervote & Overvote Report reflect a single undervote. Rejected D Harwood 12/06/07 (v.1:2.1.2.f) v.9.63 Infinity Vote Record Report (ballot image) does not identify each undervote. The report reflects undervotes as omitted selection rather than reporting each undervote as a separate entity.*	*v1:2.1.2.c: ... all systems shall: record each vote precisely as indicated by the voter and produce an accurate report of all votes cast; v1:2.1.2.f: In addition, DRE systems shall: ... record and retain redundant copies of the original ballot image. A ballot image is an electronic record of all votes cast by the voter, including undervotes. v.1:2.4.3.c: Produce a printed report for each tabulator of the results of each contest that includes the votes cast for each selection, the count of undervotes... v.1:2.4.3.d: Produce a consolidated printed report of the results for each contest of all votes cast (including the count of ballots from other sources supported by the system as specified by the vendor) that includes the votes cast for each selection, the count of undervotes ... v.1: 4.1.1: For a voting system, accuracy is defined as the ability of the system to capture, record, store, consolidate and report the specific selections and absence of selections, made by the voter for each ballot position without error*	*bhirsch 11/25/07 v4.0.12.0 Undervotes are now reported in compliance with the latest EAC interpretation defining undervote as the difference between the vote limit and the total votes cast for a contest. The Tally Report, Infinity Vote Record Report and the Undervote and Overvote reports have all been modified.*	*Accepted D Harwood 12/12/2007 v 4.0.14.0 Verified all DRE undervotes are correctly reported in all reports, including the Vote Record Report (ballot image). Accepted D Harwood 3/10/2009 v.4.0.16.0 Verified through the Under/Overvote reports that the undervotes are correctly reflected and reported for the OMR when they occur for a N of M (vote for 2) contest.*
90	*10/18/07*	*C Coggins*	*Informational*	*Closed*	*EMS v.4.0.9.0 Straight Party Voting*	*The first 2 of 3 candidate matches were selected in a straight party contest where the number of straight party selections exceeded the "Vote for 2" limit. While this test is a valid boundary test for software, this condition is outside accepted practices for a General Election. This condition would only occur under an extraordinary circumstance such as an order from a court. A partisan contest with a Vote for 2 contained a party with 3*		*bhirsch 11/25/07 v4.0.12.0 Because it is outside of accepted practices for a general election, the EMS software now prevents over filing of candidates within a general election. If the user attempts to exceed the vote limit or secondary vote limit when editing candidates, offices, or secondary vote limit*	*Accepted C Coggins 12/12/07 Verified in v.4.0.14.0 a contest cannot be set up with more candidates for a single party than the "Vote for" limit.*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
						candidates. A straight party vote was issued for the party. The first two candidates were selected, the third was not. While the system did not overvote, the expected results for this test were that the system would not overvote nor make a partial selection.		*groupings the save is cancelled and an informational message is displayed.*	
91	*10/22/07*	*M Ricketts*	*Doc Defect*	*Closed*	*Appendix V EMS User Manual v1.7*	*Provisional Voting functionality and/or the procedure for handling provisional ballots is not documented in the EMS User Manual. Appendix F (Voting Variations) states that MicroVote supports Provisional Ballots. The EMS User Manual indicates there is a Provision Vote Type, but it provides no information regarding handling of provisional voting.*	*v2:2.8 This documentation shall provide all information necessary for system use by all personnel who support pre-election and election preparation… with regard to all system functions and operations …*	*Tbehler 11/08/2007 Added more clarification to how provisional voting is handled by EMS by describing it in advanced voting and the use of the vote n card. In the user manual DO2.0TDP-V*	*Accepted M Ricketts 11/12/2007 Verified v.2.0 EMS User Manual provides information regarding the handling of provisional voting.*
92	*10/23/07*	*C Coggins*	*Doc Defect*	*Closed*	*Section 2.6 SYSTEM SECURITY SPECIFICATION EMS v.1.2*	*Physical security procedures do not address chain of evidence, witness handling or other smart card physical security procedures.* *A security test scenario included a tester defined as an election insider with:* *- uncontrolled access to the prior voted election smart cards and reports;* *- programming and smart card expertise or abetted by a conspirator with these skills;* *- 45 minutes of uncontrolled access to voted smart cards during election night central counting.* *The tester was able to switch votes from one candidate to another without detection by the EMS. The change would be detected in an audit of the smart card results and the paper Infinity Tally Report. This scenario is assessed by the VSTL to be a very low risk (v.2: 6.4) if there are physical security procedures to address the uncontrolled access, because an election insider without expertise could neither see nor switch votes.*	*v.1: 7.3 A voting system's sensitivity to disruption or corruption of data depends, in part, on the physical location of equipment and data media, and on the establishment of secure telecommunications among various locations. Most often, the disruption of voting and vote counting results from a physical violation of one or more areas of the system thought to be protected. Therefore, security procedures shall address physical threats and the corresponding means to defeat them.*	*Tbehler 11/08/2007 added instructions in the pollworker manual and the security specification to handle infinity card handling. D01.3TDP-2.6 and DO1.7TDP-U. "5. All cards (Start, Vote, Vote N and Tally) must be stored in proper envelopes for returning to election office. It is recommended that you seal tally cards and tapes in their respective envelopes before you transport them to the election office. It is also recommended that at least one poll worker from each party transport the tally cards and tapes to the election office together. The sealing of the envelopes and transportation of the cards and tapes by at least two partisan poll workers ensures a high level of security between the poll site and the election."*	*Accepted M Ricketts 11/14/2006 Confirmed that Smart Card physical security procedures were added to v1.3 Section 2.6 document and v1.7 Infinity Poll Worker Manual (Appendix U).*
93	*10/25/07*	*C Coggins*	*Doc Defect*	*Closed*	*Infinity Voting Panel Technical Reference Manual v.3.11 DO0.2TDP-B1 & Appx C COTS SPECIFICATIONS*	*The COTS hardware DoubleTalk must be configured with BIOS 0212 to support the required volume controls. No method has been identified for the jurisdiction to validate that the fielded DoubleTalk is configured with the correct BIOS* *Rejected - C Coggins 12/5/07* *No procedure or method has been submitted addressing identification of the certified system configuration for fielded hardware.*	*v.2:6.6.a: The audit shall establish a configuration baseline of the software and hardware to be tested.* *Testing & Certification Program Manual section 5.8 The manufacturer shall provide tools through which a fielded voting system may be identified and demonstrated to be unmodified from the system that was*	*Tbehler 10/31/2007 The manufacturer will supply the double talk devices with a non removable sticker with the version of bios installed as COTS.*	*Accepted D Harwood 12/19/2007 Verified Appendix AA v.1.2 addresses the issue and fulfills the requirement.*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					EMS v.1.2		certified.		
94	10/25/07	C Coggins	Doc Defect	Closed	Infinity Voting Panel Technical Reference Manual v.3.11 DO0.2TDP-B1	The Infinity Voting Panel protective enclosure is designed to be stored on it's end like a suitcase. The maintenance procedures do not describe the storage method with respect to not stacking or the maximum number of panels that can be stacked without damage. Section 9.5.4 only addresses storage in a secure place. Rejected - This issue is not addressed in v.DO 0.3TDP-B1 sec. 9.5.4 nor is it found elsewhere in the document.	v.1: 4.2.3.b.ii All precinct voting systems shall: be capable of using or be provided with, a protective enclosure rendering the equipment capable of withstanding: Stacking loads associated with storage v.1: 8.7… documentation shall be sufficient to serve the needs of the test lab, election officials, and maintenance technicians.	Tbehler 10/31/2007 Updates coming from Carson Manufacturing. Tbehler 11/08/2007 Updates submitted to FTP site from Carson Manufacturing.	Accepted - D Harwood 12/4/07 DO0.4TDP-B1 States that panels should lie flat in storage case for storage and that there is a stacking limit of 6 cases.
95	10/25/07	C Coggins	Doc Defect	Closed	Infinity Voting Panel Technical Reference Manual v.3.11 DO0.2TDP-B1	To replace the PC/104 SBC the documentation says to pry it up using your fingers to release the locking standoff tabs, without using any tools. This was attempted and no techs were able to pull the part, as doing so risked damaging the unit. It did not seem that the locking standoffs had anything to do with the issue, as they were easily pinched and released, but the actual connecters appear too tight. Further explanation is necessary to define the method for safe removal. Rejected 12/19/07 jpatterson DO0.4TDP-B1 The method described in section 11.5.11, pops the right side against the edge of the case as expected. The other side seems too likely to damage the unit to use the force required to pry it off. The manual says to use the CompactFlash as leverage, but neither the part nor the board its mounted on are strong enough to withstand the procedure. The last pin has no points for leverage. It is surrounded by surface mounted parts. The prying described in the manual risks damage to the unit. The manual says to use “the padded handle of long-nosed pliers” to pry the part up. No pliers were supplied or described. Differences between types and materials used in various pliers could make a difference when trying to remove the part. Pliers a bit smaller than a standard needle nose were used and the rubber handle padding was damage in prying.	v.1: 4.3.4.2.g. The following additional attributes will be considered to assess system maintainability: Adjust, align, tune or service components v.1: 8.7… documentation shall be sufficient to serve the needs of the test lab, election officials, and maintenance technicians.	Tbehler 10/31/2007 Updates coming from Carson Manufacturing. Tbehler 11/08/2007 Updates submitted to FTP site from Carson Manufacturing. bhirsch 3/14/08 The Infinity Manual contained in DO0.5TDP-B1.doc section 11.5.1 states that the Infinity voting panel should only be disassembled by factory trained personnel. Removal of the Compact Flash memory referenced in Section 11.5.12 is a continuation of this section and is a procedure that requires disassembly of the panel and therefore should only be performed by properly trained personnel. JPatterson with iBeta has not received this training and is therefore not qualified to perform the procedure. Instructions contained in 11.5.12 are correct and will result in removal of the Compact Flash memory as stated when performed by someone having received the correct factory training.	Rejected 12/19/07 Jpatterson DO0.4TDP-B1 Accepted jpatterson & C Coggins 3/17/08 Verified that DO0.5TDP.B1 stipulates these operations are to be performed by factory trained technicians. It is accepted that the description in section 11.5.12 is acceptable if augmented with training
96	10/25/07	C Coggins	Doc Defect	Closed	Infinity Voting Panel Technical Reference Manual v.3.11	The instructions for replacing the memory are insufficiently detailed. The locking pin holding the memory in place is very tight and may not be reusable. The pin can be easily damaged when using pliers or by prying and pulling on the pin. A more detailed explanation as to how the pin is	v.1: 4.3.4.2.g. The following additional attributes will be considered to assess system maintainability: Adjust, align, tune or service components v.1: 8.7… documentation shall be sufficient to serve the needs	Tbehler(10/31/2007)There are no maintenance operations for the infinity voting panel as communicated to me by Carson Manufacturing and in their technical	Accepted D Harwood & jpatterson 12/19/07 Verified DO0.3TDP-B1 instructions were sufficient to complete the operation.

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					DO0.2TDP-B1	removed would lessen the chance of damage during routine maintenance.	of the test lab, election officials, and maintenance technicians.	specifications.	
97	10/25/07	C Coggins	Func Defect	Closed	Infinity Voting Panel Product Marking	The Infinity Voting Panel did not include a data plate containing a schedule for and list of operations required to service or perform preventive maintenance. Rejected 11/12/07 D Harwood - In the event that there is no scheduled maintenance or service operations, this needs to be stipulated on the data plate Rejected 12/5/07 C Coggins - No procedure or method has been submitted addressing identification or upgrade of the certified system configuration for fielded hardware.	v.1: 4.3.6.b All voting systems shall: display on each device a separate data plate containing a schedule for and list of operations required to service or to perform preventive maintenance	Tbehler(10/31/2007) There are no maintenance operations for the infinity voting panel as communicated to me by Carson Manufacturing. Tbehler(11/30/2007) There will be a data plate added to the infinity voting machine to stating the EAC Certification Number and "No Routine Service or Maintenance Required"	Accepted D Harwood 12/19/2007 Verified Appendix AA v.1.2 addresses the issue and fulfills the requirement.
98	10/26/07	C Coggins	Doc Defect	Closed	Infinity Voting Panel Technical Reference Manual v.3.11 DO0.2TDP-B1	The part numbers of the approved parts list, section 12, does not match the part numbers on the Infinity Voting Panel submitted for testing. A review of the test documentation used by Wyle during environmental test revealed a 2001 Engineering Change Order (ECO). The submitted approved parts list does not reflect the updates made in the ECO. Rejected 12/19/07 jpatterson DO0.4TDP-B1 Where part numbers could be found, the list of parts and inspected Infinity Voting Panel were generally consistent, except for the keyboard. The part was marked CP4279, the documentation shows a part number of ED1220.	v.1:4.3.1.b A voting system shall: included as part of the accompanying Technical Data Package, an approved parts list. v.1: 8.7… documentation shall be sufficient to serve the needs of the test lab, election officials, and maintenance technicians.	Tbehler(10/31/2007) Carson is checking into this issue with information provided by Carolyn. 05/09/2008 Carson updated the parts list in technical specificiation DO0.7TDP-B1.doc to correctly name the keyboard part as CP4279.	Rejected JPatterson 12/19/07 DO0.4TDP-B1 Accepted C Coggins 5/22/08 Verified DO0.7TDP-B1 identifies keyboard part CP4279
99	11/1/07	D Harwood	Doc Defect	Closed	Election Manageme nt System User Manual v.1.7	The EMS User Manual does not specify how the audit records identify systems used at the polling place or how to include polling place identification. The manual does not describe the relationship of the polling place to the precinct.	v1:5.4.2 System Readiness Audit Records The following minimum requirements apply to system readiness audit records: b. In the case of systems used at the polling place, the record shall include polling place identification	Tbehler 11/08/2007 Precinct = Polling Place in our system. A machine is programmed with a precinct and it's assigned ballot style. Poll workers audit that ballot style by doing a show ballot and checking that the zero proof and the machine have the correct precinct on them.	Accepted D Harwood 12/4/2007 Election Management System User Manual v.2.2 Accepted vendor response as clarification.
100	11/5/07	K Wilson	Func Defect	Closed	Trusted Build	The project for msi has not been provided for installation of the Trusted Build. The project (*.sln) should be comprised of configuration files. These files are not expected to require source code review but the VSTL requires submission of this project in order to complete the Trusted Build installation.	EAC Testing & Certification Program Manual section 5.6.3.4 The VSTL shall install the executable code onto the system submitted for testing and certification before completion of system testing.	11/7/2007 project submitted	Accepted K Wilson 3/13/08 project for msi has been provided for installation and verified functions correctly
101	11/8/07	K Wilson	Doc Defect	Closed	Appendix Y - Build and Installation	The Trusted Build instructions do not address the project for the msi process and installation.	v.1: 8.7… documentation shall be sufficient to serve the needs of the test lab, election officials,		Accepted K Wilson 3/13/08 verified v.2.1 address the project for

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					Instructions EMS v.1.6		*and maintenance technicians.*		*msi process and installation*
102	*12/5/07*	*K Wilson*	*Doc Defect*	*Closed*	*Appendix Y - Build and Installation Instructions EMS v.2.0*	*The EMS is identified by MicroVote as a stand alone system that is not to be networked. The installation instructions do not address the disabling the wireless modem on the laptop.*	*v.1: 8.7… documentation shall be sufficient to serve the needs of the test lab, election officials, and maintenance technicians.*		*Accepted K Wilson 3/13/08 verified v.2.1 address disabling the wireless modem on the laptop*
103	*12/6/07*	*D Harwood*	*Func Defect*	*Closed*	*EMS v.4.0.12.0 Provisional Ballot Extract*	*Precinct identification was not extracted from DRE to the EMS for all provisional ballots; resulting in inaccurate reporting.* *When two provisional ballots from separate precincts were extracted from the Infinity, only precinct ID from one precinct was extracted with the record. When the two provisional ballots were posted only the ballot with the precinct ID was posted to the Election Summary Report and the Precinct Report. (There was no problem with the reporting of precinct ID for Machine Vote Types)*	*v1:2.1.2.c: ... all systems shall: record each vote precisely as indicated by the voter and produce an accurate report of all votes cast;* *v.1:2.4.3.d: Produce a consolidated printed report of the results for each contest of all votes cast (including the count of ballots from other sources sup-ported by the system as specified by the vendor) that includes the votes cast for each selection, the count of undervotes ...*		*Accepted* *D Harwood 12/13/2007* *v 4.0.14* *Verified that Precinct ID is displayed consistently in reports for all vote types*
104	*12/6/07*	*D Harwood*	*Func Defect*	*Closed*	*EMS v.4.0.12.0 Provisional Ballot Extract*	*Provisional Votes can be extracted, posted and counted multiple times.* *During extraction of the provisional ballots an error with the extraction of the Precinct ID was noted. The ballots (Vote Type of Provisional) were cleared from the election results and the posted votes were reset. The Provisional votes were extracted again in order to confirm the missing Precinct ID. The original extracted vote records were not cleared or overridden. Nor did the EMS prevent extraction of the same votes. The Provisional votes were duplicated in the second extraction. Both sets of votes were able to be posted to the election results and reported.*	*v1:2.1.4 Integrity measures insure the physical stability and function of the vote recording and counting processes. To ensure system integrity all systems shall: Protect against any attempt at improper data entry or retrieval.*		*Accepted* *D Harwood 12/13/2007* *v 4.0.14* *Verified that votes extracted directly from the panel were prevented from duplication and counting more than once. An error was generated that votes were already extracted.*
105	*12/6/07*	*D Harwood*	*Inform ational*	*Closed*	*EMS v.4.0.12.0 Infinity programme d for Vote Type- Provisional permits a Machine type vote to be entered*	*Infinity Panels programmed as Provisional Vote Types permit the use of "Vote" cards and panels programmed as Machine Vote Types permit the use of "Vote N" cards.* *Infinity Panels are programmed as either Machine or Provisional Vote Types. MicroVote procedures indicate that provisional voters should use the "Vote N" card on a dedicated Provisional Vote Type panel. "Vote" cards are used for Non-provisional voters. Panels programmed with either Vote Type permit voting with either card. When the votes are imported to the EMS they are reported in the column that corresponds to the panel Vote Type. Hence a vote from a Non-provisional voter is reported in the Provisional column. The*		*1/23/08 bhirsch v4.0.15.0 Actually our system allows the jurisdiction to define their own vote types (not just "machine" or "provisional." The Infinity Panel will correctly report whatever vote type it has been programmed to contain, as defined by the jurisdiction. We publish the method used by our system to cast a "provisional" vote. The method states that in order to cast a provisional vote the voter must vote on a dedicated provisional vote type panel using a VoteN*	*Accepted* *C Coggins 1/23/08* *Informational notations are for the purpose of disclosure; the system functions as designed*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
						votes are otherwise correctly reported.		*card. Any other combination of panel or card would not accomplish the task as defined by our system. The fact that our system accommodates other combinations of vote types and vote cards is irrelevant to whether or not our system correctly accommodates provisional voting as defined. If a jurisdiction decides to use a different combination to accom-modate their individual needs we would not want to limit their choices.*	
106	*1/21/07*	*C Coggins*	*Func Defect*	*Closed*	*Infinity Panel and DoubleTalk audio ballot connection*	*Upon completion of the Reliability test (Temperature and Power Variations), on Infinity Panel S/N3628, the DoubleTalk assistive device failed to receive the audio ballot output from the panel.* *During the post test operational status check the DoubleTalk connection to the panel was not functioning. An audio ballot could not be played and voted. Examination of the unit found that a resistor had been burned out. Carson Manufacturing ECN 1424 addresses replacement of this resistor with a thermal fuse, which resets when it cools. (Note: All votes were accurately cast and reported during test execution; audio votes were able to be cast on Infinity Panels S/N 3627, 3629, & 3630 during the post-test operational status check.)*	*v.2: 4.6.1.6 ...system hardware shall be subject to functional testing to verify continued operability. If any portion of the voting machine or precinct counter hardware fails to remain fully functional, the testing will be suspended until the failure is identified and corrected by the vendor. The system will then be subject to a retest.*	*05/09/2008 Carson stated #106 and #107 resolved with current production samples incorporating ECN's to remedy these issues previously discovered.*	*Accepted* *D Harwood 6/4/2008* *Testing was repeated with current production models (SN's 10402, 10403, 10404 and 10405) . Per section 5.2.1.1 of Wyle's test report, no anomalies were reported.*
107	*1/21/07*	*C Coggins*	*Func Defect*	*Closed*	*Infinity Panel Card Reader (Vote, Start and Tally cards)*	*Upon completion of the Reliability test (Temperature and Power Variations), on Infinity Panel S/N3628, the card reader failed to read any of the smartcards.* *During the pos-test operational status check the card reader stopped reading due to misalignment of the smartcards (Vote, Start, and Tally). Examination of the unit found that the number of spacers on the card reader did not match Carson Manufacturing ECN 1408 which addressed proper alignment of the card reader. (Note: All ballots votes were accurately cast and reported during test execution; cards were successfully read on Infinity Panels S/N 3627, 3629, & 3630 during the post-test operational status check.)*	*v.2: 4.6.1.6 ...system hardware shall be subject to functional testing to verify continued operability. If any portion of the voting machine or precinct counter hardware fails to remain fully functional, the testing will be suspended until the failure is identified and corrected by the vendor. The system will then be subject to a retest.*	*05/09/2008 Carson stated #106 and #107 resolved with current production samples incorporating ECN's to remedy these issues previously discovered.*	*Accepted* *D Harwood 6/4/2008* *Testing was repeated with current production models (SN's 10402, 10403, 10404 and 10405). Per section 5.2.1.1 of Wyle's test report, no anomalies were reported.*
108	*1/21/07*	*C Coggins*	*Func Defect*	*Closed*	*Infinity Panel audio*	*Ballot text for a long referendum will not play completely on the Infinity Panel.*	*v.1: 3.2.1. a When the provision of accessibility involves an*	*1/23/08 bhirsch v4.0.15.0 Long ballot text will now*	*Accepted* *C Coggins 3/11/08*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					Mark Reader Running on EMS ver.4.017.0	Reliability MTBF is being assessed during test operation including multiple election set up and operations. At execution of the EMS Accuracy Test for the ACP2200 OMR COTS scanner, batch 7 card 27 was inserted, the read confirmation did not display, the count did not increment and no error message displayed. The card was reinserted. The read confirmation appeared and the counter incremented by one. This was noted and testing continued. The device stopped reading ballot data on batch 22 card 25. The ballot card fed through the OMR, but no read confirmation data displayed, the count did not increment and no error message was displayed. The device was unable to perform its intended function for several hours as we checked the system. The connection from the EMS to the switchbox was confirmed by writing and reading a Vote Card by the Gemsplus to the EMS. Connections from the OMR to the switchbox were checked and reconnected. Approved maintenance cleaning of the OMR was performed. A restart of the EMS and the EMS PC were initiated. None of these actions resulted in an election card being recorded by the EMS or an error message being generated. A Chatsworth diagnostic tool was loaded on a second PC. The EMS was powered off. The OMR was connected to the second PC through the switchbox. It was confirmed that the OMR was reading the card. During disconnection and reconnection the EMS was powered off and on. An election card was now able to be recorded in the EMS.	system submitted for testing.... For the purpose of demonstrating compliance with this requirement, a failure is defined as any event which results in either the: • Loss of one or more functions • Degradation of performance such that the device is unable to perform its intended function for longer than 10 seconds		not connected correctly to the EMS an error is now displayed and the user is prevented from scanning cards.
115	4/17/08	C Coggins	Func Defect	Closed	COTS - Chatsworth ACP 2200 Optical Mark Reader Running on EMS ver.4.018.0	More than two read errors were recorded prior to reaching 3,126,404 ballot positions. MicroVote submitted 2076 ballots marked in pencil in voting patterns identified by iBeta. The OMR is a dual side reader that is designed to read ballots in all four orientations. Test ballots were in 42 batches. The first batch contained 71 ballots containing 27,335 ballot positions. These were fed once in a single orientation. The OMR and EMS successfully read 26,997 ballot positions without error. Subsequent batches of 50 ballots were fed into the OMR two times. The first read was one orientation; the second was reversed. Prior to reading 388,850 ballot positions, a ballot position was misread. Prior to reading 430,045 ballot positions a second	v2: 4.7.1.1.c If the system correctly reads more than 26,997 ballot positions but less than 1,549,703 when the first error occurs, the testing will have to be continued until another 1,576,701 consecutive ballot positions are counted without error (a total of 3,126,404 with one error) .	5/9/2008 TWB Updated user manual DO2.3TDP-V.doc to update absentee card marking and inspection instructions. 5/13/2008 D02.4TDP-v.doc	Accepted C Coggins 5/23/2008 Accuracy-OMR Regression 3 read all cards without errors using the marking devices (#2 pencil and black ink) defined in the revised specification Appendix-V v.2.4

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
						ballot position was misread.			
116	4/18/08	C Coggins	Func Defect	Closed	Infinity Voting Panel - power supply	The Ault power supply was damaged during the Electrostatic Disruption Test During the ESD test the Ault PW128RA1203F01 power supply failed when 15kV air discharge was applied to the vote card slot. (0 VDC) The failure was repeated on a second Ault power supply. Normal operation could not be resumed.	v.1: 4.1.2.8 …all DRE equipment, shall be able to withstand +/-15kV air discharge …without damage or loss of data. The equipment may resent or have momentary interruption so long as normal operation is resumed without human intervention	Updated approved power supply in Appendix C DO1.4TDP-C.doc. To • ELPAC Power Systems Model FW3012 Power Supply. Carson removed power supply specifications from his technical specificiation DO0.7TDP-B1.doc.	Accepted C Coggins 6/5/2008 ESD was repeated incorporating Carson ECN 1449/ 1450 & ELPAC power supply with the power cord ferrite, (Wyle Test Report section 5.3.3); no anomalies were reported. Verified Appx C COTS Specification v.1.4 identifies ELPAC Power Supply; Micro-Vote ECR/ECN 101 addresses addition of ferrite.
117	4/18/08	C Coggins	Func Defect	Closed	Infinity Voting Panel -#17 button	The #17 button (bottom left) on the Infinity Voting Panel ceased to function after the Electrostatic Disruption. During the Electrostatic Disruption (ESD) a shock was applied to the #17 button of the Infinity Voting Panel. The button did not function in the Operational Status Check following the test. Normal operation could not be resumed.	v.1: 4.1.2.8 …all DRE equipment, shall be able to withstand +/-15kV air discharge and +/- 8 kV contact discharge without damage or loss of data. The equipment may resent or have momentary interruption so long as normal operation is resumed without human intervention		Accepted D Harwood 6/4/2008 ESD was repeated incorporating Carson ECN 1449/ 1450, and the ELPAC power supply with the ferrite; no anomalies were reported per Wyle Test Report Section 5.3.3 and Appendix E
118	4/18/08	C Coggins	Doc Defect	Closed	Appendix B1- Infinity Technical Reference Manual DO0.5TDP-B1	The model number of the power supply submitted for testing does not match the documented approved power supply. The approved power supply identified in the Technical References the Ault model PW101MA1203F01; the submitted power supply is the Ault model PW128RA1203F01.	v.2:2.1.1 The content of the Technical Data Package is intended to provide clear, complete description of the following information about the system: ... equipment ... requirements for system operation...	Updated approved power supply in Appendix C DO1.4TDP-C.doc. To • ELPAC Power Systems Model FW3012 Power Supply. Carson removed power supply specifications from his technical specificiation DO0.7TDP-B1.doc.	Accepted D Harwood 5/12/2008 Verified that Appendix B1 v.0.7 no longer references the power supply and Appendix C v.1.3 now references the ELPAC power supply to be used with the Infinity Voting Panel.
119	4/18/08	C Coggins	Documentation Defect	Closed	Infinity Voting Panel - Emissions Engineering Change Notice	The Infinity Panel exceeded the radiated emissions of FCC Part 15B (55.97 MHz test frequency) per Wyle Notice of Anomaly No. 2 dated 4/10/08. Mitigation was performed by the manufacture with Wyle Engineers observing. Wyle observations documented: Three ferrites were added to the device to obtain compliance: #1 AC input line #2 Audio module input line # 3 inside on the main board. The front data interface jack was disabled by removal of an internal cable. An engineering change notice must be submitted documenting mitigation requirements.	v.2: 4.8.2 The test for electromagnetic radiation shall be conducted in compliance with the FCC Part 15 Class B requirements by testing per ANSI C63.4		Accepted D Harwood 6/4/2008 verified Carson ECN 1449
120	5/1/08	M Libman	Doc Defect	Closed	Section 2.2 System Overview	The use and configuration of the Universal Power Supply identified in Appendix C COTS Specification EMS for the power	v.2: 2.2.1.b The system description shall include written descriptions, drawings and	5/8/2008 TWB Updated Appendix C DO1.4TDP-C.doc, System Overview	Rejected M Libman 5/9/2008

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
					Election Management System v.1.3 *MicroVote EMS User Manual v.2.2*	*backup of the OMR/EMS is not identified or referenced in either the System Overview or the EMS User Manual.* *Rejected:* *M Libman 5/9/2008* *The update identifies the use of the UPS unit, but doesn't provide the configuration. The UPS is not contained in figure 1 of the System Overview .*	*diagrams that present: a description of the operational environment of the system that provides an overview of the hardware and communications structure* *v.2: 2.8.2 .b The vendor shall identify all facilities, furnishings, fixtures, and utilities that will be required for equipment operations, including equipment that operates at the: central count facility*	*DO1.5TDP-2.2.doc and User Manual DO2.3TDP-V.doc to describe suggested Uninterruptible Power Supply specifications.* *5/13/2008 SystemOverview DO1.6TDP-22.doc*	*Accepted* *C Coggins 5/22/2008* *Verified figure 1 of System Overview references UPS and configuration per Appendix C, which identifies hardware to connected to the UPS.*
121	*5/6/08*	*D Harwood*	*Func Defect*	*Closed*	*EMS v.4.0.18.0 Pause & Resume a long proposition Infinity Voting Panel v.9.67*	*Audio pause/resume does not resume at the point of pause with longer referendum text* *When proposition text exceeded (+/-) a minute, and the pause was initiated before the minute, the resume was at the point of pause. However if the audio pause was attempted in the playback after a minute, the resume was at the beginning of the proposition text, instead of the point of pause.*	*v.1: 3.2.2.2.b.iii. The ATI shall allow the voter to pause and resume the audio presentation.*	*05/09/2008 Carson replied that discrepancy #121 was addressed with test firmware version 9.68*	*Accepted* *D Harwood 6/6/2008* *Retested in Gentwo regression 8 with Infinity ver 4.0 and verified that the audio pause and resumes as expected even with extended text.*
122	*6/5/08*		*Doc Defect*	*Closed*	*Appendix U: Election Management System Poll Worker's Manual v. 1.7*	*The Initialization Procedures section does not address readiness testing (prior to opening the polls) of the audio device (DoubleTalk confirmation of the activation and volume level status) or the Infinity Voting Panel transition to audio mode.*	*V.2:2.8.6 Operations Support The vendor shall provide documentation of system operating procedures that meets the following requirements: Defines the procedures required to support system acquisition, installation, and readiness testing. These procedures may be provided by reference, if they are contained either in the system hardware specifications, or in other vendor documentation.*	*06/06/2008 TWB Updated Pollworker Manual Appendix U to version 1.8 to Test the readiness of the double talk in step 6.3 show ballot.*	*Accepted* *D Harwood 6/6/2008* *v1.8 of the Pollworkers Manual addresses readiness testing of the audio mode and capabilities.*
123	*6/5/08*	*C Coggins*	*Doc Defect*	*Closed*	*RC Systems ECN 1025 and Appendix AA MicroVote System Identification Tool User Manual v.1.2*	*The COTS verification procedure for validation of the correct Doubletalk model conflicts with the volume control RC Systems ECN 1025.*	*v.2: 2.12.2 The vendor shall provide a description of its practices for part and materials tests and examinations that meet the requirements of vol.1 subsection 8.5.* *v.1: 8.5.a In order to ensure that voting system parts and materials function properly, vendors shall: select parts and materials to be used in voting systems and components according to their suitability for the intended application. Suitability may be determined ... by means of special tests.*	*06/06/2008 TWB Updated Appendix AA to version 1.3 to update the verification of the double talk device has a piece of tape applied to the volume control as stated in ECN1025.*	*Accepted* *D Harwood 6/6/2008* *Verified that ver 1.3 coincides with ECN1025 regarding the volume control.*
124	*6/5/08*	*C*	*Doc*	*Closed*	*Appendix AA*	*An RC Systems engineering change notice*	*v.2: 2.12.2 The vendor shall*		*Accepted*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
		Coggins	*Defect*		*MicroVote System Identification Tool User Manualv.1.2*	*addressing validation of the correct Doubletalk firmware version has not been submitted for the process outlined in the Identification Tool User Manual.*	*provide a description of its practices for part and materials tests and examinations that meet the requirements of vol.1 sub-section 8.5. v.1: 8.5.a In order to ensure that voting system parts and materials function properly, vendors shall: select parts and materials to be used in voting systems and components according to their suitability for the intended application. Suitability may be determined ... by means of special tests.*		*D Harwood 6/5/2008 RC Systems ECN 1026 addresses Doubletalk model identification*
125	*8/15/08*	*K Wilson*	*Doc Defect*	*Closed*	*Appendix AA MicroVote System Identification Tool Users Manual v1.3*	*The manual does not address unauthorized software.*	*v.2: 2.4.6. The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure software (including firmware) installation to meet the specific requirements of Vol. I, Subsect. 7.4. This information shall address software installation for all system components. v.1: 7.4.6.a Setup validation methods shall verify that no unauthorized software is present on the voting equipment.*	*9/18/08 bhirsch The manual and verification tool software has been modified to identify unauthorized software.*	*Accepted K. Wilson 9/22/2008 Appendix AA v1.5, tool addresses all authorized and unauthorized software.*
126	*8/15/08*	*K Wilson*	*Doc Defect*	*Closed*	*Appendix AA MicroVote System Identification Tool Users Manual v1.3*	*The manual does not address producing a listing of all software files installed on the voting systems.*	*v.2: 2.4.6. The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure software (including firmware) installation to meet the specific requirements of Vol. I, Subsect. 7.4. This information shall address software installation for all system components. v.1.7.4.6.c: The vendor shall provide a method to compre-hensively list all software files that are installed on voting systems.*	*9/18/08 bhirsch The manual and verficiation tool software has been modified to list all software files installed on the voting system, and to comprehensively list which of these files is verified, modified, or new.*	*Accepted K. Wilson 9/22/2008 Appendix AA v1.5, tool addresses all installed software files.*
127	*8/15/08*	*K Wilson*	*Doc Defect*	*Closed*	*Appendix AA MicroVote System Identification Tool Users Manual v1.3*	*The manual does not address the verification process in sufficient detail to address the FIPS 140-2 requirement.*	*v.2: 2.4.6. The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure software (including firmware) installation to meet the specific requirements of Vol. I, Subsect. 7.4. This information shall address software installation for all system components.*	*9/18/08 bhirsch The manual now contains a statement of compliance to the FIPS 140-2 requirement.*	*Accepted K. Wilson 9/22/2008 Appendix AA v1.5 addresses usage of a FIPS 140-2 certified cryptographic provider.*

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							v.1: 7.4.6.d: The verification process should be able to be performed using COTS software and hardware available from sources other than the voting system vendor. i. If the process uses hashes or digital signatures, then the verification software shall use a FIPS 140-2 level 1 or higher validated cryptographic module. ii. The verification process shall either (a) use reference information on unalterable storage media received from the repository or (b) verify the digital signature of the reference information on any other media.		
128	*8/15/08*	*K Wilson*	*Doc Defect*	*Closed*	*Appendix AA MicroVote System Identification Tool Users Manual v1.3*	*The manual does not describe that a password is required to boot to the CD or that the CD is otherwise protected with a tamper evident technique. It does not describe an enabled/disabled indicator or that the CD is disabled during voting.*	*v.2: 2.4.6. The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure software (including firmware) installation to meet the specific requirements of Vol. I, Subsect. 7.4. This information shall address software installation for all system components. v.1: 7.4.6.d.i, ii & iii Voting system equipment shall provide a means to ensure that the system software can be verified through a trusted external interface, such as a read-only external interface, or by other means. i. The external interface shall be protected using tamper evident techniques ii. The external interface shall have a physical indicator showing when the interface is enabled and disabled iii. The external interface shall be disabled during voting*	*9/18/08 bhirsch The manual now describes the process of using the CD, which includes using a password to access the system. It also describes that the CD is tamper resistant because it's read-only (unlike CD-RW media). The manual now indicates that the CD is used on the EMS computer system which is designed to allow the design of ballots, programming of voting panels, retrieval and tally of results. The EMS computer is not directly involved with the casting of votes, which is handled by the Infinity voting panel and absentee paper ballots.*	*Accepted K. Wilson 9/22/2008 Appendix AA v1.5 describes usage of a password to boot to the CD drive containing the verification tool.*
129	*8/15/08*	*K Wilson*	*Doc Defect*	*Closed*	*Appendix AA MicroVote System Identification Tool Users Manual v1.3*	*The manual does not describe the verification of all registers and variables. Additionally it does not identify the values of the static registers and variables or the initial starting values of all dynamic registers and variables listed, excluding the values set to conduct a specific election.*	*v.2: 2.4.6. The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure software (including firmware) installation to meet the specific requirements of Vol. I, Subsect. 7.4. This information shall address software installation for all system components.*	*9/18/08 bhirsch The manual now describes the method to identify the values of the static registers and variables, as well as the starting values of all dynamic registers.*	*Accepted K. Wilson 9/22/2008 Appendix AA v1.5 addresses verification of the state of the EMS system (with reference to the EMS User Manual). Appendix AA also addresses verification of the software on the Infinity DRE. Appendix*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
							v.1:7.4.6.e Setup validation methods shall verify that registers and variables of the voting system equipment contain the proper static and initial values. i. The vendor should provide a method to query the voting system to determine the values of all static and dynamic registers and variables including the values that jurisdictions are required to modify to conduct a specific election. ii. The vendor shall document the values of all static registers and variables, and the initial starting values of all dynamic registers and variables listed for voting system software, except for the values set to conduct a specific election.		U v1.9 addresses verification of the state of the registers in the Infinity DRE.
130	8/15/08	K Wilson	Doc Defect	Closed	Appendix Y - Build and Installation Instructions - EMS v.2.1	The procedures for set up and EMS installation on a COTS laptop do not address methods to ensure any modem hardware is disabled.	v.1: 7.3.2 Vendor develops and documents in detail the measures to be taken in a central counting environment. These measures shall include physical and procedural controls related to the: ...Reporting data.		Accept 9/8/08 CCoggins - v.2.2 verified instructions address disabling the modem on a COTS laptop
131	8/15/08	K Wilson	Doc Defect	Closed	Sect 2.6 System Security Spec EMS v.1.4	The EMS system configuration submitted for certification specifies installation of the EMS on a stand alone platform. The following contain conflicting EMS network connection references: Pg 3 describes the possibility that EMS is networked; Pg 4 "whenever possible" does not exclude a LAN connected to jurisdiction wide LAN or subnet; Pg 10: "EMS communicates with the MSDE 2000 data engine employing TCP/IP protocol, even if the EMS application and MSDE 2000 exist on the same physical computer. By default, the listening port is set to "1433", but this can be modified for each installation to provide the jurisdiction the ability to enable firewall security of the EMS TCP/IP traffic. This firewall should prohibit other nodes of the same network or sub-network from accessing EMS network traffic" Pg 10: EMS_Installation_Instructions describe network setup capability to achieve database connectivity on the same box. pg 11: "Data interception is prevented since communication is done via LAN..." & "The results database extract can be placed by	v.1: 7.3.2: The vendor shall develop and document in detail the measures to be taken in a central counting environment. These measures shall include physical and procedural controls related to the handling of ... counting operation and reporting data.		Accept 9/8/08 CCoggins - v.1.5 verified specification updates consistent with a stand alone platform

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
						EMS in a secure location on the juris-diction's local area network (LAN) ..."			
132	*8/15/08*	*K Wilson*	*Doc Defect*	*Closed*	*Sect 2.11 Config Mgmt Plan EMS v.1.3*	*The EMS system configuration submitted for certification specifies installation of the EMS on a stand alone platform. The following contain conflicting EMS network connection references: pg 7: Userids and Passwords will be created and maintained on the LAN ...." pg 8 "EMS software shall be scalable so that it will run on systems from a single computer in a small county to a large network of distributed workstations in a large metropolitan county"*	*v.1: 7.3.2: The vendor shall develop and document in detail the measures to be taken in a central counting environment. These measures shall include physical and procedural controls related to the handling of ... counting operation and reporting data.*	*09/05/08 bhirsch Reference used on pg 7 (Userids and Passwords) refers to the development environment (which is networked), not the end user environment. Could not find reference on pg 8 applicable to scalability.*	*Accept 9/8/08 CCoggins - Tester error. The specific context of the pg. 7LAN reference was not noted. Discrepancy reporting error: pg 8 quote was under the wrong document. See #137*
133	*8/15/08*	*K Wilson*	*Doc Defect*	*Closed*	*Sect 2.5 SW Design & Spec EMS v.2.4*	*The EMS system configuration submitted for certification specifies installation of the EMS on a stand alone platform. The following contain conflicting EMS network connection references: pg 15 "The physical location of the MSDE 2000 installation may be on the same computer as the EMS application is installed, or it may be located on another computer/server on the customer's Local Area Network (LAN). EMS requires access to a laser printer ... a node on the customer's LAN. If the printer is attached via a LAN ... Although file sharing is not a requirement of EMS, files can be stored on the customer's LAN, ... "*	*v.1: 7.3.2: The vendor shall develop and document in detail the measures to be taken in a central counting environment. These measures shall include physical and procedural controls related to the handling of ... counting operation and reporting data.*	*09/05/08 bhirsch Removed reference to operation on a LAN*	*Accept 9/8/08 CCoggins - v.2.5 verified specification updates consistent with a stand alone platform*
134	*8/15/08*	*K Wilson*	*Doc Defect*	*Closed*	*Appx V EMS User Manual v.2.4*	*The EMS system configuration submitted for certification specifies installation of the EMS on a stand alone platform. The following contain conflicting EMS network connection references: pg 160: "EMS supports the option of setting up multiple OMR and Gemplus card readers in a local area network*	*v.1: 7.3.2: The vendor shall develop and document in detail the measures to be taken in a central counting environment. These measures shall include physical and procedural controls related to the handling of ... counting operation and reporting data.*	*9/5/08 bhirsch Removed reference to operation over a LAN*	*Accept 9/8/08 CCoggins - v.2.5 verified manual identifies this version of EMS does not support networking of multiple OMR & Gemplus readers*
135	*8/19/08*	*K Wilson*	*Func Defect*	*Closed*	*Logging a checksum validation*	*Checksums are generated for vote records by the Infinity. When transferred by serial port, an error in the checksum is not logged or reported to user.*	*v.1: 7.5.1.a Voting systems that use electrical or optical transmission of data shall ensure the receipt of valid vote records is verified at the receiving station. This should include standard transmission error detection and correction methods such as checksums or message digest hashes. Verification of correct transmission shall occur at the voting system application level and ensure that the correct data is recorded on all relevant components consolidated within the polling place prior to the voter completing casting of his or her*	*09/05/08 bhirsch Modified EMS source code to calculate checksum of received vote record data over serial connection and compare it to received checksum value. Checksum mismatch will generate user warning and audit log entry.*	*Accept 9/11/08 KWilson - By review of v4.0.21 of EMS Source Code. 4 additional lines of code not in the error path added to ICS_Controller.vb and frmVExt.vb to verify checksum. All other additional lines of code (6 lines) are used to report the error, log the error and join with previously existing error path code at that point.*

#	Date	Tester	Type	Status	Location	Issue Description	Standard- Requirement	Vendor Response	Resolution Validation
							ballot.		
136	*8/25/08*	*C Coggins*	*Doc Defect*	*Closed*	*Sect 2.11 Config Mgmt Plan EMS v.1.3*	*The report or method by which the MicroVote tracks to whom they deliver voting system software is not identified.*	*v.1: 7.4.4. f. The vendors and testing labs shall document to whom they provide voting system software.*	*9/5/08 bhirsch Added reference to the COTS Atrex accounting program for tracking of voting system software deliveries.*	*Accepted 9/8/08 C Coggins v.1.4 references the tracking of software deliveries*
137	*9/8/08*	*K Wilson*	*Doc Defect*	*Closed*	*Sect 2.5 SW Design & Spec EMS v.2.5*	*The EMS system configuration submitted for certification specifies installation of the EMS on a stand alone platform. The following contain conflicting EMS network connection references: pg 7 "EMS software shall be scalable so that it will run on systems from a single computer in a small county to a large network of distributed workstations in a large metropolitan county"*	*v.1: 7.3.2: The vendor shall develop and document in detail the measures to be taken in a central counting environment. These measures shall include physical and procedural controls related to the handling of ... counting operation and reporting data.*	*9/17/08 bhirsch Removed reference to scalability involving network connectivity for large metropolitan counties.*	*Accepted 9/19/08 C Coggins v.2.6 verified removal of reference*

7.6 *Appendix F: Trusted Build & Validation Tools EMS v.4.0 voting system*

The MicroVote Election Management Voting System (EMS) v.4.0 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 witness and trusted builds. Both algorithms have been validated using the test data from the NIST NSRL website (http://www.nsrl.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.

7.6.1 Witness of the Trusted Build EMS 4.0.21

iBeta QUALITY ASSURANCE	***Voting Witness Trusted Build*** iBeta Quality Assurance	Issue Date: 9/23//2008	Version: **2.0**
Document Title:	**Witness of the Trusted Build – EMS 4.0.21**		Page #: ***1 of 4***

Trace: NIST Hdbk 150-22: 4.2.3, 4.13.2, 4.13.4, 5.10.4; VSS: vol.1 9.6.2.4; VVSG: vol. 1:7.4.4, vol.2 18.2.4

Listed below are the Source Code Applications reviewed by iBeta for the Final Build and Witness:
Voting System: Election Management System (EMS) v 4.0
Client: MicroVote General Corporation

Application/ Component	Version	Language	File Signature
EMS	4.0.21.x	VB.Net	20080923.ems4021.src.hash.txt
EMS	4.0.21.x	SQL	20080923.ems4021.src.hash.txt

Document Prior to the Build Witness:	
Vendor Name	Microvote General Corporation
Vendor Consultant(s)	Bernie Hirsch
Witness Name	Kevin Wilson (primary) Bill Miller (IT OS clean/install) (see 4.0.19) Lich Le (Recorder for 4.0.19)
Witness Title	Sr. Security Lead
iBeta COTS used to clean the build environment disk (name and version)	Secure Erase (CMRR) HDDErase v3.3
Verify (by signature) that the build environment is isolated and controlled by iBeta	20080529.mvems.os.hash.txt (see 4.0.19) in custody since 4.0.19, 4.0.20 20080923.mvems4.0.21.preall.hash.txt
Witness attests to verifying that the source code being built is the source code provided by iBeta	Yes
Vendor CM Tool and version	N/A
Build tool(s) and version(s)	Microsoft .NET Framework v1.1 .NET 1.1 SP1 for above (KB867460) Visual Studio 2003 SP1 Franson Serial Tools SDK v2.01g ComponentOne Studio Enterprise 2005
Additional file(s) loaded and version(s)	N/A
Record the build environment file signature	1) 20080529.mvems.tls.hash.txt 2) 20080530.mvems.tls.hash.txt 3) 20080923.mvems4.0.21.prebuild.hash.txt 4) 20080923.mvems4.0.21.prebuild.hash.ems.txt contains only the ems folder of drive
Verify (by signature) the build environment file signature	Yes
Verify (by signature) that each file signature of the source code loaded matches as documented above	Yes
Method of Build Witness	Visual Studio .NET 2003 IDE
3rd Party Libraries and Version	Franson Serial Tools

	ComponentOne
3rd Party Source Code (COTS) and Version	
3rd Party DLLs, Drivers, etc. and Version(s)	C1.C1Pdf.dll v1.1.20053.42 C1.C1PrintDocument.dll v1.0.20053.287 C1.Win.C1Command.dll v1.0.20052.128 C1.Win.C1FlexGrid.dll v2.5.20053.220 C1.Win.C1Input.dll v1.0.20052.99 C1.Win.C1List.dll v1.1.20052.78 C1.Win.C1PrintPreview.dll v1.0.20053.287 C1.Win.C1Report.dll v2.5.20053.188 C1CommandConverter.dll v1.0.20023.2 C1.Common.dll v1.0.20052.118 7Adodb.dll v7.0.9466.0 Interop.ACTIVEVOICEPROJECTLib.dll v1.0.0.0 Interop.IasHelperLib.dll v1.0.0.0 Interop.SpeechLib.dll v1.0.0.0 Microsoft.mshtml.dll v7.0.3300.0 SerialNET.dll v2.0.0.1
Record the combined source code and build environment file signature	1) 20080529.mvems.prebuild.hash.txt 2) 20080530.mvems.prebuild.hash.txt 3) 20080923.mvems4.0.21.prebuild.hash.txt
Record the Final Build Version – Unique Identifier	4.0.21.0
Certification Application Number (if applicable)	MVT0701
Document during the Build Witness:	
Date / Time Build Initiated	9/23/2008 1050 MDT (1650 GMT)
Compiler and Version	Visual Studio .NET 2003 IDE as above
Application Name	Election Management System consisting of EMS.exe, EMSMeasurements.dll with installation utilities EMSInstall (msi Setup) and EMSCustomerInstall (msi Setup)
Application Version Order	4.0.21
Obtain Names and Signatures of all persons present during build (record below)	see Notes
Issue(s) and Resolution(s)	see Notes, no fatal issues
Document at Completion of the Build Witness:	
Record file signature of the final build	20080923.mvems4.0.21.postbuild1.hash.txt – ems folder 20080923.mvems4.0.21.postbuild2.hash.txt – c drive 20080923.mvems4.0.21.built.hash.txt – of built items transferred to USB e: drive
Record the type of unalterable storage media being used (i.e., CD)	CD
Record each piece of media that is part of the build (each must have a unique identifier)	20080923MVEMS Microvote Trusted Build Election Management System SEP-23-2008 EMS4.0.21 9/23/2008 Copy 1, Copy 2, Copy 3
Explanation of any significant differences observed	Insignificant notes given below.

Notes:

1. See DO2.1TDP-Y.doc “Appendix Y Build and Installation Instructions Election Management System v 2.1 12/5/2007” for procedures followed to generate the build.

2. Following trusted build of 4.0.19.0, it was discovered that there was a defect in the vb.net code that was not allowing communications between EMS and the Infinity panel with the Infinity panel set to the 4.00 version. This code was fixed after full release of the 4.0.19.0 Trusted Build. The EMS code was removed from the Trusted Build box, a fresh 20080530.mvems.tls.hash.txt was taken and a comparison indicated that the only changes were in the OS and a few crumbs of the Microsoft IDE. So we reloaded the code and did another Trusted Build from there. Because Bernie Hirsch had to catch a plane, we only kept the notes of the hashes in the file 20080530.mvems.notes.txt and Bernie Hirsch and Kevin Wilson signed the printed version of that document. This document was filled out on 6/2/2008 and sent to Mr.

Hirsch for signature. The CD contains all hashes from both the 4.0.19 and 4.0.20 builds since the 4.0.20 build relies on the installation from the 4.0.19 build.
3. As with the previous 4.0.19 trusted build, it was late and the full hash of the box was begun, everyone went home or caught their flight and the file obtained by K. Wilson on 6/2/2008. The created filename was inadvertently left to 20080530.mvems.postbuild1.hash.txt, but this error was discovered on 6/2/2008 and the resulting hash file was renamed 20080530.mvems.postbuild2.hash.txt.
4. Trusted Build Hardware configuration:

- Dell Dimension 4100; Pentium III 930MHz; 512MB RAM; DVD-Rom Model XJ-HD166S; 3.5” Floppy Drive; 75G Hard Drive
- Windows XP with Service Pack 2 v2002

5. Trusted Build continued following EAC review and changes to code delivered on 9/5/2008. Same machine, hardware and COTS software. When first invited to logon during preparation on 9/22/2008, the OS needed to be registered so K. Wilson registered the XP with Microsoft. 20080922.preall.hash.txt was taken after that, and compared to the final hash of the 4.0.20.0 build, 20080530.postbuild2.hash.txt. No significant differences were observed. 20080923.mvems4.0.21.preall.hash.txt taken after prior version of source code was removed. This build utilized DO2.2TDP-Y.doc “Appendix Y Build and Installation Instructions Election Management System v 2.2 9/5/2008,” which had no differences in the build portion of the document from the previous version.

Build witness signatures are on file at iBeta for the 9/23/2008 Trusted Build include:
MicroVote: Bernie Hirsch
iBeta: Kevin Wilson, Bill Miller, Lich Li

7.6.2 Witness of the Trusted Build - Infinity v.4.0

iBeta QUALITY ASSURANCE	***Voting Witness Trusted Build*** iBeta Quality Assurance	Issue Date: 6/12/2008	Version: **1.0**
Document Title:	**Witness of the Trusted Build - Infinity 4.0**		Page #: ***1 of 4***

Trace: NIST Hdbk 150-22: 4.2.3, 4.13.2, 4.13.4, 5.10.4; VSS: vol.1 9.6.2.4; VVSG: vol. 1:7.4.4, vol.2 18.2.4

Listed below are the Source Code Applications reviewed by iBeta for the Final Build and Witness:
Voting System: Election Management System (EMS) v 4.0
Client: MicroVote General Corporation

Application/ Component	Version	Language	File Signature
Infinity	4.0	C	080529.src.hash.txt
Encrypt.exe – not distributable, used only for build process	2.14	C	080529.src2.hash.txt
InfUpdater.exe – used only for loading Infinity executable onto Infinity panel	1.0.1	VB6	080529.src2.hash.txt
GetUpdt.exe	2.16	C	080529.src2.hash.txt

Document Prior to the Trusted Build:	
Document Prior to the Build Witness:	
Vendor Name	Microvote General Corporation
Vendor Consultant(s)	Bernie Hirsch
Witness Name	Kevin Wilson (primary)
Witness Title	Sr. Security Lead
iBeta COTS used to clean the build environment disk (name and version)	Secure Erase (CMRR) HDDErase v3.3 see Note 1,2
Verify (by signature) that the build environment is isolated and controlled by iBeta	20080529.mvinf.os.hash.txt in custody of iBeta in a locked lab since 5/29/2008 20080612.mvinf.os.hash.txt
Witness attests to verifying that the source code being built is the source code provided by iBeta.	Initials: KW
Consultant attests to verifying that the source code being built and provided by iBeta is the source code provided to iBeta for review.	Initials: BH
Vendor CM Tool and version	N/A
Build tool(s) and version(s)	Borland C++ Development Suite v. 5.02
Additional file(s) loaded and version(s)	Lgb1.chr, Lgb2.chr, Lgn1.chr, Lgn2.chr Smb1.chr, Smb2.chr, Smn1.chr, Smn2.chr (Borland COTS font files)
Record the build environment file signature	20080529.mvinf.tls.hash.txt
Verify (by signature) the build environment file signature	ok
Verify (by signature) that each file signature of the source code loaded matches as documented above	ok
Method of Build Witness	Infinity.exe from the previous trusted build (sha1: 93656F6E1FA5D40AAA054066C6FC927EF33659F9) Borland IDE to build getupdt.exe scripts to create updtxxxx.$$$, manual renaming of updtxxxx.$$$ to updt0400B.$$$
3rd Party Libraries and Version	DataLight Rom-DOS v6.22 PKzip v2.04g
3rd Party Source Code (COTS) and Version	N/A
3rd Party DLLs, Drivers, etc. and Version(s)	DataLight Rom-DOS v6.22
Record the combined source code and build environment	see 20080612.postbuild.hash.txt

file signatures	
Record the Final Build Version – Unique Identifier	Infinity 4.00
Certification Application Number (if applicable)	MVT0701
Document during the Build Witness:	
Date / Time Build Initiated	11:15 MDT 6/12/2008
Compiler and Version	as above
Application Name	Infinity Voting Panel consisting of Infinity.exe, (executable), updt0400B$$$ (distributable container consisting of infinity.exe, go.bat, getupdt.exe, chkdsk.exe, lgb1.chr, lgb2.chr, lgn1.chr, lgn2.chr, smb1.chr, smb2.chr, smn1.chr, smn2.chr)
Application Version Order	4.00
Obtain Names and Signatures of all persons present during build (record below)	ok
Issue(s) and Resolution(s)	see Notes
Document at Completion of the Build Witness:	
Record file signature of the final build	20080529.mvinf.postbuild.hash.txt, contains up to infinity.exe 20080612.mvinf.postbuild.hash.txt, contains production of updt0400B$$$
Record the type of unalterable storage media being used (i.e., CD)	CD

Note:

1. We observed on 6/9/2008 that the version of GetUpdt.c used to build GetUpdt.exe was 2.13 not 2.16. This file is distributed during the update process to perform updates. It affects only the contents of the update package, and not the contents of Infinity.exe. Following this observation, we determined that the only changes to the code between the 2.13 version and the 2.16 version are that in the 2.13 version there were 2 lines of obsolete code that deleted obsolete and non-existent files, cardio.exe and status.cfg, but in the 2.16 version those 2 lines were removed. Version 2.13 with those lines of code was used to generate tested Infinity panels using the Witness Build of 8/27/2007 9.61 and EMS 4.0.6.0. Had we ever received these files, they would have been deleted from our functional test panels at that time. So all functional testing was done without these files present.
2. Procedure to build the installation files of the Infinity panel
   - The repository CD will consist of
     i. the GetUpdt.c source code
     ii. the GetUpdt.exe executable
     iii. the UPDT0400B.$$$ distributable file
     iv. the contents of the original trusted build contained in a subfolder 080529INF400
   - Verify the hash of the build system matches the original post build hash within the files not affected by the operation of the OS. That includes the hash and location of Infinity.exe in the C:\My Documents\Infinity 300\Update Prep folder.
   - Remove the files
     i. GetUpdt.c (2.13)
     ii. GetUpdt.exe (2.13)
     iii. UPDATE.$$$, UPDATE.EXE, UPDATE.ZIP
     iv. C:\WINDOWS\Desktop\updt0400.$$$
     v. and hash the C:\My Documents, C:\Windows\Desktop subfolders
   - Replace the GetUpdt.c file (2.16) and hash the C:\My Documents subfolders
   - Build GetUpdt.exe (2.16)
   - Run the PrepareUpdate.bat script in C:\My Documents\Infinity 300\Update Prep\ [this is step 6 of Appendix Y]
   - As described in the Appendix Y document, rename C:\WINDOWS\Desktop\updtxxxx.$$$ to be updt0400B.$$$
   - Add the Infinity.exe and Updt0400B.$$$ to the built folder of the repository for the CD
   - Hash the entire box.
3. To avoid any confusion, the following files were removed from the 080529INF400 subfolder of the CD: \Built\Infinity\infBuildTools\GetUpdt.exe, \Build\Infinity\Infinity 400\updt0400.$$$

4. After the compilation and linking of the Infinity.exe and GetUpdt.exe programs, the programs and configuration files are combined into a zipped package. That package is encrypted using encrypt.exe. That program has no other use or capability and utilizes a proprietary encryption algorithm.

Build witness signatures are on file at iBeta for the 5/30/2008 Trusted Build with install file GetUpdt.c v.2.13:
MicroVote: Bernie Hirsch
iBeta: Kevin Wilson, Bill Miller, Lich Li

Build witness signatures are on file at iBeta for the 6/12/2008 Trusted Build with install file GetUpdt.c v.2.16:
MicroVote: Bernie Hirsch
iBeta: Kevin Wilson, Bill Miller, Lich Li

7.6.3 MicroVote System Identification Tools

As identified in Section 5.8 and 5.9 of the *US Election Assistance Commission Test and Certification Program Manual* delivery of the System Identification Tools to the EAC is the responsibility of MicroVote. Review of the System Identification Tools is the responsibility of the EAC. iBeta reviewed the installation documentation to the requirements of v.2: 2.6.4 (See Appendix C) and confirms that MicroVote provided the following validations tools at the end of the certification test effort:

- *Appendix AA MicroVote System Identification Tool User Manual* v.1.5; and
- VerificationTools400CD.iso.

iBeta confirmed that the functionality of the tool was consistent with the operations identified in the User Manual.

7.7 *Appendix G: EAC Certification Number & Voting System Configuration*

This Election Assistance Commission issued certification number MVTEMS4 on February 6, 2009.

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

7.8 *Appendix H: Warrant of Accepting Change Control Responsibility*

[redacted]

MicroVote
GENERAL CORP.
ELECTION SOLUTIONS

Warrant of Accepting Change Control Responsibility

The MicroVote EMS V4.0 voting system has been meticulously tested to the EAC 2005 Voluntary Voting System Guidelines. During testing, it was determined that the following engineering changes were required:

Description	**Date**	**Manufacturer**
Engineering Change Notice 1330	4/16/2001	Carson Manufacturing Co. Inc.
Engineering Change Notice 1408	6/7/2005	Carson Manufacturing Co. Inc.
Engineering Change Notice 1413	10/10/2005	Carson Manufacturing Co. Inc.
Engineering Change Notice 1420	3/14/2006	Carson Manufacturing Co. Inc.
Engineering Change Notice 1424	5/12/2006	Carson Manufacturing Co. Inc.
Engineering Change Notice 1437	8/22/2007	Carson Manufacturing Co. Inc.
Engineering Change Notice 1438	9/19/2007	Carson Manufacturing Co. Inc.
Engineering Change Notice 1449	4/13/2008	Carson Manufacturing Co. Inc.
Engineering Change Notice 1450	5/15/2008	Carson Manufacturing Co. Inc.
Engineering Change Notice (ECN) # 1023	5/28/2008	RC Systems
Engineering Change Notice (ECN) # 1024	5/28/2008	RC Systems
Engineering Change Notice (ECN) # 1025	5/28/2008	RC Systems
Engineering Change Notice (ECN) # 1026	6/5/2008	RC Systems
RC Systems DoubleTalk RC8650 Voice Synthesizer	4/18/2007	RC Systems
ECR/ECN 101 Part Number 0431164951	4/21/2008	MicroVote General Corp.
Infinity Revision C Engineering Change Notice Declaration	1/23/2008	Carson Manufacturing Co. Inc.

I hereby warrant that these engineering changes will be included in the final certified product that is delivered to customers.

Attested by: MICROVOTE GENERAL CORPORATION

Signed: JM Ries CP Date: 9-26-08

Printed: James M Ries Title: President

6366 Guilford Avenue ■ Indianapolis, IN 46220-1750 ■ 317/257-4900 ■ Fax 317/254-3269

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7.9 *Appendix J: MicroVote EMS Voting System v.4.0 Implementation Statement*

A copy of the MicroVote Implementation statement is submitted as a separate document, *Implementation Statement Election Management System v.1.1.*

7.10 *Appendix I: Amended Test Plan*

The *MicroVote General Corporation Election Management System (EMS) Voting System v. 4.0.0 VSTL Certification Test Plan* v.3.0 and the EAC Approval Letter are found on the EAC website.

This test plan was amended during test execution. This amended test plan is submitted as a separate document, *MicroVote General Corporation Election Management System (EMS) Voting System v. 4.0.0 VSTL Certification Test Plan v.4.0.* Changes are provided in red text for easy identification.