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Test Plan for EAC 2005 VVSG Certification Testing
Dominion Voting Systems Democracy Suite (D-Suite) Version 5.20
Voting System

EAC Project Number: DVS-DemSuite5.20

Version: 06

Date: 09/17/2026

U.S. Election Assistance Commission
VSTL
EAC Lab Code 1501

NVLAP®
TESTING
NVLAP LAB CODE 200978-0

Disclaimer: The test report and test results resulting from this test plan must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

SIGNATURES

Approved by: Michael L. Walker — 09/17/2026

Michael Walker, VSTL Program Manager — Date

Approved by: Wendy Owens — 09/17/2026

Wendy Owens, VSTL Program Director — Date

Approved by: Stacey Glover — 09/17/2026

Stacey Glover, QA Manager — Date

Pro V&V attests to the following: 1) all testing prescribed by the approved and published test plan or amended test plan will be performed as identified or the divergence from the test plan will be properly documented in the resulting test report, 2) all identified voting system anomalies or failures will be reported and resolved, and 3) the resulting test report will be accurate and complete. There will be no opinions or interpretations included in the resulting report, except as noted under 'Recommendations'.

REVISIONS

Revision	Description	Date
00	Initial Release	03/22/2024
01	Post EAC Comments	04/16/2024
02	Post Updated Implementation and System Overview Update	04/17/2024
03	Post Updated Implementation and Change Notes Update	11/15/2024
04	Minor Edits per EAC Comments	11/26/2024
05	Corrected document version in Table 4-1	11/27/2024
06	Removed incorrect ICP hardware version	09/17/2026

TABLE OF CONTENTS

1.0 INTRODUCTION **1**

1.1 Description and Overview of EAC Certified System Being Modified 1

1.1.1 Baseline Certified System 1

1.1.2 Description of Modification 4

1.1.3 Initial Assessment 6

1.1.4 Regression Test 7

1.2 References 7

1.3 Terms and Abbreviations 8

1.4 Project Schedule 9

1.5 Scope of Testing 9

1.5.1 VVSG 10

1.5.2 RFIs 10

1.5.3 NOCs 10

1.6 System Overview 10

1.6.1 Block Diagram 24

1.6.2 System Limits 24

1.6.3 Supported Languages 25

1.6.4 Supported Functionality 27

2.0 PRE-CERTIFICATION TESTING AND ISSUES 27

2.1 Evaluation of Prior VSTL Testing 27

2.2 Evaluation of Prior Non-VSTL Testing 27

2.3 Known Field Issues 27

3.0 MATERIALS REQUIRED FOR TESTING 28

3.1 Software 28

3.2 Equipment 28

3.3 Test Materials 28

3.4 Proprietary Data 29

4.0 TEST SPECIFICATIONS **29**

4.1 Requirements (Strategy of Evaluation) 29

4.1.1 Rational for ‘Not Applicable’ Requirements 32

4.2 Hardware Configuration and Design 32
4.3 Software System Functions 32
4.4 Test Case Design 32
4.4.1 Hardware Qualitative Test Case Design 33
4.4.2 Hardware Environmental Test Case Design 33
4.4.3 Software Module Test Case Design and Data 33
4.4.4 Software Functional Test Case Design and Data 33
4.4.5 System-Level Test Case Design 34
4.5 TDP Evaluation 34
4.6 Source Code Review 42
4.7 Physical Configuration Audit (PCA) 43
4.8 System Level Testing 43
4.8.1 Functional Configuration Audit (FCA) 44
4.8.2 Accuracy 44
4.8.3 System Integration 44
4.8.4 Volume & Stress 45
4.8.5 Regression Testing 46
4.9 Security Functions 46
5.0 TEST DATA 46
5.1 Test Data Recording 46
5.2 Test Data Criteria 47
6.0 TEST PROCEDURES AND CONDITIONS 47
6.1 Facility Requirements 47
6.2 Test Set-Up 47
6.3 Test Sequence 47
6.4 Test Operations Procedure 48

APPENDIX A: PROJECT SCHEDULE A-1

1.0 INTRODUCTION

The purpose of this Test Plan is to document the procedures that Pro V&V, Inc. will follow to perform certification testing during a system modification campaign for the Dominion Voting Systems Democracy Suite (D-Suite) 5.20 Voting System to the requirements set forth for voting systems in the U.S. Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (VVSG), Version 1.0. Prior to submitting the voting system for testing, Dominion Voting Systems submitted an application package to the EAC for certification of the D-Suite 5.20 Voting System. The application was accepted by the EAC and the project was assigned the unique Project Number of DVS-DemSuite 5.20.

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

1.1 Description and Overview of EAC Certified System Being Modified

The D-Suite 5.20 Voting System is a paper-based optical scan voting system. The D-Suite 5.20 consists of the following major components: The Election Management System (EMS), the ImageCast Central (ICC), the ImageCast Precinct (ICP and ICP2), ImageCast X (ICX) VVPAT BMD, ImageCast Evolution (ICE), and the ImageCast X (ICX) BMD. The D-Suite 5.20 Voting System configuration is a modification from the EAC approved D-Suite 5.17 system configuration.

1.1.1 Baseline Certified System

The EAC Certified System that is the baseline for the submitted modification is described in the following subsections. All information presented was derived from the previous Certification Test Report, the EAC Certificate of Conformance and/or the System Overview.

The baseline system for this modification is the D-Suite 5.17 Voting System. The D-Suite 5.17 Voting System is a paper-based optical scan voting system. The D-Suite 5.17 consists of the following major components: The Election Management System (EMS), the ImageCast Central (ICC), the ImageCast Precinct (ICP and ICP2), ImageCast X (ICX) VVPAT BMD, ImageCast Evolution (ICE), and the ImageCast X (ICX) BMD.

Detailed descriptions of the D-Suite 5.17 test campaign are contained in Pro V&V Report No.TR-01-01-DVS-50-01.03, which is available for viewing on the EAC's website at www.eac.gov.

The following subsections describe the baselined D-Suite 5.17 Voting System.

Election Management System (EMS)

The D-Suite 5.17 EMS consists of various components running as either a front-end/client application or as a back-end/server application. A listing of the applications and a brief description of each is presented below.

Front-end/Client applications:

- EMS Adjudication: Represents the client component responsible for adjudication, including reporting and generation of adjudicated result files from ImageCast Central tabulators and adjudication of write-in selections from ImageCast Precinct and ImageCast Central tabulators. This client component is installed on both the server and the client machines.

- EMS Audio Studio: A client application that 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.

- EMS Election Data Translator: End-user application used to export election data from election project and import election data into election project.

- EMS Election Event Designer: A client application that integrates election definition functionality together with ballot styling capabilities and represents a main pre-voting phase end-user application

- ImageCast Voter Activation: An application, installed on a workstation or laptop at the polling place, which allows the poll workers to program smart cards for voters. The smart cards are used to activate voting sessions on ImageCast X.

- EMS Results Tally and Reporting: A client application that integrates election results acquisition, validation, tabulation, reporting, and publishing capabilities and represents the main post-voting phase end-user application.

Back-end/Server applications:

- EMS Adjudication Service: Represents a server side application which provides ballot information such as contests, candidates and their coordinates from EMS to the Adjudication application.

- EMS Application Server: Represents a server side application responsible for executing long running processes, such as rendering ballots, generating audio files and election files, etc.

- EMS Database Server: 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.

- EMS Data Center Manager: A server application that represents a system level configuration application used in EMS back-end data center configuration.

- EMS File System Service: A back-end application that acts as a stand-alone service that runs on client machines, enabling access to low level operating system API for partitioning CF cards, reading raw partition on ICP CF card, etc.

- EMS NAS Server: Represents a server side file repository of the election project file based artifacts, such as ballots, audio files, reports, log files, election files, etc.

- Smart Card Helper Service: A service that is installed on a workstation or laptop at the polling place, and provides required data format for programming smart cards for ImageCast devices, or, for jurisdiction's voting registration system in case of integration.

ImageCast Precinct (ICP)

The ImageCast Precinct (ICP) device is a precinct optical scan ballot counter designed to provide three major functionalities: ballot scanning and tabulation, accessible voting, and ballot review and second chance voting. The ICP is used in conjunction with ImageCast compatible ballot storage boxes. The system is designed to scan marked paper ballots printed on standard or secure paper stock, interpret voter marks on the paper ballot, and safely store and tabulate each vote from each paper ballot. The ICP also supports enhanced accessibility voting through optional accessories connected to the ImageCast unit.

ImageCast Precinct (ICP2)

The ImageCast Precinct (ICP2) device is a precinct-based optical scan ballot counter designed to provide two major functionalities: ballot scanning and tabulation and ballot review and second chance voting. The ICP2 is used in conjunction with ImageCast compatible ballot storage boxes. The system is designed to scan marked paper ballots printed on standard or secure paper stock, interpret voter marks on the paper ballot, and safely store and tabulate each vote from each paper ballot.

ImageCast Evolution (ICE)

The ICE device is a precinct-level optical scan ballot counter designed to perform three major functions: ballot scanning and tabulation, ballot review and second chance voting, and accessible voting and ballot marking.

ImageCast Central (ICC) Count Scanner

The ImageCast Central (ICC) is a high-speed, central ballot optical 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 scanning and counting of paper ballots.

ImageCast X (ICX)

The Democracy Suite ImageCast X (ICX) consists exclusively of COTS available hardware and operating system, while the applications installed on top customize its behavior to turn it into a Ballot Marking Device (BMD) or a Ballot Marking Device (BMD) and Tabulator device. ICX application is the application that verifies voter's session eligibility, using the smart card and then presents the appropriate ballot to the voter. When a voter is satisfied with choices selected, ICX application verifies them and produces a marked printed ballot or stores the votes onto a memory device. The ICX is designed to perform the following functions:

- Ballot marking and printing
- Ballot review and second chance voting
- Accessible voting and ballot marking
- Saving voting results (in VVPAT BMD mode)
- Printing votes on a voter verifiable paper audit trail device (when VVPAT is in use)

1.1.2 Description of Modification

The Dominion Democracy Suite 5.20 Voting System is a modified voting system configuration. The list below includes changes between the current D-Suite 5.20 system and the baseline of the Democracy Suite 5.17 Voting System, as taken from the *System Change Notes*:

General System Changes

- System and security updates to Democracy Suite:
  - Upgrade to Windows 11, Windows Server 2022 and SQL Server 2022
  - Updated system components to OpenSSL 3.0
  - Added support for CardLogix Smart Cards
- Added support for Rank Choice Voting
- ICX USB Whitelist is now maintained as part of a configuration file.
- Added an option to ensure short write-in entries (3 characters or less) can register when scanned.
- Added an option to add Batch ID's to Precinct Batch Cards
- Added ability to specify color for paper ballot and screen ballot headers based on Ballot Group

EMS

- Adjudication Databases now included in system back-ups
- Election Event Designer: Added ability to sort and group results by Ballot Groups in the Ballot Types Report
- Election Event Designer: Added support for New Hampshire Ballot Style
- Results Tally & Reporting: The following reports are now WCAG compliant (for accessibility):
  - Precinct Canvass

- District Canvass
- District Total Canvass
- Summary Report (2 column)

- Results Tally & Reporting: Reporting Improvements:
  - Added option to filter Machine Report by Tabulator Type
  - District Total Canvass – Added voter privacy threshold
  - Added an option to include or exclude unincorporated areas in the SOVC report
  - Added ability to export and import Reporting Profiles for all reports in the Results Reporting Module
  - Prevented a blank write-in value from appearing in all contests on Canvass reports where write-ins do not exist
- Results Tally & Reporting: The Automatic Results Loading screen now has an option to allow users to set the results to 'Skip Adjudication'
- Results Tally & Reporting: All Adjudication reports are now generated in RTR
- Results Tally & Reporting: Added new Election Readiness Dashboard
- Results Tally & Reporting: Updated sort order on District Canvass and District Total Canvass reports to follow global order

Adjudication

- Updated User Interface for the Adjudication application
- User Management is now based within the application and can be specific to the election, rather than workstation/workgroup based
- Ballot processing can now be done in two different ways
  - Assign entire batch to single user(s)
  - Next available ballot goes to next available workstation
- Outstack criteria can now be defined by tabulator type or tabulator and counting group, allowing users to adjudicate central count/mail ballots for one set of criteria and ballots tabulated within polling places and vote centers using another set of criteria
- Added new Adjudication Statistics Report

ICP

- Ensure that the Total Result File contains information that the poll is closed
- Removed ability to print Zero Report after ballots have been cast.

ICC

- Updated User Interface for the central scanning application
- Loading and configuration of election files has been enhanced, users are now only required to browse to the appropriate set of election files
- Batches can be spoiled through the application now
- New Status Report introduced, that allows users to view the list of batches and total ballots within batches that have been scanned on any tabulator, without viewing results

ICE

- Added support for multi-page TIFF images

ICP2

- Added support for multi-page TIFF images

ICX

- Added ability to perform a Hardware Sound Test from the Poll Administration and Technician Menus
- Updated option to print line between contests on VVPAT tape to print a dashed line instead of a full line when switched on
- Allow a voter making a straight party selection to split the ticket without having to deselect their part choice.

1.1.3 Initial Assessment

Testing from the previous test campaign was used to establish the baseline. The focus of this test campaign is the functional modifications and updates. It was determined the following tasks would be required to verify compliance of the modifications:

- Source Code Review, Compliance Build, Trusted Build, and Build Document Review
- System Level Testing
    - System Integration Testing
    - Accuracy Testing

- Functional Configuration Audit (FCA), including Regression Testing
- Volume & Stress

- Technical Documentation Package (TDP) Review
- System Loads & Hardening
- Physical Configuration Audit (PCA)
- Security Testing

1.1.4 Regression Test

D-Suite 5.20 is a modified voting system configuration that includes functional upgrades and modifications to the baseline system. Modified system testing is an abbreviated testing campaign built upon a regression review of the modifications against the baseline-system and requirements. Modifications, alone and collectively, are reviewed (tested) to see if they fall under any requirement(s), or functionally impact the ability of the modified system to continue to meet requirements.

Regression reviews consist of targeted investigations to determine if further testing is necessary based on the nature and scope of the communicated modifications (whether activated or deactivated), and any other submitted information. The objective of regression testing is to establish assurance that the modifications have no adverse impact on the compliance, integrity, or performance of the system.

Regression testing for this test campaign will consist of the execution of the System Integration Testing.

1.2 References

- Election Assistance Commission (EAC) 2005 Voluntary Voting System Guidelines (VVSG) Version 1.0, Volume I, "Voting System Performance Guidelines", and Volume II, "National Certification Testing Guidelines"
- Election Assistance Commission Testing and Certification Program Manual, Version 3.0
- Election Assistance Commission Voting System Test Laboratory Program Manual, Version 3.0
- National Voluntary Laboratory Accreditation Program NIST Handbook 150, 2020 Edition, "NVLAP Procedures and General Requirements (NIST HB 150-2020)"
- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2021 Edition, "Voting System Testing (NIST Handbook 150-22-2021)"
- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002

- Pro V&V, Inc. Quality Assurance Manual
- Election Assistance Commission "Approval of Dominion Voting Systems Corp Democracy Suite 5.20 Testing Application Package" letter dated March 5, 2024
- EAC Requests for Interpretation (RFI) and Notices of Clarification (NOC) (listed on www.eac.gov)
- Pro V&V Certification Test Report TR-01-01-DVS-50-01.03, dated 03/15/2023
- Dominion Voting Systems Technical Data Package *(A listing of the D-Suite 5.20 documents submitted for this test campaign is listed in Section 4.5 of this Test Plan)*

1.3 Terms and Abbreviations

This subsection lists terms and abbreviations relevant to the hardware, the software, or this Test Plan.

"ADA" – Americans with Disabilities Act 1990

"BMD" – Ballot Marking Device

"CM" – Configuration Management

"COTS" – Commercial Off-The-Shelf

"EAC" – United States Election Assistance Commission

"EMS" – Election Management System

"FCA" – Functional Configuration Audit

"HAVA" – Help America Vote Act

"ICC" – ImageCast Central

"ICE" – ImageCast Evolution

"ICP" – ImageCast Precinct

"ICP2" – ImageCast Precinct 2

"ICX" – ImageCast X

"ISO" – International Organization for Standardization

"NOC" – Notice of Clarification

"PCA" – Physical Configuration Audit

"QA" – Quality Assurance

"RFI" – Request for Interpretation

"TDP" – Technical Data Package

"UPS" – Uninterruptible Power Supply

"VSTL" – Voting System Test Laboratory

"VVPAT" – Voter Verifiable Paper Audit Trail

"VVSG" – Voluntary Voting System Guidelines

1.4 Project Schedule

The Project Schedule for the test campaign is located in Appendix A. The dates on the schedule are not firm dates but planned estimates based on the anticipated project work flow.

1.5 Scope of Testing

The scope of testing focused on the functional updates and modifications. To evaluate the D-Suite 5.20 test requirements, the submitted modifications were evaluated against each section of the EAC 2005 VVSG to determine the applicable tests to be performed.

Based on this assessment, it was determined that multiple areas within the EAC 2005 VVSG would be evaluated to encompass the required tests. A breakdown of the areas and associated tests is listed below:

- EAC 2005 VVSG Volume 1, Section 2: Functional Requirements
  - System Integration Testing
  - Functional Configuration Audit (FCA)
  - Physical Configuration Audit (PCA), including System Loads & Hardening
  - Technical Documentation Package (TDP) Review
  - Accuracy Testing
  - Volume & Stress
- EAC 2005 VVSG Volume 1, Section 5: Software Requirements
  - Source Code Review, Compliance Build, Trusted Build, and Build Document Review
  - Technical Documentation Package (TDP) Review
  - Functional Configuration Audit (FCA)
- EAC VVSG 1.0 Volume 1, Section 7: Security Requirements
  - Security Testing
  - Technical Documentation Package (TDP) Review

Note: Section 6 (Telecommunications Requirements) of the VVSG 1.0 is not applicable to the D-Suite 5.20 system and was therefore not included in testing. Additionally, Section 3 (Usability & Accessibility), Section 4 (Hardware Requirements), Section 8 (Quality Assurance Requirements), and Section 9 (Configuration Management Requirements) were reviewed in previous test campaigns and were not impacted by the submitted modifications.

1.5.1 VVSG

The D-Suite 5.20 Voting System shall be evaluated against the relevant requirements contained in the EAC 2005 VVSG, Version 1.0. To evaluate the D-Suite 5.20 test requirements, the submitted modifications were evaluated against each section of the EAC VVSG 1.0 to determine the applicable tests to be performed. Details of this evaluation are contained in Section 4.1 of this Test Plan.

1.5.2 RFIs

There are no RFIs released by the EAC as of the date of this Test Plan that pertain to this test campaign that were not in effect at the time of the baseline system certification.

1.5.3 NOCs

There are no NOCs released by the EAC as of the date of this Test Plan that pertain to this test campaign that were not in effect at the time of the baseline system certification.

1.6 System Overview

The DVS 5.20 Voting System is a paper-based optical scan voting system consisting of the following major components: EMS, ImageCast Central, ImageCast Evolution, ImageCast Precinct, ImageCast Precinct 2, ImageCast X BMD, and ImageCast X VVPAT BMD.

The proprietary and COTS equipment specifications for the components of the D-Suite 5.20 system configuration are listed below:

Election Administration

Democracy Suite Election Management System (EMS)

- Dominion Voting Systems Democracy Suite EMS 5.20.2.6, containing:
  - Election Event Designer
  - Results Tally and Reporting
  - Audio Studio
  - Election Data Translator
  - Application Server
  - Database Server
  - EMS Logger

- NAS Server
- EMS Server Applications & Services
  - Data Center Manager
  - File System Service
  - Smart Card Helper Service

❖ DCF version (ICP) DCF_5.20.1.1_20231010

❖ MBS version (ICC) ICC_5.20.1.1_EAC_5.20_20231030

❖ MBS version (ICE) ICE_5.20.1.1_EAC_5.20_20231016

❖ MBS version (ICP2) ICP2_5.20.1.1_EAC_5.20_20231016

❖ MCF version (ICX) MCF_5.20.2.5_20240227

❖ Optional Adjudication 5.20.2.4

COTS Hardware and Software

- EMS Standard Server Configuration
  - Microsoft Windows Server 2022
  - Microsoft SQL Server 2022 Standard
  - Server computer system per *2.02 Democracy Suite System Configuration Overview*
    - Dell PowerEdge R660
    - Dell PowerEdge R640
    - Dell PowerEdge R630
- EMS Express Server Configuration
  - Microsoft Windows 11 Professional
  - Microsoft SQL Server 2022 Standard
  - Desktop computer system per *2.02 Democracy Suite System Configuration Overview*
    - Dell Precision 3460 XE
    - Dell Precision 3450 XE
    - Dell Precision 3440 XE
    - Dell Precision 3431
    - Dell Precision 3430
    - Dell Precision T3420
    - Dell Precision T1700

- Client Workstation Configuration
  - Microsoft Windows 11 Professional
  - Desktop computer system per *2.02 Democracy Suite System Configuration Overview*
    - Dell Precision 3460 XE
    - Dell Precision 3450 XE
    - Dell Precision 3440 XE
    - Dell Precision 3431
    - Dell Precision 3430
    - Dell Precision T3420
    - Dell Precision T1700
- EMS COTS Software common to Standard and Express configurations
  - Microsoft.Net Framework 4.8
  - Microsoft.Net Framework 3.5
  - Microsoft Visual C++ 2015 Redistributable
  - Dallas 1-Wire Device Driver version 4.0.5 or newer
  - Adobe Reader DC or later
- Optional COTS Software for Standard and Express configurations
  - Microsoft Windows Defender (Servers and Client Workstations)
  - Cepstral Voices (English, Spanish, etc.) 6.2.3
  - Microsoft Excel 2010 or later
  - Additional Fonts (Arial narrow fonts, 2.37a)
  - UPS drivers
  - Printer drivers
- Auxiliary Equipment:
  - iButton to 1-Wire USB Adapter: Dallas Maxim DS1402-RP8+
  - iButton Reader/Writer: Dallas Maxim DS9490R#
  - Compact Flash Reader: Lexar Professional USB 3.0 Dual-Slot Card Reader
  - Compact Flash Reader: Kingston USB 3.0 High-Speed Media Reader
  - Compact Flash Reader: Hoodman Steel USB3
  - Compact Flash / SD Reader: Delkin Devices DDREADER-44
  - Compact Flash / SD Reader: IOGEAR GFR381

- Smart Card Reader: Advanced Card Systems ACR38U
- Smart Card Reader: Advanced Card Systems ACR39U
- Smart Card Reader: HID Global Omnikey 3121 FIPS-201
- LCD Monitor:
  - Dell P2422H
  - Dell P2419H
  - Dell P2417H
- Ethernet Switch: Dell x1026
- Ethernet Switch: Dell x1008
- Ethernet Switch: Cisco 8-port Switch (CBS350-8T-E-2G)
- Ethernet Switch: Cisco 24-port Switch (CBS350-24T-4G)
- Mini-Server Rack: StarTech RK1236BKF
- Rack Power Distribution Unit: APC AP9562
- UPS:
  - Tripp Lite SMART1500RMXL2U
  - APC SMT1500 Smart-UPS
  - APC SMT1500C Smart-UPS
  - CyberPower PR1500LCD
  - CyberPower PR1500LCD-VTVM
- Keyboard, Mouse, Headset with microphone, Audio Adapter networking switch – COTS computing accessories
- EMS Report Printer: HP M404dn laser or equivalent

- Election media:
  - iButton (Pollworker): Dallas Maxim DS1963S-F5+ (w/Black Key Ring Mount DS9093A+)
  - Compact Flash Memory Cards (16GB): Centon C4-CM-CF-16.4
  - USB Memory Device (128GB): Apricorn AEGIS Secure Key 3NX PN: ASK3-NX-128GB
  - USB Memory Device (32GB): Apricorn AEGIS Secure Key 3NX PN: ASK3-NX-32GB
  - USB Memory Device (16GB): Centon (BiCS4) PN: C4-CT-U3P2-16.3
  - USB Memory Device (16GB): Centon S4-CM-U3P2-16.1
  - USB Memory Device (16GB): Apacer EH353-M APHA016GAG0CG-3TM

- USB Memory Device (8GB): Centon (BiCS4) PN: C4-CT-U3P2-8.3
- USB Memory Device (8GB): Centon S4-CM-U3P2-8.1
- USB Memory Device (8GB): Apacer EH353-M APHA008GAG0CG-3TM
- USB Memory Device (4GB): Verbatim 97087
- Smart Cards: ACS ACOS-6-64 v3090 and ACOS-6-64 v3100
- Smart Cards: CardLogix C7

ImageCast Voter Activation (ICVA)

❖ Software version: 5.20.2.6

COTS Hardware and Software

- Client Workstation Configuration
  - Microsoft Windows 11 Professional
  - Desktop computer system per *2.02 Democracy Suite System Configuration Overview*
    - Dell Latitude 3340
    - Dell Latitude 3420
    - Dell Latitude 3410 (SSD)
    - Dell Latitude 3410 (HDD)
    - Dell Latitude 3400
    - Dell Latitude 3490
    - Dell Latitude e3480
    - Dell Latitude e3470
    - Dell Latitude e7450
- Auxiliary Equipment:
  - Smart Card Reader: Advanced Card Systems ACR38U
  - Smart Card Reader: Advanced Card Systems ACR39U
  - Smart Card Reader: HID Global Omnikey 3121 FIPS-201
- Election Media:
  - USB Memory Device (16GB): Centon (BiCS4) PN: C4-CT-U3P2-16.3
  - USB Memory Device (16GB): Centon S4-CM-U3P2-16.1
  - USB Memory Device (16GB): Apacer EH353-M APHA016GAG0CG-3TM
  - USB Memory Device (8GB): Centon (BiCS4) PN: C4-CT-U3P2-8.3
  - USB Memory Device (8GB): Centon S4-CM-U3P2-8.1

- USB Memory Device (8GB): Apacer EH353-M APHA008GAG0CG-3TM
- USB Memory Device (4GB): Verbatim 97087
- Smart Cards: ACS ACOS-6-64 v3090 and ACOS-6-64 v3100
- Smart Cards: CardLogix C7

Central Count

ImageCast Central Count (ICC)

❖ ICC software application: version 5.20.2.6

COTS Software

- ICC COTS computer operating system: Windows 11 Professional
- Microsoft Windows Defender
- Microsoft Visual C++ 2015 Redistributable
- Dallas Maxim: 1-wire driver - version 4.0.3 or newer, 64 bit (32 bit as needed)
- Canon: DR-G2140 driver - version 1.2.7601
- Canon: DR-G1130 driver - version 1.3.6458
- Canon: DR-M160-II driver - version 1.3.6556
- Canon: DR-M260 driver - version 1.2.7500
- InoTec: HiPro 821 driver - version 2.0.2.0

COTS Hardware:

- ICC Scanner: Canon DR-G2140
  - Imprinter (optional)
- ICC Scanner: Canon DR-G1130
  - Imprinter (optional)
- ICC Scanner: Canon DR-M160-II
- ICC Scanner: Canon DR-M260
- ICC Scanner: InoTec HiPro 821 with integrated imprinter
- Canon Scanner Client Workstation Configuration:
  - Desktop or All-in-One computer system per *2.02 Democracy Suite System Configuration Overview*
    - Dell Precision 3460 XE
    - Dell Precision 3450 XE
    - Dell Precision 3440 XE

        - Touch Monitor: Planar PCT2235
        - Touch Monitor: Dell P2424HT
    - Dell Optiplex 5270 AIO
    - Dell Optiplex 3050 AIO
    - Dell Optiplex 7440 AIO
    - Dell Optiplex 9030 AIO
    - Dell Optiplex 9020 AIO
    - Dell Optiplex 9010 AIO
- InoTec HiPro Scanner Client Workstation Configuration:
    - Desktop computer system per *2.02 Democracy Suite System Configuration Overview*
        - Dell Optiplex XE4
        - Dell Optiplex XE3
        - Dell Optiplex 7070
        - Dell Optiplex 7060
        - Dell Optiplex 7050
        - Touch Monitor: Lenovo 10QXPAR1US
        - Touch Monitor: Lenovo 11GCPAR1US
        - Touch Monitor: Dell P2418HT
        - Non-Touch Monitor: Dell P2422H
        - Touch Monitor: Dell P2424HT
- Auxiliary Equipment:
    - iButton to 1-Wire USB Adapter: Dallas Maxim DS1402-RP8+
    - iButton Reader/Writer: Dallas Maxim DS9490R#
    - Compact Flash / SD Card Reader: Lexar Professional USB 3.0 Dual-Slot Card Reader
    - Compact Flash / SD Card Reader: Kingston USB 3.0 High-Speed Media Reader
    - Compact Flash / SD Card Reader: Hoodman Steel USB3
    - Compact Flash / SD Card Reader: Delkin Devices DDREADER-44
    - Compact Flash / SD Card Reader: IOGEAR GFR381
- Auxiliary Equipment:
    - iButton: Dallas Maxim DS1963S-F5+ (with Key Ring Mount DS9093A+)
    - USB Memory Device (16GB): Centon (BiCS4) PN: C4-CT-U3P2-16.3

- USB Memory Device (16GB): Centon S4-CM-U3P2-16.1
- USB Memory Device (16GB): Apacer EH353-M APHA016GAG0CG-3TM
- USB Memory Device (8GB): Centon (BiCS4) PN: C4-CT-U3P2-8.3
- USB Memory Device (8GB): Centon S4-CM-U3P2-8.1
- USB Memory Device (8GB): Apacer EH353-M APHA008GAG0CG-3TM
- USB Memory Device (4GB): Verbatim 97087
- Compact Flash Memory Cards (16GB): Centon C4-CM-CF-16.4
- Compact Flash Memory Cards (8GB): RiTek RDCF8G-233XMCB2-i
- Compact Flash Memory Cards (8GB): SanDisk SDCFHS-008G
- Compact Flash Memory Cards (4GB): SanDisk SDCFHS-004G

Precinct Vote Capture

ImageCast X with BMD (ICX BMD)

❖ Firmware version: 5.20.2.7

❖ Hardware version:

- Avalue SID-15V-Z37 (15.6 in. screen-Classic)
- Avalue SID-21V-Z37 (21.5 in. screen-Classic)
- Avalue HID-21V-BTX (21.5 in. screen-Prime) (steel or aluminum chassis)

Optional Hardware

- Accessible-Tactile Interface (ATI-USB) box
- ICX Classic BMD Transport Bag
- ICX Prime BMD Transport Bag
- ICX Privacy Screen
- ICX Voting Booth
- ICX Prime Battery Charger – Dual Bay

COTS Hardware

- UPS:
  - APC SMT-1500
  - APC SMT-1500C
  - CyberPower PR1500LCD
  - CyberPower PR1500LCD-VTVM
- Printer:

- Avision Ap3061
- HP M402dn
- HP M402dne
- HP M404dn
- HP M501dn
- HP 4001dn

- Election Media
  - USB Memory Device (128GB): Apricorn AEGIS Secure Key 3NX PN: ASK3-NX-128GB
  - USB Memory Device (32GB): Apricorn AEGIS Secure Key 3NX PN: ASK3-NX-32GB
  - USB Memory Device (16GB): Centon (BiCS4) PN: C4-CT-U3P2-16.3
  - USB Memory Device (16GB): Centon S4-CM-U3P2-16.1
  - USB Memory Device (16GB): Apacer EH353-M APHA016GAG0CG-3TM
  - USB Memory Device (8GB): Centon (BiCS4) PN: C4-CT-U3P2-8.3
  - USB Memory Device (8GB): Centon S4-CM-U3P2-8.1
  - USB Memory Device (8GB): Apacer EH353-M APHA008GAG0CG-3TM
  - USB Memory Device (4GB): Verbatim 97087
  - Smart Cards: ACS ACOS-6-64 v3090 and ACOS-6-64 v3100
  - Smart Cards: CardLogix C7

COTS Software

- Android 8.1.0-2.5.2
- Google TTS

Optional COTS Software

- None

Optional COTS Hardware

- Headphone: Cyber Acoustics ACM-70, ACM-70B or equivalent
- Sip & puff: Enabling Device #972
- Sip & puff straws: #970K (Pkg of 10)
- Paddle switches: Enabling Device #971
- Paddle switches: AbleNet 10033400 (2x)
- Paddle Switch Cable: Hosa Technology YMM-261 (for use with AbleNet switches)

ImageCast X VVPAT BMD (ICX VVPAT BMD)

❖ Firmware version: 5.20.2.7

❖ Hardware version:

- Avalue HID-21V-BTX (21.5 in. screen-Prime) (steel or aluminum chassis)

Optional Hardware

- Accessible-Tactile Interface (ATI-USB) box
- ICX Prime VVPAT Transport Bag
- ICX Leg Assembly
- ICX Privacy Screen
- ICX Voting Booth
- ICX Prime Battery Charger – Dual Bay

COTS Hardware

- VVPAT Printer: KFI 702-75250014A (V1)
- VVPAT Printer: KFI 702-75250014C (V1-C)
- Election Media
    - USB Memory Device (8GB): Centon (BiCS4) PN: C4-CT-U3P2-8.3
    - USB Memory Device (8GB): Centon S4-CM-U3P2-8.1
    - USB Memory Device (16GB): Centon (BiCS4) PN: C4-CT-U3P2-16.3
    - USB Memory Device (16GB): Centon S4-CM-U3P2-16.1
    - USB Memory Device (8GB): Apacer EH353-M APHA008GAG0CG-3TM
    - USB Memory Device (16GB): Apacer EH353-M APHA016GAG0CG-3TM
    - USB Memory Device (4GB): Verbatim 97087
    - Smart Cards: ACS ACOS-6-64 v3090 and ACOS-6-64 v3100

- Smart Cards: CardLogix C7

COTS Software

- Android 8.1.0-2.5.2
- Google TTS

Optional COTS Software

- None

Optional COTS Hardware

- Headphone: Cyber Acoustics ACM-70, ACM-70B or equivalent
- Sip & puff: Enabling Device #972
- Sip & puff straws: #970K (Pkg of 10)
- Paddle switches: Enabling Device #971
- Paddle switches: AbleNet 10033400 (2x)
- Paddle Switch Cable: Hosa Technology YMM-261 (for use with AbleNet switches)

ImageCast Evolution (ICE)

❖ Firmware version: 5.20.2.3

❖ Hardware version: PCOS 410A (w/ smart card reader) PCOS-410A (w/o smart card reader)

- IR Sensor Board Firmware version: 1.0.003
- Motherboard FPGA version: 1.1.5
- Scanner Board FPGA version: 1.1.2
- Logger Controller version: 2.0.2
- Power Controller version: 3.0.5
- Integrated Printer Controller version: 4.1.7
- Bootloader version: 1.3.4.63
- Ballot Box Options
    - Stackable Molded Plastic: BOX-410A
    - Foldable Coroplast Plastic: BOX-420A

Optional Hardware

- Accessible-Tactile Interface (ATI-Serial) box
- Light Pole for Ballot Boxes

COTS Software

- None

COTS Hardware

- Election media:
    - iButton (Pollworker): Dallas Maxim DS1963S-F5+ (w/Black Key Ring Mount DS9093A+)
    - iButton (Admin/Tech): Dallas Maxim DS1963S-F5+ (w/Yellow Key Ring Mount DS9093AY+)
    - Compact Flash Memory Cards (16GB): Centon C4-CM-CF-16.4
    - Compact Flash Memory Cards (8GB): RiTek RDCF8G-233XMCB2-i

Optional COTS Software

- None

Optional COTS Hardware

- Headphone: Cyber Acoustics ACM-70, ACM-70B or equivalent
- Sip & puff: Enabling Device #972
- Sip & puff straws: #970K (Pkg of 10)
- Paddle switches: Enabling Device #971
- Paddle switches: AbleNet 10033400 (2x)
- Paddle Switch Cable: Hosa Technology YMM-261 (for use with AbleNet switches)
- Hardware for Dual Monitor configuration:
    - Secondary Monitor: AOC e1649FWU
    - Secondary Monitor: Display Logic LM15.6-USB-DV.B
    - Cable, USB, 10 ft.: TE Connectivity 1496476-4
    - Cable, USB, 10 ft.: Keyjoy 131-000004

ImageCast Precinct (ICP)

❖ Firmware version: 5.20.2.3

❖ Hardware version: PCOS-320A and PCOS-320C

- Ballot Box Options
    - Stackable Molded Plastic: BOX-330A
    - Collapsible Plastic: ElectionSource IM-COLLAPSIBLE BIN
    - Accessories: ICP Baseplate Adapter Kit for all listed Ballot Boxes

Optional Hardware

- Accessible-Tactile Interface (ATI-Serial) box

COTS Software

- Boot Loader (COLILO) 20040221

COTS Hardware

- Election media:
  - iButton (Pollworker): Dallas Maxim DS1963S-F5+ (w/Black Key Ring Mount DS9093A+)
  - iButton (Admin/Tech): Dallas Maxim DS1963S-F5+ (w/Blue Key Ring Mount DS9093AB+)
  - Compact Flash Memory Cards (16GB): Centon C4-CM-CF-16.4
  - Compact Flash Memory Cards (8GB): RiTek RDCF8G-233XMCB2-i
  - Compact Flash Memory Cards (8GB): SanDisk SDCFHS-008G
  - Compact Flash Memory Cards (4GB): SanDisk SDCFHS-004G

Optional COTS Software

- None

Optional COTS Hardware

- Headphone: Cyber Acoustics ACM-70, ACM-70B or equivalent
- Sip & puff: Enabling Device #972
- Sip & puff straws: #970K (Pkg of 10)
- Paddle switches: Enabling Device #971
- Paddle switches: AbleNet 10033400 (2x)
- Paddle Switch Cable: Hosa Technology YMM-261 (for use with AbleNet switches)

ImageCast Precinct (ICP2)

❖ Firmware version: 5.20.2.2

❖ Hardware version: PCOS-330A

- Ballot Box Options
  - Stackable Molded Plastic: BOX-350A
  - Collapsible Plastic: ElectionSource IM-COLLAPSIBLE BIN

Optional Hardware

- None

COTS Software

- None

COTS Hardware

- Election media:
    - iButton (Pollworker): Dallas Maxim DS1963S-F5+ (w/Black Key Ring Mount DS9093A+)
    - iButton (Admin/Tech): Dallas Maxim DS1963S-F5+ (w/Yellow Key Ring Mount DS9093AY+)
    - SDHC Memory Cards (16GB):
        - Centon (BiCS5) PN: C4-ET-SDU3-16.1
    - SDHC Memory Cards (8GB):
        - Centon (BiCS4) PN: S4-ET-SDU3-8.1
        - Centon S4-CM-SDHU1-8G-002
        - Centon C4-CM-SDU1-8.2
        - Apacer (BiCS5) PN: AJ3.148FSA.00105

Optional COTS Software

- None

Optional COTS Hardware

- None

1.6.1 Block Diagram

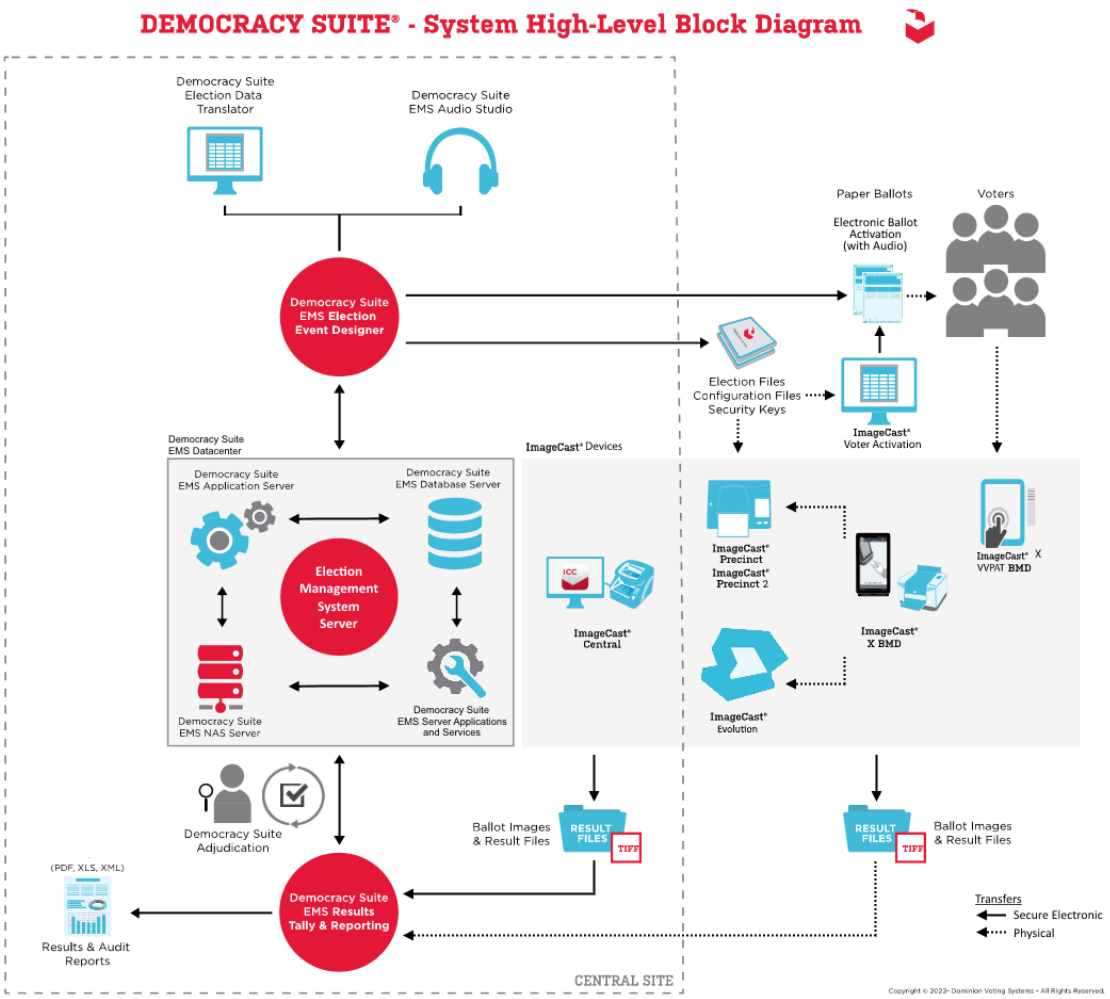


Figure 1-1. D-Suite 5.20 System Overview

1.6.2 System Limits

The system limits that Dominion Voting Systems has stated to be supported by the D-Suite 5.20 are provided in the table below.

Table 1-1. D-Suite 5.20 System Limits

Characteristic	Limit by Configuration		Limiting Component
	Express	Standard	
Ballot positions	462**/292*	462**/292*	22-inch Ballot
Precincts in an election	250	1000	Memory
Contests in an election	250	1000	Memory
Candidates/Counters in an election	2500	10000	Memory
Candidates/Counters in a precinct	462**/240*	462**/240*	22-inch Ballot
Candidates/Counters in a tabulator	2500	10000	Memory
Ballot Styles in an election	750	3000	Memory
Ballot IDs in a tabulator	200	200	Memory
Contests in a ballot style	153**/38*	153**/38*	22-inch Ballot* 14-inch QR Ballot**
Candidates in a contest	231**/240*	231**/240*	22-inch Ballot
Ballot styles in a precinct	5	5	Memory
Number of political parties	30	30	Memory
"Vote for" in a contest	30**/24*	30**/24*	22-inch Ballot
Supported languages in an election	5	5	Memory
Number of write-ins	462**/24*	462**/24*	22-inch Ballot

* Reflects the system limit for a ballot printed in landscape

** Reflects the system limit for a ballot printed in portrait.

1.6.3 Supported Languages

The following languages are supported by the D-Suite 5.20 System:

Table 1-2. D-Suite 5.20 Supported Languages

Language	ICE	ICP	ICP2	ICX
Alaska Native	No	Yes, if using Latin alphabet	No	No
Arabic	Yes	No	Yes	Yes
Apache	No	Audio only	No	No
Bengali	Yes	Yes	Yes	Yes
Burmese	No	No	Yes	No
Cantonese	Audio only	No	No	No
Chinese	Yes	Yes	Yes	Yes
English	Yes	Yes	Yes	Yes
Inuit	No	Yes, if using Latin alphabet	No	No
Filipino	Yes	Yes	Yes	No
French	No	Yes	Yes	Yes
Gujarati	Yes	No	Yes	No
Haitian Creole	Yes	No	Yes	No

Table 1-2. D-Suite 5.20 Supported Languages *(continued)*

Language	ICE	ICP	ICP2	ICX
Hindi	Yes	Audio only	Yes	Yes
Hmong	Yes	No	Yes	No
Ilocano	Yes	No	Yes	No
Indonesian	No	No	Yes	No
Japanese	Yes	Yes	Yes	Yes
Jicarilla	No	Audio only	No	No
Keres	No	Audio only	No	No
Khmer	Yes	Audio only	Yes	No
Korean	Yes	Yes	Yes	Yes
Laotian	Yes	No	Yes	No
Mien	No	No	Yes	No
Mongolian	No	No	Yes	No
Nepali	Yes	No	Yes	No
Navajo	No	Audio only	No	No
Mandarin	Audio only	No	No	No
Polish	Yes	No	Yes	No
Punjabi	Yes	No	Yes	No
Russian	Yes	No	Yes	No
Seminole	No	Audio only	No	No
Spanish	Yes	Yes	Yes	Yes
Tagalog	Yes	No	Yes	Yes
Tamil	Yes	No	Yes	No
Telugu	Yes	No	Yes	No
Thai	Yes	Audio only	Yes	Yes
Tolowa	No	No	Yes	No
Towa	No	Audio only	No	No
Ute	No	Audio only	No	No
Ukrainian	Yes	No	Yes	No
Urdu	Yes	No	Yes	No
Vietnamese	Yes	Yes	Yes	Yes
Yuman	No	Audio only	No	No
Yurok	No	No	Yes	No

Support for all stated languages will be verified; however, only English and Spanish language ballots will be cast during the performance of functional testing. Additionally, one character based language (Chinese) will be tested during System Integration Testing.

For the character based language, the ballot will be created by Pro V&V and voted utilizing both paper ballots and ADA voting devices along with all applicable peripherals. The Chinese Language for the ballot will be created using a readily available online translation tool. The translated language text will be entered into the Election Event Designer Application. A ballot preview will be generated in the EED application. The Chinese characters displayed in the ballot preview will be compared to the characters generated by the online translation tool, to ensure that the characters match. The ballots will then be generated and printed, and the election loaded onto the tabulators and the BMD units. The Chinese characters displayed on both the printed ballots

and displayed on the BMD units will be compared to the original Chinese Characters generated by the online translation tool to verify that the characters match.

1.6.4 Supported Functionality

The D-Suite 5.20 is designed to support the following voting variations:

- General Election
- Closed Primary
- Open Primary
- Early Voting
- Partisan/Non-Partisan Offices
- Write-In Voting
- Primary Presidential Delegation Nominations
- Split Precincts
- Vote for N of M
- Ballot Rotation
- Provisional or Challenged Ballots
- Straight Party Voting
- Cross-Party Endorsement
- Rank Choice Voting

2.0 PRE-CERTIFICATION TESTING AND ISSUES

This section describes previous testing performed prior to submitting the voting system to the EAC.

2.1 Evaluation of Prior VSTL Testing

Pro V&V evaluated to the published Final Test Report for the D-Suite 5.17 System in order to baseline the current system under test. It was determined testing to satisfy the requirements for this test campaign would focus on functional evaluation of the submitted modifications.

2.2 Evaluation of Prior Non-VSTL Testing

No prior non-VSTL testing of the D-Suite 5.20 modifications were considered for this test campaign.

2.3 Known Field Issues

D-Suite 5.20 is a modification to a previously certified system (D-Suite 5.17). There are no known field issues related to the baseline D-Suite 5.17 system. Any known field issues on previously certified versions derived from the original D-Suite 5.0 system are addressed in the associated published test plans.

3.0 MATERIALS REQUIRED FOR TESTING

The following sections list all materials needed to enable the test engagement to occur.

The materials required for testing of the D-Suite 5.20 System include all materials to enable the test campaign to occur. This includes the applicable hardware and software as well as the TDP, test support materials, and deliverable materials, as described in the following subsections.

3.1 Software

This subsection lists the proprietary and COTS software to be provided by the manufacturer as part of the test campaign.

All software required for testing is identified in Section 1.6 of this test plan. Pro V&V will perform a comparison on the submitted source code against the previously certified versions. Regression testing will be performed to verify successful implementation of changes.

3.2 Equipment

This subsection lists the proprietary and COTS equipment to be provided by the manufacturer as part of the test campaign.

All proprietary and COTS equipment required for testing is identified in Section 1.6 of this test plan. For COTS equipment, every effort will be made to verify that the COTS equipment has not been modified for use. This will be accomplished by performing research using the COTS equipment manufacturer's websites based on the serial numbers and service tag numbers for each piece of equipment. Assigned test personnel will evaluate COTS hardware, system software and communications components for proven performance in commercial applications other than voting. For PCs, laptops, and servers, the service tag information will be compared to the system information found on each machine.

Physical external and internal examination will also be performed when the equipment is easily accessible without the possibility of damage. Hard drives, RAM memory, and other components will be examined to verify that the components match the information found on the COTS equipment manufacturer's websites.

3.3 Test Materials

This subsection lists the test materials required to execute the required tests throughout the test campaign.

Table 3-1. Required Test Materials

Material	Description(s)
Tamper Evident Security Seals	Adhesive tamper evident security seal, Novavision Part# XSG21-08RESN
Printer Cartridges	HP LaserJet CF226X

Table 3-1. Required Test Materials *(continued)*

Material	Description(s)
Smart Cards	Programmable Smart Cards for voters, poll workers, and technicians for the ICX System
ImageCast Precinct Cleaning Sheets	Cleaning Sheets for ImageCast Precinct tabulator Part# CSHT-100B
Stereo Breakout Cable	3.5mm stereo male plug to dual 3.5mm mono female plugs
3.5mm Stereo Cable	3.5mm stereo male plug to 3.5mm stereo female plug
Compact Flash Cards	SanDisk Ultra 4Gb and Centon 16GB Compact Flash Cards
iButton Security Tokens	iButton Security Token with lanyards
Permanent Markers	Fine Tip Sharpie Permanent Markers
Ethernet Cables	Cat5e Ethernet Cables
ICE Paper Rolls	Replacement Thermal Paper Rolls for the ImageCast Evolution tabulator
ICP Paper Rolls	Replacement Thermal Paper Rolls for the ImageCast Precinct tabulator
Sip & Puff Disposable Straws	Disposable straws for use with the Sip & Puff input device
Ballot Stock	Ballot Paper Stock for printing ballots
A/C Power Cables	3-Prong A/C Power Cables
USB Thumb drives	4 GB, 8 GB, and 16 GB USB Thumb drives

3.4 Proprietary Data

All data and documentation considered by the manufacturer to be proprietary will be identified and documented in an independent submission along with a Notice of Protected Information.

4.0 TEST SPECIFICATIONS

Certification testing of the Dominion D-Suite 5.20 Voting System submitted for evaluation will be performed to ensure the applicable requirements of the EAC 2005 VVSG and the EAC Testing and Certification Program Manual, Version 3.0 are met. Additionally, all EAC Request for Interpretations (RFI) and Notices of Clarification (NOC) relevant to the system under test will be incorporated in the test campaign. A complete listing of the EAC RFIs and NOCs is available on the EAC website.

4.1 Requirements (Strategy of Evaluation)

To evaluate the D-Suite 5.20 test requirements, the submitted modifications were evaluated against each section of the EAC 2005 VVSG to determine the applicable tests to be performed. Based on this assessment, it was determined the following evaluations would be required to verify compliance of the modifications:

Technical Documentation Package (TDP) Review

A TDP Review will be performed to ensure that all submitted modifications are accurately documented and that the documents meet the requirements of the EAC 2005 VVSG. The preliminary TDP is performed to gather information concerning the system under test and its capabilities or design intentions. Additionally, a TDP review will be performed throughout the test campaign. The TDP Review includes the Initial Review, the Regulatory/Compliance Review, and the Final Review. This review is conducted to determine if the submitted technical documentation meets the regulatory, customer-stated, or end-user requirements and includes reviewing the documents for stated functionality review and verification.

Section 2: Functional Requirements

The requirements in this section shall be tested during the FCA and System Integration Test. This evaluation will utilize baseline test cases as well as specifically designed test cases and will include predefined election definitions for the input data.

The FCA targets the specific functionality claimed by the manufacturer to ensure the product functions as documented. This testing uses both positive and negative test data to test the robustness of the system. The FCA encompasses an examination of manufacturer 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 in the TDP (such as system operations, voter manual, maintenance, and diagnostic testing manuals). It includes a test of system operations in the sequence in which they would normally be performed. These system operations and functional capabilities are categorized as follows by the phase of election activity in which they are required:

- Overall System Capabilities: These functional capabilities apply throughout the election process. They include security, accuracy, integrity, system audit ability, election management system, vote tabulation, ballot counters, telecommunications, and data retention.

- Pre-voting Capabilities: These functional capabilities are used to prepare the voting system for voting. They include ballot preparation, the preparation of election-specific software (including firmware), the production of ballots, the installation of ballots and ballot counting software (including firmware), and system and equipment tests.

- Voting System Capabilities: These functional capabilities include all operations conducted at the polling place by voters and officials including the generation of status messages.

- Post-voting Capabilities: These functional capabilities apply after all votes have been cast. They include closing the polling place; obtaining reports by voting machine, polling place, and precinct; obtaining consolidated reports; and obtaining reports of audit trails.

- Maintenance, Transportation and Storage Capabilities: These capabilities are necessary to maintain, transport, and store voting system equipment.

The system integration testing addresses the integration of the hardware and software. This testing focuses on the compatibility of the voting system software components and subsystems with one another and with other components of the voting system. During test performance, the system is configured as would be for normal field use.

The accuracy test ensures that each component of the voting system can each process at least 1,549,703 consecutive ballot positions correctly within the allowable target error rate. The Accuracy test is designed to test the ability of the system to "capture, record, store, consolidate and report" specific selections and absences of a selection. The required accuracy is defined as an error rate. This rate is the maximum number of errors allowed while processing a specified volume of data.

Section 5: Software Requirements

The requirements in this section shall be tested utilizing a combination of review and functional testing during the source code review, TDP review, and FCA. Trusted builds from previously certified versions will be used as the baseline for testing.

To perform the source code review, Pro V&V will review the submitted source code to the EAC 2005 VVSG and the manufacturer-submitted coding standards. Prior to initiating the software review, Pro V&V shall verify that the submitted documentation is sufficient to enable: (1) a review of the source code and (2) Pro V&V to design and conduct tests at every level of the software structure to verify that design specifications and performance guidelines are met. The source code review includes a compliance build and a trusted build of the submitted source code.

Section 7: Security Requirements

The requirements in this section shall be tested during the source code review, security tests, and FCA.

To evaluate the integrity of the system, Pro V&V will develop specifically designed test cases in an attempt to defeat the access controls and security measures documented in the system TDP as well as verifying compliance to EAC RFI 2012-05. During the security testing, the system shall be inspected for various controls and measures that are in place to meet the objectives of the security standards which include: protection of the critical elements of the voting system; establishing and maintaining controls to minimize errors; protection from intentional manipulation, fraud and malicious mischief; identifying fraudulent or erroneous changes to the voting system; and protecting the secrecy in the voting process.

The submitted threat matrix identifying the system's risks and vulnerabilities shall be evaluated for completeness and to determine that mitigating controls are adequately implemented. An evaluation of the system shall be accomplished by utilizing a combination of functional testing, source code review, and static code analyzers. All findings will be reported to the EAC and Dominion.

Note: Section 6 (Telecommunications Requirements) of the VVSG 1.0 is not applicable to D-Suite 5.17 and is therefore not included in this Test Plan. Additionally, Section 3 (Usability &

Accessibility), Section 4 (Hardware Requirements), Section 8 (Quality Assurance Requirements) and Section 9 (Configuration Management Requirements) were reviewed in the test campaigns for the baseline systems and are not impacted by the submitted modifications.

4.1.1 Rationale for 'Not Applicable' Requirements

All requirements that were excluded from the previous test campaign (D-Suite 5.17) were also deemed not applicable to this test campaign. The submitted modifications did not require the evaluation of any requirements that were not included in the baseline system. These requirements, along with the rationale for not evaluating the system to the identified section, are identified below:

- Volume I, Section 6.2.6 (Telecommunications Requirements: Integrity)
    - *These requirements are written for use of public networks. The D-Suite 5.20 does not utilize public networks*
- Volume I, Section 7.5.2-7.5.4 (Security: Protection Against External Threats, Monitoring and Responding to External Threats, and Shared Operating Environment)
    - *These requirements are written for use of public networks. The D-Suite 5.20 does not utilize public networks*
- Volume I, Section 7.6 (Use of Public Communications Networks)
    - *D-Suite 5.20 does not support transmission over public networks.*
- Volume I, Section 7.7 (Wireless Communications)
    - *No wireless technology is utilized in this system.*

4.2 Hardware Configuration and Design

The hardware configuration and design for the modification is unchanged from the baseline system.

4.3 Software System Functions

The D-Suite 5.20 EMS consists of various components running as either a front-end/client application or as a back-end/server application.

4.4 Test Case Design

Test cases are designed based on the manufacturer's design specifications and the relevant technical requirements set forth by the VVSG. Test cases shall be based on the following aspects of the voting system:

- Hardware qualitative examination design
- Hardware environmental test case design
- Software module test case design and data

- Software functional test case design
- System level test case design

Test cases shall provide information regarding the sequence of actions to be performed for the execution of a test, the requirements being met, the test objective, test configuration, equipment needed, special requirements, assumptions, and pass/fail criteria. Once the test cases are finalized, they will be validated and published for use in the test campaign. The validation of the test case will be accomplished by technical review and approval. This validation will include the following: confirmation of adequate test coverage of all requirements; confirmation that test case results are not ambiguous and gave objective pass/fail criteria; and confirmation that any automated test suites will produce valid results.

4.4.1 Hardware Qualitative Test Case Design

Previous hardware examinations were performed on the certified baseline system (D-Suite 5.17); therefore, no hardware testing is required.

4.4.2 Hardware Environmental Test Case Design

Previous hardware examinations were performed on the certified baseline system (D-Suite 5.17); therefore, no hardware testing is required.

4.4.3 Software Module Test Case Design and Data

Pro V&V shall review the manufacturer's program analysis, documentation, and module test case design and shall evaluate the test cases for each module with respect to flow control parameters and entry/exit data. As needed, Pro V&V shall design additional test cases to satisfy the coverage criteria specified in Volume II, Section 7.2.1. Component Level Testing will be implemented during the FCA for each component and subcomponent. During the Source Code Review, Compliance Builds, and Security Testing, Pro V&V will utilize limited structural-based techniques (white-box testing). Additionally, specification-based techniques (black-box testing) will be utilized for the individual software components.

Pro V&V shall define the expected result for each test and the ACCEPT/REJECT criteria for certification. If the system performs as expected, the results will be accepted. If the system does not perform as expected, an analysis will be performed to determine the cause. The test will be repeated in an attempt to reproduce the results. If the failure can be reproduced and the expected results are not met, the system will have failed the test. If the results cannot be reproduced, the test will continue. All errors encountered will be documented and tracked through resolution.

4.4.4 Software Functional Test Case Design and Data

Pro V&V shall review the manufacturer-submitted test plans and data to verify that the individual performance requirements specified in the EAC 2005 VVSG and the TDP are reflected in the software. As part of this process, Pro V&V shall review the manufacturer's test case design and prepare a detailed matrix of system functions and the test cases that exercise them. Pro V&V shall also prepare a test procedure describing all test ballots, operator procedures, and the data content

of output reports. Pro V&V shall define abnormal input data and operator actions and then design test cases to verify that the system is able to handle and recover from these abnormal conditions. During this review, emphasis shall be placed on those functions where the manufacturer data on module development, such as the system release notes and comments within the source code, reflects significant debugging problems, and on functional tests that resulted in high error rates.

Pro V&V shall define the expected result for each test and the ACCEPT/REJECT criteria for certification. If the system performs as expected, the results will be accepted. If the system does not perform as expected, an analysis will be performed to determine the cause. The test will be repeated in an attempt to reproduce the results. If the failure can be reproduced and the expected results are not met, the system will have failed the test. If the results cannot be reproduced, the test will continue. All errors encountered will be documented and tracked through resolution.

4.4.5 System-Level Test Case Design

System Level testing will be implemented to evaluate the complete system. This testing will include all proprietary components and COTS components (software, hardware, and peripherals) in a configuration of the system's intended use. For software system tests, the tests shall be designed according to the stated design objective without consideration of its functional specification. The system level hardware and software test cases shall be prepared independently to assess the response of the hardware and software to a range of conditions.

4.5 TDP Evaluation

In order to determine compliance of the modified TDP documents with the EAC 2005 VVSG, a limited TDP review shall be conducted. This review will focus on TDP documents that have been modified since the certification of the baseline system. The review will consist of a compliance review to determine if each regulatory, state, or manufacturer-stated requirement has been met based on the context of each requirement. Results of the review of each document will be entered on the TDP Review Checklist and reported to the manufacturer for disposition of any anomalies. This process will be ongoing until all anomalies are resolved.

Any revised documents during the TDP review process will be compared with the previous document revision to determine changes made, and the document will be re-reviewed to determine whether subject requirements have been met. A listing of all documents contained in the D-Suite 5.20 TDP is provided in Table 4-1.

Table 4-1. TDP Documents

Document Number	Description	Version
Adjudication Documents		
2.05	Democracy Suite Adjudication Software Design and Specification	5.20::1
2.08	Democracy Suite Adjudication System Operation Procedures	5.20::1
2.09	Democracy Suite Adjudication System Maintenance Manual	5.20::1

Table 4-1. TDP Documents *(continued)*

Document Number	Description	Version
D-Suite Documents		
2.02	Democracy Suite System Overview	5.20::4
2.06	Democracy Suite System Security Specification	5.20::2
2.07	Democracy Suite System Test and Verification Specification	5.20::1
2.10	Democracy Suite Personnel Deployment and Training Requirements	5.20::1
2.11	Democracy Suite Configuration Management Plan	5.20::3
2.12	Democracy Suite Quality Assurance Program	5.20::1
2.13	Democracy Suite System Change Notes	5.20::4
EMS Documents		
2.03	Democracy Suite EMS Functionality Description	5.20::1
2.05	Democracy Suite EMS Software Design and Specification	5.20::2
2.08	Democracy Suite EMS System Operations Procedures	5.20::1
2.09	Democracy Suite EMS System Maintenance Manual	5.20::1
---	Democracy Suite EMS Client Workstation Installation and Configuration Procedure	5.20::4
---	Democracy Suite EMS Express Installation and Configuration Procedure	5.20::4
---	Democracy Suite EMS Standard System Installation and Configuration Procedure	5.20::5
---	Democracy Suite ImageCast Voter Activation Installation and Configuration Procedure	5.20::3
ImageCast Central Documents		
2.03	Democracy Suite ImageCast Central System Functionality Description	5.20::1
2.05	Democracy Suite ImageCast Central Software Design and Specification	5.20::2
2.08	Democracy Suite ImageCast Central System Operation Procedures	5.20::1
---	Democracy Suite ImageCast Central Installation and Configuration Procedure	5.20::8
ImageCast Evolution Documents		
2.03	Democracy Suite ImageCast Evolution System Functionality Description	5.20::1
2.04	Democracy Suite ImageCast Evolution System Hardware Specifications	5.20::1
2.05	Democracy Suite ImageCast Evolution Software Design and Specifications	5.20::2
2.08	Democracy Suite ImageCast Evolution System Operations Procedures	5.20::2

Table 4-1. TDP Documents *(continued)*

Document Number	Description	Version
2.09	Democracy Suite ImageCast Evolution System Maintenance Manual	5.20::1
ImageCast Precinct Documents		
2.03	Democracy Suite ImageCast Precinct System Functionality Description	5.20::1
2.04	Democracy Suite ImageCast Precinct System Hardware Specification	5.20::1
2.04.1	Democracy Suite ImageCast Precinct System Hardware Characteristics	5.20::1
2.05	Democracy Suite ImageCast Precinct Software Design and Specification	5.20::1
2.08	Democracy Suite ImageCast Precinct System Operation Procedures	5.20::1
2.09	Democracy Suite ImageCast Precinct System Maintenance Manual	5.20::1
ImageCast Precinct2 Documents		
2.03	Democracy Suite ImageCast Precinct 2 System Functionality Description	5.20::1
2.04	Democracy Suite ImageCast Precinct 2 System Hardware Specifications	5.20::2
2.05	Democracy Suite ImageCast Precinct 2 Software Design and Specifications	5.20::2
2.08	Democracy Suite ImageCast Precinct 2 System Operation Procedures	5.20::1
2.09	Democracy Suite ImageCast Precinct 2 System Maintenance Manual	5.20::1
ImageCast X Documents		
2.03	Democracy Suite ImageCast X System Functionality Description	5.20::1
2.05	Democracy Suite ImageCast X Software Design Specification	5.20::2
2.08	Democracy Suite ImageCast X System Operation Procedures	5.20::1
---	Democracy Suite ImageCast X Classic System Installation and Configuration Procedure	5.20::3
---	Democracy Suite ImageCast X Prime System Installation and Configuration Procedure	5.20::3
2.09	Democracy Suite ImageCast X System Maintenance Manual	5.20::1
User Guides		
---	Democracy Suite ImageCast Adjudication User Guide	5.20::4
---	Democracy Suite EMS Election Data Translator User Guide	5.20::2
---	Democracy Suite EMS Audio Studio User Guide	5.20::1
---	Democracy Suite EMS Results Tally and Reporting User Guide	5.20::3
---	Democracy Suite EMS Election Event Designer User Guide	5.20::5
---	Democracy Suite ImageCast Central User Guide	5.20::1

Table 4-1. TDP Documents *(continued)*

Document Number	Description	Version
---	Democracy Suite ImageCast Precinct User Guide	5.20::1
---	Democracy Suite EMS ImageCast Voter Activation User Guide	5.20::1
---	Democracy Suite ImageCast X User Guide	5.20::3
---	Democracy Suite ImageCast Precinct 2 User Guide	5.20::3
---	Democracy Suite ImageCast Evolution User Guide	5.20::1
DVS Supplementary Documents		
---	Democracy Suite ImageCast C++ Coding Standard	5.20::1
---	Democracy Suite ImageCast Tabulator Surface Cleaning Guide	5.20::1
---	Java Coding Standards	5.20::1
---	JavaScript Coding Standards	5.20::1
---	SD_Google Java Style Dominion	1.0
---	Democracy Suite ImageCast Central Machine Behavioral Setting	5.20::2
---	Democracy Suite ImageCast Device Configuration Files	5.20::1
---	Democracy Suite ImageCast Election Definition Files	5.20::1
---	Democracy Suite ImageCast Printing and Finishing Specification	5.20::1
---	Democracy Suite ImageCast Total Results File Format	5.20::1
---	Democracy Suite ImageCast Evolution Firmware Installation Procedure	5.20::2
---	Democracy Suite ImageCast Evolution Level One (L1) Maintenance Manual	5.20::1
---	Democracy Suite ImageCast Evolution Li-Ion Battery Maintenance Procedure	5.20::1
---	Democracy Suite ImageCast Evolution Machine Behavior Settings	5.20::1
---	Usability Test Report of ImageCast Evolution	5.20::1
---	Democracy Suite ImageCast Precinct Li-Ion Battery Maintenance Procedure	5.20::1
---	Democracy Suite ImageCast Precinct Extracting Firmware Contents	5.20::1
---	Democracy Suite ImageCast Precinct Firmware Update Procedure	5.20::1
---	Democracy Suite ImageCast Precinct Level One (L1) Maintenance Manual	5.20::1

Table 4-1. TDP Documents *(continued)*

Document Number	Description	Version
---	Democracy Suite ImageCast Precinct Technical Guide	5.20::1
---	Usability Test Report Of ImageCast Precinct 5.0 With 36 Participants for VVSG	5.20::1
---	Democracy Suite ImageCast Precinct 2 Extracting Firmware Contents and Verifying SHA256 Values	5.20::1
---	Democracy Suite ImageCast Precinct 2 Level One (L1) Maintenance Manual	5.20::1
---	Democracy Suite ImageCast Precinct 2 Machine Behavior Settings	5.20::1
---	Democracy Suite ImageCast X Machine Configuration File Settings	5.20::3
---	Usability Test Report Of ImageCast X 5.0 With 36 Participants for VVSG 1.0	5.20::1
---	Common Industry Format for Usability Test Report ImageCast X 5.2 with VVPAT	5.20::1
---	Democracy Suite System Identification Guide	5.20::11
---	SD_HashValues_Detailed_5.20	---
COTS Supplemental		
---	Ablenet Single Switch Quickstart Guide	B
---	Cyber Acoustics ACM-70B Stereo Headphones	---
---	ACS AC0s6 Multi-Application and Purse Card Functional Specifications	1.04
---	ACS ACR38x CCID Smart Card Reader Reference Manual	6.05
---	ACS AC0S6 SAM Reference Manual	2.90
---	ACS ACR39 Series PC-linked Smart Card Readers Reference Manual	1.04
---	AOC USB Monitor User Manual e1649Fwu	---
---	Apacer RoHS Recast Compliant Industrial SDHC/XC 6.1 CH120-SD Production Specifications for DVS	0.2
---	APC Installation and Operation Rack Power Distribution Unit AP9562	990-1215D-001
---	APC User Manual Back-UPS BE600M1	EN 990-5679
---	APC Smart-UPS Installation Guide SMT1500	EN 990-3535F-001

Table 4-1. TDP Documents *(continued)*

Document Number	Description	Version
---	APC Operation Manual Smart-UPS Uninterruptible Power Supply	EN 990-3534F
---	APC Operation Manual Smart-UPS Uninterruptible Power Supply	EN 990-5442D
---	ApriCorn Aegis Secure Key 3z User's Manual	---
---	Apricorn Aegis Secure Key 3NX Compliance	---
---	Avalue HID-21V-BTX Datasheet	---
---	Avalue HID-21V-BTX-B1R User Manual	1.3
---	Avalue HID-21V-BTX-A1R User Manual	3.0
---	Avalue SID-15V Quick Reference Guide	1st Ed
---	Avalue SID-15V-Z37-A1R User Manual	1.0
---	Avalue SID-21V Fact Sheet	---
---	Avalue SID-21V-Z37-A1R User Manual	1.0
---	Avalue SID-21V Quick Reference Guide	1st Ed
---	Avision AP30 Series Printer Spec Sheet	---
---	Avision AP30 Series Printer User's Guide	---
---	Avision AP3061 CE Test Report	V1.0
---	Avision AP3061 FCC Test Report	V3.0
---	Avison AP3061 Statement of Conformity	---
---	Canon DR-G1130 User Guide	CE-IM-910-E1.00
---	Canon DR-G2140 DR-G2110 DR-2090 User Manual	6T3-0034-E1.10
---	Canon DR-M160II User Manual	CE-IM-0953-E1.00
---	Canon DR-M260 User Manual	CE-IM-0991-E1.00
---	Canon imageClass LBP6230dw Spec Sheet	---
---	Canon imageClass LBP6230dw Startup	---
---	CardLogix C7 Specification	PN 7400033
---	Cisco Business 350 Series Managed Switches Data Sheet	C78-744156-01
---	Cisco Business 350 Series Managed Switches Quick Start Guide	---
---	CyberPower RoHS Declaration of Compliance	2019/11/01
---	SD and CF Reader Datasheet	---
---	CyberPower Smart App Sinewave Series PR1500LCD User's Manual	---
---	Dell Latitude 3340 2-in-1 Product Compliance Datasheet	Rev. A25
---	Dell Latitude 3340/Latitude 3340 2-in-1 Service Manual	Rev. A00
---	Dell Latitude 3340/Latitude 3340 2-in-1 Setup and Specifications	Rev. A00

Table 4-1. TDP Documents *(continued)*

Document Number	Description	Version
---	Dell Latitude 3400 Setup and specifications guide	Rev. A00
---	Dell Latitude 3410 Product Compliance Datasheet	Rev. A18
---	Dell Latitude 3410 Setup and Specifications Guide	Rev. A01
---	Dell Latitude 3420 Setup and Specifications Guide	Rev. A03
---	Dell Latitude 3470 Owner's Manual	Rev. A00
---	Dell Latitude 3480 Owner's Manual	Rev. A00
---	Dell Latitude 3490 Owner's Manual	Rev. A01
---	Dell Latitude E7450 Owner's Manual	Rev. A02
---	Dell Latitude E7470 Owner's Manual	Rev. A02
---	Dell Networking X-Series Spec Sheet	1.9
---	Dell Networking X1000 and X4000 Series Switches User Guide	Rev. A06
---	Dell OptiPlex 3050 All-in-One Owner's Manual	Rev. A00
---	Dell OptiPlex 5270 All-in-One Setup and specifications guide	Rev. A00
---	Dell OptiPlex 7050 Tower Owner's Manual	Rev. A01
---	Dell OptiPlex 7060 Small form Factor Setup and specifications guide	Rev. A01
---	Dell OptiPlex 7070 Tower Setup and Specifications	Rev. A00
---	Dell OptiPlex 7440 All-In-One Owner's Manual	Rev. A01
---	Dell OptiPlex 9010/7010 Desktop Owner's Manual	Rev. A02
---	Dell OptiPlex 9020 Small Form Factor Owner's Manual	Rev. A01
---	Dell OptiPlex 9030 All-In-One Owner's Manual	Rev. A01
---	Dell OptiPlex XE3 Small Form Factor Product Compliance Datasheet	Rev. A12
---	Dell OptiPlex XE3 Small Form Factor Setup and Specifications	Rev. A01
---	Dell OptiPlex XE3 Small Form Factor Service Manual	Rev. A01
---	Dell OptiPlex XE4 SFF Product Compliance Datasheet	Rev. A23
---	Dell OptiPlex XE4 Small Form Factor Service Manual	Rev. X-Rev
---	Dell OptiPlex XE4 Small Form Factor Setup and Specifications	Rev. A01
---	Dell P2417H Monitor User's Guide	Rev. A01
---	Dell P2418HT User's Guide	Rev. A00
---	Dell P2418HT Worldwide Regulatory Compliance Engineering and Environmental Affairs	A11
---	Dell P2419H Monitor User's Guide	Rev. A00
---	Dell P2422H Monitor User's Guide	Rev. A02
---	Dell P2422H Product Compliance Datasheet	Rev. A20
---	Dell PowerConnect 2808 Worldwide Regulatory Compliance Engineering and Environmental Affairs	---
---	Dell PowerConnect 2816 Worldwide Regulatory Compliance Engineering and Environmental Affairs	---
---	Dell PowerEdge R630 Worldwide Regulatory Compliance Engineering and Environmental Affairs	A10
---	Dell PowerEdge R630 Owner's Manual	Rev. A03

Table 4-1. TDP Documents *(continued)*

Document Number	Description	Version
---	Dell EMC PowerEdge R640 Installation and Service Manual	Rev. A01
---	Dell EMC PowerEdge R640 Technical Guide	Rev. A00
---	Dell PowerEdge R660 Product Compliance Datasheet	Rev. A26
---	Dell PowerEdge R660 Installation and Service Manual	Rev. A00
---	Dell Precision 3430 Small form Factor Service Manual	Rev. A00
---	Dell Precision 3431 Small Form Factor Setup and specifications guide	Rev. A00
---	Dell Precision 3440 SFF Product Compliance Datasheet	Rev. A17
---	Dell Precision 3440 Small Form Factor Setup and Specifications Guide	Rev. A00
---	Dell 3450 Small Form Factor Service Manual	Rev. A02
---	Dell Precision 3450 Small Form Factor Setup and Specifications	Rev. A02
---	Dell Precision 3460 SFF Product Compliance Datasheet	Rev. A23
---	Dell Precision 3460 Small Form Factor Service Manual	Rev. A00
---	Dell Precision 3460 Small Form Factor Setup and Specifications	Rev. A01
---	Dell Precision T1700 Mini-Tower Owner's Manual	Rev. A00
---	Dell Precision Tower 3420 Owner's Manual	Rev. A00
---	Dell Touch USB-C Hub Monitor P2424HT User’s Guide	Rev. A01
---	DisplayLink DL-1x5 Series High Performance USB Virtual Graphics	---
---	Programming Research High-Integrity C++ Coding Standard Manual	2.2
---	HIC++ Standards Model for C++	9.5.4
---	HID Omnikey 3121 Assembly Procedure	Rev. A.0
---	HID Omnikey 3121 User Guide	Rev. A.3
---	HID Omnikey 3121 Datasheet	---
---	HP LaserJet Pro 4001, 4002 User Guide	1.0
---	HP LaserJet Pro 4001 series Setup Guide	---
---	HP LaserJet Pro M402dn Datasheet	Rev. 2
---	HP LaserJet Pro M402dne Datasheet	---
---	HP Laser Jet Pro M402, M403 User Guide	2
---	HP Laser Jet Pro M403-M304, M404-M405 User Guide	2
---	HP LaserJet Pro M404 series Datasheet	1
---	HP LaserJet Pro M501 User Guide	3
---	IOGEAR GFR381 USB 3.0 Compact Flash Memory Card Reader	n/a
---	Dominion Voting Voter-verified paper audit trail (VVPAT) Model: VRP3 User manual	n/a
---	Kingston USB 3.0 High-Speed Media Reader Datasheet	n/a

Table 4-1. TDP Documents *(continued)*

Document Number	Description	Version
---	Lenovo ThinkCentre TIO24Gen3Touch User Guide	First Edition
---	Lenovo ThinkCentre TIO24Gen4Touch User Guide	First Edition
---	Lexar Professional USB 3.0 Dual-Slot Reader Quick Start Guide	A
---	Planar PCT2235 Touch LED LCD Monitor User's Guide	n/a
---	SCAMAX 8x1 Ultra High Performance Scanner	A
---	SCAMAX Document Scanner Type: H12 User Manual	2019.12
---	Tripp-Lite SmartPro SM1500RMXL2UTAA Datasheet	n/a
---	Tripp-Lite Smart1500 Owner's Manual	n/a
Build Documents		
---	Democracy Suite ImageCast Central Build Procedure	5.20::3
---	Democracy Suite ImageCast Evolution Firmware Build, Prerequisite Setup and Installation	5.20::3
---	Democracy Suite ImageCast Precinct Firmware Build and Install	5.20::2
---	Democracy Suite ImageCast X Build	5.20::4
---	Democracy Suite Windows Build Document	5.20::12
---	Democracy Suite ImageCast Precinct 2 Build Environment and Prerequisite Setup, Firmware Build and Installation	5.20::2
---	Android Build Procedure	5.20::5

4.6 Source Code Review

Pro V&V will review the submitted source code to the EAC 2005 VVSG and the manufacturer-submitted coding standards. Prior to initiating the software review, Pro V&V shall verify that the submitted documentation is sufficient to enable: (1) a review of the source code and (2) Pro V&V to design and conduct tests at every level of the software structure to verify that design specifications and performance guidelines are met.

For all components, the submitted source code will be compared to the previously certified Democracy Suite 5.17 voting system versions to determine the changes, if any. A combination of Automated Source Code Review and Manual Source Code Review methods will then be used to review the changes in the source code. A compliance review of all modified source code will be performed. Once the compliance review is performed and the source is deemed stable enough to proceed with testing, the source code and all additional packages will be compiled into a Compliance Build. Following successful completion of the FCA, a Trusted Build will be performed. The trusted build consists of inspecting the submitted source code, COTS, and third-party software products and combining them to create the executable code following the documented process outlined in Section 4.8 of the *EAC Voting System Testing and Certification Program Manual, Version 3.0*.

The Automated Source Code Review will be performed during the Compliance and Trusted Builds. In addition, 10% of the source code comments will be manually reviewed.

4.7 Physical Configuration Audit (PCA)

The Physical Configuration Audit (PCA) 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
- If the hardware is non-COTS, Pro V&V shall review drawings, specifications, technical data, and test data associated with system hardware 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

4.8 System Level Testing

System Level Testing will be implemented to evaluate the complete system. This testing will include all proprietary components and COTS components (software, hardware, and peripherals) in a configuration of the system's intended use. System Level Testing for this campaign includes the evaluations of the following test areas: FCA, Accuracy Testing, Volume & Stress, and System Integration Testing.

For software system tests, the tests will be designed according to the stated design objective without consideration of its functional specification. The system level hardware and software test cases will be prepared independently to assess the response of the hardware and software to a range of conditions. Pro V&V will review the manufacturer's program analysis, documentation, and module test case design and evaluate the test cases for each module with respect to flow control parameters and entry/exit data.

Pro V&V defines the expected result for each test and the ACCEPT/REJECT criteria for certification. If the system performs as expected, the results will be accepted. If the system does not perform as expected, an analysis was performed to determine the cause. If needed, the test will be repeated in an attempt to reproduce the results. If the failure can't be reproduced and the expected results are not met, the system will be determined to have failed the test. If the results can't be reproduced, the test will continue. All errors encountered will be documented and tracked through resolution.

4.8.1 Functional Configuration Audit (FCA)

The Functional Configuration Audit (FCA) 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 in 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.

The FCA for this test campaign will include an assessment of the submitted modifications and will include inputs of both normal and abnormal data during test performance. This evaluation will utilize baseline test cases as well as specifically designed test cases and will include predefined election definitions for the input data.

4.8.2 Accuracy

The accuracy test ensures that each component of the voting system can each process at least 1,549,703 consecutive ballot positions correctly within the allowable target error rate. The Accuracy test is designed to test the ability of the system to "capture, record, store, consolidate and report" specific selections and absences of a selection. The required accuracy is defined as an error rate. This rate is the maximum number of errors allowed while processing a specified volume of data. In an effort to achieve this and to verify the proper functionality of the units under test, the following methods will be used to test components of the voting system:

For paper-based voting systems the ballot positions on a paper ballot must be scanned to detect selections for individual candidates and contests and the conversion of those selections detected on the paper ballot converted into digital data. The accuracy requirements for the ICC, ICP, ICP2, and ICE units will be met by the execution of the standard accuracy test utilizing pre-marked and hand-marked ballots of each ballot length supported by the system, and ballots produced by the ICX BMD. The accuracy requirements for the ICX VVPAT BMD will be met by using the built-in vote simulation tool to cast votes on the device.

4.8.3 System Integration

System Integration is a system level test for the integrated operation of both hardware and software. It evaluates the compatibility of the voting system software components or subsystems with one another, and with other components of the voting system environment. This is determined through functional tests integrating the voting system software with the remainder of the system. During this area of testing, the system shall be configured exactly as it would for normal field use. Pro V&V personnel shall properly configure and test the system by following

the procedures detailed in the D-Suite 5.20 voting system technical documentation. This includes connecting all supporting equipment and peripherals including ballot boxes, voting booths (regular and accessible), and any physical security equipment such as locks and ties.

To accomplish the test objective, two General Elections and two Primary Elections will be exercised on the voting system, as described below:

Two general elections with the following breakdowns:

- General Election GEN-01: A General Election with Straight Party held in four precincts, one of which is a split precinct. This election contains nineteen contests compiled into four ballot styles. Five of the contests are in all four ballot styles. The other fourteen contests are split between at least two of the precincts with a maximum of four different contest spread across the four precincts.

- General Election GEN-03: A General Election held in two precincts. This election contains eight contests and compiled into two ballot styles. Four of the contests are in both ballot styles. The other four contests are split between the two precincts. This election is designed to functionally test the handling of multiple ballot styles, support for at least three languages including a character-based language, support for common voting variations, and audio support for at least three languages and an ADA binary input device.

Two primary elections with the following breakdowns:

- Primary Election PRIM-01: This election is designed to functionally test a Closed Primary Election with multiple ballots and support for common voting variations. This election contains thirty-one contests and six parties compiled into eighteen ballot styles, each ballot containing six contests.

- Primary Election PRIM-02: An Open Primary Election held in two precincts. This election contains thirteen contests and is compiled into three ballot styles. One of the contests is in all three ballot styles. The other twelve contests are independent. This election was designed to functionally test the handling of multiple ballot styles, support for Primary presidential delegation nominations, support for two languages, support for complex voting variations, and audio support for multiple languages.

4.8.4 Volume & Stress

The Volume & Stress test investigates the system's response to conditions that tend to overload the system's capacity to process, store, and report data. The test parameters will focus on the system's stated limits and the ballot logic for areas such as the maximum number of active voting positions, maximum number of ballot styles, maximum candidates, maximum contests, and stated limits within the EMS. This test will be utilized to ensure the system can achieve the manufacturer's TDP claims of what the system can support. Testing will be performed by exercising multiple election definitions developed specifically to test for volume and stress conditions of the system being tested.

4.8.5 Regression Testing

Regression testing will be conducted on the D-Suite 5.20 to establish assurance that the modifications have no adverse impact on the compliance, integrity, or performance of the system

4.9 Security Functions

The objective of the Security Testing is to evaluate the effectiveness of the voting system in detecting, preventing, recording, reporting, and recovering from security threats. To evaluate the integrity of the system, Pro V&V shall develop specifically designed test cases in an attempt to defeat the access controls and security measures documented in the system TDP.

The submitted threat matrix identifying the system's risks and vulnerabilities shall be evaluated for completeness and to determine that mitigating controls are adequately implemented. An evaluation of the system shall be accomplished by utilizing a combination of functional testing and source code review. All findings will be reported to the EAC and Dominion.

The test methods for performing the Security Testing are execution and review. Prior to performance of Security testing, the examiner will verify that security hardening scripts have been properly applied to system components per the system documentation. The examiner will review the submitted TDP to verify that documented access and physical controls are in place. Following the documented procedures, the examiner will configure the voting system for use and functionality to verify that the documented controls are in place and adequate and meet the stated requirements.

Physical Security will be tested by setting up the system as described in the TDP and then examining the effectiveness and comprehensiveness of physical security measures.

Administrative Security will be tested by examining the system's documented security instructions and procedures for effectiveness and breadth.

Logical security will be tested as part of FCA testing by a recognized security expert who not only will review the physical and administrative testing outcomes, but will perform the following tests on system components: Vulnerability Scans, SCAP Scans, and Physical Bypass Attempts. Logical security testing will assess the effectiveness of the security hardening scripts applied during the system setup and install process.

5.0 TEST DATA

The following subsections provide information concerning test data recording, criteria, and reduction.

5.1 Test Data Recording

All equipment utilized for test data recording shall be identified in the test data package. The output test data shall be recorded in an appropriate manner as to allow for data analysis.

For source code and TDP reviews, results shall be compiled in reports and submitted to Dominion for resolution.

5.2 Test Data Criteria

The D-Suite 5.20 Voting System shall be evaluated against all applicable requirements contained in the EAC 2005 VVSG. The acceptable range for system performance and the expected results for each test case shall be derived from the manufacturer-submitted technical documentation and the EAC 2005 VVSG.

6.0 TEST PROCEDURES AND CONDITIONS

The following subsections detail the facility requirements, test setup conditions, and sequence of testing.

6.1 Facility Requirements

Unless otherwise annotated, all testing shall be conducted at the Pro V&V test facility located in Huntsville, AL, by personnel verified by Pro V&V to be qualified to perform the test. Unless otherwise specified herein, testing shall be performed at the following standard ambient conditions and tolerances:

- Temperature: 68-75◦ F (±3.6◦F)
- Relative Humidity: Local Site Humidity
- Atmospheric Pressure: Local Site Pressure
- Time Allowable Tolerance: ±5%

Testing performed at third-party laboratories will be subjected to the test parameters and tolerances defined by the test facility and will be reported in the final Test Report.

6.2 Test Set-up

All voting system equipment shall be received and documented using Pro V&V proper QA procedures. Upon receipt of all hardware, an inspection will be performed to verify that the equipment received is free from obvious signs of damage and/or degradation that may have occurred during transit. If present, this damage shall be recorded, photographed, and reported to the Dominion Representative. Additionally, a comparison shall be made between the recorded serial numbers/part numbers and those listed on shipper's manifest and any discrepancies shall be reported to the Dominion Representative. TDP items and all source code received shall be inventoried and maintained by Pro V&V during the test campaign.

During test performance, the system shall be configured as it would be for normal field use. This includes connecting all supporting equipment and peripherals.

6.3 Test Sequence

The D-Suite 5.20 Voting System will be evaluated against all applicable requirements in the EAC 2005 VVSG. There is no required sequence for test performance.

6.4 Test Operations Procedure

Pro V&V will identify PASS/FAIL criteria for each executed test case. The PASS/FAIL criteria will be based on the specific expected results of the system. In the case of an unexpected result that deviates from what is considered standard, normal, or expected, a root cause analysis will be performed.

Pro V&V will evaluate every EAC 2005 VVSG requirement applicable to the Democracy Suite 5.20 voting system. Any deficiencies noted will be reported to the EAC and the manufacturer. If it is determined that there is insufficient data to determine compliance, this test plan will be altered and additional testing will be performed.

APPENDIX A

PROJECT SCHEDULE

Task Name	Start Date	End Date	Assigned To	% Comple	Duration	Predeces	Status
EAC Application & TRR	**10/25/23**	**03/05/24**		**100%**	**86d**		**Complete**
Application Submitted to EAC	10/25/23	10/25/23	Chuck Rice	100%	1d		Complete
TRR	10/31/23	11/02/23	Chuck Rice	100%	3d		Complete
Pen Testing	01/15/24	02/27/24	Chuck Rice	100%	32d		Complete
Application Approval from EAC	02/28/24	03/05/24	Chuck Rice	100%	5d	4	Complete
TDP	**10/30/23**	**03/19/24**		**100%**	**93d**		**Complete**
Initial Review	10/30/23	11/02/23	Stacey Glover	100%	4d		Complete
Compliance Review	11/03/23	03/13/24	Stacey Glover	100%	85d	7	Complete
Final review	03/14/24	03/19/24	Stacey Glover	100%	4d	8	Complete
Test Plan	03/06/24	05/13/24		100%	49d		**Complete**
Test Plan Creation	03/06/24	03/19/24	Wendy Owens	100%	10d	5	Complete
Vendor Review & Comments	03/20/24	03/21/24	Wendy Owens	100%	2d	11	Complete
EAC Submission and Review	03/22/24	04/18/24	Wendy Owens	100%	20d	12	Complete
VSTL Comment Review & Update	04/19/24	04/25/24	Wendy Owens	100%	5d	13	Complete
EAC Submission & Review of Revision	04/26/24	05/09/24	Wendy Owens	100%	10d	14	Complete
EAC Approved Test Plan	05/10/24	05/13/24	Wendy Owens	100%	2d	15	Complete
Source Code	**10/30/23**	**03/25/24**		**100%**	**97d**		**Complete**
Automated Review	10/30/23	10/31/23	Jack Cobb	100%	2d		Complete
Source Code Review	10/30/23	12/12/23	Jack Cobb	100%	30d		Complete
Source Code Re-Review	03/20/24	03/22/24	Jack Cobb	100%	3d		Complete
Document Review	03/25/24	03/25/24	Jack Cobb	100%	1d	20	Complete
System Delivery & Setup	**10/30/23**	**12/15/23**		**100%**	**33d**		**Complete**
PCA	10/30/23	12/01/23	Chuck Rice	100%	23d		Complete
System Setup	12/04/23	12/05/23	Chuck Rice	100%	2d	23	Complete
System Loads & Hardening	12/06/23	12/15/23	Chuck Rice	100%	8d	24	Complete
System Level Testing	**03/26/24**	**11/11/24**		**100%**	**164d**		**Complete**
Compliance Build	03/26/24	03/28/24	Chuck Rice	100%	3d		Complete
System Re-Loads & Hardening	03/29/24	04/01/24	Chuck Rice	100%	2d	27	Complete
FCA	04/22/24	05/24/24	Chuck Rice	100%	25d		Complete
Volume & Stress	05/28/24	05/30/24	Chuck Rice	100%	3d	29	Complete
Trusted Build	07/01/24	07/03/24	Chuck Rice	100%	3d		Complete
System Loads & Hardening	07/04/24	07/08/24	Chuck Rice	100%	3d	31	Complete
System Validation	07/09/24	07/10/24	Chuck Rice	100%	2d	32	Complete
Security (SCAP)	07/11/24	07/17/24	Chuck Rice	100%	5d	33	Complete
Accuracy	07/18/24	07/31/24	Chuck Rice	100%	10d	34	Complete
Regression Testing	11/04/24	11/04/24	Chuck Rice	100%	1d		Complete
System Integration	11/05/24	11/11/24	Chuck Rice	100%	5d	36	Complete
Test Report	**11/12/24**	**01/16/25**		**27%**	**48d**		**In Progress**
Test Report Creation	11/12/24	11/25/24	Wendy Owens	100%	10d	37	Complete
Vendor Review & Comments	11/26/24	11/27/24	Wendy Owens	100%	2d	39	Complete
EAC Submission & Review	11/28/24	12/25/24	Wendy Owens	5%	20d	40	In Progress
VSTL Comment Review & Update	12/26/24	01/01/25	Wendy Owens	0%	5d	41	Not Started
EAC Submission & Review of Revision	01/02/25	01/15/25	Wendy Owens	0%	10d	42	Not Started
EAC Approved Test Report	01/16/25	01/16/25	Wendy Owens	0%	1d	43	Not Started