Test Report for
EAC 2005 VVSG Certification Testing
Performed on Election Systems & Software Voting
System 5.2.1.0

Issue Date: 12/11/2015

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U.S. Election Assistance Commission
VSTL
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REVISIONS

Revision	Reason for Revision	Date
NR	Initial Release	12/04/2015
A	Added EXP to Table of Abbreviations	12/11/2015
A	Added "ES&S" to final sentence and updated last sentence, pg. 20	12/11/2015
A	Added source code resolution to first paragraph of Summary Findings, pg. 22	12/11/15

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1.0 INTRODUCTION

The purpose of this National Certification Test Report is to document the results of the certification testing performed on Election Systems & Software's (ES&S), herein referred to as manufacturer, Election Systems & Software Voting System 5.2.1.0 (EVS5210). EVS 5.2.1.0 was tested to the requirements set forth in the U.S. Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines Standards (2005 VVSG). EVS 5.2.1.0 is a modification to the previously 2005 VVSG certified EVS 5.2.0.0 voting system (Certification number: ESSEVS5200), and was tested by NTS Huntsville based on the "modified system" requirements set forth in section 4.6.2.3 of the EAC Testing and Certification Program Manual, Version 2.0, herein referred to as the Program Manual.

1.1 Description of EAC Certified System Being Modified

The following subsection describes the EAC Certified System that is baseline for the submitted modification. All information was derived from the previous Certification Test Report and/or EAC Certificate of Conformance.

1.1.1 Baseline Certified System

The baseline system for this modification is the EVS 5.2.0.0. Tables 1-1 and 1-2 describe the hardware and software/firmware versions submitted for certification testing. For a complete description of the configuration and description of the EVS 5.2.0.0 product, refer to the EVS 5.2.0.0 Test Report located on the EAC's website at http://www.eac.gov.

Table 1-1. Baseline Certified Software

Software	Software/Firmware Version
Proprietary Software	
DS200	2.12.0.0
DS850	2.10.0.0
Electionware	4.6.0.0
Election Reporting Manager (ERM)	8.11.0.0
ExpressVote	1.4.0.0
COTS Software	
Adobe Acrobat Standard	11
Cerberus FTP	6.0.7.1
Microsoft Server 2008	R2 w/ SP1
Microsoft Windows 7, SP1	5.1 w/ SP1
Microsoft Visual C++ 2008 Redistributable – x64	9.0.30729
Microsoft Visual C++ 2010 x64 Redistributable	10.0.40219
Microsoft Visual C++ 2010 x86 Redistributable	10.0.40219
Microsoft .net Framework	4.5.1
Micro Focus RM/COBOL Runtime	12.06
Symantec Endpoint Protection - Small Business Edition 2013	12.1.4

1.1.1 Baseline Certified System (Continued)

Table 1-2. Baseline Certified Voting System Equipment.

Component	Hardware Version	Firmware Version
Proprietary Hardware		
ExpressVote Accessible Voting Station	1.0	1.4.0.0
DS200 Precinct Count Scanner	1.2.1, 1.2.3, & 1.3	2.12.0.0
DS850 Central Count Scanner	1.0	2.10.0.0
AutoMARK A100	1.0	1.8.6.0
AutoMARK A200 (SBC 2.0 & SBC 2.5)	1.1	1.8.6.0
AutoMARK A300 (SBC 2.0 & SBC 2.5)	1.3	1.8.6.0
Plastic Ballot Box	1.2 & 1.3	N/A
Metal Ballot Box	1.0, 1.1, & 1.2	N/A
COTS Hardware		
EMS Server – Dell	PowerEdge T710	N/A
EMS Reporting Workstation – Dell	Optiplex 980	N/A
EMS Reporting Laptop – Dell	E6410	N/A
Motorola QR Code Scanner	DS9208	N/A
Delkin USB Flash Drives	512MB, 1, 2, 4, & 8GB	N/A
Delkin Compact Flash	1GB	N/A
DS850 Report Printer	OKI B430dn & B 431dn	N/A
DS850 Audit Printer	OKI Microline 420	N/A
Avid Headphones	Avid FV 60	N/A
SanDisk CF Card Reader	018-6305	N/A

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1.2 References

- Election Assistance Commission 2005 Voluntary Voting System Guidelines, Volume I, Version 1.0, "Voting System Performance Guidelines," and Volume II, Version 1.0, "National Certification Testing Guidelines," dated December 2005

- Election Assistance Commission Testing and Certification Program Manual, Version 2.0, expiration date June 30, 2018

- Election Assistance Commission Voting System Test Laboratory Program Manual, Version 2.0, expiration date June 30, 2018

- National Voluntary Laboratory Accreditation Program NIST Handbook 150, 2006 Edition, "NVLAP Procedures and General Requirements (NIST Handbook 150)," dated February 2006

- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2008 Edition, "Voting System Testing (NIST Handbook 150-22)," dated May 2008

- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002

- Test Guidelines Documents: EMI-001A, Test Guidelines for Performing Electromagnetic Interference (EMI) Testing," and EMI-002A, "Test Procedure for Testing and Documentation of Radiated and Conducted Emissions Performed on Commercial Products"

- NTS Quality Assurance Program Manual, Revision 7

- ANSI/ISO/IEC 17025:2005 and ANSI/NCSL Z540.3, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"

- ISO 10012:2003, "Quality Assurance Requirements for Measuring Equipment"

- EAC Requests for Interpretation (RFI) (listed on www.eac.gov)

- EAC Notices of Clarification (NOC) (listed on www.eac.gov)

- EAC Quality Monitoring Program residing on:

  http://www.eac.gov/testing_and_certification/quality_monitoring_program.aspx

- NTS Test Report No. T71379.01-01 Rev B – National Certification Test Report for Certification Testing of the Election Systems & Software EVS 5.2.0.0 Voting System

- ES&S EVS 5.2.0.0 Technical Data Package

- ES&S EVS 5.2.1.0 Technical Data Package

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1.3   Terms and Abbreviations

Table 1-3 defines all terms and abbreviations applicable to this Test Report.

Table 1-3. Terms and Abbreviations

Term	Abbreviation	Definition
Anomaly	--	Any non-repeatable testing event that is not the expected result or interrupts the test operations.
Americans with Disabilities Act 1990	ADA	ADA is a wide-ranging civil rights law that prohibits, under certain circumstances, discrimination based on disability.
Configuration Management	CM	Systems engineering process for establishing and maintaining consistency of a product's performance, functional and physical attributes with its requirements, design and operational information throughout its life
Commercial Off-the-Shelf	COTS	Commercial, readily available hardware or software.
Deficiency	--	Any repeatable test result that was not the expected result or violates a requirement of the 2005 VVSG.
United States Election Assistance Commission	EAC	Commission created per the Help America Vote Act of 2002, assigned the responsibility for setting voting system standards and providing for the voluntary testing and certification of voting systems.
ES&S Event Log Service	ELS	ES&S Event Log Service is a Windows Service that runs in the background of any active ES&S Election Management software application to monitor the proper functioning of the Windows Event Viewer
Election Management System	EMS	Within the EVS 5.2.1.0 voting system, the EMS is comprised of five components: Electionware, ERM, ES&S Event Log Service, VAT Previewer and ExpressVote Previewer.
Election Reporting Manager	ERM	EMS reporting component.
Election Systems and Software	ES&S	Identified vendor doting the equipment under test as part of this test plan.
Engineering Change Order	ECO	--
Equipment Under Test	EUT	Refers to the individual system component or multiple piece of the same component
ES&S Voting System	EVS	Proprietary equipment owned by ES&S
ES&S Export Utility	EXP	Export utility, part of ERM.
Functional Configuration Audit	FCA	Verification of system functions and combination of functions cited in the manufacturer's documentation.
Help America Vote Act	HAVA	Act created by United States Congress in 2002.
Institute of Electrical and Electronics Engineers	IEEE	--
Intelligent Mark Recognition	IMR	Visible light scanning technology to detect completed ballot targets.

1.3   Terms and Abbreviations (Continued)

Table 1-3. Terms and Abbreviations (Continued)

Term	Abbreviation	Definition
National Institute of Standards and Technology	NIST	Government organization created to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhances economic security and improves our quality of life.
Notice of Clarification	NOC	Provides further guidance and explanation on the requirements and procedures of the EAC's Voting System Certification or Voting System Testing Laboratory programs.
Personal Computer	PC	Computer component of the EVS 5.2.1.0 voting system.
Quality Assurance	QA	Administrative and procedural activities implemented as a way of preventing mistakes or defects.
Quantity	QTY	Number/Count of items
Quick Response Code	QR Code	Two-dimensional barcode
Request for Interpretation	RFI	A means by which a registered Manufacturer or Voting System Test Laboratory (VSTL) may seek clarification on a specific Voluntary Voting System Guidelines (VVSG) standard.
System Under Test	SUT	Refers to the system as a whole (all components)
Technical Data Package	TDP	Manufacturer documentation related to voting system required to be submitted as a precondition of testing.
Trusted Build	---	Final build of source code performed by a trusted source and overseen by the manufacturer which is delivered to the EAC designated repository; also referred to as a "Witness Build".
Underwriters Laboratories Inc.	UL	Safety consulting and certification company
Uninterruptible Power Supply	UPS	Electrical apparatus providing emergency power when an input power source fails.
Voter Assist Terminal	VAT	Electronic ballot marking device component is the ES&S AutoMARK.
National Technical Systems, Inc.	NTS	Identified VSTL hosting the testing of the equipment listed in this test plan; facilities located in Huntsville, Alabama.
National Voluntary Laboratory Accreditation Program	NVLAP	Program which provides an unbiased third-party test and evaluation program to accredit laboratories in the respective fields to ISO 17025 standard.
NTS Operating Procedure	OP	NTS Test Method or Test Procedure.
Virtual Review Tool	VRT	Test campaign management software used by the EAC and vendors applying for qualification testing.
Voting System Test Laboratory	VSTL	NTS
Voluntary Voting System Guidelines	VVSG	EAC Voluntary Voting System Guidelines Version 1.0.

2.0   CERTIFICATION TEST BACKGROUND

NTS Huntsville is an independent testing laboratory for systems and components under harsh environments, including dynamic and climatic extremes as well as the testing of electronic voting systems. NTS Huntsville holds the following accreditations:

- ISO-9001:2000
- NVLAP Accredited ISO 17025:2005
- EAC Accredited VSTL, NIST 150,150-22
- A2LA Accredited (Certification No.'s 0214.40, 0214.41, and 0214.42)
- FCC Approved Contractor Test Site (Part 15, 18)

2.1   Revision History

Table 2-1 describes the version history of the submitted voting system.

Table 2-1. Voting System Revision History

System Version	Certification Type	System Modified	Certification	Certification
EVS 5.0.0.0	New System	Original	05/16/2013	ESSEVS5000
EVS 5.0.1.0	Modification	EVS 5.0.0.0	03/18/2014	ESSEVS5010
EVS 5.2.0.0	Modification	EVS 5.0.0.0	07/02/2014	ESSEVS5200
EVS 5.2.1.0	Modification	EVS 5.2.0.0	TBD	ESSEVS5210

2.2   Scope of Testing

The focus of the test campaign was to verify functionality of EVS 5.2.1.0 submitted by the manufacturer for EAC certification.

This report is valid only for the system identified in Section 2.2.2 Description of EAC Certified System Being Modified. Any changes, revisions, or corrections not listed in this report or made to the system after this evaluation are required to be submitted to the EAC for assessment.

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2.2.1 Modification Overview

Changes, as summarized in this section, were made to address specific requirements for the State of Maryland, cryptographic key generation discrepancy, and other stability enhancing features. A full description of submitted modifications can be found in Appendix F – Details of Submitted Modifications.

Electionware

- RSACRYPTO update
- Write-in Snippet report flag
- State of Maryland specific export
- Support for Bengali
- Straight Party handling for U.S Virgin Islands

ERM

- General bug fixes

DS200

- Write-in Snippet report flag
- Support for Bengali
- Straight Party handling for U.S Virgin Islands

DS850

- Straight Party handling for U.S Virgin Islands

ExpressVote

- Support for Bengali
- Security checks for fonts
- General bug fixes

Hardware

- ExpressVote Rolling Kiosk
- Delkin CF card reader

2.2.2 Test Materials

EVS 5.2.1.0 proprietary and COTS software submitted by the manufacturer for testing are listed in Table 2-2. Proprietary hardware and COTS are listed in Table 2-3.

Table 2-2. Required Voting System Software

Software	Software/Firmware Version
Proprietary Software	
DS200	2.12.0.0
DS850	2.10.1.0
Electionware	4.7.1.0
Election Reporting Manager (ERM)	8.12.1.0
ExpressVote	1.4.1.0
COTS Software	
Adobe Acrobat Standard	11
Cerberus FTP	6.0.7.1
Microsoft Server 2008	R2 w/ SP1
Microsoft Windows 7	5.1 w/ SP1
Microsoft Visual C++ 2008 Redistributable – x64	9.0.30729
Microsoft Visual C++ 2010 x64 Redistributable	10.0.40219
Microsoft Visual C++ 2010 x86 Redistributable	10.0.40219
Microsoft .net Framework	4.5.1
Micro Focus RM/COBOL Runtime	12.06
Symantec Endpoint Protection	12.1.4

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Table 2-3. Required Voting System Equipment

Component	Hardware Version	Firmware Version
Proprietary Hardware		
ExpressVote Accessible Voting Station	1.0	N/A
ExpressVote Rolling Kiosk	1.0	N/A
DS200 Precinct Count Scanner	1.2.1, 1.2.3, & 1.3	2.12.1.0
DS850 Central Count Scanner	1.0	2.10.1.0
AutoMARK A100	1.0	1.8.6.0
AutoMARK A200 (SBC 2.0 & SBC 2.5)	1.1	1.8.6.0
AutoMARK A300 (SBC 2.0 & SBC 2.5)	1.3	1.8.6.0
Plastic Ballot Box	1.2 & 1.3	N/A
Metal Ballot Box	1.0, 1.1, & 1.2	N/A
COTS Hardware		
EMS Server – Dell	PowerEdge T710	N/A
EMS Reporting Workstation – Dell	Optiplex 980	N/A
EMS Reporting Laptop – Dell	E6410	N/A
Motorola QR Code Scanner	DS9208	N/A
Zebra QR Code Scanner	DS457-SR20009	N/A
Symbol Technologies	DS9208	N/A
Delkin USB Flash Drives	512MB, 1, 2, 4, & 8GB	N/A
Delkin Compact Flash	1GB	N/A
DS850 Report Printer	OKI B430dn & B 431dn	N/A
DS850 Audit Printer	OKI Microline 420	N/A
Avid Headphones	Avid FV 60	N/A
SanDisk CF Card Reader	018-6305	N/A
Delkin CF Card Reader	6381	N/A

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2.2.3 Block Diagram

EVS 5.2.1.0 is an integrated suite of election management products. Figure 2-1 provides a visual system overview.
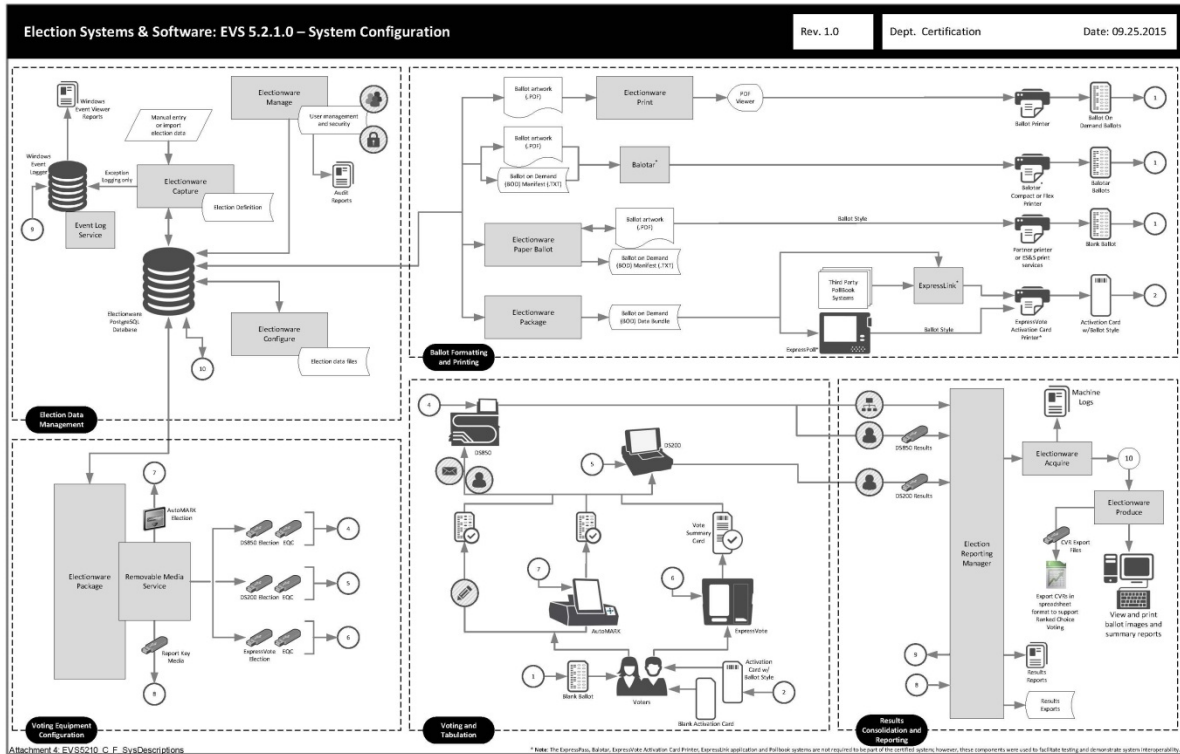

Figure 2-1. EVS 5.2.1.0 System Overview

2.2.4 Supported Languages

Supported languages are English, Spanish, Chinese, Korean, Japanese, and Bengali.

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2.2.5 RFIs

Table 2-4 lists the applicable RFIs the EAC has released as of the date of the report as it pertains to this test campaign.

Table 2-4. Applicable RFIs

RFI ID	Name
2007-01	EAC Decision on Accessible Design
2007-02	EAC Decision on Variable Names
2007-04	EAC Decision on Presentation of Alternative Language
2007-05	EAC Decision on Testing Focus and Applicability
2008-04	EAC Decision on Supported Languages
2008-05	EAC Decision on Durability
2008-08	EAC Decision on Automatic Bar Code Readers
2008-09	EAC Decision on Safety Testing
2009-02	EAC Decision on Alternate Languages
2009-04	EAC Decision on Audit Log Events
2010-02	EAC Decision on Coding Conventions
2010-03	EAC Decision on Database Coding Conventions
2010-05	EAC Decision on Testing of Modifications to a Certified System
2010-07	EAC Decision on Module Length
2010-08	EAC Decision on Calling Sequence
2012-03	EAC Decision on Configuration Management of COTS Products
2012-04	EAC Decision on Software Setup Validation
2013-03	EAC Decision on Timestamps

2.2.6 NOCs

There are no applicable NOCs as of the date of the report as it pertains to this test campaign.

3.0 TEST FINDINGS

The EVS 5.2.1.0, as identified in Section 2.2.2 of this report, was subjected to the tests as summarized in this section.

3.1 Deficiencies and Resolutions

NTS Huntsville defines a deficiency as any repeatable test result or event that is counter to the expected result or violates the specified requirements. Deficiencies are placed into the NTS deficiency tracking system (Mantis) and the EAC's Virtual Review Tool (VRT) for disposition and resolution.

Deficiencies are summarized in the summary findings of the respective test section of the test report and their resolutions are presented in their entirety in Appendix B – Deficiency Report.

3.1 Anomalies

NTS Huntsville defines an anomaly as any unexpected result and/or event that deviates from what is standard, normal, or expected in which no root cause has been determined. All anomalies are logged and monitored throughout the test campaign and subsequent testing efforts. Anomalies may become deficiencies when a root cause is established.

3.2 Summary Findings

Description of the test and findings are summarized in this section.

3.2.1 Hardware Testing

Hardware requirements and environmental condition categories applicable to the design and operation of voting systems are detailed in Table 3-1.

Table 3-1. Voting Systems Hardware Requirements and Environmental Conditions

Hardware Requirements	Environmental Conditions (Applicable to Design and Operation)
Shelter	Natural environment: Including temperature, humidity, and atmospheric pressure
Space	Induced environment: Including proper and improper operation and handling of the system and its components during the election processes
Furnishings and fixtures	
Supplied energy	Transportation and storage
Environmental control	Electromagnetic signal environment: Including exposure to and generation of radio frequency energy
External telecommunications services	

Procedural summaries and summary test results within this report verify that the Equipment Under Test (EUT) submitted for certification testing meets the hardware requirements of the 2005 VVSG.

Receipt inspection and evaluation of voting system documentation was conducted prior to the start of the testing sequence. Operational tests/checks to verify system performance and function were performed throughout testing.

Environmental tests were conducted to ensure that climatic and physical occurrences would not affect system structure or functionality. In addition, Electromagnetic Compatibility (EMC) tests were conducted to ensure continued system operation and reliability in the presence of abnormal electrical events.

3.2.1.1 Hardware Testing Re-Use

The manufacturer requested that prior VSTL security testing be accepted for reuse consideration. In response to this request NTS evaluated NTS Test Report No. PR035098, "2005 VVSG Compliance Testing for Election Systems & Software ECO 1822, ExpressVote Rolling Kiosk."

NTS personnel performed an examination to 1) assess if the testing was performed under the guidelines of the EAC program, 2) assess if the tests were performed per the EAC 2005 VVSG, and 3) determine if engineering changes were implemented since test performance that would cause testing to be repeated.

Based on the evaluation, NTS recommended the EAC accept the results for the hardware testing listed in table 3-1. This recommendation was accepted by the EAC

Table 3-1. Voting Systems Hardware Requirements and Environmental Conditions

Test/EAC 2005 VVSG Section	Procedure/Description	EVS 5.2.0.0 ExpressVote Rolling Kiosk
Vibration/4.1.2.14	MIL-STD-810D, Method 514.3 physical shock and vibration during handling and transport	Accept ECO 1822
Safety/4.3.8	UL 60950-1 product safety review	Accept ECO 1822

3.2.1.2 Electrostatic Disruption

Electrostatic Disruption (ESD) testing was performed in accordance with Volume I Section 4.1.2.8 and Volume II Section 4.8 of the 2005 VVSG and RFI 2010-01. This testing was performed to ensure that should an electrostatic discharge event occur during equipment setup and/or ballot casting, the EUT would continue to operate normally. Momentary interruption is allowed so long as normal operation is resumed without human intervention or loss of data.

The EUT was subjected to electrostatic discharges, contact, and air as shown in Table 3-2.

Table 3-2. Electrostatic Discharge Test Levels

Characteristic	Resistance				Capacitance						Unit
Pulse Wave Shape (RC Network)	330				150						Ω / pf
Discharge Types	Air Gap				Direct Contact			Indirect Coupling			
Test Levels	A	B	C	D	A	B	C	A	B	C	
	±2	±4	±8	±15	±2	±4	±8	±2	±4	±8	kV
Number of Discharges	20	20	20	20	20	20	20	20	20	20	10 Discharges each polarity

3.2.1.2 Electrostatic Disruption (Continued)

Discharges were performed at areas typical of those that might be touched during normal operation, including the touch screen, user buttons, cables, connectors, and other points of contact used by the voter or poll worker:

- Power lines and power line returns were configured as required by the system configuration.
- Voter selection buttons were configured as required by the system configuration.

The ExpressVote was attached to the Rolling Kiosk for this testing.

Summary Findings

The ExpressVote and Rolling Kiosk met the requirements of the Electrostatic Disruption Test.

3.2.2 System Level Testing

System-level testing examines the ability of proprietary software, hardware, and peripherals in addition to the COTS software, hardware, and peripherals to operate as a complete system. NTS Huntsville utilizes test cases designed to ensure that integrated components function as specified by the manufacturer's documentation and meet the requirements of the VVSG.

3.2.2.1 System Level Testing Re-Use

The manufacturer requested that prior VSTL security testing be accepted for reuse consideration. In response to this request NTS evaluated NTS Test Report No. PR035098, "2005 VVSG Compliance Testing for Election Systems & Software ECO 1822, ExpressVote Rolling Kiosk."

NTS personnel performed an examination to 1) assess if the testing was performed under the guidelines of the EAC program, 2) assess if the tests were performed per the EAC 2005 VVSG, and 3) determine if engineering changes were implemented since test performance that would cause testing to be repeated.

Based on the evaluation, NTS recommended the EAC accept the results for the system level testing listed in table 3-1. This recommendation was accepted by the EAC

Table 3-1. Voting Systems Hardware Requirements and Environmental Conditions

Test/EAC 2005 VVSG Section	Procedure/Description	EVS 5.2.0.0 ExpressVote Rolling Kiosk
Mobility/3.2.4	Testing to verify that the voting station is accessible to voters who use mobility aids, including wheelchairs.	Accept ECO 1822
Physical Security/7.3	Testing to address physical security measures and procedures that prevent disruption of the voting process at the polling place and corruption of voting data	Accept ECO 1822

3.2.2.2 TDP Review

The EVS 5.2.1.0 TDP was reviewed to the 2005 VVSG. This review was performed as part of the testing activities. The TDP review only included the revised and new documents submitted for this testing campaign. The documents were reviewed for accuracy, completeness, and compliance to the 2005 VVSG.

The review results were recorded in a worksheet that provided the pass/fail compliance to each applicable VVSG requirement. The discovered deficiencies were reported to the manufacturer and internally tracked by NTS Huntsville as test exceptions until verified that the applicable documents had been corrected. The manufacturer corrected nonconformance observations and resubmitted the associated documents for review. This process continued until the TDP complied with the applicable TDP standards in the EAC 2005 VVSG.

Summary Findings

There were forty-two TDP deficiencies discovered during this test campaign. A summary of the TDP issues encountered is provided below:

- Some descriptive information included was inconsistent with descriptions in other TDP documents.

- Some documents included functionality that was not supported in the voting system.

- Some of the individual user guides included information which conflicted with the actual information encountered when verified during the testing process.

All TDP deficiencies were resolved by ES&S prior to completion of testing.

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3.2.2.3 Physical Configuration Audit (PCA)

A Physical Configuration Audit (PCA) was performed as part of the testing activities in accordance with Section 6.6 of Volume II of the VVSG. The PCA compares the voting system components submitted for certification with the vendor's technical documentation and confirms that the documentation submitted meets the requirements of the Guidelines. The PCA performed on the EVS 5.2.1.0 Voting System consisted of inspecting the ExpressVote Rolling Kiosk. The PCA included the following activities:

- Establishing a configuration baseline of software and hardware to be tested; confirm whether manufacturer's documentation is sufficient for the user to install, validate, operate, and maintain the voting system;

- Verifying software conforms to the manufacturer's specifications; inspect all records of manufacturer's release control system; if changes have been made to the baseline version, verify manufacturer's engineering and test data are for the software version submitted for certification;

- Reviewing drawings, specifications, technical data, and test data associated with system hardware, and to establish system baseline;

- Reviewing manufacturer's documents of user acceptance test procedures and data against system's functional specifications; resolve any discrepancy or inadequacy in manufacturer's plan or data prior to beginning system integration functional and performance tests;

- Subsequent changes to baseline software configuration made during testing, as well as system hardware changes that may produce a change in software operation are subject to re-examination.

Summary Findings

A PCA was performed to baseline the system's hardware and software components that were used during the test campaign. No discrepancies were noted during the PCA.

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3.2.2.4 Functional Configuration Audit (FCA)

A Functional Configuration Audit of the EVS 5.2.1.0 was performed in accordance with Section 6.7 of Volume II of the VVSG. The purpose of the FCA was to verify that the submitted modifications listed in section 2.2.1 performed as documented in the manufacturer supplied technical documentation and to validate that the modifications met the requirements of the EAC 2005 VVSG. FCA consisted of testing the following components:

- Electionware – Electionware was tested to verify that the new Bengali and write-in snippet features performed as required. In addition, the other bugs and enhancements listed in Appendix F - Details of Submitted Modifications, were tested.

- ERM – ERM was tested to ensure that the bugs listed in Appendix F – Details of Submitted Modifications, were resolved

- DS200 – The DS200 was tested to verify that the new Bengali and write-in snippet features performed as required. In addition the other bugs and enhancements listed in Appendix F – Details of Submitted Modifications, were tested.

- DS850 – The DS850 was tested to verify that the new Bengali feature performed as required.

- ExpressVote/ExpressVote Kiosk – The ExpressVote was tested to verify that the new Bengali feature performed as required. In addition, the QR code reader that is in the ExpressVote Kiosk was tested to verify that it works correctly.

Summary Findings

There was one deficiency discovered during the FCA. When using the QR code functionality, the ExpressVote did not display the message "The barcode contains your online vote selections" in the language selected by the voter. This deficiency was corrected by ES&S through source code revision and regression testing found that the deficiency was resolved by the revision.

In addition, one anomaly occurred during testing of the EVS 5.2.1.0. During the FCA on Electionware, it was observed that while creating election media the created media was not appearing in the list for created media. After restarting Electionware the media was present. Testers were unable to replicate the issue. See section 3.1 for information on anomaly dispositioning.

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3.2.2.5 System Integration

In order to further verify compatibility between the system in scope, ballots created utilized across all system components. The results verified against the expected results matrix. The test decks for system integration included hand marked ballots, AutoMARK generated ballots, QR Codes and ExpressVote generated ballots. The generated test deck was then utilized for system integration testing on the DS200 and DS850 with all expected results verified within ERM.

The six election definitions exercised during the System Integration Testing are listed below:

- GEN-01

- GEN-02

- GEN-03

- PRIM-01

- PRIM-02

- PRIM-03

Summary Findings

Through System Integration testing, it was demonstrated that the system performed as documented with all components performing their intended functions and the requirements of system integration testing were met.

One anomaly was noted during testing. After a power cycle of the ExpressVote, the message "Warning: system malfunction Internal firmware corrupt or missing" appeared. The SSD was returned to the manufacturer, Inno, to determine why the drive failed. Inno was unable to determine a root cause. The Mean-Time-Between-Failure stated by the manufacturer is >3,000,000 hours. Testers were unable to replicate the issue. See section 3.1 for information on anomaly dispositioning.

3.2.3   Source Code Review

Prior to submitting EVS 5.2.1.0, ES&S submitted EVS 5.3.0.0-IL and EVS 5.2.0.2 for source code review. This source code review was performed in accordance with the 2005 VVSG and EAC Testing and Certification Program Manual, Version 1.0. NTS Huntsville recommends the EAC accept the results of this source code review as re-use for the EVS 5.2.1.0 modification. All code modified or added subsequent to the EVS 5.3.0.0-IL and EVS 5.2.0.2 source code reviews was reviewed as part of the 5.2.1.0 test campaign.

Summary Findings

A total of 13,196 lines of code were reviewed for the EVS 5.2.1.0 test campaign. One hundred and twelve source code deficiencies were discovered during testing. All identified source code deficiencies were resolved prior to the conclusion of the source code review process. The deficiencies are summarized is in Table 3-3.

Table 3-3. Source Code Review Deficiencies

System Name	Deficiency (Type)	Deficiency (QTY)
DS200	Units Called	1
DS850	Header Return	2
	Header Purpose	1
	Inconsistent Indenting	1
Electionware	Manual Review (Comments not matching code)	3
(ElectionwarePaperBallot)	Pointer Value Not Protected	3
Election Reporting Manager (ERM)	N/A	No issues
ExpressVote	Header Parameter	1
	Header Return	1
	Header Purpose	13
	Header Inputs or Outputs	6
	Header File References	9
	In-Line Comments	2
	Header Globals Missing	36
	Units Called	8
	Pointer Values Not Protected	5
	Illegal Name	1
	Multiple Entry Exit	1
	No Parameter Validation	5
	No Case Default	1
	Inconsistent Indenting	3
	Line Too Long	1
	Over 6 Levels Of Indenting	1
	Non Enumerated Constant	4
	Header or File Name Missing	1
	Header Revision History	1
	Object/Datatype/Variable Comments	1

4.0   RECOMMENDATION FOR CERTIFICATION

NTS Huntsville performed conformance testing on the Election Systems & Software Voting System 5.2.1.0 to the EAC 2005 VVSG. NTS determined that the modifications met the requirements of the EAC 2005 VVSG and the manufacturer's technical documentation. Based on test findings, NTS Huntsville recommends the EAC grant the EVS 5.2.1.0 certification to the EAC 2005 VVSG. This report is valid only for the equipment identified in Section 2.0 of this report. Due to the varying requirements of individual jurisdictions, it is recommended by the EAC 2005 VVSG that local jurisdictions perform acceptance tests on all systems prior to implementation within their jurisdiction.

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APPENDIX A. ADDITIONAL FINDINGS

A.1 ADDITIONAL FINDINGS REPORT

The following tests were performed by NTS Huntsville at the request of the manufacturer. These modifications or additions represent functionality or tools that are outside the scope of the certification.

A.1.2 Election Support Software and Hardware

The following software and hardware components were used during certification test to support the operations of the EMS and ExpressVote:

- ExpressLink – ExpressLink is a Windows PC application that can run in either a standalone mode, or in a monitor mode, where the application monitors requests from a voter registration (VR) system over a shared network folder. The application imports an election definition from Electionware, accepts requests to print a voter's ExpressVote activation card, determines the voter's ballot style and then prints the activation card on the ExpressVote Activation Card Printer.
- ExpressVote Activation Card Printer – The ExpressVote Activation Card Printer is a small, thermal, on demand printer used to print the ballot activation code on the ExpressVote activation card.
- Electionware Toolbox – Electionware Toolbox is a set of utilities that can be integrated into the Electionware EMS to enhance the software usability experience and streamline various processes. These add-on utilities include Test Deck and Text to Speech.
- Ballot Online ExpressPass – Ballot Online ExpressPass is an optional system that allows a user to access their ballot online and make sample ballot selections on any device connected to the Internet. When finished, the output from this system is the ExpressPass – a selection summary with scannable QR code that the user can either print or save in an electronic format on their mobile device. The voter operates the ExpressVote Vote Capture to scan, review and validate vote selections. The vote summary card may then be submitted for tabulation on an ES&S tabulator: ExpressVote Tabulator, DS200 or DS850.

NTS Huntsville performed limited testing as requested by the manufacturer. Table A-1 outlines the requested testing.

Table A-1. Manufacturer Requested Testing Outside of Certification

Component	Version	Requested Testing
ExpressLink	1.3.0.0	2005 VVSG Source code Compliance, Functional Integration Test
ExpressVote Activation Card Printer	N/A	Functional Integration Test
Electionware Toolbox	2.3.0.0	Functional Integration Test
Ballot Online ExpressPass	N/A	Functional Integration Test

A.1.3 Summary Findings

The limited testing by NTS determined that the components listed in Table A-1 functioned as described and did not introduce any errors into the certified system. In addition the ExpressLink Software was found to comply with the source code requirements of the 2005 VVSG.

APPENDIX B. DEFICIENCY REPORT

B.1 DEFICIENCY REPORT

Table B-1 describes the functional deficiency and resolution discovered during the EVS 5.2.1.0 test campaign.

Table B-1. Functional Deficiency Report

EAC VRT ID[1]	Deficiency Summary	Resolutions
180	The ExpressVote does not display the "The barcode contains your online vote selections" in the language selected by the voter.	The ExpressVote software was modified to correct this deficiency.

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[1] The ID numbers may not be sequential. The deficiency tracking system (VRT) that is utilized by the EAC creates unique ID numbers based on overall entries within the database and not within individual projects.

APPENDIX C. ANOMALY REPORT

C.1   ANOMALY REPORT

Table C-1 describes the anomalies discovered during the EVS 5.2.1.0 test campaign.

Table C-1. Anomaly Report

Anomaly ID	Deficiency Summary
EVS5210-A-001	During the FCA on Electionware, it was observed that while creating election media the created media was not appearing in the list for created media. After restarting Electionware the media was present. Testers were unable to replicate the issue.
EVS5210-A-002	After a power cycle of the ExpressVote, the message "Warning: system malfunction Internal firmware corrupt or missing" appeared. The SSD was returned to the manufacturer, Inno, to determine why the drive failed. Inno was unable to determine a root cause. The Mean-Time-Between-Failure stated by the manufacturer is >3,000,000 hours. Testers were unable to replicate the issue.

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APPENDIX D. AS-RUN TEST PLAN

D.1 AS-RUN TEST PLAN

Table D-1 details the change made to the test plan during the course of testing. For a complete description see NTS Test Plan PR039745-01 Rev C.

Table D-1. As-Run Test Plan Changes

Test Plan Section	Description of Change	Justification
1.5.1, Figure 1-1	Corrected the System Overview Diagram	The System Over Diagram was not the correct version. The corrected one was added to this section.
3.2, Table 3-2	Added the Symbol QR Code reader	Due to various company acquisitions the Motorola QR Scanner DS9208 has been relabeled as Symbol. The test plan was updated to reflect the inclusion of this device in the EVS 5.2.1.0 test campaign.
4.5	Added Electrostatic Disruption Testing	Due to deficiencies discovered with the ExpressVote/ExpressVote Rollin Kiosk in a parallel testing campaign, EVS 5.4.0.0, the EAC requested that ESD testing be performed on the EVS 5.2.1.0 version of the hardware.
Appendix B, Table B-1	Updated the TDP version numbers	Due to deficiencies discovered during testing the various TDP documents were updated to correct the deficiencies.
Appendix C, Figure C-1	Updated the project schedule	Project schedules included in the test plan reflect a best case estimate of the time to completion. These estimates were adjusted to match the actual time to completion.

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APPENDIX E. TECHNICAL DATA PACKAGE

E.1 EVS 5.2.1.0 TECHNICAL DATA PACKAGE

The documents listed in Table E-1 comprise the EVS 5.2.1.0 TDP.

Table E-1. EVS 5.2.1.0 TDP

EVS 5.2.1.0 TDP Documents	Version	Doc No.	Document Code
System Overview			
Voting System Overview	1.6	01-01	EVS5210_C_D_0100_SysOvr
System Functionality Description			
System Functionality Description	1.0	02-01	EVS5210_C_D_0200_SFD
System Hardware Specification			
AutoMARK System Hardware Overview	8	03-01	AutoMARK_ESS_System_Hardware _Overview_AQS-18-5002-000-S
AutoMARK System Hardware Specification	6	03-02	AutoMARK_ESS_System_Hardware _Specification_AQS-18-5000-001-F
System Hardware Specification – DS200 HW Rev 1.2	3.0	03-03	DS200HW_M_SPC_0312_HWSpec
System Hardware Specification – DS200 HW Rev 1.3	4.0	03-04	DS200HW_M_SPC_0313_HWSpec
System Hardware Specification – DS850 HW Rev 1.0	1.2	03-05	DS850HW_M_SPC_0310_HWSpec
System Hardware Specification – ExpressVote HW Rev 1.0	3.4	03-06	ExpressVoteHW_M_SPC_0310_HWSpec
Software Design and Specification			
ES&S Coding Standards	3.0	04-01	ESSSYS_D_P_0400_CodingStandards
ES&S System Development Program	2.0	04-02	ESSSYS_SG_P_0400_SystemDevProgram
Software Design Specifications DS200	1.0	04-03	EVS5210_D_SDS00_DS200
Software Design Specifications DS850	1.0	04-04	EVS5210_D_SDS00_DS850
Software Design Specifications Electionware	1.0	04-05	EVS5210_D_SDS00_Electionware
Software Design and Specification – ELS	1.0	04-06	EVS5210_D_SDS00_ELS
Software Design and Specification – ERM	1.0	04-07	EVS5210_D_SDS00_ERM
Software Design and Specification – ERM Appendices	1.0	04-08	EVS5210_D_SDS00_ERM01_Appendices
Software Design and Specification – ExpressVote	1.0	04-09	EVS5210_D_SDS00_ExpressVote
AutoMark Software Design and Specifications	--	04-02	01_AutoMARK Software Design and Specification (Folder)
AutoMARK Ballot Image Processing Specifications	6	04-02-01	AutoMARK ESS Ballot Image Processing Specification AQS-18-5002-003-S
AutoMARK Ballot Scanning and Printing Specification	5	04-02-02	AutoMARK ESS Ballot Scanning and Printing Specification AQS-18-5002-007-S
AutoMARK Driver API Specification	5	04-02-03	AutoMARK ESS Driver API Specification AQS-18-5000-002-F
AutoMARK Embedded Database Interface Specifications	5	04-02-04	AutoMARK ESS Embedded Database Interface Specifications AQS-18-5002-005-S
AutoMARK GUI Design Specifications	6	04-02-05	AutoMARK ESS GUI Design Specifications AQS-18-5001-005-R
AutoMARK Operating Software Design Specifications	5	04-02-06	AutoMARK ESS Operating Software Design Specifications AQS-18-5001-002-R
AutoMARK Operations and Diagnostic Log Specifications	5	04-02-07	AutoMARK Operations and Diagnostic Log Specs AQS-18-5002-004-S
AutoMARK Programming Specifications Details	5	04-02-08	AutoMARK ESS Programming Specifications Details AQS-18-5001-011-R
AutoMARK Software Design Specifications	5	04-02-09	AutoMARK ESS Software Design Specs AQS-18-5001-004-S
AutoMARK Software Design Specification Overview	n/a	04-02-10	AutoMARK ESS Software Design Spec Overview

E.1 EVS 5.2.1.0 TECHNICAL DATA PACKAGE (CONTINUED)

Table E-1. EVS 5.2.1.0 TDP (Continued)

EVS 5.2.1.0 TDP Documents	Version	Doc No.	Document Code
System Security Specification			
AutoMARK System Security Specification	7	06-01	AutoMARK ESS System Security Specification AQS-18-5002-001-S
EMS Client Workstation Secure Setup & Configuration Guide	1.0	06-02	ESSSYS_5'2'1'0_SPC_ClientWorkstationSetupConfig Guide
EMS Server Secure Setup & Configuration Guide	1.1	06-03	ESSSYS_5'2'1'0_SPC_EMSServerSetupConfigGuide
Standalone EMS Workstation Secure Setup & Configuration Guide	1.0	06-04	ESSSYS_5'2'1'0_SPC_StandaloneWorkstationSetup ConfigGuide
System Security Specification	1.0	06-05	EVS5210_CM_SPC00_SysSecuritySpec
Security Script Description	1.0	06-06	EVS5210_CM_SPC02_SecScriptDesc
System Operations Procedure			
System Operations Procedures – AutoMARK	1.0	07-01	EVS5210_DOC_SOP_AMVAT
System Operations Procedures – DS200	1.1	07-02	EVS5210_DOC_SOP_DS200
System Operations Procedures – DS850	1.1	07-03	EVS5210_DOC_SOP_DS850
System Operations Procedures – Event Log Service	1.0	07-04	EVS5210_DOC_SOP_ELS
System Operations Procedures – Election Reporting Manager	1.1	07-05	EVS5210_DOC_SOP_ERM
Electionware Administrator's Guide	1.1	07-06	EVS5210_DOC_SOP_EW01Admin
Electionware Define: User's Guide	1.1	07-07	EVS5210_DOC_SOP_EW02Define
Electionware Design: User's Guide	1.1	07-08	EVS5210_DOC_SOP_EW03Design
Electionware Deliver: User's Guide	1.2	07-09	EVS5210_DOC_SOP_EW04Deliver
Electionware Results: User's Guide	1.0	07-10	EVS5210_DOC_SOP_EW05Results
System Operations Procedures – ExpressLink	1.1	07-11	EVS5210_DOC_SOP_ExpressLink
System Operations Procedures – ExpressVote	1.2	07-12	EVS5210_DOC_SOP_ExpressVote
System Operations Procedures – ExpressVote Appendices	1.0	07-13	EVS5210_DOC_SOP_ExpressVote_APPX
System Maintenance Manuals			
System Maintenance Manual – ES&S AutoMARK	1.0	08-1	EVS5210_DOC_SMM_AMVAT
System Maintenance Manual – ES&S DS200	1.0	08-2	EVS5210_DOC_SMM_DS200
System Maintenance Manual – ES&S DS850	1.0	08-3	EVS5210_DOC_SMM_DS850
System Maintenance Manual – ES&S ExpressVote	1.5	08-4	EVS5210_DOC_SMM_ExpressVote
Personnel Deployment and Training			
Personnel Deployment and Training Program	3.0	09-01	ESSSYS_T_D_0900_TrainingProgram
Configuration Management Plan			
Configuration Management Program	2.0	10-1	ESSSYS_CM_P_1000_CMProgram
Technical Documentation Program	5.0	10-2	ESSSYS_DOC_P_1000_TDProgram

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E.1   EVS 5.2.1.0 TECHNICAL DATA PACKAGE (CONTINUED)

Table E-1. EVS 5.2.1.0 TDP (Continued)

QA Program			
Manufacturing Quality Assurance Plan	2.0	11-01	ESSSYS_M_P_1100_MNFQualityAssurancePlan
Software Quality Assurance Program	2.0	11-02	ESSSYS_QA_P_1100_SoftwareQualityAssuranceProgram
Software/Firmware Acceptance	2.0	11-03	ESSSYS_QA_L_1100_ SoftwareFirmwareAcceptance
System Change Notes			
System Change Notes	1.2	12-01	EVS5210_DOC_D_1200_ChangeNotes
System Change Notes with QA Test Notes	1.1	12-02	EVS5210_DOC_D_1200_ChangeNotes_QA
Other TDP Documents			
ES&S Ballot Production	2.0	13-01	BPG_2'0_SOP

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APPENDIX F – DETAILS OF SUBMITTED MODIFICATIONS

F.1   Submitted Modification

Table F-1. Submitted Modification

Change ID	Changed Component	Change Description	Impacted 2005 VVSG Requirement
ENH34179	DS200	Support version of straight party required for US Virgin Islands.	Vol II Section 6.7
ENH34221	DS200	Support Bengali language for voter facing U/I content.	Vol I Section 3.1.3
ENH34234	DS200	Add support of data from election to enable auto printing of the write-in snippet report and passing size of the print used on ExpressVote card to allow for write-in snippet detection.	Vol II Section 6.7
ENH34410	DS200	Clarify wording on undervote screen to make clearer.	Vol I Section 3.1.2.a, 3.1.4.b, 3.1.4.d
BUG34299	DS200	Enhance write-in snippet capture to prevent dense ballots from occasionally cutting off part of snippet.	Vol II Section 6.7
ENH34181	DS850	Support version of straight party required for US Virgin Islands.	Vol II Section 6.7
ENH33844	Electionware	Include a new version of RSACRYPTO in the Electionware Install that now uses the PKCS1 padding scheme to ensure compatibility with the MS Crypto library used by the ExpressVote.	Vol II Section 6.7
ENH34130	Electionware	The default for the "Force Unique Ballot Styles" option on the Poll Record has been switched to off.	Vol II Section 6.7
ENH34119 ENH34120 ENH34121	Electionware	A write-in review flag can be set to allow for a global setting of the write-in snippet report.	Vol II Section 6.7
ENH34294	Electionware	The setting of the selected ExpressVote font size will be provided to the DS200 to help with write-in capture.	Vol II Section 6.7
ENH34118	Electionware	Updates were made to allow for EXP use in Maryland.	Vol II Section 6.7
ENH34123	Electionware	Updates were made for adding Bengali and Vrinda font support to Electionware.	Vol I Section 3.1.3
ENH34133	Electionware	Updates were made for adding Bengali support to the ExpressVote.	Vol I Section 3.1.3
ENH34180	Electionware	Flag for requested Straight Party handling for USVI will be passed when "Virgin Islands of the U.S." is selected in Election Information.	Vol II Section 6.7
ENH34503	Electionware	Comments were updated in the Electionware Code per NTS requirement.	Vol II Section 5.4

F.1   Submitted Modification (Continued)

Table F-1. Submitted Modification (Continued)

Change ID	Changed Component	Change Description	Impacted 2005 VVSG Requirement
ENH34349	Electionware	When Bengali is added to an election, the Vrinda font will be added to the ExpressVote poll stick.	Vol I Section 3.1.3
BUG34465 BUG34545	Electionware	Write-in snippets will be handled for landscape ballots.	Vol II Section 6.7
BUG34128	Electionware	In a ballot style with contests in multiple districts of the same type, contest order will be determined by district order.	Vol I Section 2.1.6
BUG34101	Electionware	Changes have been made to Acquire for better handling of DS200 results media which have been closed on more than one DS200 Terminal.	Vol I Section 2.4.3
BUG33881	ERM	Creating ERM from XML for a 2nd time and adding additional groups will not check for duplicates between 0 value columns.	Vol II Section 6.7
BUG33886	ERM	Changes were made to remove an outdated file version check.	Vol II Section 6.7
BUG33887	ERM	Pre-populated NNNNNNNNNNNN was removed from file names.	Vol II Section 6.7
BUG33888	ERM	Users will now be able to indicate Update Precincts Counted in an election with only one group.	Vol II Section 6.7
BUG33889	ERM	Users will be notified of 0 ballot cast precincts in the reading of a 2nd stick from the DS850.	Vol II Section 6.7
BUG33892	ERM	EL45 will no longer report precincts as counted when Update Precinct Counted is turned off.	Vol I Section 2.4.3
BUG34011	ERM	Update Precinct Results from SFTP Server is not a selectable option in this release.	Vol II Section 6.7
BUG34220	ERM	ERM can be created from XML files when ERM is mapped to a network drive.	Vol II Section 6.7
BUG34228	ERM	ERM will show all parties for a Cross-Endorsed candidate.	Vol I Section 2.4.3
BUG34316	ERM	2nd users will no longer be asked to create Results Database when it has already been created.	Vol II Section 6.7
BUG34412	ERM	The correct totals will show for the Name and District Totals Canvass for parties which do not have party ballots in all precincts.	Vol I Section 2.4.3
BUG34413	ERM	Subset elections can again be created when the election is located on a network drive.	Vol II Section 6.7
ENH33890	ERM	Users are able to skip all precincts with zero ballots cast.	Vol II Section 6.7
ENH33893	ERM	Users are able to set a time interval for the automatic creation of the Results XML file.	Vol II Section 6.7

F.1   Submitted Modification (Continued)

Table F-1. Submitted Modification (Continued)

Change ID	Changed Component	Change Description	Impacted 2005 VVSG Requirement
ENH33927	ERM	Users are able to Generate the Names and District Totals report for a specific contest.	Vol I Section 2.4.3
EN34195	ExpressVote	New OS to support Uniscribe (Bengali).	Vol I Section 3.1.3
EN34306	ExpressVote	Add security check with additional font transfer.	Vol II Section 6.7
EN34340	ExpressVote	Error message addition for clarification.	Vol I 2.1.5.1
EN34363	ExpressVote	Synchronized SPE firmware between EVS5400 and EVS5210.	Vol II Section 6.7
EN34550	ExpressVote	Updated picture of barcode scanner in configuration screen.	Vol II Section 6.7
BUG34293	ExpressVote	Added additional language support for Bengali.	Vol I Section 3.1.3
BUG34330	ExpressVote	Holding voted card on insertion caused card to be seen as blank.	Vol II Section 6.7
BUG34335	ExpressVote	Code maintenance no features added.	Vol II Section 6.7
BUG34398	ExpressVote	Copyright screen date change.	Vol II Section 6.7
BUG34402	ExpressVote	Updated Windows CE version number.	Vol II Section 6.7
BUG34443 BUG34448	ExpressVote	Imperfect bar code caused card to be seen as blank.	Vol II Section 6.7
BUG34449	ExpressVote	Florida rule to have all responses on the same screen.	Vol I 3.1.4.b
BUG34752	DS200	When a short name for contest title exceeds 76 characters the DS200 will stop responding when printing the write-in review tape.	Vol II Section 6.7
N/A	TDP	Voting System Overview	Vol II Section 2.2.1
N/A	TDP	Software Design and Specification - Electionware	Vol II Section 2.5
N/A	TDP	Software Design and Specification - Electionware Database Descriptions	Vol II Section 2.5
N/A	TDP	Software Design and Specification - ERM	Vol II Section 2.5
N/A	TDP	System Change Notes	Vol II Section 2.11

END OF TEST PLAN