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CERTIFICATION TEST PLAN

Prepared for:

Manufacturer Name	Dominion Voting Systems
Manufacturer System	Democracy Suite Version 4.0
EAC Application No.	**DVS-40-G-20**
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NVLAP LAB CODE 200771-0

U.S. Election Assistance Commission
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Revisions		**REVISION** Original
		REPORT NO. Test Plan T57381.01-01
wyle laboratories		**DATE** April 19, 2011

REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
---	4-19-11	Entire Document	Original Release

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APPENDICES

1.0 INTRODUCTION

The purpose of this National Certification Test Plan (Test Plan) is to document the procedures that Wyle Laboratories, Inc., will follow to perform certification testing of the Dominion Voting Systems, Democracy Suite 4.0 System, to the requirements set forth for voting systems in the U.S. Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (EAC 2005 VVSG). The Democracy Suite 4.0 System has been submitted to Wyle Laboratories, Inc., for testing to the EAC 2005 VVSG. Prior to submitting the System for certification testing, Dominion Voting Systems submitted an application to the EAC for certification of the Democracy Suite 4.0 System to the requirements of the EAC 2005 VVSG.

At test conclusion, the results of all testing performed as part of this test program will be submitted to the EAC in the form of a final report.

1.1 References

The documents listed below were used in the development of the Test Plan and are utilized to perform certification testing.

- 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 1.0, effective date January 1, 2007
- Election Assistance Commission Voting System Test laboratory Program Manual, Version 1.0, effective date July 2008
- 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
- Wyle Laboratories' Test Guidelines Documents: EMI-001A, "Wyle Laboratories' 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"
- Wyle Laboratories' Quality Assurance Program Manual, Revision 4
- ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"
- ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment"
- EAC Requests for Interpretation (listed on www.eac.gov)
- EAC Notices of Clarification (listed on www.eac.gov)

A listing of the Democracy Suite 4.0 System Technical Data Package (TDP) Documents submitted for this certification test effort is listed in Section 3.4: Deliverable Materials.

1.0 INTRODUCTION (CONTINUED)

1.2 Terms and Abbreviations

This subsection defines all terms and abbreviations applicable to the development of this Test Plan.

Table 1-1 Terms and Abbreviations

Term	Abbreviation	Definition
Americans with Disabilities Act of 1990	ADA	ADA is a wide-ranging civil rights law that prohibits, under certain circumstances, discrimination based on disability.
EMS Audio Studio	AS	EMS application used to record audio files.
Audio Tactile Interface	ATI	Voter interface designed to not require visual reading of a ballot.
Configuration Management	CM	---
Commercial Off the Shelf	COTS	Commercial, readily available hardware or software
Direct Record Electronic	DRE	---
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.
EMS Election Event Designer	EED	EMS application used for election definition functionality.
Election Management System	EMS	The Election Management System equivalent for the Democracy Suite System.
Equipment Under Test	EUT	---
Functional Configuration Audit	FCA	Exhaustive verification of every system function and combination of functions cited in the manufacturer's documentation.
Help America Vote Act	HAVA	Act created by United States Congress in 2002.
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.
ImageCast Central	ICC	High-speed central ballot scan tabulator.
ImageCast eVolution	ICE	Precinct-level optical scanner and tabulator with audio voting and ballot marking capabilities.
ImageCast Precinct	ICP	Precinct-level optical scanner and tabulator with audio voting capabilities.

1.0 INTRODUCTION (CONTINUED)

1.2 Terms and Abbreviations (continued)

Table 1-1 Terms and Abbreviations (continued)

Physical Configuration Audit	PCA	Review by accredited test laboratory to compare voting system components submitted for certification testing to the manufacturer's technical documentation, and confirmation the documentation meets national certification requirements. A trusted build of the executable system is performed to ensure the certified release is built from tested components.
Quality Assurance	QA	---
EMS Results, Tally and Reporting	RTR	EMS application used to integrate election results and reporting.
System Under Test	SUT	---
Test Case Procedure Specifications	TCPS	Wyle-developed document that specifies test items, input specifications, output specifications, environmental needs, special procedural requirements, inter-case dependencies, and all validated test cases that will be executed during the area under test.
Technical Data Package	TDP	Manufacturer documentation related to the voting system required to be submitted as a precondition of certification testing.
Uninterruptible Power Supply	UPS	---
Voluntary Voting System Guidelines	EAC 2005 VVSG	Published by the EAC, the third iteration of national level voting system standards.
Wyle Operating Procedure	WoP	Wyle Test Method or Test Procedure.

1.3 Testing Responsibilities

All core and non-core software and hardware certification testing will be conducted under the guidance of Wyle Laboratories, Inc., by personnel verified by Wyle to be qualified to perform the testing.

1.3.1 Project Schedule

This information is contained in a Wyle-generated Microsoft Project schedule. This schedule is presented in Appendix C "Dominion Voting Systems Project Schedule". The dates on the schedule are not firm dates but planned estimates presented for informational purposes.

1.3.1.1 Owner Assignments

This information in contained in a Wyle generated Microsoft Project schedule. This schedule is presented in Appendix C "Dominion Voting Systems Project Schedule".

1.0 INTRODUCTION (CONTINUED)

1.3 Testing Responsibilities (continued)

1.3.1 Project Schedule (continued)

1.3.1.2 Test Case Development

Wyle will utilize the "Wyle Baseline Test Cases" for the Functional Configuration Audit (FCA), Usability and System Integration Tests. These will be augmented with specially designed test cases tailored to the Dominion Voting Systems Democracy Suite 4.0. Wyle has designed specific election definitions for the Operational Status Check and the Logic & Accuracy Tests. The "Baseline" functional test cases, "Baseline" usability test cases, and the election definitions are being submitted as part of this test plan package.

Throughout the test campaign, Wyle will develop and submit to the EAC Test Case Procedure Specifications (TCPS) documents for major areas of testing. The TCPS documents the test items, input specifications, output specifications, environmental needs, special procedural requirements, inter-case dependencies, and all validated test cases that will be executed for a given test.

1.3.1.3 Test Procedure Development and Validation

Wyle will utilize the Wyle Operating Procedures (WoPs) during the duration of this test program. These procedures are validated and are being submitted as part of the test plan package.

1.3.1.4 Third-Party Tests

Dominion Voting Systems submitted five hardware test reports for the ImageCast Precinct (ICP unit). This testing was performed during the New York State certification effort using the EAC 2005 VVSG standards. Wyle's evaluation of these reports is contained in Section 2.2 of this document. Additionally, Wyle will be utilizing 3rd party testing to perform the product safety portion of the test campaign.

1.3.1.5 EAC and Manufacturer Dependencies

This information in contained in a Wyle generated Microsoft Project schedule. This schedule is presented in Appendix C "Dominion Voting Systems Project Schedule".

1.4 Target of Evaluation Description

The following sections address the design methodology and product description of the Democracy Suite 4.0 System, as taken from the Dominion Voting Systems technical documentation.

1.4.1 System Overview

The Dominion Voting Systems Democracy Suite 4.0 System is a paper-based optical scan voting system. The Democracy Suite 4.0 System consists of four major components: the Election Management System (EMS), ImageCast Evolution (ICE) precinct scanner with optional ballot marking capabilities, ICP precinct scanner with audio ballot and DRE capabilities, and ImageCast Central (ICC) central count scanner.

1.0 INTRODUCTION (CONTINUED)

1.4.1 Target of Evaluation Description (continued)

1.4.1 System Overview (continued)

Election Management System

The Dominion Voting Systems Democracy Suite 4.0 EMS consists of seven components running as either a front-end/client application or as a back-end/server application. Below is a list and brief description of each.

- Democracy Suite 4.0 EMS Election Event Designer client application - integrates election definition functionality and represents a main pre-voting phase end-user application.
- Democracy Suite 4.0 EMS Results Tally and Reporting client application - integrates election results acquisition, validation, tabulation, reporting and publishing capabilities and represents a main post-voting phase end-user application.
- Democracy Suite 4.0 EMS Audio Studio client application - represents an end-user helper application used to record audio files for a given election project. As such, it is utilized during the pre-voting phase of the election cycle.
- Democracy Suite 4.0 EMS Data Center Manager client application - represents a system level configuration application used in EMS back-end data center configuration.
- Democracy Suite 4.0 EMS Application Server server application - represents a server side application responsible for executing long running processes, such as rendering ballots, generating audio files and election files, etc.
- Democracy Suite 4.0 EMS Network Attached Storage (NAS) Server server application - represents a server side file repository for election project file based artifacts, such as ballots, audio files, reports, log files, election files, etc.
- Democracy Suite 4.0 EMS Database Server server application - represents a server side RDBMS repository of the election project database which holds all the election project data, including pre-voting and post-voting data.

The EMS platform can be deployed in three physical hardware configurations:

- EMS Express hardware configuration - all EMS software components are installed on a single physical PC or laptop.
- EMS Standard hardware configuration - the EMS server components are installed on a single physical server, in addition to the UPS and LAN network switch devices, while the EMS client components are installed on one or more physical PCs or laptops. All system components are interconnected in a client-server local LAN environment.
- EMS Enterprise hardware configuration - represents a two-server configuration. In addition to the UPS and LAN network switch device, the EMS client components are installed on one or more physical PCs or laptops. All system components are interconnected in a client-server local LAN environment.

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.1 System Overview (continued)

Precinct Ballot Tabulator: ImageCast eVolution (ICE)

The ICE Ballot Counter device is a precinct-level, optical scan, ballot counter (tabulator) designed to perform three major functions**:**

- Ballot scanning and tabulation
- Ballot review and second chance voting
- Accessible voting and ballot marking

The primary function of the ICE ballot counter device is to scan and tabulate paper ballots. The ICE software platform integrates an optional ballot review function. The ballot review feature allows voters to review their selections and change any votes. Once a paper ballot is processed, the voting results for a given ballot are displayed on the LCD for verification. The results are presented in a text format with selectable zoom and contrast, which allows voters to easily identify any voting errors they may have made, and to verify that the tabulator has correctly identified the selections. The same verification procedure can be performed for an Accessible Voting Session (AVS). The voter can accept or reject the ballot before it is cast. However, in this case, votes are reviewed through an audio summary.

The ICE ballot counter also allows a voter to cast a ballot using accessible devices. The tabulators' audio voting capabilities lets voters listen to, and vote for, any available choice on the ballot. Through the Audio Tactile Interface (ATI) device connected to the tabulator, the voter listens to an audio voting session consisting of contest and candidate names. In addition to allowing a voter to indicate his or her votes, the ATI also allows a voter to adjust the volume and speed of audio playback. Furthermore, the ATI provides voters the opportunity to navigate to the next or previous contest/candidate on the ballot. A voter also has the option to receive visual assistance while voting. A nineteen inch (19") LCD touch-screen display provides visual voting information, as well the ability to change zoom and contrast levels during ballot presentation. As with audio based voting, voters make selections using an ATI connected to the tabulator.

The audio and visual interfaces indicated can be used separately or simultaneously. All voting choices, such as write-in voting and straight party voting, can be made with the ATI. Voters who require alternative input devices may use the ATI, sip and puff device or the paddle (foot) switches to navigate the ballot and vote during a voting session. Accessible voting sessions begin when the administrator employs the Administrative Key and initiates a voting session from the administrative menu on the device. When prompted, the administrator enters the appropriate ballot ID. The Administrative Key can be also be used to cancel a voting session. This may be necessary when a voter needs to restart their voting session to review any applicable instructions. Each voter begins an AVS session by selecting a language. Following this, instructions are provided to orient the user. When the voter has made all ballot selections, the ImageCast eVolution will provide a marked ballot that is indistinguishable from commercially printed and human marked ballots.

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.1 System Overview (continued)

Photograph 1: ImageCast eVolution (ICE)

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.1 System Overview (continued)

Precinct Ballot Tabulator: ImageCast Precinct (ICP)

The ImageCast Precinct Ballot Counter is a precinct-based optical scan ballot tabulator that is used in conjunction with ImageCast compatible ballot storage boxes. The system is designed to scan marked paper ballots, interpret voter marks on the paper ballot and safely store and tabulate each vote from each paper ballot. The ICP contains a small touch-screen LCD to allow the pollworker to access diagnostic and configuration settings.

In addition, enhanced accessibility voting may be accomplished via optional accessories connected to the ImageCast unit. The ICP utilizes an ATI device to allow voters with disabilities to navigate and submit a voted ballot. This is accomplished by presenting the ballot to the voter in an audio format. The ATI is connected to the tabulator, and allows the voter to listen to an audio voting session consisting of contest and candidate names. The ATI also allows a voter to adjust the volume and speed of audio playback. The cast vote record is recorded electronically when the ATI is used to cast a ballot.

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1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.1 System Overview (continued)

Photograph 2: ImageCast Precinct (ICP)

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.1 System Overview (continued)

Central Tabulator: ImageCast Central Count (ICC)

The Dominion Democracy Suite ICE Ballot Counter system is a high-speed, central ballot scan tabulator based on Commercial off the Shelf (COTS) hardware, coupled with the custom-made ballot processing application software. It is used for high speed, accurate, and reliable centralized scanning and counting of paper ballots. Central scanning system hardware consists of a combination of two COTS devices used together to provide the required ballot scanning processing functionality:

- Kodak Ngenuity 9150DC scanner is used to provide ballot scanning and image transfers to the local ImageCast Central Workstation.
- ImageCast Central Workstation is a COTS computer used for ballot image and election rules processing and results transfer to the EMS Datacenter. The ImageCast Central Workstation is a logical name for the Dominion pre-approved PC workstation hardware which executes the image processing and election rules software application.

Photograph 3: ImageCast Central Count (ICC)

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.2 Block Diagram

The entire system diagram is presented in Figure 1-1.

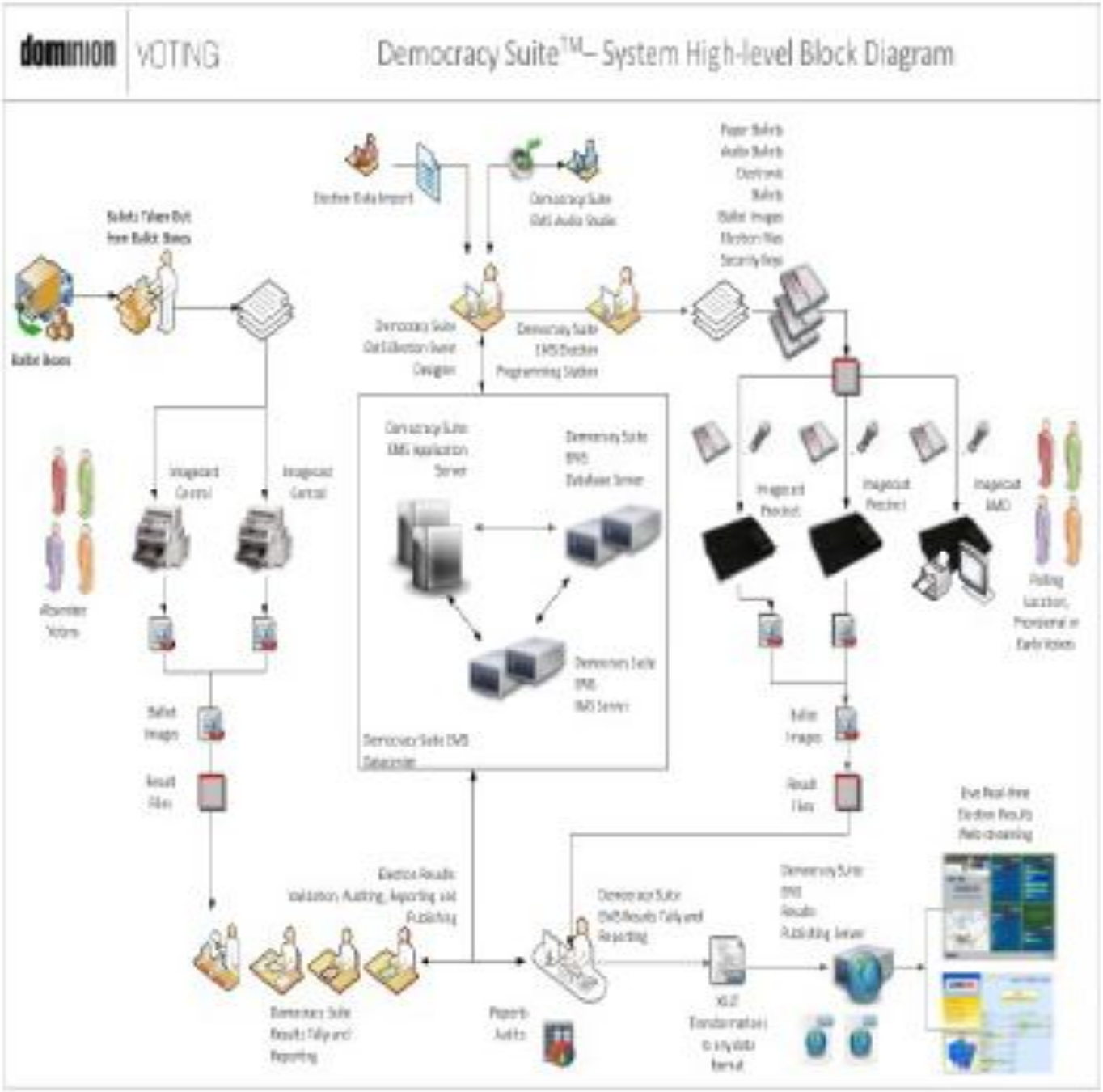

Figure 1-1 System Overview Diagram

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.3 System Limits

The system limits that Dominion Voting Systems has stated to be supported by the Democracy Suite 4.0 are compiled in the table below.

Table 1-2 Democracy Suite 4.0 System Limits for Landscape (New York State) Ballot Style

Limit (Maximum Number of)	Value (by configuration)			Limiting Component
	Express	Standard	Enterprise	
Ballot Positions	292	292	292	22 Inch Landscape Ballot (240 candidates + 24 write-ins + 28 Yes/No choices)
Precincts in Election	250	1000	10000	Memory
Contests in Election	250	1000	4000	Memory
Candidates/Counters in Election	2500	10000	40000	Memory
Candidates/Counters in Precinct	240	240	240	22 Inch Landscape Ballot
Candidates/Counters in Tabulator	2500	10000	TBD	Memory
Ballot Styles in Election	750	3000	30000	Memory
Contests in a Ballot Style	38	38	38	22 Inch Landscape Ballot (24 candidacy contests + 14 propositions)
Candidates in a Contests	240	240	240	22 Inch Landscape Ballot
Ballot Styles in a Precinct	5	5	5	Memory
Number of Parties	30	30	30	Memory
Vote For in Contest	24	24	24	22 Inch Landscape Ballot
Supported Languages per Election	5	5	5	Memory
Number of Write-ins	24	24	24	22 Inch Landscape Ballot

Table 1-3 Democracy Suite EMS 4.0/ImageCast Ballot Target Limits for Landscape (New York State) Ballot Style

Ballot Length	Targets Per Inch (tpi) Maximum Positions per Row x Column
11 Inch	11 x 9
14 inch	11 x 13
17 Inch	11 x 17
20 Inch	11 x 21
22 Inch	11 x 24

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.3 System Limits (continued)

Table 1-4 Democracy Suite 4.0 System Limits for Portrait Ballot Style

Limit (Maximum Number of)	Value (by configuration)			Limiting Component
	Express	Standard	Enterprise	
Ballot Positions	462	462	462	22 Inch Portrait Ballot
Precincts in Election	250	1000	10000	Memory
Contests in Election	250	1000	4000	Memory
Candidates/Counters in Election	2500	10000	40000	Memory
Candidates/Counters in Precinct	462	462	462	22 Inch Portrait Ballot
Candidates/Counters in Tabulator	2500	10000	10000	Memory
Ballot Styles in Election	750	3000	30000	Memory
Contests in a Ballot Style	156	156	156	22 Inch Portrait Ballot
Candidates in a Contests	231	231	231	22 Inch Portrait Ballot (Column Span 3)
Ballot Styles in a Precinct	5	5	5	Memory
Number of Parties	30	30	30	No Limitation
Vote For in Contest	30	30	30	No Limitation
Supported Languages per Election	5	5	5	Memory
Number of Write-ins	462	462	462	22 Inch Portrait Ballot

Table 1-5 Democracy Suite EMS 4.0/ImageCast Ballot Target Limits for Landscape (New York State) Ballot Style

Ballot Length	Targets Per Inch (tpi) Maximum Positions per Row x Column
11 Inch	33 x 2
14 inch	45 x 3
17 Inch	57 x 3
20 Inch	69 x 3
22 Inch	77 x 3

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.4 Supported Languages

The following languages have been stated by Dominion Voting Systems to be supported by the Democracy Suite 4.0:

- Alaska Native
- Aleut
- Athabascan
- Eskimo
- Chinese
- Filipino
- French
- English
- Japanese
- Korean
- Vietnamese
- Spanish
- Native (other group specified)
    - Apache
    - Jicarilla
    - Keres
    - Navajo
    - Seminole
    - Towa
    - Ute
    - Yuman

Dominion Voting Systems also states that any language that has an ISO definition file can be supported by the Democracy Suite voting system.

1.0 INTRODUCTION (CONTINUED)

1.4 Target of Evaluation Description (continued)

1.4.5 Supported Functionality

The Democracy Suite 4.0 is designed to support the following voting variations:

- General Election
- Closed Primary
- Open Primary
- Early Voting
- Partisan offices
- Non-Partisan offices
- Write-in voting
- Primary presidential delegation nominations
- Straight Ticket voting
- Split Precincts
- Ballot Rotation
- Vote for N of M
- Ranked Choice Voting (RCV)
- Audio Ballot

As stated in the System Configuration and Overview document, the Democracy Suite 4.0 System does not include functions for Cumulative Voting, or Recall Issues; therefore, testing will not be conducted on these functions.

1.4.6 VVSG

The Democracy Suite 4.0 will be tested to all applicable EAC 2005 VVSG requirements. Please refer to Appendix A titled "2005 EAC Program Requirements Matrix" submitted by Wyle along with this test plan for further reference.

1.4.7 Beyond VVSG

Dominion Voting Systems submitted hardware test reports for Dust and Rain Tests on the ICP unit. This testing was performed during the New York state certification effort. The evaluation of these reports is contained in Section 2.2 of this document.

2.0 PRE-CERTIFICATION TESTING AND ISSUES

Currently, no pre-certification testing has been completed. Per EAC Notice of Clarification (NOC) 09-001, Wyle views the Certification Test Plan as a living document. It will be updated with "As Run" testing and resubmitted to the EAC as major areas of testing have been completed.

Wyle has performed the first pass review for all source code submitted by Dominion for the Democracy Suite version 4.0 voting system. The issues with compliance to the EAC 2005 VVSG were reported back to the manufacturer for resolution. Subsequent submissions will be reviewed by comparing the new submission against the last submission to ensure all documented issues are resolved before the source code review is completed.

An initial Technical Data Package (TDP) review was performed on the Dominion documents submitted as their TDP to determine compliance with the EAC 2005 VVSG and EAC requirements. Wyle found some documents were missing or included partial information, and the existing documentation contained information which was not consistent throughout the Dominion TDP. The results were reported to Dominion for resolution. Dominion has subsequently revised and resubmitted the TDP. Wyle is performing a review of these documents and will submit the results to Dominion as documented in Section 4.6 TDP Evaluation. Any incidences of non-certification issues (editing issues such as spelling or formatting) will be noted to Dominion as informational comments for them to decide whether or not to address them.

2.1 Evaluation of Prior VSTL Testing

The Dominion Voting Systems Democracy Suite 4.0 is a new voting system that has not been previously tested to applicable federal standards in the EAC Program. It will be fully tested and the results will be submitted to the EAC in accordance with the requirements of the EAC Voting System Testing and Certification Manual, Section 4 Certification Testing and Technical Review.

2.2 Evaluation of Prior Non-VSTL Testing

A version of the Democracy Suite was submitted and tested by New York State Board of Elections (NYSBOE). The version submitted to NYSBOE consisted of an earlier version of the EMS, the ICP, and the ICC components. Wyle has researched this test campaign and test results and believes some of the hardware testing can be reused. The only portion of testing that Wyle believes can be reused is the ICP hardware testing. The ICP hardware has not changed significantly from the ICP hardware that was submitted for NYSBOE testing. For details of the hardware qualitative examination performed by Wyle, refer to Section 4.4.1 of this test plan.

Dominion Voting Systems will submit a usability report for the Democracy Suite Version 4.0 when this information is available. The testing will focus on two components of the Democracy Suite that voters would use to print and cast ballots – the ICE and the ICP. Participants in the test will take on the role of voters who would cast ballots in person at a polling location as well as the tasks of testing the system used by the special needs voters who require auditory, visual or physical assistance to cast their vote.

2.2.1 Reason for Testing and Results

The hardware testing was performed because Dominion Voting Systems submitted the ICP unit to NYSBOE for state certification.

Manufacturers are required to conduct usability testing and submit the results to the VSTL as a part of the TDP. Wyle verified that the report has been submitted and the report states that it is in the common industry format.

2.0 PRE-CERTIFICATION TESTING AND ISSUES (CONTINUED)

2.3 Known Field Issues

This system has never been fielded in the configuration submitted for EAC 2005 VVSG certification testing.

2.3.1 Listing of Relevant Issues

The ImageCast Evolution, and ImageCast Central portions of the SUT have never been fielded; therefore, there are no known field issues. The ImageCast Precinct has been utilized in a small number of elections in New York State. There were no systemic or significant issues traceable to voting system performance.

3.0 MATERIALS REQUIRED FOR TESTING

The materials required for certification testing of the Democracy Suite 4.0 voting system include software, hardware, test materials, and deliverable materials to enable the test campaign to occur will be delivered by Dominion Voting Systems to Wyle.

3.1 Software

The tables below list the software the manufacturer must submit for testing. This section lists all software required for operation and testing of the voting system being certified. This includes software used for testing telecommunications, security and system integration; as well as supporting software required for the test environment including compilers, assemblers, and database managers, etc. Both COTS and non-COTS software components are listed in this section.

Table 3-1 Democracy Suite 4.0 EMS Software Platform Component Descriptions

Software Required For Testing	Software Version	Filename	Hash Value
Democracy Suite EMS EED Client Application	4.0.8	setup.exe: DemocracySuiteEMS_EED_Setup_FED_CERT.msi	TBD
Democracy Suite EMS RTR Client Application	4.0.8	setup.exe: DemocracySuiteEMS_RTR_Setup_FED_CERT.msi	TBD
Democracy Suite EMS Application Server	4.0.8	setup.exe: DemocracySuiteEMS_APPS_Setup_FED_CERT.msi	TBD
Democracy Suite EMS Audio Studio Client Application	4.0.8	setup.exe: EMSAS2010_Setup.msi	TBD
Democracy Suite EMS Data Center Manager	4.0.8	DemocracySuiteEMS_DCM.exe	TBD
.NET Framework 3.5 Library	3.5	dotNetFx35setup.exe and dotNetFx35setup_sp1.exe (installed automatically through Windows OS – see separate document/s)	TBD
NetAdvantage for .NET 2008 Vol. 1 CLR 2.0	2008 Vol.1 CLR 2.0	NetAdvantage_WinForms_20081_CLR20_Product.exe (for details see document Components_3rdParty_1.0.xlsx)	TBD

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-2 Democracy Suite 4.0 EMS Software Platform Unmodified COTS Components Descriptions

Software Required For Testing	Software Version	Filename	Hash Value
TX Text Control Library for .NET	14.0	Tx_Text_Control_DotNet_1400.zip (for details see document Components_3rdParty_1.0.xlsx)	TBD
OneWire API for .NET	4.0.2.0	OneWireAPI.NET.dll (for details see document Components_3rdParty_1.0.xlsx)	TBD
SOX – audio converter application	14.3.1	sox.exe (for details see document Components_3rdParty_1.0.xlsx)	TBD
Log4net	1.2.10	log4net.dll, log4net.xml (for details see document Components_3rdParty_1.0.xlsx)	TBD
NLog – log library	1.0.0.505	NLog.dll (for details see document Components_3rdParty_1.0.xlsx)	TBD
Cepstral Text-to-Speech	5.1.0	Cepstral_Allison_windows_5.1.0.msi + 3 more voices (for details see document Components_3rdParty_1.0.xlsx)	TBD
iTextSharp – pdf generation library	4.0.3	itextsharp.dll (for details see document Components_3rdParty_1.0.xlsx)	TBD
openssl.exe, libeay32.dll, ssleay32.dll	1.2	openssl.exe, lebeay32.dll, ssleay32.dll (for details see document Components_3rdParty_1.0.xlsx)	TBD
SQLite	1.0.65.0 (0.1.66.0)	System.Data.SQLite.DLL 32-bit and 64-bit (for details see document Components_3rdParty_1.0.xlsx)	TBD
Lame	3.97 (3.98)	System.Data.SQLite.DLL 32-bit and 64-bit (for details see document Components_3rdParty_1.0.xlsx)	TBD
Speex	1.0.4	speexdec.exe and speexenc.exe (for details see document Components_3rdParty_1.0.xlsx)	TBD
Ghostscript	8.71	gsdll32.dll – both 32-bit and 64-bit (for details see document Components_3rdParty_1.0.xlsx)	TBD
PdfToImage.dll	1.2	PdfToImage.dll (for details see document Components_3rdParty_1.0.xlsx)	TBD
Tamir.SharpSSH.dll, DiffieHellman.dll, Org.Mentalis.Security.dll – Cryptography	SharpSSh package 1.1.1.13	Tamir.SharpSSH.sll, Diffie.Hellman.dll, Org.Mentalis.Security.dll (for details see document Components_3rdParty_1.0.xlsx)	TBD

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-3 Democracy Suite 4.0 EMS Software Platform Third Party Software Component Descriptions

Software Required For Testing	Software Version	Filename	Hash Value
NetAdvantage for .NET Windows Forms 2008 Subscription	2008 Vol.1 CLR 2.0	NetAdvantage_WinForms_20081_CLR20_Product.exe	TBD
TxText Control .NET Version 14	14.0	Tx_Text_Control_DotNet_1400.zip	TBD
Cepstral Text-to-Speech Desktop Voices	5.1.0	Cepstral_Allison_windows_5.1.0.msi + 3 more voices	TBD

Table 3-4 Democracy Suite 4.0 EMS Client Application Software Component Descriptions

Software Required For Testing	Software Version	Filename	Hash Value
Microsoft Windows 7 x64	6.1	Microsoft DVD provided	TBD
Windows Server 2008 R2 x64	6.1	Microsoft DVD provided	TBD
Microsoft SQL Server 2008 R2 x64 or Microsoft SQL Server 2008 Express R2 x64	10.0	Microsoft DVD provided	TBD
Microsoft .NET Framework 3.5	3.5	dotNetFx35setup.exe and dotNetFx35setup_sp1.exe (installed automatically through Windows OS – see separate document/s)	TBD
Microsoft Visual J# Redistributable 2.0 x64	2.0 x64	vjredist64.exe	TBD
Adobe Acrobat Reader 9.3 or higher	9.0	AdbeRdr930_en_US.exe	TBD
Dallas 1-Wire Device Driver version 4.0.3b x64	4.0	install_1_wire_drivers_x64_v403beta.msi	TBD
Cepstral Text-to-Speech Desktop Voices	5.1.0	Cepstral_Allison_windows_5.1.0.msi + 3 more voices	TBD
Java Runtime Environment 6.0	6.0	jre-6u18-windows-x64.exe	TBD
Microsoft IIS 7.5	7.5	Microsoft DVD provided	

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-5 Democracy Suite 4.0 EMS Software Build Environment Component Descriptions

Software Required For Testing	Software Version	Filename	Hash Value
Microsoft Windows Server 2008 R2 x64	6.1	Microsoft DVD provided	TBD
.NET Framework	3.5	dotNetFx35setup.exe and dotNetFx35setup_sp1.exe (installed automatically through Windows Server Roles)	TBD
Microsoft Visual J# 2.0 Redistributable	2.0 x64	vjredist64.exe	TBD
Microsoft Visual Studio 2008	9.0	Microsoft DVD provided	TBD
Microsoft Visual Studio 2008 Service Pack 1	9.0.307 29.1 SP	VS90sp1-KB945140-ENU.exe	TBD
Cruise Control	1.5	CruiseControl.NET-1.5.7256.1-Setup	TBD
Nant	0.90	nant-0.90-bin.zip	TBD
Csunit	2.1.1	csUnit.2.1.1.BETA.setup	TBD
7-Zip	9.20 x64	7z920-x64.msi	TBD
NetAdvantage Infragistics	2008 Vol.1 CLR 2.0	NetAdvantage_WinForms_20081_CLR20_Product.exe	TBD
Tx Text Control 14.0.NET	14.0	Tx_Text_Control_DotNet_1400.zip	TBD
Adobe Acrobat Reader 9.3 or higher	9.3	AdbeRdr930_en_US.exe	TBD
ImgBurn 2.5 or higher	2.5.1.0	SetupImgBurn_2.5.0.0.exe	TBD

Table 3-6 Democracy Suite 4.0 ImageCast Precinct Software Component Descriptions

Software Required For Testing	Software Version	Filename	Hash Value
Election Firmware	TBD	cf2xx.sig	TBD
Firmware Updater	TBD	firmUp.enc	TBD
Firmware Extractor	TBD	FirmwareExtract.enc	TBD

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.1 Software (continued)

Table 3-7 Democracy Suite 4.0 ImageCast Precinct Unmodified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename	Hash Value
PNG Reference Library	1.2.24	libpng-1.2.24.tar.gz	2a08809502c29ea535d5179457ce21bf
OpenSSL	1.1.2	Openssl-fips-1.1.2.tar.gz	8d618698947a48e93c57e5808d663669
Zlib	1.2.3	Zlib-1.2.3.tar.gz	debc62758716a169df9f62e6ab2bc634

Table 3-8 Democracy Suite 4.0 ImageCast Precinct Modified COTS Software Component Descriptions

Software Required For Testing	Software Version	Filename	Hash Value
uClinux	20070130	uClinux-dist-20070130.tar.gz	a867164cf62020ee22906dced02e0165
COLILO Boot Loader	TBD	colilo.bin	TBD

Table 3-9 Democracy Suite 4.0 ImageCast Precinct Election Firmware Compiler Descriptions

Software Required For Testing	Software Version	Filename	Hash Value
g++ (GNU C++ compiler)	gcc3.4.0-20040603	m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh	78ced9730058618e436b11260d863b71

Table 3-10 Democracy Suite 4.0 ImageCast Precinct Firmware Build Environment Component Descriptions

Software Required For Testing	Software Version	Filename	Hash Value	COTS
Ubuntu 10.04 LTS – Long-term support	10.04	ubuntu-10.04.2-desktop-amd64.iso	c19e5139e10df2626055f1d9985856d7	TBD
Toolchain Installation Script	N/A	Toolchain.sh	N/A	TBD
m68k uClinux tools base gcc	3.4.0-20040603	m68k-uclinux-tools-base-gcc3.4.0-20040603.sh	d8f8083ce4124bfb7449431eca637186	TBD
m68k uClinux tools c++ gcc	3.4.0-20040603	m68k-uclinux-tools-c++-gcc3.4.0-20040603.sh	78ced9730058618e436b11260d863b71	TBD
m68k uClinux tools gdb	20040603	m68k-uclinux-tools-gdb-20040603.sh	f9be7c555551f89012109054a5d2cec9	TBD
OpenSSL	1.1.2	Openssl-fips-1.1.2.tar.gz	8d618698947a48e93c57e5808d663669	TBD

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.2 Equipment

This subsection categorizes the equipment the manufacturer has submitted for testing. Each test element is included in the list of the equipment required for testing of that element, including system hardware, general purpose data processing and communications equipment, and any required test instrumentation.

Table 3-2 below, lists all of the major components of the ICE voting system. Each ImageCast eVolution (Equipment Under Test) EUT will be comprised of an ICE unit and a ballot box.

Table 3-11 ImageCast eVolution Equipment

Equipment	Manufacturer	Model	Serial Number
ICE	Dominion	ImageCast PCOS 320A	18000106
ICE	Dominion	ImageCast PCOS 320A	18000107
ICE	Dominion	ImageCast PCOS 320A	18000108
ICE	Dominion	ImageCast PCOS 320A	18000109
ICE	Dominion	ImageCast PCOS 320A	TBD
ICE Ballot Box	Dominion	N/A	BOX-57381-007
ICE Ballot Box	Dominion	N/A	BOX-57381-008
ICE Ballot Box	Dominion	N/A	BOX-57381-009
ICE Ballot Box	Dominion	N/A	BOX-57381-010
ICE Ballot Box	Dominion	N/A	TBD

Each ImageCast Precinct EUT will be comprised of one ICP unit and a ballot box. Each component and its details are listed in the table below.

Table 3-12 ImageCast Precinct Equipment

Equipment	Manufacturer	Model	Serial Number
ICP	Dominion	ImageCast Precinct Tabulator PSOS 400A	18000100
ICP	Dominion	ImageCast Precinct Tabulator PSOS 400A	18000101
ICP	Dominion	ImageCast Precinct Tabulator PSOS 400A	18000102
ICP	Dominion	ImageCast Precinct Tabulator PSOS 400A	18000103
ICP	Dominion	ImageCast Precinct Tabulator PSOS 400A	18000104
ICP Ballot Box	Dominion	N/A	BOX-57381-011
ICP Ballot Box	Dominion	N/A	BOX-57381-012
ICP Ballot Box	Dominion	N/A	BOX-57381-013
ICP Ballot Box	Dominion	N/A	BOX-57381-014
ICP Ballot Box	Dominion	N/A	TBD

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.2 Equipment (continued)

The ICP and ICE voting systems make use of many of the same peripherals and accessories. Both the ICP and ICE units make use of the ATI handset. The table below lists the headphones, sip & puff devices, and other accessories required to perform voting using the Democracy Suite voting system.

Table 3-13 ImageCast Precinct and ImageCast eVolution Accessories

Equipment	Manufacturer	Quantity	Serial Number(s)
HF268 Collapsible Headphone	Pro-Luxe	14	HP-57381-001 thru 014
Footswitch Pair	Kinesis	4	FS-57381-001 thru 004
Buddy Button 5700 Series Pair	Tash	1	BB-57381-001
#970 Armrest Sip & Puff Attachment	Enabling Devices	6	AR-57381-001 thru 006
AirVoter Sip & Puff	Origin Instruments	6	AV-57381-001 thru 003, 002251, 002268, 002267
ATI Handsets	Dominion	12	ATI-57381-001 thru 012
Black Ballot Privacy Sleeves	Dominion	4	n/a
White Ballot Privacy Sleeves	Dominion	4	n/a
Black Privacy Panels (set of 2 pieces)	Dominion	4	n/a
White Privacy Panels	Dominion	4	n/a

The ImageCast Central Count consists of a COTS scanner paired with a COTS workstation PC used for ballot image and election rules processing and transfer of results to the EMS Datacenter.

Table 3-14 ImageCast Central Count Hardware

Equipment	Manufacturer	Model	Serial Number
ImageCast Central High-Speed Scanner	Kodak	Ngenuity 9150DC	K47444863
ImageCast Central Workstation PC	TBD	TBD	TBD

The manufacturer provided the hardware listed in Table 3-15 for the purpose of testing three documented system configurations: Enterprise, Standard, and Express. This hardware consists of PCs, Application/Database Servers, encrypted Network Attached Storage (NAS) servers, and ruggedized encrypted portable hard drives.

The system configurations consist of:

Enterprise: (2) PCs, (1) Application Servers, (1) Database Servers, (1) encrypted NAS for Application Server, (1) encrypted NAS for Database Server

Standard: (1) PC, (1) Application Server/ Database Server, (1) encrypted NAS for Application/Database Server

Express: (1) PC and (1) Portable Hard Drive

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.2 Equipment (continued)

Table 3-15 Election Management System Hardware

Equipment	Manufacturer	Version/Model	Specifications	Serial Number
PC1	Dell	Precision T1500	Processor: Intel Core i7-860 2.8 GHz, Memory: 4x 1GB 1333MHz DDR3, Hard Drive Capacity: 500 GB	61VNNM1
PC2	Dell	Precision T1500	Processor: Intel Core i7-860 2.8 GHz, Memory: 4x 1GB 1333MHz DDR3, Hard Drive Capacity: 500 GB	61TPNM1
PC3	Dell	Precision T1500	Processor: Intel Core i7-860 2.8 GHz, Memory: 4x 1GB 1333MHz DDR3, Hard Drive Capacity: 500 GB	61YMNM1
PC4	Dell	Precision T1500	Processor: Intel Core i7-860 2.8 GHz, Memory: 4x 1GB 1333MHz DDR3, Hard Drive Capacity: 500 GB	61TNNM1
SERVER1	Dell	PowerEdge R610	Processor: Intel Xeon E5620 2.4 GHz, Memory: 8x 2GB 1333MHz DDR3, Hard Drive Capacity: 2x 500 GB	5M9NNM1
SERVER2	Dell	PowerEdge R610	Processor: Intel Xeon E5620 2.4 GHz, Memory: 8x 2GB 1333MHz DDR3, Hard Drive Capacity: 2x 500 GB	5M8PNM1
SERVER3	Dell	PowerEdge R610	Processor: Intel Xeon E5620 2.4 GHz, Memory: 8x 2GB 1333MHz DDR3, Hard Drive Capacity: 2x 500 GB	5M8QNM1
STORAGE1	Rocstor	Guardian 4RM Raid System	Disk space: 2 TB (Striped + Mirrored), Processor: 400 MHz storage I/O, Hot bus interface: eSATA, Drive bus interface: SATA II	ROC732621047 /SB09010154
STORAGE2	Rocstor	Guardian 4RM Raid System	Disk space: 2 TB, Processor: 400 MHz storage I/O, Hot bus interface: eSATA, Drive bus interface: SATA II	ROC732621045 /SB09010157
STORAGE3	Rocstor	Guardian 4RM Raid System	Disk space: 2 TB, Processor: 400 MHz storage I/O, Hot bus interface: eSATA, Drive bus interface: SATA II	ROC732621046 /SB09010161

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.2 Equipment (continued)

Table 3-15 Election Management System Hardware (continued)

Equipment	Manufacturer	Version/Model	Specifications	Serial Number
STORAGE4	Rocstor	Commander 2UE Portable Hard Drive	Hard Drive Capacity: 500 GB	5VJ4DRJP
STORAGE5	Rocstor	Commander 2UE Portable Hard Drive	Hard Drive Capacity: 500 GB	5VJ48VFJ

The support equipment listed below was provided by Dominion Voting Systems to support the EAC VVSG 2005 Test Campaign.

Table 3-16 Election Management System Support Equipment

Equipment	Manufacturer	Model	Quantity	Serial Number
iButton (SHA-1) with USB Reader/Writer	Maxim	USB R/W: DS9490R iButton: DS1963S	3	4D027C, 4C9CF5, 514DFD
iButton (SHA-1)	Maxim	DS1963S	2	4CE4C9, 4D064A
LCD Monitor	Soyo	18.5” wide LCD	1	DYLM19R6-KLE-10202
LCD Monitor	Samsung	23” wide LCD	1	MY23HVMS701197B
LCD Monitor	Dell	1909W	4	07E-4EUS, 07F-071S, 07F-06US, 07F-074S
LCD Monitor	Dell	N445N	3	2TWC, 2UOC, 2U6C
Audio Adapter	Soundwave	USB Soundwave 7.1 Audio Adapter	2	SW-57381-001, SW-57381-002
PCI Software	Soundwave	Soundwave 7.1 PCI Software	2	n/a
USB Software	Soundwave	USB Soundwave 7.1 Software	1	n/a
Networking Switch	D-Link	D-Link DES-1105 5-Port Switch	1	DRL728A001397
Mouse	Dell	USB w/rollerball	4	G1A00M0M, 10203JTI, LZA30491960, 438027372
Mouse	Microsoft	USB w/rollerball	1	X800898
Keyboard	Kensington	USB	1	D0713000487
Keyboard	Microsoft	USB	1	6968200717217
Keyboard	IBM	USB	1	2162079
Compact Flash Reader	SanDisk	USB	3	0171618, 0201833, 0171631
Networking Switch	D-Link	DGS-2208 8-Port Switch	2	F36J69C004821, F36J69C004824
Headphones w/mic	Logitech	n/a	3	HP-57381-020 thru 022

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.2 Equipment (continued)

Table 3-16 Election Management System Support Equipment (continued)

Equipment	Manufacturer	Model	Quantity	Serial Number
eSATA PCI Card (Installed into Servers and PCs)	SIIG, Inc.	eSATA II PCIe Pro Card	7	n/a
Card Reader	GGI Gear	Compact Flash Card Reader	4	CFRW-57381-001 thru 004
Headset w/mic	Logitech	H530	4	HP-57381-023 thru 026
Inland Headphone w/ Mic	Headphones	TBD	2	HP-57381-015, HP-57381-016
Plantronics Headphone w/ Mic	Headphones	TBD	3	HP-57381-017 thru 019

3.3 Test Support Materials

This subsection enumerates any and all test materials needed to perform voter system testing. The scope of testing determines the quantity of a specific material required.

The following test materials are required to support the Democracy Suite 4.0 certification testing.

Table 3-17 Democracy Suite 4.0 Test Support Materials

Test Material	Quantity	Make	Model
Hasp Locks (red)	12	TBD	TBD
Tamper Evident Seals	53	TBD	SE-37
Disposable Gloves	3	TBD	TBD
Gloves and Mouthpiece Kit	17	TBD	TBD
Green and White Mouthpiece Kit	5	TBD	TBD
Black and Clear Mouthpiece	1	TBD	TBD

3.4 Deliverable Materials

The materials listed below are identified by Dominion to be delivered as part of the Democracy Suite 4.0 Voting System to the users. Actual deliverables will vary depending upon the system configuration selected by a jurisdiction.

3.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

3.4 Deliverable Materials (continued)

Table 3-18 Deliverable Materials

Deliverable Material	Version	Description
Election Event Designer	4.0	EMS client application
Results Tally and Reporting	4.0	EMS client application
Audio Studio	4.0	EMS client application
Application Server	4.0	EMS server application
Datacenter Manager	4.0	EMS server application
ImageCast eVolution	n/a	Precinct ballot scanner with audio voting capabilities
ImageCast Precinct	n/a	Precinct ballot scanner with audio voting capabilities
ImageCast Central Count	n/a	Central ballot scanner
ImageCast eVolution Ballot Box	n/a	ICE Ballot box
ImageCast Precinct Ballot Box	n/a	ICP Ballot box
EMS Client PC	n/a	PC used to run EMS client applications
EMS Server	n/a	Server used to run EMS server applications
Rocstor Encrypted NAS	n/a	Encrypted Network Attached Storage module for server and data backup
Rocstor Portable Hard Drive	n/a	Encrypted and ruggedized external hard drive
iButton with Reader/Writer	n/a	Security authentication token with programmer
Gigabit Network Switch	n/a	Network switch for enterprise configuration
Rack Mount UPS	n/a	Rack mounted backup power supply
ICE/ICP Headphones	n/a	Headphones used for audio voting
Sip/Puff Device	n/a	Binary input device for disabled voters
ICP System Operation Procedures	1.0.0::66	TDP Document
EMS System Operation Procedures	1.1.0::67	TDP Document
ICE System Operation Procedures	TBD	TDP Document
ICC System Operation Procedures	1.0.0::110	TDP Document
ICP System Maintenance Manual	1.0.0::10	TDP Document
ICE System Maintenance Manual	1.0.0::39	TDP Document
Election Event Designer User's Guide	2.3.1	TDP Document
Results Tally and Reporting User's Guide	2.2.2	TDP Document
Audio Studio User's Guide	1.0.0::10	TDP Document

4.0 TEST SPECIFICATIONS

Certification testing of the Democracy Suite 4.0 is the configuration submitted in the EAC application DVS-40-G-20. Wyle qualified personnel will ensure that all certification testing performed on the manufacturer's voting system follows Wyle's procedures for testing and the specific test cases to ensure the requirements of the EAC 2005 VVSG and EAC Testing and Certification Program Manual.

Below is a list of EAC Request for Interpretations (RFI) and Notice of Clarifications (NOC) that will be incorporated in the test campaign:

4.0 TEST SPECIFICATIONS (CONTINUED)

Interpretations

2010-08 EAC Decision on Calling Sequence
2010-07 EAC Decision on Module Length
2010-06 EAC Decision on DRE Accessibility Requirements and Other Accessible Voting stations
2010-05 EAC Decision on Testing of Modifications to a Certified System
2010-04 EAC Decision on Functional Requirements with Respect to Security
2010-03 EAC Decision on Database Coding Conventions
2010-02 EAC Decision on Coding Conventions
2010-01 EAC Decision on Voltage Levels and ESD Test
2009-06 EAC Decision on Temperature and Power Variation
2009-05 EAC Decision on T-Coil Requirements
2009-04 EAC Decision on Audit Log Events
2009-03 EAC Decision on Battery Backup for Central Count Systems
2009-02 EAC Decision on Alternate Languages
2009-01 EAC Decision on VVPAT Accessibility New
2008-12 EAC Decision on Ballot Marking Device/Scope of Testing
2008-10 EAC Decision on Electrical Fast Transient
2008-09 EAC Decision on Safety Testing
2008-08 EAC Decision on Automatic Bar Code Readers
2008-07 EAC Decision on 0' Count to Start Election
2008-06 EAC Decision on Battery Backup for Central Count
2008-05 EAC Decision on Durability
2008-04 EAC Decision on Supported Languages
2008-03 EAC Decision on OS Configuration
2008-02 EAC Decision on Battery Backup for Optical Scan Voting Machines
2008-01 EAC Decision on Temperature and Power Variation
2007-06 EAC Decision on Recording and Reporting Undervotes
2007-05 EAC Decision on Testing Focus and Applicability
2007-04 EAC Decision on Presentation of Alternative Language
2007-03 EAC Decision on Summative Usability Testing
2007-02 EAC Decision on Variable Names
2007-01 EAC Decision on Accessible Design

4.0 TEST SPECIFICATIONS (CONTINUED)

Notice of Clarifications

NOC 09-005 – Development and Submission of Test Plans for Modifications to EAC Certified Systems

NOC 09-004 – Development and Submission of Test Reports

NOC 09-003 – De Minimis Change Determination Requirement

NOC 09-002 -- Laboratory Independence Requirement

NOC 09-001 -- Requirements for Test Lab Development and Submission of Test Plans

NOC 08-003 -- EAC Conformance Testing Requirements

NOC 08-002 -- EAC Mark of Certification

NOC 08-001 -- Validity of Prior Non-core Hardware Environmental and EMC Testing

NOC 07-005 -- Voting System Test Laboratory Responsibilities in the Management and Oversight of Third Party Testing

NOC 07-004 -- Voting System Manufacturing Facilities

NOC 07-003 -- State Testing Done in Conjunction with Federal Testing within the EAC Program

NOC 07-002 -- VSTL Work with Manufacturers Outside of Voting System Certification Engagements

NOC 07-001 -- Timely Submission of Certification Application

4.1 Requirements (Strategy of Evaluation)

To evaluate the system test requirements, each section of the EAC 2005 VVSG will be analyzed to determine the applicable tests. The EAC 2005 VVSG Volume I Sections, along with the strategy for evaluation, are described below:

- **Section 2: Functional Requirements** – The requirements in this section will be tested during the FCA and System Integration test utilizing the "Wyle Baseline Test Cases" along with test cases specially designed for the Dominion Voting Systems Democracy Suite 4.0. The data input during these tests will be the predefined election definitions submitted as part of the Test Plan Package.
- **Section 3: Usability and Accessibility** – The requirements in this section will be tested during the Usability Test utilizing a combination of the "Wyle Baseline Test Cases" and the "Wyle Baseline Usability Test Cases". The data input during this test will be the predefined election definitions submitted as part of the Test Plan Package.
- **Section 4: Hardware Requirements** – The requirements in this section will be tested by trained Wyle personnel per sections 4.4.2 and the table in section 6.
- **Section 5: Software Requirements** – The requirements in this section will be tested during source code review, TDP review, and FCA. A combination of review and functional testing will be performed to ensure these requirements are met.
- **Section 6: Telecommunication** – A test of the telecommunication technologies utilized by the Dominion Voting Systems Democracy Suite 4.0 will be tested for data accuracy and correctness by analyzing the packet level information being transmitted. Section 6.2.6 will be excluded since the Dominion Voting Systems Democracy Suite 4.0 does not support the use of public networks.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.1 Requirements (Strategy of Evaluation) (continued)

- **Section 7: Security Requirements** – The requirements in this section will be tested during source code review, FCA, System Integration, and Security Tests. In addition to functional testing, the source code for the Dominion Voting Systems Democracy Suite 4.0 will be analyzed utilizing Fortify Source Code Analysis (SCA) for security vulnerabilities in addition to the manual line by line review.
- **Section 8: Quality Assurance (QA) Requirements** – The requirements in this section will be tested throughout the test campaign via various methods. TDP review will be performed on the Dominion Voting Systems QA documentation to determine compliance to EAC 2005 VVSG requirements and the requirements stated in the Dominion Voting Systems QA Program document. All source code will be checked to ensure that proper QA documentation has been completed. All equipment received for initial testing and follow up testing will be checked against Dominion Voting Systems documentation to ensure their QA process is being followed. Wyle personnel will complete the requirements of EAC 2005 VVSG Vol. 2 Section 7, Quality Assurance Testing and Section 1.3.1.5, Focus of Vendor Documentation that requires Wyle personnel to physically examine documents at the customer's location.
- **Section 9: Configuration Management (CM) Requirements** – The requirements in this section will be tested throughout the test campaign. TDP review will be performed on the Dominion Voting Systems configuration management documentation to determine EAC 2005 VVSG compliance and to further determine whether Dominion Voting Systems is following its documented CM requirements within the TDP. Any anomalies will be formally reported to Dominion Voting Systems as describe in Section 4.6 TDP Evaluation. During source code review, Wyle qualified personnel will verify that Dominion Voting Systems is following EAC 2005 VVSG CM requirements as well as Dominion Voting Systems CM requirements. Any anomalies will be formally reported to Dominion Voting Systems as described in Section 4.7 Source Code Review. All equipment received for initial testing and follow up testing will be checked against Dominion Voting Systems documentation to ensure their CM process is being followed.

4.1.1 Mapping of Requirements to Equipment Type and Features

Refer to the "2005 EAC Program Requirements Matrix" submitted as Appendix A EAC Requirements Matrix.

4.1.2 Rationale for 'Not Applicable' Requirements

The Dominion Voting Systems Democracy Suite 4.0 is a paper- based precinct counting system that supports a closed network (does not support transmission over public networks). Therefore, all EAC 2005 VVSG requirements intended for DRE with exceptions below will be excluded from this test campaign.

- Volume I Section 3 (Usability and Accessibility Requirement) per RFI 2010-06
- Volume I Section 6.2.6 (Telecommunication Requirements)
- Volume I Section 7.5.2 (Telecommunications and Data Transmission)
- Volume I Section 7.6 (Use of Public Communication Networks)
- Volume I Section 7.7 (Wireless Communications)
- Volume I Section 7.9 (Voter Verifiable Paper Audit Trail Requirements)

4.0 TEST SPECIFICATIONS (CONTINUED)

4.1 Requirements (Strategy of Evaluation) (continued)

4.1.2 Rationale for 'Not Applicable' Requirements (continued)

The rationale for not evaluating the Democracy Suite 4.0 to the requirements contained in the indicated sections of the EAC 2005 VVSG is described below:

Table 4-1 Not Applicable Requirements

EAC 2005 VVSG Volume I Section	Rationale for 'Not Applicable'
6.2.6, 7.5.2, and 7.5.3	These requirements are written for use on public networks. The Dominion Voting Systems Democracy Suite 4.0 does not use public networks.
7.5.4	This section was intended for a shared operating environment on ballot recording and vote counting equipment. The ICE and ICP use dedicated operating environments and will be excluded from this requirement. The EMS and ICC components do use a shared operating environment and will be tested.
7.6	This section pertains to "Voting systems that transmit data over public telecommunications…" The Dominion Voting Systems Democracy Suite 4.0 does not support transmission over public networks.
7.7	No wireless technology is present in the Dominion Voting Systems Democracy Suite 4.0.
7.9	The Dominion Voting Systems Democracy Suite 4.0 is a paper based system.

Refer to the "2005 EAC Program Requirements Matrix" submitted as Appendix A of this document for specific requirements that are excluded during this test campaign.

4.2 Hardware Configuration and Design

The Dominion Voting Systems Democracy Suite is a paper-based optical scan voting system. The Democracy Suite consists of four major component: the EMS, ICE precinct scanner with optional ballot marking capabilities, ICP precinct scanner, and ICC central count scanner.

The Democracy Suite is comprised of two proprietary pieces of hardware (ICE and ICP) and one piece of COTS hardware (ICC). All EMS functions are handled by proprietary software running on COTS PC/laptops/severs. Wyle has determined that these COTS PC/laptops/severs are not subject to hardware testing per the EAC 2005 VVSG. The provided PC/laptops/severs documented in Section 3 Materials Required For Testing all contained "CE", "UL", and "FCC" labeling.

ICP - Dominion Voting Systems has submitted reports of prior testing for the ImageCast Precinct. For more information refer to Sec 4.4.1 of this test plan.

ICE - ICE will be set on the ballot box to simulate real election configuration. During operational tests the unit will be in auto feed mode ("Shoe-Shine") and scan test ballots for the duration of the operational test. Each unit will be loaded with the Operational Status Check Hardware election definition configured for early voting. This will allow all the data generated for the Pre-operational, Operational, and Post-operational test to be further analyzed, compiled and included in the Reliability, Availability and Accuracy Test results.

ICC - ICC consists of COTS scanner and COTS Workstation PC. The Kodak Ngenuity 9150DC scanner and the (Brand and Model TBD) Workstation PC contained "CE", "UL", and "FCC" labeling.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.3 Software System Functions

The Dominion Democracy Suite 4.0 System software is written in the C, C++, C# (C Sharp) programming languages. The system software is broken into three areas EMS, Precinct tabulator software acting as firmware, and central count application running on a COTS workstation.

The Democracy Suite EMS software consists of seven applications listed below:

- Election Event Designer
- Results Tally and Reporting
- Audio Studio
- Datacenter Manager
- Application Server
- Network Attached Storage Server
- Database Server

The Democracy Suite 4.0 contains two precinct tabulators. Both tabulators run software that is treated as firmware. The software applications are ICP and ICE.

The Democracy Suite 4.0 has an independent workstation running proprietary software. The ICC application provides the central tabulation function for the system.

4.4 Test Case Design

Wyle uses the V-Model Life Cycle as defined by the Institute of Electrical and Electronics Engineers (IEEE). The IEEE definition of the V-Model Life Cycle uses two concepts "Verification" and "Validation". Wyle's test approach is to use both "Verification" and "Validation" to some degree. There are four basic levels of testing in the V-Model Life Cycle: Component, Integration, System, and Acceptance. Wyle will be evaluating the Dominion Voting System Democracy Suite 4.0 to all four levels.

4.4.1 Hardware Qualitative Examination Design

Dominion Voting Systems submitted the results of previous testing in the form of the following test reports:

- Sun Microsystems, Advanced Product Testing Lab Test Report Number 08-00735, "Testing Services Report, ImageCast Precinct Ballot Counter & Ballot Marker," dated July 16, 2008
- Criterion Technology Test Report Number 090826-1455R, "EMC Qualification Test Report, Dominion, ImageCast Precinct Ballot Counter With Ballot Box, ICP 300B", dated October 5, 2009
- EMC Integrity Incorporated Test Report Number ETRA80606, Rev. A, "Radiated and Conducted Emissions, ImageCast Precinct Ballot Counter and Ballot Marker," dated July 22, 2008
- EMC Integrity Incorporated Test Report Number TRA80606, Rev. A, "Full Compliance Immunity, ImageCast Precinct Ballot Counter and Ballot Marker," dated July 22, 2008
- Compliance Integrity Services Test Report Number DVS-0807-R02, "Electrical Safety Testing To UL 60950-1: 2007, ImageCast Precinct Counter and Marker," dated August 11, 2008

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4 Test Case Design (continued)

4.4.1 Hardware Qualitative Examination Design (continued)

Wyle performed a hardware qualitative examination to assess if the testing was performed under the guidelines of the EAC program, if the tests were performed per the EAC 2005 VVSG, and the scope of the engineering changes implemented since test performance. The results from this examination deemed that the majority of the previous test results require further analysis before they can be accepted for the current test campaign based on the following:

- Testing was performed on an ICP with a Ballot Marking Device Attached
- Multiple ECO's were applied after initial testing with Electrostatic Disruption and Electromagnetic Radiation testing being performed to verify that the system operates within acceptable limits

Initial testing was performed on an ICP with an attached ballot marking device. The ICP equipment configuration submitted to Wyle for this test campaign does not include the ballot marking device. To verify that the Ballot Marking device does not significantly alter the unit's electronic signature, analysis will be performed using an Electromagnetic Radiation quick scan. If the resulting electronic signature is within acceptable limits, prior EMI testing will be accepted.

The results of the Temperature & Power Variation and Transportation Vibration tests were rejected because of anomalies noted during testing. The anomalies are mentioned in the Test Report, but no specifics are given regarding their nature.

Based on the results of the examination, the summary of acceptable testing is provided in the table below. All testing that is deemed rejected will be performed by Wyle personnel under this test campaign. The details of those tests are presented in Section 6.0.

Table 4-1 Hardware Test Examination Results

Test/EAC 2005 VVSG Section	Procedure/Description	Configuration Tested	Status
Electrical Supply/4.1.2.4	Meets voltage and power requirements of EAC 2005 VVSG Vol. 1 Section 4.1.2.4	Not Tested	--
Electrical Power Disturbance/4.1.2.5	IEC 61000-4-11 (1994-06) power surges and dips	ICP w/ BMD	Analysis Required
Electrical Fast Transient/4.1.2.6	IEC 61000-4-4 (1995-01)	ICP w/ BMD	Analysis Required
Lightning Surge/4.1.2.7	IEC 61000-4-5 (1995-02)	ICP w/ BMD	Analysis Required
Electrostatic Disruption/4.1.2.8	IEC 61000-4-2 (1995-01) 15kV air discharge and 8kV contact discharge	ICP	Accept
Electromagnetic Radiation/4.1.2.9	FCC Part 15 Class B for both radiated and conducted emissions	ICP	Accept

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4 Test Case Design (continued)

4.4.1 Hardware Qualitative Examination Design (continued)

Table 4-1 Hardware Test Examination Results (continued)

Electromagnetic Susceptibility/4.1.2.10	IEC 61000-4-3 electromagnetic field of 10V/m modulated by a 1kHZ, 80% AM modulation at 80MHz to 1000MHz frequency	ICP w/ BMD	Analysis Required
Conducted RF Immunity/4.1.2.11	IEC 61000-4-6 (1996-04) conducted radio frequency energy	ICP w/ BMD	Analysis Required
Magnetic Fields Immunity/4.1.2.12	IEC 61000-4-8 (1993-06) AC magnetic fields of 30 A/m at 60Hz	ICP w/ BMD	Analysis Required
Temperature/Power Variation/4.1.2.13	MIL-STD-810D, Method 502.2 and Method 501.2 163 hours at 50 degrees to 95 degrees	ICP w/ BMD	Reject
High Temperature/4.1.2.14	MIL-STD-810D, Method 501.2 maximum temperature shall be 140 degrees F	ICP w/ BMD	Accept
Low Temperature/4.1.2.14	MIL-STD-810D minimum temperature shall be -4 degrees F	ICP w/ BMD	Accept
Bench Handling	MIL-STD-810D, Method 516.3 Procedure VI six 4" drops on each edge totaling 24 drops	ICP w/ BMD	Accept
Vibration/4.1.2.14	MIL-STD-810D, Method 514.3 physical shock and vibration during handling and transport	ICP w/ BMD	Reject
Humidity Test/4.1.2.14	MIL-STD-810D, Method 501.2 ten 24 hour humidity cycles	ICP w/ BMD	Accept
Maintainability/4.3.4	The ease with which preventive maintenance actions can be performed	Not Tested	--
Safety/4.3.8	UL 60950-1 product safety review	ICP w/ BMD	Accept

Dominion Voting Systems submitted COTS PCs and Laptops to be used during the test campaign that were labeled "CE", "UL", and "FCC" compliant. The supporting documentation for this testing has not been submitted to Wyle at this time. During this test campaign Wyle will review this documentation to ensure that it meets the requirements of the EAC 2005 VVSG.

4.4.1.1 Mapping of Requirements to Specific Interfaces

Please refer to the Wyle Laboratories, Inc., proprietary document "Wyle's EAC Program Req Matrix - VVSG 2005", submitted by Wyle along with this test plan for further reference on requirements mapping

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4 Test Case Design (continued)

4.4.2 Hardware Environmental Test Case Design

The Dominion Voting Systems Democracy Suite 4.0 ICE hardware will be tested by the Wyle Laboratories' EMI, Dynamics, and Environmental test facilities for testing to the hardware requirements in accordance with Wyle Laboratories A2LA certifications 845.01-.03. All EMI testing will be performed per the following Wyle Laboratories' Test Guidelines Documents: EMI-001A, "Wyle Laboratories' 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". These proprietary documents shall be submitted under separate cover for reference. All hardware testing will be performed per the guidelines of ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements", and ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment" and the governing MIL-STD to which the test is required. All pre-voting and post-voting tests will be conducted by Wyle qualified personnel at the Wyle Huntsville, AL facility.

The following hardware tests shall be performed per Volume I of the EAC 2005 VVSG:

- Electrical Supply (Section 4.1.2.4)
- Electrical Power Disturbance (Section 4.1.2.5)
- Electrical Fast Transient (Section 4.1.2.6)
- Lightning Surge (Section 4.1.2.7)
- Electrostatic Disruption (Section 4.1.2.8)
- Electromagnetic Emissions (Section 4.1.2.9)
- Electromagnetic Susceptibility (Section 4.1.2.10)
- Conducted RF Immunity (Section 4.1.2.11)
- Magnetic Fields Immunity (Section 4.1.2.12)
- Environmental Control – Operating Environment (Section 4.1.2.13)
- Environmental Control – Transit and Storage (Section 4.1.2.14)
- Safety (Section 4.3.8)

4.4.3 Software Module Test Case Design and Data

Wyle implements Component Level Testing during the FCA for each component and subcomponent, exercising the functionality of each component and subcomponent as designed and documented. Wyle will utilize limited structural-based techniques (white-box testing) mainly in the area of Source Code Review, Compliance Builds and Security Testing and Review. Wyle will depend heavily on specification-based techniques (black-box testing) for the individual software components. The most common specification-based techniques applied to the Dominion Voting Systems Democracy Suite 4.0 during the software testing portion of testing will be "equivalence partitioning" and "boundary value testing".

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4 Test Case Design (continued)

4.4.3 Software Module Test Case Design and Data (continued)

- "Equivalence partitioning" will be used to evaluate specific software functions and data entry points of the Democracy Suite for valid and invalid data during the FCA. For software functions and data entry points, an entry will be made for a valid data requirement and at least one invalid data requirement to test for normal and abnormal conditions.

- "Boundary Value Testing" will be used to evaluate specific software functions and data entry points for minimums and maximums during the FCA. For software functions and data entry points, an entry will be made for all minimum and all maximum documented requirements to test for normal and abnormal conditions. This technique will be used for numeric ranges as well as non-numeric ranges.

Wyle will document an expected result for each test. The ACCEPT/REJECT criteria at the Component Level will be based on the expected result. If the System Under Test (SUT) performs as expected the results will be accepted including entries for invalid data. If the SUT does not perform as expected the test will be evaluated for tester error. If it is determined there was no tester error, the test will be re-run in an attempt to reproduce the results. If the results can be reproduced and the expected results are not met the SUT will have failed the test. If the results can not be reproduced the results would be determined to be not repeatable and the test would continue. Wyle will document the error and track the error through resolution. Wyle will move to the next level of testing until all documented errors are resolved to try and minimize errors that might occur farther along in the test campaign. Engineering analysis will be performed to determine what effect the resolution has on the component. A determination will be made whether Regression Testing will be sufficient or a complete re-test is necessary.

4.4.4 Software Functional Test Case Design and Data

Wyle implements Integration Level Testing primarily focusing on the interface between components and applications. The test approach to be used for the Dominion Voting Systems Democracy Suite 4.0 will be a bottom-up approach where the lower-level components will be tested first and then used to facilitate the testing of higher-level components. The specification-based technique used by Wyle at the Integration Level is "Use Case". The actors that have been identified to use the Dominion Voting Systems Democracy Suite 4.0 are the following:

- Election Administrator – the actor with responsibility of entering the election definition with translation and audio. This actor is also responsible for maintaining EMS users and the election database.
- Warehouse Technician – the actor responsible for loading the election definition onto the ICE and ICP units. This actor also runs diagnostic tests and maintains the units.
- Poll Worker- the actor at the precinct location to set up and close down the ICE and ICP on Election Day.
- Voter – the actor who physically casts the ballot on Election Day.
- ADA Voter – the actor with special needs who has to vote unassisted on Election Day.
- Election Official – the actor who reports and audits the election results post Election Day.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.4 Test Case Design (continued)

4.4.4 Software Functional Test Case Design and Data (continued)

"Use Case" will be used during the FCA with a single pass through each component using only valid data. This pass will be considered the "Master Copy" of data to be passed between interfacing points of applications during Integration level testing. If a component down stream in the test process needs data from previous processes, the "Master Copy" of data can be used or altered to accelerate the test process. Known tests that will utilize the "Master Copy" of data at the Integration Level are Security, Telecommunication, and Usability.

Wyle expects the components and applications at the Integration Level to interface without error. If an error occurs between data interfaces or in the process flow, an engineering analysis will be performed to determine if the error is data, process, or tester error. The ACCEPT/REJECT criteria for Integration Level testing is whether the components and applications interface using the documented process for each actor. If there is an error interfacing between components, the error will be documented and tracked through resolution. Engineering analysis will be performed to determine what effect the resolution has on the component. A determination will be made whether Regression Testing will be sufficient or a complete re-test is necessary.

4.4.5 System-Level Test Case Design

Wyle implements System Level testing focusing on a complete system including all proprietary software, proprietary hardware, proprietary peripherals, COTS software, COTS hardware, and COTS peripherals in a configuration of the system's intended use. The Dominion Voting Systems Democracy Suite 4.0 is intended to support both large and small jurisdictions. Wyle's approach for Dominion Voting Systems Democracy Suite 4.0 will be to execute most System Level Testing for a large jurisdiction. Wyle will have three different test setup configurations for the EMS components.

Wyle expects all hardware, software, and peripherals to function as a complete system without error during System Level Testing. The ACCEPT/REJECT criteria for System Level testing is whether the system can continue if an error is encountered or if the system is too unstable to continue. If an error occurs during System Level Testing, the error will be documented. If the Dominion Voting Systems Democracy Suite 4.0 is able to recover and continue, the test will continue. If the error causes the system to become unstable, the test will be halted. All errors documented during System Level Testing will be tracked through resolution. Engineering analysis will be performed to determine what effect the resolution has on the system. A determination will be made whether Regression Testing will be sufficient or a complete re-test is necessary.

Wyle implements Acceptance Level testing focusing on all the data collected during the entire test campaign along with performing the "Trusted Build" for the system. All data from pre-testing, hardware testing, software testing, functional testing, security testing, volume testing, stress testing, telecommunication testing, usability testing, accessibility testing, and reliability testing activities will be combined to ensure all requirements that are supported by the Dominion Voting Systems Democracy Suite 4.0 in the EAC 2005 VVSG have been tested. All requirements will be checked against the test data to ensure the EAC 2005 VVSG requirements are met. Items not supported by Dominion Voting Systems Democracy Suite 4.0 will be documented. Any issues documented during testing will be resolved.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.5 Security Functions

Wyle expects that every EAC 2005 VVSG requirement supported by the Dominion Voting Systems Democracy Suite 4.0 will be tested. Wyle will report all issues discovered during this test campaign to the EAC. The EAC has the final determination on whether the system meets all the requirements for an EAC certified system. The ACCEPT/REJECT criteria for Acceptance Level testing is whether or not the data for the test campaign supports a recommendation for certification by the EAC. If Wyle determines there is not enough data to ensure a requirement was met, the test plan will be altered and further testing will be done.

The purpose of the security testing will be to evaluate the effectiveness of the Democracy Suite in detecting, preventing, logging, and recovering from any security risks identified by simulating attacks on the system. To accomplish this, Wyle has developed internal operating procedures to evaluate the Dominion Voting Systems Democracy Suite 4.0 to the security requirements set forth in the EAC 2005 VVSG. These procedures have been specifically tailored to assess the Dominion Voting Systems Democracy Suite 4.0 to the applicable requirements. Wyle will attempt to defeat the access controls and physical security measures documented in the Dominion Voting Systems technical data package. A threat matrix will be created to determine the risks and vulnerabilities. The procedures are proprietary and have been submitted as part of the test plan package.

Wyle will utilize a combination of functional testing, source code review, and Fortify SCA to evaluate the Democracy Suite. Wyle's strategy for evaluating the Democracy Suite will be to utilize the Express Hardware Configuration and the Enterprise Hardware Configuration. Wyle excluded the Standard Hardware Configuration because this configuration overlaps the other two. The following areas are not applicable to the OVS and are therefore not included in the scope of the security testing:

- Use of Public Networks
- Wireless Communication

Testing will be performed by a qualified security expert. All findings will be reported to Dominion Voting Systems for resolution. Dominion Voting Systems will review all findings and correct risks they deem as valid. All documented risks will be reported as an addendum to the final test report.

4.6 TDP Evaluation

Wyle qualified personnel will perform a comprehensive review of the Dominion Voting Systems TDP to determine compliance to the EAC 2005 VVSG, EAC requirements, and Dominion Voting Systems-specific requirements. Wyle qualified personnel utilize a TDP Review Matrix which lists every EAC 2005 VVSG requirement pertaining to TDP review. Wyle qualified personnel will record the results of the review of each document to the applicable requirements listed in the TDP Review Matrix.

During the TDP review process, each document will be reviewed for completeness, clarity, and correctness, and continuity between the TDP documents. The review results will be formally reported to Dominion Voting Systems for resolution. If a revised document is received, it will be re-reviewed as discussed in this section.

The TDP will be continued to be reviewed during the entire testing process as these documents will be utilized to set up the systems, verify correct operational results and numerous other tests.

At the end of the TDP review process, an Anomaly Report will be issued listing the non-compliant items on a document-by-document basis.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.6 TDP Evaluation (continued)

A listing of all documents contained in the Dominion Voting Systems Democracy Suite 4.0 System TDP is provided in Table 4-2.

Table 4-2 Democracy Suite 4.0 TDP Documents

Democracy Suite 4.0 TDP Documents	System	Version	Date	Document Number
Documents describing overall system performance:				
System Configuration Overview	All	1.2.0::161	4/5/2011	2.02
System Security Specification	All	1.1.0::233	4/5/2011	2.06
Configuration Management Process	All	1.2.0::112	4/5/2011	2.11
Quality Assurance Program	All	1.2.0::52	4/5/2011	2.12
System Test and Verification	All	1.0.0::73	4/5/2011	2.07
Personnel Training and Deployment Requirements	All	1.0.0::24	4/5/2011	2.10
Documents describing functionality, hardware, software design, maintenance, and operation:				
EMS Functional Description	EMS	1.0.0::104	4/5/2011	2.03
ICE Functional Description	ICE	1.2.0::35	4/5/2011	2.03
ICP Functional Description	ICP	1.0.0::53	4/5/2011	2.03
ICC Functional Description	ICC	2.2.3::21	4/5/2011	2.03
ICE Tabulator System Hardware Specification	ICE	1.0.0::210	4/5/2011	2.04
ICP Tabulator System Hardware Specification	ICP	1.0.0::31	4/5/2011	2.04
ICE System Hardware Characteristics	ICE	1.0.0::24	4/14/2010	2.04
ICP System Hardware Characteristics	ICP	1.0.0::12	4/14/2010	2.04
EMS Software and Design Specification	EMS	2.1.3	12/3/2009	2.05
ICE Software and Design Specification	ICE	1.0.0::29	4/5/2011	2.05
ICP Software and Design Specification	ICP	2.14::67	4/5/2011	2.05
ICC Software and Design Specification	ICC	1.0.0::15	4/5/2011	2.05
ICP System Operation Procedures	ICP	1.0.0::100	4/5/2011	2.08
EMS System Operation Procedures	EMS	1.1.0::189	4/5/2011	2.08
ICE System Operation Procedures	ICE	TBD	TBD	2.08
ICC System Operation Procedures	ICC	1.0.0::38	4/5/2011	2.08
ICP System Maintenance Manual	ICP	1.0.0::23	4/5/2011	2.09
ICE System Maintenance Manual	ICE	1.0.0::53	4/5/2011	2.09
EMS System Maintenance Manual	EMS	1.0.0::16	4/5/2011	2.09
Election Event Designer Users Guide	EMS	2.3.1	11/2009	N/A
Results Tally and Reporting Users Guide	EMS	2.2.2	12/3/2009	N/A
Audio Studio Users Guide	EMS	1.0.0::10	3/16/2010	N/A
Democracy Suite EMS Coding Standards	EMS	1.0.0	7/28/2010	N/A
Democracy Suite EMS Database Design Documentation	EMS	TBD	TBD	N/A
Democracy Suite EMS Software Build Environment Install Document	EMS	2.0.4	10/21/2009	N/A

4.0 TEST SPECIFICATIONS (CONTINUED)

4.6 TDP Evaluation (continued)

Table 4-2 Democracy Suite 4.0 TDP Documents (continued)

Democracy Suite 4.0 TDP Documents	System	Version	Date	Document Number
ImageCast Evolution Software Update	ICE	TBD	TBD	N/A
ImageCast Evolution Technical Guide	ICE	TBD	TBD	N/A
ImageCast Precinct Approved Parts List	ICP	TBD	TBD	N/A
ImageCast Precinct Configuration Files	ICP	2.3	5/6/2009	N/A
ImageCast Precinct Election Definition Files	ICP	TBD	TBD	N/A
ImageCast Precinct Firmware Build and Install Document	ICP	3.32	8/5/2009	N/A
ImageCast Precinct Firmware Update	ICP	1.1	5/15/2009	N/A
ImageCast Precinct Technical Guide	ICP	1.0.6	3/30/2007	N/A
ImageCast Precinct Test Specification and Reports	ICP	1.0.0	4/27/2007	N/A
ImageCast Million Ballot Scan Test	ICP	1.0.0	3/16/2007	N/A
ImageCast Mean Time Between Failure Measurements	ICP	1.1.0	6/3/2008	N/A
PCOS 300B ICP Manufacturing Test Procedure	ICP	1.4	11/2/2009	N/A
Engineering Product Development Processes	ICP	TBD	TBD	N/A
ImageCast Mean Time Between Failure Measurements	ICE	1.1.0	6/3/2008	N/A
ImageCast Million Ballot Scan Test	ICE	TBD	TBD	N/A
ImageCast Evolution Approved Parts List	ICE	TBD	TBD	N/A
Dominion Voting C C++ Coding Standard	All	2.2.1	7/14/2010	N/A

4.7 Source Code Review

As part of the pre-testing activities, the Dominion Voting Systems Democracy Suite 4.0 source code was reviewed to the EAC 2005 VVSG coding standards and the manufacturer supplied coding standards. The review was conducted per the guidelines described in the following paragraphs.

As the source code was received, an MD5 hash value was created for each source code file. The source code team then conducted a visual scan of every line of source code for an initial review and every line of modified source code for a re-review. This was done to identify any violation of EAC 2005 VVSG coding standards or manufacturer supplied coding standards. Each identified violation was recorded by making notes of the standards violation along with directory name, file name, and line number.

If the review was the initial review, the source code team performed a peer-review on a percentage of the code. This was done to evaluate the correctness of the review and look for standards violations that may have been missed or violations that were noted in error. Any standards violations that the team concluded were recorded in error or missed were then corrected in the code review notes.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.7 Source Code Review (continued)

A technical summary report of all identified standards violations was sent to Dominion Voting Systems for resolution. Dominion Voting Systems then corrected all standards violations and re-submitted the source code for re-review. This process was repeated as many times as necessary, until all identified standards violations were corrected. All reports will be included in an anomaly report for source code and submitted to the EAC and included in the final test report.

Dominion Voting Systems uses an auto-feed option designed in the system to repetitively feed ballots in and out of the scanner. This feature is documented as "Auto-Feed" mode or "Shoe Shine" mode. As part of the source code review this function was inspected in detail to meet the requirements of EAC 2005 VVSG Volume 1 Section 2.2.4 g and h.

The final step will be to create a "Trusted Build" from the reviewed source code. The "Trusted Build" follows the steps below:

- Clean the build machine
- Retrieve the compliant source code
- Retrieve the installation media for OS, compilers, and build software
- Construct the build environment
- Create digital signatures of the build environment
- Load the compliant source code into the build environment
- Create a digital signature of the pre build environment
- Create a disk image of the pre-build environment
- Build executable code
- Create a digital signature of executable code
- Create a disk image of the post-build environment
- Build installation media
- Create a digital signature of the installation media
- Install executable code onto the system a validate the software/firmware
- Deliver source code with digital signature, disk image of pre-build environment with digital signatures, disk image of post-build environment with digital signatures, executable code with digital signatures, and installation media with signatures to EAC Approved Repository.

The "Trusted Build" for Dominion Voting Systems Democracy Suite 4.0 includes source code, data, and script files, in clear text form. The build also includes COTS software on commercially available media, COTS software downloaded by the VSTL, COTS software verified by MD5's from the software supplier, and picture and sound files in binary format provided by Dominion Voting Systems. The first step of the process is to clean the hard drives by writing data to every spot on the hard drive, so the drive is cleared of existing data. The Microsoft Windows XP Professional operating system will then be loaded and the applications from the VSTL reviewed source along with the VSTL verified COTS software will be built. The final step is installing the applications on the hardware.

4.0 TEST SPECIFICATIONS (CONTINUED)

4.8 QA and CM System Review

The Dominion Voting Systems QA Plan and CM Plan state that they comply with ISO 9001 and cite internal Dominion Voting Systems ISO 9001 documentation for details. Both the Dominion Voting Systems QA Plan and CM Plan will be reviewed to determine compliance with EAC 2005 VVSG Volume II Section 2, and Volume I Sections 8 and 9, EAC stated requirements, and with the requirements of the internal Dominion Voting Systems ISO documentation. Also, the Dominion Voting Systems TDP documentation package will be reviewed to determine if the Dominion Voting Systems QA Plan and the CM Plan are being followed. The results of the TDP review will be entered on a spreadsheet as previously described in Section 4.6 TDP Evaluation of this test plan. The results of the TDP review, including the QA and CM compliance results, are included in Appendix F Technical Data Package Review. The results of the TDP review will also be included in the final Test Report.

5.0 TEST DATA

5.1 Test Data Recording

All equipment utilized for test data recording shall be identified in the test data package. For hardware environmental and operational testing, the equipment will be listed on the Instrumentation Equipment Sheet for each test. The output test data will be recorded in an appropriate manner as to allow for data analysis. For source code and TDP reviews, results will be compiled in output reports and submitted to Dominion Voting Systems for resolution. Additionally, all test results, including functional test data, will be recorded on the relevant Wyle Laboratories' Operating Procedure and Test Cases. Results will also be recorded real-time in engineering log books.

5.2 Test Data Criteria

Wyle Laboratories, Inc. will evaluate all test results against the Dominion Voting Systems provided technical documentation for the Democracy Suite 4.0 and the requirements set forth in the EAC 2005 VVSG. The Democracy Suite 4.0 shall be evaluated for its performance against the EAC 2005 VVSG. The acceptable range for system performance and the expected results for each test case shall be derived from the Democracy Suite 4.0 documentation. Per the EAC 2005 VVSG, these parameters shall encompass the test tolerances, the minimum number of combinations or alternatives of input and output conditions that can be exercised to constitute an acceptable test of the parameters involved, and the maximum number of interrupts, halts or other system breaks that may occur due to non-test conditions (excluding events from which recovery occurs automatically or where a relevant status message is displayed).

5.3 Test Data Reduction

Test data shall be manually processed and recorded in the relevant Wyle Laboratories' Operating Procedures and Test Cases. Results will also be recorded real-time in engineering log books.

6.0 TEST PROCEDURES AND CONDITIONS

The following subsections describe test procedures and a statement of the criteria by which readiness and successful completion shall be indicated and measured.

6.1 Facility Requirements

All testing will be conducted at the Wyle Huntsville, AL facility unless otherwise annotated. Hardware environmental non-operating (storage) and operating testing will be conducted utilizing an adequately sized environmental test chamber or dynamic shaker system equipped with the required data gathering support equipment. All remaining operating hardware tests will be conducted at the appropriate test site with the required support equipment. All instrumentation, measuring, and test equipment used in the performance of this test program will be listed on the Instrumentation Equipment Sheet for each test and shall be calibrated in accordance with Wyle Laboratories' Quality Assurance Program, which complies with the requirements of ANSI/NCSL Z540-1 and ISO 10012-1. Standards used in performing all calibrations are traceable to the National Institute of Standards and Technology (NIST) by report number and date. When no national standards exist, the standards are traceable to international standards or the basis for calibration is otherwise documented.

Unless otherwise specified herein, all remaining tests, including system level functional testing, shall be performed at standard ambient conditions:

- Temperature: 25°C ± 10°C (77°F ± 18°F)
- Relative Humidity: 20 to 90%
- Atmospheric Pressure: Local Site Pressure

Unless otherwise specified herein, the following tolerances shall be used:

- Time ± 5%
- Temperature ± 3.6°F (2°C)
- Vibration Amplitude ± 10%
- Vibration Frequency ± 2%
- Random Vibration Acceleration
  - 20 to 500 Hertz ± 1.5 dB
  - 500 to 2000 Hertz ± 3.0 dB
- Random Overall grms ± 1.5 dB
- Acoustic Overall Sound Pressure Level +4/-2 dB

Deviations to the above tolerances may be submitted by the test responsible agency with sufficient engineering information to substantiate the deviation request, but only when best effort technique and system limitations indicate the need for a deviation.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.2 Test Set-Up

All voting machine equipment (hardware and software), shall be received and documented utilizing Wyle Receiving Ticket (WL-218, Nov'85) and proper QA procedures. When voting system hardware is received, Wyle Shipping and Receiving personnel will notify Wyle QA personnel. With Wyle QA personnel present, each test article will be unpacked and inspected for obvious signs of degradation and/or damage that may have occurred during transit. Noticeable degradation and/or damage, if present, shall be recorded, photographs shall be taken, and the Dominion Voting Systems, Inc., representative shall be notified.

Wyle QA personnel shall record the serial numbers and part numbers. Comparison shall be made between those numbers recorded and those listed on the shipper's manifest. Any discrepancies noted shall be brought to the attention of the Dominion Voting Systems, Inc., representative for resolution.

TDP items, including all manuals, and all source code modules received will be inventoried and maintained by the Wyle Project Engineer assigned to testing.

For hardware test setup, the system will be configured as would for normal field use. This includes connecting all supporting equipment and peripherals. Wyle personnel will properly configure and initialize the system, and verify that it is ready to be tested, by following the procedures detailed in the Democracy Suite 4.0 technical documentation. Wyle will develop an operational status test to be performed prior to and immediately following each hardware test. Wyle will develop the system performance levels to be measured during operational tests.

6.3 Test Sequence

The components of the Democracy Suite 4.0 will undergo all hardware software tests described in the EAC 2005 VVSG. The following is a list of tests and a brief description of each hardware and software test and a planned sequence along with the location of each test:

6.3.1 Hardware Test Description

Electromagnetic Radiation – This test verifies that radiated and conducted emissions from the voting system hardware do not exceed the allowable limits of CFR Part 15, Class B. The test for electromagnetic radiation shall be conducted in compliance with the FCC Part 15 Class B requirements by testing per ANSI C63.4 (Volume II, Section 4.8.b).

Low Temperature – This requirement addresses a range of tests for voting machines and precinct counters, as such devices are stored between elections and are transported between the storage facility and polling place, to meet specific minimum performance standards for low temperatures.

Vibration – This requirement addresses a range of tests for voting machines and precinct counters, as such devices are stored between elections and are transported between the storage facility and polling place, to meet specific minimum performance standards for vibration.

Lightning Surge – This test demonstrates the voting system's hardware to withstand power line lightning surges during normal operation. This test is equivalent to the procedure of IEC 61000-4-5. The test for lightning surge protection shall be conducted in compliance with the test specified in IEC 61000-4-5 (Volume II, Section 4.8.f).

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.1 Hardware Test Description (continued)

High Temperature – This test addresses a range of tests for voting machines and precinct counters, as such devices are stored between elections and are transported between the storage facility and polling place, to meet specific minimum performance standards for high temperature.

Bench Handling – The bench handling test simulates stresses faced during maintenance and repair of voting machines and ballot counters.

Electrical Fast Transient – This test demonstrates the voting system's hardware to withstand electrical fast transients during normal operation. This test is equivalent to the procedure of IEC 61000-4-4. The test for electrical fast transient protection shall be conducted in compliance with the test specified in IEC 61000-4-4 (Volume II, Section 4.8.e).

Humidity Test – This requirement addresses a range of tests for voting machines and precinct counters, as such devices are stored between elections and are transported between the storage facility and polling place, to meet specific minimum performance standards.

Electrostatic Disruption – This test demonstrates the voting system's hardware to withstand electrostatic discharges during normal operation. This test is equivalent to the procedure of IEC 61000-4-2. The test for electrostatic disruption shall be conducted in compliance with the test specified in IEC 61000-4-2 (Volume II, Section 4.8.c).

Electromagnetic Susceptibility – This test demonstrates the voting system's hardware to withstand radiated electromagnetic fields during normal operation. This test is equivalent to the procedure of IEC 61000-4-3. The test for electromagnetic susceptibility shall be conducted in compliance with the test specified in IEC 61000-4-3 (Volume II, Section 4.8.d.).

Conducted RF Immunity – This test demonstrates the voting system's hardware ability to withstand conducted RF energy on power and I/O lines during normal operation. This test is equivalent to the procedure of IEC 61000-4-6. The test for conducted RF immunity shall be conducted in compliance with the test specified in IEC 61000-4-6 (Volume II, Section 4.8.g).

Magnetic Fields Immunity – This test demonstrates the voting system's hardware ability to withstand Magnetic Fields during normal operation. This test is equivalent to the procedure of IEC 61000-4-8. The test for AC magnetic fields RF immunity shall be conducted in compliance with the test specified in IEC 61000-4-8 (Volume II, Section 4.8.h).

Electrical Power Disturbance – This test demonstrates the voting system's hardware to withstand power disturbances during normal operation. This test is equivalent to the procedure of IEC 61000-4-11 (Volume I, Section 4.1.2.5). The test for power disturbance disruption shall be conducted in compliance with the test specified in IEC61000-4-11(Volume II, Section 4.8.a)

Temperature Power Variation – The Environmental Test, Operating, subjects the system hardware to varying temperatures and voltages, demonstrating hardware/data recording accuracy reliability Mean-Time-Between-Failure (MTBF) of 163 hours.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.1 Hardware Test Description (continued)

Safety – All voting systems shall meet the following requirements for safety:

a. All voting systems and their components shall be designed to eliminate hazards to personnel or to the equipment itself.

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.

c. Equipment designed for personnel safety shall be equal to or better than the appropriate requirements of the Occupational Safety and Health Act, Code of Federal Regulations, Title 29, Part 1910.

Maintainability – Maintainability represents the ease with which preventive and corrective maintenance actions can be performed based on the design characteristics of equipment and software and the processes the manufacturer and election officials have in place for preventing failures and for reacting to failures.

Electrical Supply – This requirement addresses the battery power source for providing electrical supply during a power failure.

Table 6-1 Democracy Suite 4.0 Hardware Test Sequence

Test	Procedure/Description	Location	Specimen
Electromagnetic Radiation	FCC Part 15 Class B for both radiated and conducted emissions	EMI Lab	
Low Temperature	MIL-STD-810D minimum temperature shall be -4 degrees F	Environmental Lab	
Vibration	MIL-STD-810D, Meth0d 514.3 physical shock and vibration during handling and transport	Dynamics Lab	
Lightning Surge	IEC 61000-4-5 (1995-02)	EMI Lab	
High Temperature	MIL-STD-810D, Method 501.2 maximum temperature shall be 140 degrees F	Environmental Lab	
Bench Handling	MIL-STD-810D, Method 516.3 Procedure VI six 4” drops on each edge totaling 24 drops	Dynamics Lab	
Electrical Fast Transient	IEC 61000-4-4	EMI Lab	
Humidity Test	MIL-STD-810D, Method 501.2 ten 24 hour humidity cycles	Environmental Lab	
Electrostatic Disruption	IEC 61000-4-2 (1995-01) 15kV air discharge and 8kV contact discharge	EMI Lab	
Electromagnetic Susceptibility	IEC 61000-4-3 electromagnetic field of 10V/m modulated by a 1kHZ, 80% AM modulation at 80MHz to 1000MHz frequency	EMI Lab	

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.1 Hardware Test Description (continued)

Table 6-1 Democracy Suite 4.0 Hardware Test Sequence (continued)

Test	Procedure/Description	Location	Specimen
Conducted RF Immunity	IEC 61000-4-6 (1996-04) conducted radio frequency energy	EMI Lab	
Magnetic Fields Immunity	IEC 61000-4-8 (1993-06) AC magnetic fields of 30 A/m at 60Hz	EMI Lab	
Electrical Power Disturbance	IEC 61000-4-11 (1994-06) power surges and dips	EMI Lab	
Temperature/Power Variation	MIL-STD-810D, Method 502.2 and Method 501.2 163 hours at 50 degrees to 95 degrees	Environmental Test Chamber	
Safety	UL 60950-1 product safety review	Product Safety Lab	
Maintainability	The ease with which preventive maintenance actions can be performed	Product Safety Lab	
Electrical Supply	Meets voltage and power requirements of EAC 2005 VVSG Vol. 1 Section 4.1.2.4	Product Safety Lab	

6.3.2 Software Test Description

TDP Review – The technical data package must be submitted as a precondition of national certification testing. These items are necessary to define the product and its method of operation; to provide technical and test data supporting the manufacturer's claims of the system's functional capabilities and performance levels; and to document instructions and procedures governing system operation and field maintenance. Any information relevant to the system evaluation shall be submitted to include source code, object code, and sample output report formats.

Source Code Compliance Review – Wyle Laboratories personnel will compare the source code to the manufacturer's software design documentation to ascertain how completely the software conforms to the manufacturer's specifications. Source code inspection shall also assess the extent to which the code adheres to the requirements in Volume I, Section 5.

Compliance Build of the Democracy Suite 4.0 Software, Firmware, and Utilities– Before testing can begin, a compliance build of all the applications will be constructed by Wyle personnel using the build environment, build documentation and reviewed source code. This is to ensure the software being tested is constructed from the same source code that was reviewed.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.2 Software Test Description (continued)

Physical Configuration Audit – The Physical Configuration Audit compares the voting system components submitted for qualification to the manufacturer's technical documentation, and shall include the following activities:

- Establish 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.
- Verify 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.
- Review drawings, specifications, technical data, and test data associated with system hardware, if non-COTS, to establish system hardware baseline associated with software baseline.
- Review 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

COTS Source Code Review – Unmodified, general purpose COTS non-voting software (e.g., operating systems, programming language compilers, data base management systems, and Web browsers) is not subject to the detailed examinations specified in this section. However, Wyle Laboratories personnel will examine such software to confirm the specific version of software being used against the design specification to confirm that the software has not been modified. Portions of COTS software that have been modified by the manufacturer in any manner are subject to review. Unmodified COTS software is not subject to code examination. However, source code generated by a COTS package and embedded in software modules for compilation or interpretation will be provided in human readable form to Wyle Laboratories. Wyle Laboratories personnel may inspect COTS source code units to determine testing requirements or to verify the code is unmodified. Wyle Laboratories may inspect the COTS generated software source code in preparation of test plans and to provide some minimal scanning or sampling to check for embedded code or unauthorized changes. Otherwise, the COTS source code is not subject to the full code review and testing. For purposes of code analysis, the COTS units shall be treated as unexpanded macros.

Baseline of EMS Operating and Build Machine OS – Wyle will review the submitted NIST SCAP FDCC checklist for the EMS Operating System and Build Machine OS by Dominion Voting Systems. The review will be performed for completeness, clarity, and consistency.

Functional Configuration Audit – The functional configuration audit encompasses an examination of manufacturer's tests, and the conduct of additional tests, to verify that the system hardware and software perform all the functions described in the manufacturer's documentation submitted for the TDP. In addition to functioning according to the manufacturer's documentation, tests will be conducted to ensure all applicable EAC 2005 VVSG requirements are met.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.2 Software Test Description (continued)

Error Recovery Test – This will be tested to ensure that the unit is capable of recovering from a non-catastrophic failure of a device, or from any error or malfunction that is within the operator's ability to correct and restore the device gracefully from the failures. Testing will include powering units off while operating, and disconnecting various cables and components to ensure operation once restored.

Security Source Code Review – The security source code review is a detailed review of the functionality of the source code that has been submitted. Both a manual line by line review and an automated analysis of the source code will be performed.

Security Test – The security test is designed and performed to test the capabilities of the voting system against the requirements defined in Volume I Section 7. These procedures shall focus on the ability of the system to detect, prevent, log, and recover from a broad range of security risks identified. This test will also examine system capabilities and safeguards claimed by the Dominion Voting Systems in the TDP to go beyond these risks. The range of risks tested is determined by the design of the system and potential exposure to risk.

Telecommunication Test – The telecommunication test focuses on system hardware and software function and performance for the transmission of data that is used to operate the system and report election results. This test applies to the requirements for Volume I, Section 6 of the EAC 2005 VVSG.

Usability – The usability test is a measure of the effectiveness, efficiency, and satisfaction achieved by a specified set of users with a given product in the performance of specified tasks. This test applies to the requirements for Volume I, Section 3 of the EAC 2005 VVSG.

Volume/Stress/Reliability – The volume/stress/reliability test is designed to test the systems ability to process more data at a high rate than is expected within the Mean Time Between Failure (MTBF) ratio.

Logic and Accuracy – The logic and accuracy test ensures the voting system can process 1,549,703 consecutive ballot positions correctly within the Mean Time Between Failure (MTBF) ratio.

System Integration – System Level certification tests address the integrated operation of both hardware and software, along with any telecommunication capabilities. Compatibility of the voting system software components or subsystems with one another, and with other components of the voting system environment, shall be determined through functional tests integrating the voting system software with the remainder of the system.

Trusted Build – The trusted build is a process of converting the reviewed source code into machine-readable binary instructions for a computer. This test will follow Section 5.6 of the EAC Testing and Certification Program manual.

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.2 Software Test Description (continued)

Table 6-2 Democracy Suite 4.0 Software and System Testing Sequence

Test	Description	Procedure	Test Level	Specimen	Election Data
Technical Data Package (TDP) Review (Pre-testing Activity)	Documentation review for compliance, correctness, and completeness	WHVS07.1 WOP 3	Document	TDP package	
Compliance Source Code Review (Pre-testing Activity)	Source code review for compliance	WHVS07.2 WOP 5a	Component	Democracy Suite 4.0 Source Code Package	
Compliance Build	Using the build documents and souce code to construct the EMS, ImageCast Precinct, ADA Device and ImageCast Central	WHVS07.3 WOP 25	Component	Democracy Suite 4.0	
Physical Configuration Audit	Audit hardware and software models and versions	WHVS07.3 WOP 25	Component & System	Democracy Suite 4.0	
Source Code COTS Review	Source code review to examine third party products for modification and versions	WHVS07.2 WOP 5d	Component	Democracy Suite 4.0 Source Code Package	
Baseline OS	RFI 2008-03 OS Configuration	WHVS07.3 WOP 25	Component	Democracy Suite 4.0	
Functional Configuration Audit	Functional testing to the system documentation and EAC 2005 VVSG requirements	WHVS07.4 WOP 26 WOP30a	Component & Integration		Gen-01 Prim-01
Source Code Functional Review	Source code review for functionality and high level software design	WHVS07.2 WOP5b	Component & Integration	Democracy Suite 4.0 Source Code Package	

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.2 Software Test Description (continued)

Table 6-2 OpenElect Voting System Software and System Testing Sequence (continued)

Test	Description	Procedure	Test Level	Specimen	Election Data
Source Code Security Review (manual – automated)	Source code review for specific security concerns and an automated review using Fortify	WHVS07.2 WOP5d WOP 6a	Component & Integration	Democracy Suite 4.0 Source Code Package	
Telecommunication	Test of telecommunication technology of the system for accuracy and correctness	WHVS07.6 WOP 31	Integration & System		Gen-01 Volume & Stress
Security	Assess the system to the 2005 VVSG requirements and execute basic system security tests.	WHVS07.7 WOP 6 WOP 6a WOP 6b WOP 6c WOP 6d	Integration & System		Gen-01 Prim -01
Usability/Accessibility		WOP 22 WOP 24-1 WOP 24-1a WOP 24-1b WOP 24-1c WOP 24-1d WOP 24-1f WOP 24-1g WOP 24-2 WOP 24-2a WOP 24-2b WOP 24-2c WOP 24-2d WOP 24-2e WOP 24-2f	Integration		Gen-01 Prim-01
Volume, Stress, & Reliability Test	Test to investigate the system's response to larger amounts of data than it is expecting.	WOP 21	System		Volume and Stress Election
Logic and Accuracy (Temp Power)	Test of accuracy to ~1.6 million ballot positions	WHVS07.9 WOP 30	System		L&A Election

6.0 TEST PROCEDURES AND CONDITIONS (CONTINUED)

6.3 Test Sequence (continued)

6.3.2 Software Test Description (continued)

Table 6-2 OpenElect Voting System Software and System Testing Sequence (continued)

Test	Description	Procedure	Test Level	Specimen	Election Data
System Integration Test	Test of all system hardware, software and peripherals.	WOP 30	System		Gen-01-03 Prim-01-03
Trusted Build	Creation and installation of the final system software	WHVS07.6 WOP 7 WOP 7a	Component		Democracy Suite 4.0 Source Code Package

7.0 TEST OPERATIONS PROCEDURES

7.1 Proprietary Data

All proprietary data that is marked will be distributed only to those persons that the manufacturer or EAC identifies as needing the information to conduct qualification testing. The manufacturer is required to mark all proprietary documents as such. All organizations and individuals receiving proprietary documents will ensure those documents are not available to non-authorized persons.

Table 7-1 Proprietary Data

Document/Data	Scope Of Restriction

APPENDIX A

EAC REQUIREMENTS MATRIX

(TO BE SUPPLIED AT A LATER DATE)

APPENDIX B

DOMINION VOTING SYSTEMS DEMOCRACY SUITE 4.0 IMPLEMENTATION STATEMENT

(TO BE SUPPLIED AT A LATER DATE)

APPENDIX C

DOMINION VOTING SYSTEMS PROJECT SCHEDULE

(TO BE SUPPLIED AT A LATER DATE)

APPENDIX D

USABILITY REPORTS

(TO BE SUPPLIED AT A LATER DATE)