

Voting System Test Report

Report Number: VWS-24003-TR-03

VotingWorks

VxSuite 4.0 Voting System

Test Report version 3.0

August 26th, 2026

Prepared for:

Manufacturer Name	VotingWorks
Manufacturer System	VxSuite 4.0
EAC Application No.	VXS4

Prepared by:



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Accredited by the National Institute of Standards and Technology (NIST) National Voluntary Lab Accreditation Program (NVLAP) and accredited by the Election Assistance Commission (EAC) for VSTL status



Revision History

Date	Release	Author	Revision Summary
June 19 th , 2026	1.0	E. Bickley	Initial Release
July 16 th , 2026	2.0	E. Bickley	Incorporated EAC comments
August 26 th , 2026	3.0	E. Bickley	Incorporated EAC comments

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Disclaimer

The Test results reported herein must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the US Government. Results herein relate only to the items tested.

The tests referenced in this document were performed in a controlled environment using specific systems and data sets, and results are related to the specific items tested. Actual results in other environments may vary.

Opinions and Interpretations

There are no opinions or interpretations included in this report, except as noted under Recommendations.

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Other Labs Performing Hardware Testing

SLI Compliance is responsible for all core voting system tests as identified in NIST Handbook 150-22 (current version). Regarding non-core hardware testing for this test campaign, this report contains data that were produced under subcontract by the following lab(s):

- Element Materials Technology Denver-Longmont, 1736 Vista View Drive Longmont, CO 80504 (A2LA certified for Electromagnetic Compatibility/ Interference (EMC/EMI), Lightning, Transient, and Surge tests)
- Element Materials Technology Denver-Longmont, 1601 Dry Creek Drive Longmont, CO 80503 (A2LA certified for mechanical including MIL STD 810H)



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1 System Identification and Overview

SLI Compliance submits this report as a summary of the certification testing efforts for the VotingWorks VxSuite 4.0 voting system, as detailed in the section **System Identification**. The purpose of this document is to provide an overview of the testing effort and the resulting findings.

This effort included documentation review of the Technical Data Package, source code review, and testing of the VotingWorks VxSuite 4.0 voting system. Testing consisted of the development of a test plan, managing system configurations, executing test suites of functional and system levels tests based on the system's functionality, and analysis of results. The review and testing were performed at SLI Compliance's Wheat Ridge, Colorado facility, from Dec 10th, 2024, to June 10th, 2026.

1.1 References

1. Election Assistance Commission Voluntary Voting System Guidelines (EAC VVSG), Version 2.0, 2021
2. VVSG Version 2.0 Test Assertions Version 1.3
3. NIST Handbook 150: 2020
4. NIST Handbook 150-22: 2021
5. EAC Voting System Testing and Certification Program Manual, United States Election Assistance Commission, v 3.0
6. SLI Compliance VSTL Quality System Manual, v4.4, dated July 21, 2025

1.2 Document Overview

This document contains the following sections:

- The "System Identification and Overview" discusses the system that was tested.
- The "Certification Test Background" section discusses the testing process.
- The "Test Findings and Recommendation" section contains the results and analysis of the testing effort.
- Attachments listed in the test report subsections, which include:
 - Attachment A – VotingWorks VxSuite 4.0 Implementation Statement
 - Attachment B – VotingWorks VxSuite 4.0 Technical Data Package Listing
 - Attachment C – VotingWorks VxSuite 4.0 Warrant of Change Control
 - Attachment D – VotingWorks VxSuite 4.0 Test Plan - As Run
 - Attachment E – VotingWorks VxSuite 4.0 Test Case Matrix – PROPRIETARY



- Attachment F – VotingWorks VxSuite 4.0 Record of Trusted Build
- Attachment G – VotingWorks VxSuite 4.0 Hashes
- Attachment H – Accredited Hardware Test Lab Certification
- Attachment I – VotingWorks VxSuite 4.0 Hardware Test Plans
- Attachment J – VotingWorks VxSuite 4.0 Hardware Testing Results
- Attachment K – VotingWorks VxSuite 4.0 Source Code Reviewed and Results – PROPRIETARY
- Attachment L – VotingWorks VxSuite 4.0 Test Suites – PROPRIETARY

1.3 System Identification

The VotingWorks VxSuite 4.0 voting system was submitted for testing with the documentation, hardware and software listed in the following subsections.

1.3.1 Software and Firmware

The software and firmware employed by VotingWorks VxSuite 4.0 consists of custom software or firmware that have been created as open source or incorporating open source software and commercial off the shelf (COTS) products. The COTS applications were verified to be unmodified or were subjected to source code review for analysis of any modifications and verification of meeting the pertinent standards.

The tables below detail each application employed by the VotingWorks VxSuite 4.0 voting system.

Table 1 – VxSuite 4.0 Software/Firmware

Component	Component Type	Software Version
VxAdmin (Pre-Election definition loaded and equipment configuration and media creation) (Post-election result consolidation, adjudication, and report creation)	Workstation Software	4.0.7
VxMarkScan	Ballot Marking Device (BMD)	4.0.7
VxScan (Scan and tabulate)	Precinct Count Scanner/PCS	4.0.7
VxCentralScan (Scan and tabulate)	Central Count Scanner/CCS	4.0.7

Table 2 – VxSuite 4.0 COTS Software and Firmware

	Workstations (All)	
Manufacturer/Managing entity	Application/Package	Version
https://www.rust-lang.org/governance	rust-1.93.0-x86_64-unknown-linux-gnu.tar.gz	1.93.0
https://nodejs.org/en/about/governance	node-v20.16.0-linux-x64.tar.gz	20.16.0
Debian ALSA Maintainers <pkg-alsa-devel@lists.aliases.debian.org>	alsa-utils_1.2.8-1_amd64.deb	1.2.8-1
nicoo <nicoo@debian.org>	brightnessctl_0.5.1-3_amd64.deb	0.5.1-3
Matthias Klose <doko@debian.org>	build-essential_12.9_amd64.deb	12.9
Debian Chromium Team <chromium@packages.debian.org>	chromium_148.0.7778.167-1~deb12u1_amd64.deb	148.0.7778.167-1~deb12u1
Debian Cloud Team <debian-cloud@lists.debian.org>	cloud-guest-utils_0.33-1_all.deb	0.33-1
Debian Cryptsetup Team <pkg-cryptsetup-devel@aliases-lists.debian.net>	cryptsetup_2%3a2.6.1-4~deb12u2_amd64.deb	2:2.6.1-4~deb12u2
Debian Printing Team <debian-printing@lists.debian.org>	cups_2.4.2-3+deb12u9_amd64.deb	2.4.2-3+deb12u9
Debian Printing Team <debian-printing@lists.debian.org>	cups-bsd_2.4.2-3+deb12u9_amd64.deb	2.4.2-3+deb12u9
Debian Printing Team <debian-printing@lists.debian.org>	cups-client_2.4.2-3+deb12u9_amd64.deb	2.4.2-3+deb12u9
Alessandro Ghedini <ghedo@debian.org>	curl_7.88.1-10+deb12u14_amd64.deb	7.88.1-10+deb12u14
Sanford Rockowitz <rockowitz@minsoft.com>	ddcutil_1.4.1-1_amd64.deb	1.4.1-1
Debian Java Maintainers <pkg-java-maintainers@lists.aliases.debian.org>	default-jdk_2%3a1.17-74_amd64.deb	2:1.17-74
Andreas Bombe <aeb@debian.org>	dosfstools_4.2-1_amd64.deb	4.2-1
Debian EFI Maintainers <debian-efi@lists.debian.org>	efitools_1.9.2-3_amd64.deb	1.9.2-3



	Workstations (All)	
Manufacturer/Managing entity	Application/Package	Version
Sven Hoexter <hoexter@debian.org>	exfatprogs_1.2.0-1+deb12u1_amd64.deb	1.2.0-1+deb12u1
util-linux packagers <util- linux@packages.debian.org>	fdisk_2.38.1-5+deb12u3_amd64.deb	2.38.1-5+deb12u3
Utopia Maintenance Team <pkg-utopia- maintainers@lists.aliases.debian.org>	firewalld_1.3.3-1~deb12u1_all.deb	1.3.3-1~deb12u1
Debian Kernel Team <debian- kernel@lists.debian.org>	firmware-amd-graphics_20230210-5_all.deb	20230210-5
Debian Kernel Team <debian- kernel@lists.debian.org>	firmware-linux_20230210-5_all.deb	20230210-5
Debian Kernel Team <debian- kernel@lists.debian.org>	firmware-linux-free_20200122-1_all.deb	20200122-1
Debian Kernel Team <debian- kernel@lists.debian.org>	firmware-misc-nonfree_20230210-5_all.deb	20230210-5
Mark Pearson <mpearson- lenovo@squebb.ca>	firmware-sof-signed_2.2.4-1_all.deb	2.2.4-1
Debian Fonts Task Force <pkg-fonts- devel@lists.aliases.debian.org>	fonts-wqy-zenhei_0.9.45-8_all.deb	0.9.45-8
Jonathan Nieder <jrnieder@gmail.com>	git_1%3a2.39.5-0+deb12u3_amd64.deb	1:2.39.5- 0+deb12u3
Debian GNOME Maintainers <pkg-gnome- maintainers@lists.aliases.debian.org>	gvfs_1.50.3-1+deb12u1_amd64.deb	1.50.3-1+deb12u1
Milan Kupcevic <milan@debian.org>	gzip_1.12-1_amd64.deb	1.12-1
Debian Printing Team <debian- printing@lists.debian.org>	hplip_3.22.10+dfsg0-2_amd64.deb	3.22.10+dfsg0-2
Debian Printing Team <debian- printing@lists.debian.org>	ipp-usb_0.9.23-1+b4_amd64.deb	0.9.23-1+b4
Debian Netfilter Packaging Team <pkg-netfilter- team@lists.aliases.debian.org>	iptables_1.8.9-2_amd64.deb	1.8.9-2
ChangZhuo Chen (陳昌倬) <czchen@debian.org>	jq_1.6-2.1+deb12u1_amd64.deb	1.6-2.1+deb12u1

	Workstations (All)	
Manufacturer/Managing entity	Application/Package	Version
Debian Qt/KDE Maintainers <debian-qt-kde@lists.debian.org>	kde-cli-tools_4%3a5.27.5.1-2_amd64.deb	4:5.27.5.1-2
Debian Accessibility Team <pkg-a11y-devel@alioth-lists.debian.net>	libatspi2.0-0_2.46.0-5_amd64.deb	2.46.0-5
Debian GNOME Maintainers <pkg-gnome-maintainers@lists.alioth.debian.org>	libcairo2-dev_1.16.0-7_amd64.deb	1.16.0-7
David Suárez <david.sephiroth@gmail.com>	libgif-dev_5.2.1-2.5_amd64.deb	5.2.1-2.5
Debian GNOME Maintainers <pkg-gnome-maintainers@lists.alioth.debian.org>	libglib2.0-bin_2.74.6-2+deb12u9_amd64.deb	2.74.6-2+deb12u9
Debian GNOME Maintainers <pkg-gnome-maintainers@lists.alioth.debian.org>	libgtk-3-0_3.24.38-2~deb12u3_amd64.deb	3.24.38-2~deb12u3
Ondřej Surý <ondrej@debian.org>	libjpeg-dev_1%3a2.1.5-2_amd64.deb	1:2.1.5-2
Debian GNOME Maintainers <pkg-gnome-maintainers@lists.alioth.debian.org>	libnotify4_0.8.1-1_amd64.deb	0.8.1-1
Debian GNOME Maintainers <pkg-gnome-maintainers@lists.alioth.debian.org>	libpango1.0-dev_1.50.12+ds-1_amd64.deb	1.50.12+ds-1
Ludovic Rousseau <rousseau@debian.org>	libpcsclite1_1.9.9-2_amd64.deb	1.9.9-2
Ludovic Rousseau <rousseau@debian.org>	libpcsclite-dev_1.9.9-2_amd64.deb	1.9.9-2
Debian X Strike Force <debian-x@lists.debian.org>	libpixman-1-dev_0.42.2-1_amd64.deb	0.42.2-1
Maintainers of libpng1.6 packages <libpng1.6@packages.debian.org>	libpng-dev_1.6.39-2+deb12u5_amd64.deb	1.6.39-2+deb12u5
Jörg Frings-Fürst <debian@jff.email>	libsane_1.2.1-2_amd64.deb	1.2.1-2

	Workstations (All)	
Manufacturer/Managing entity	Application/Package	Version
Jörg Frings-Fürst <debian@jff.email>	libsane1_1.2.1-2_amd64.deb	1.2.1-2
Jörg Frings-Fürst <debian@jff.email>	libsane-common_1.2.1-2_all.deb	1.2.1-2
Debian Printing Team <debian- printing@lists.debian.org>	libsane-hpaio_3.22.10+dfsg0-2_amd64.deb	3.22.10+dfsg0-2
Debian systemd Maintainers <pkg-systemd- maintainers@lists.alioth.debia n.org>	libudev-dev_252.39-1~deb12u2_amd64.deb	252.39-1~deb12u2
Aurelien Jarno <aurel32@debian.org>	libusb-1.0-0-dev_2%3a1.0.26-1_amd64.deb	2:1.0.26-1
Debian X Strike Force <debian-x@lists.debian.org>	libx11-dev_2%3a1.8.4-2+deb12u2_amd64.deb	2:1.8.4-2+deb12u2
Debian X Strike Force <debian-x@lists.debian.org>	libxss1_1%3a1.2.3-1_amd64.deb	1:1.2.3-1
Debian X Strike Force <debian-x@lists.debian.org>	libxtst6_2%3a1.2.3-1.1_amd64.deb	2:1.2.3-1.1
Aurelien Jarno <aurel32@debian.org>	lm-sensors_1%3a3.6.0-7.1_amd64.deb	1:3.6.0-7.1
Manoj Srivastava <srivasta@debian.org>	make_4.3-4.1_amd64.deb	4.3-4.1
Debian QA Group <packages@qa.debian.org>	mingetty_1.08-4_amd64.deb	1.08-4
Mateusz Łukasik <mati75@linuxmint.pl>	openbox_3.6.1-10_amd64.deb	3.6.1-10
Thomas Girard <thomas.g.girard@free.fr>	pahole_1.24-4.1_amd64.deb	1.24-4.1
Parted Maintainer Team <parted-maintainers@alioth- lists.debian.net>	parted_3.5-3_amd64.deb	3.5-3
Ludovic Rousseau <rousseau@debian.org>	pcscd_1.9.9-2_amd64.deb	1.9.9-2
Ludovic Rousseau <rousseau@debian.org>	pcsc-tools_1.6.2-1_amd64.deb	1.6.2-1
Pulseaudio maintenance team <pkg-pulseaudio- devel@lists.alioth.debian.org>	pulseaudio_16.1+dfsg1-2+b1_amd64.deb	16.1+dfsg1-2+b1
Pulseaudio maintenance team <pkg-pulseaudio- devel@lists.alioth.debian.org>	pulseaudio-utils_16.1+dfsg1-2+b1_amd64.deb	16.1+dfsg1-2+b1

	Workstations (All)	
Manufacturer/Managing entity	Application/Package	Version
Paul Sloomman <paul@debian.org>	rsync_3.2.7-1+deb12u4_amd64.deb	3.2.7-1+deb12u4
Michael Biebl <biebl@debian.org>	rsyslog_8.2302.0-1+deb12u1_amd64.deb	8.2302.0-1+deb12u1
Debian Ruby Team <pkg-ruby-extras-maintainers@lists.aliases.debian.org>	ruby_1%3a3.1_amd64.deb	01:3.1
Debian Ruby Team <pkg-ruby-extras-maintainers@lists.aliases.debian.org>	ruby-dev_1%3a3.1_amd64.deb	01:3.1
Debian Printing Team <debian-printing@lists.debian.org>	sane-airscan_0.99.27-1+b1_amd64.deb	0.99.27-1+b1
Jörg Frings-Fürst <debian@jff.email>	sane-utils_1.2.1-2_amd64.deb	1.2.1-2
Debian EFI Team <debian-efi@lists.debian.org>	sbsigntool_0.9.4-3.1_amd64.deb	0.9.4-3.1
Torsten Landschoff <torsten@debian.org>	swig_4.1.0-0.2_all.deb	4.1.0-0.2
Debian systemd Maintainers <pkg-systemd-maintainers@lists.aliases.debian.org>	systemd-boot-efi_252.39-1~deb12u2_amd64.deb	252.39-1~deb12u2
Janos Lenart <ocsi@debian.org>	tar_1.34+dfsg-1.2+deb12u1_amd64.deb	1.34+dfsg-1.2+deb12u1
Stefano Karapetsas <stefano@karapetsas.com>	trash-cli_0.17.1.14-5_all.deb	0.17.1.14-5
Axel Beckert <abe@debian.org>	unclutter_8-25_amd64.deb	8-25
Santiago Vila <sanvila@debian.org>	unzip_6.0-28_amd64.deb	6.0-28
Birger Schacht <birger@debian.org>	usbguard_1.1.2+ds-3+b1_amd64.deb	1.1.2+ds-3+b1
Noël Köthe <noel@debian.org>	wget_1.21.3-1+deb12u1_amd64.deb	1.21.3-1+deb12u1
Debian X Strike Force <debian-x@lists.debian.org>	x11-common_1%3a7.7+23_all.deb	1:7.7+23
Debian freedesktop.org maintainers <pkg-freedesktop-	xdg-utils_1.1.3-4.1_all.deb	1.1.3-4.1

	Workstations (All)	
Manufacturer/Managing entity	Application/Package	Version
maintainers@lists.aliases.debian.org>		
Debian X Strike Force <debian-x@lists.debian.org>	xinit_1.4.0-1_amd64.deb	1.4.0-1
Debian X Strike Force <debian-x@lists.debian.org>	xinput_1.6.3-1_amd64.deb	1.6.3-1
Debian X Strike Force <debian-x@lists.debian.org>	xorg_1%3a7.7+23_amd64.deb	1:7.7+23
Debian X Strike Force <debian-x@lists.debian.org>	xserver-xorg-core_2%3a21.1.7-3+deb12u12_amd64.deb	2:21.1.7-3+deb12u12
Debian X Strike Force <debian-x@lists.debian.org>	xserver-xorg-input-all_1%3a7.7+23_amd64.deb	1:7.7+23
Debian X Strike Force <debian-x@lists.debian.org>	xserver-xorg-input-libinput_1.2.1-1+b1_amd64.deb	1.2.1-1+b1
Boyuan Yang <byang@debian.org>	xserver-xorg-input-wacom_1.1.0-1_amd64.deb	1.1.0-1
Debian X Strike Force <debian-x@lists.debian.org>	xserver-xorg-video-all_1%3a7.7+23_amd64.deb	1:7.7+23
Debian Vim Maintainers <team+vim@tracker.debian.org>	xxd_2%3a9.0.1378-2+deb12u2_amd64.deb	2:9.0.1378-2+deb12u2
Santiago Vila <sanvila@debian.org>	zip_3.0-13_amd64.deb	3.0-13
Debian QA Group <packages@qa.debian.org>	autoconf_2.71-3_all.deb	2.71-3
Bastien Roucariès <rouca@debian.org>	autoconf-archive_20220903-3_all.deb	20220903-3
Eric Dorland <eric@debian.org>	automake_1%3a1.16.5-1.3_all.deb	1:1.16.5-1.3
Henrique de Moraes Holschuh <hnh@debian.org>	autotools-dev_20220109.1_all.deb	20220109.1
Alessandro Ghedini <ghedo@debian.org>	libcurl4-openssl-dev_7.88.1-10+deb12u14_amd64.deb	7.88.1-10+deb12u14
Nicolas Mora <babelouest@debian.org>	libjson-c-dev_0.16-2_amd64.deb	0.16-2
Alastair McKinstry <mckinstry@debian.org>	libltdl-dev_2.4.7-7~deb12u1_amd64.deb	2.4.7-7~deb12u1
NIIBE Yutaka <gniibe@fsij.org>	libqrencode4_4.1.1-1_amd64.deb	4.1.1-1



	Workstations (All)	
Manufacturer/Managing entity	Application/Package	Version
NIIBE Yutaka <gniibe@fsij.org>	libqrencode-dev_4.1.1-1_amd64.deb	4.1.1-1
Debian OpenSSL Team <pkg- openssl-devel@alioth- lists.debian.net>	libssl-dev_3.0.20-1~deb12u1_amd64.deb	3.0.20-1~deb12u1
Alastair McKinstry <mckinstry@debian.org>	libtool_2.4.7-7~deb12u1_all.deb	2.4.7-7~deb12u1
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-esys-3.0.2-0_3.2.1-3_amd64.deb	3.2.1-3
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-fapi1_3.2.1-3_amd64.deb	3.2.1-3
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-mu0_3.2.1-3_amd64.deb	3.2.1-3
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-rc0_3.2.1-3_amd64.deb	3.2.1-3
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-sys1_3.2.1-3_amd64.deb	3.2.1-3
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-tcti-cmd0_3.2.1-3_amd64.deb	3.2.1-3
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-tcti-device0_3.2.1-3_amd64.deb	3.2.1-3
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-tctildr0_3.2.1-3_amd64.deb	3.2.1-3
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-tcti-mssim0_3.2.1-3_amd64.deb	3.2.1-3
Mathieu Trudel-Lapierre <cyphermox@ubuntu.com>	libtss2-tcti-swtpm0_3.2.1-3_amd64.deb	3.2.1-3
Santiago Vila <sanvila@debian.org>	m4_1.4.19-3_amd64.deb	1.4.19-3
NIIBE Yutaka <gniibe@fsij.org>	qrencode_4.1.1-1_amd64.deb	4.1.1-1
Luca Boccassi <bluca@debian.org>	tpm2-openssl_1.1.1-1_amd64.deb	1.1.1-1
Ying-Chun Liu (PaulLiu) <paulliu@debian.org>	tpm2-tools_5.4-1_amd64.deb	5.4-1



1.3.2 Equipment (Hardware)

The hardware employed by VotingWorks VxSuite 4.0 consists of two types: custom and commercial off the shelf (COTS). COTS hardware was verified to be pristine or was subjected to review for analysis of any modifications and verification of meeting the pertinent standards.

The tables below detail each device employed by the VotingWorks VxSuite 4.0 voting system.

Table 3 – VxSuite 4.0 Custom Equipment

Manufacturer	Hardware	Model
VotingWorks	VxScan	4.0.5
VotingWorks	VxScan Ballot box - Precinct Scanner Ballot Box - Purpose made, plastic, collapsible ballot box for use with VxScan	4.0.0
VotingWorks	VxMarkScan	4.0.0

Table 4 – VxSuite 4.0 COTS Equipment

Component	Component Type	Associated COTS Hardware
VxAdmin	Workstation	- Runs on the following COTS workstations: - HP Elitebook 840 G11 with internal smart card reader - Tripp Lite 4-port Ultra Slim USB Hub - HP Laser Pro 4001dn printer - Uninterruptible Power Supply for backup power: - APC Backup-UPS 1500 - BN1500M2 - Lindy RJ45 Port Blocker
VxCentralScan	Workstation	- Runs on the following COTS workstations: - HP Elitebook 840 G11 with internal smart card reader - Tripp Lite 4-port Ultra Slim USB Hub - RICOH fi-8170 small desktop scanner - RICOH fi-819PRB Imprinter (for fi-8170) - RICOH fi-7600 Large desktop Scanner - RICOH fi-760PRB Imprinter(for fi-7600) - Uninterruptible Power Supply for backup power: - APC Backup-UPS 1500 - BN1500M2 - Lindy RJ45 Port Blocker
VxScan	Precinct Scanner	- Uninterruptible Power Supply for backup power: - GoldenMate 1000 VA



Component	Component Type	Associated COTS Hardware
VxMarkScan	Ballot Marking Device	• Smartmatic Ballot marking Device VSAP-150 • Origin Instruments Air Voter (Sip and Puff) • HID Smart Card Reader R31210375-1 • Williams audio Visual T-Coil Neckloop NKL-001 • Uninterruptible Power Supply for backup power: ○ APC Backup-UPS 1500 - BN1500M2

1.3.3 Engineering Changes

VxSuite 4.0 is the base release and does not currently have any Engineering Changes.

1.3.4 Test Materials

Items identified below reflect materials required to perform hardware, software, telecommunications, security, accuracy and integrated system tests in a manner that reflects real world use and needs.

Manufacturer	Application	Version
Tenable	Nessus Professional	10.7.1
Wireshark Foundation	Wireshark	4.2.5
Mh-nexus	HxD	2.5.0.0
Kali	Kali Linux	2024.1
GCHQ	CyberChef	10.18.6
WebAIM.org	Contrast Checker	N/A

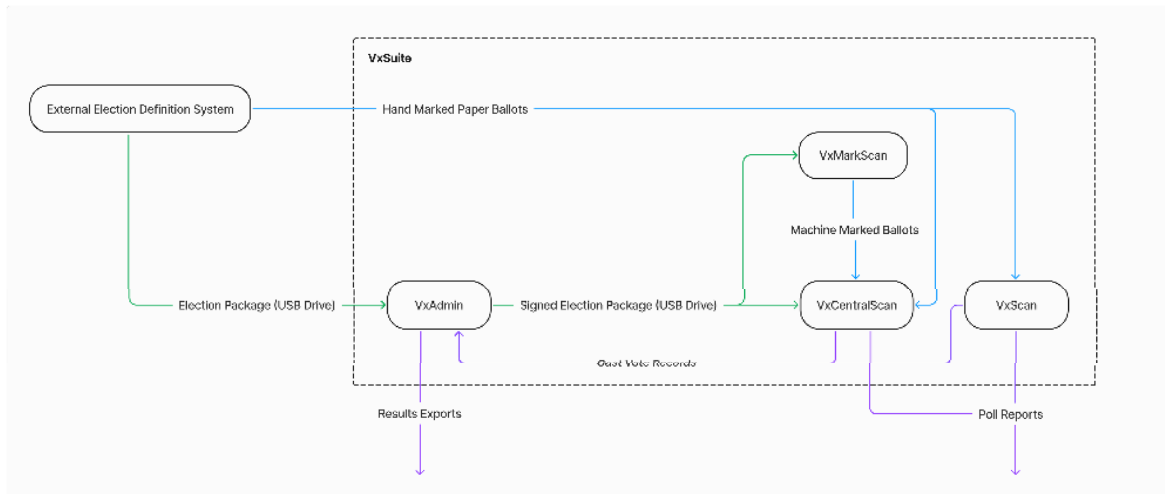
1.3.5 Technical Data Package (TDP) Documents

The VxSuite 4.0 documents provided in the TDP are listed in "Attachment B – Technical Data Package Listing".

1.4 System Overview

1.4.1 Scope of the VotingWorks VxSuite 4.0 Voting System

System Overview



Top level system diagram

The VotingWorks VxSuite 4.0 voting system (**VxSuite 4.0**) consists of four primary components:

- **VxAdmin**: election setup and election results manager
- **VxMarkScan**: ballot-marking device (BMD)
- **VxScan**: precinct count scanner/PCS
- **VxCentralScan**: central scanner/CCSCentral Count Scanner/CCS

Voters mark paper ballots by hand or by using VxMarkScan to machine mark. Ballots are read and counted by tabulating devices (VxScan & VxCentralScan), which create cast vote records for adjudication and aggregation on VxAdmin. VotingWorks considers read and counted ballots as the same.

An election begins with generating an election package and hand marked ballots using an External Election Definition System which is not part of the EAC certified VxSuite 4.0 configuration.



VxAdmin

VxAdmin is where the election administrator performs election setup tasks and manages election results. At the beginning of an election, the user configures VxAdmin with an election package. Once configured, VxAdmin is used for two key election setup tasks:

Exporting a copy of the election package to USB drives with a digital signature. The election package is used to configure VxMarkScan, VxScan, and VxCentralScan, and it must be digitally signed by VxAdmin.

Programming role-based smart cards that will be used to authenticate on all machines. While the "System Administrator" role is election-agnostic, the "Election Manager" and "Poll Worker" roles are election-specific and cards must be programmed for every election.

VxAdmin is later used to load, store, and aggregate cast vote records from the scanners. The results are available for review or export in several results formats. Election administrators can mark results as official, after which no new results can be added.

VxMarkScan

VxMarkScan is the system's ballot-marking device (BMD) that provides an accessible voting experience. At the beginning of an election, it is configured with an election package from VxAdmin. Once configured, a voter can make vote selections in various interaction modes according to their needs.

The following input modes are supported:

- Touch, using the touchscreen
- Tactile, using the accessible controller
- Limited Dexterity, using a sip-and-puff device or other dual-switch input
- The following output modes are supported:
 - Visual, with options to change color contrast and text size
 - Audio, with navigation instructions and contest details read to the user over headphones

The voter can also adjust the language based on translations included in the election package.



After the voter finishes their vote selections, VxMarkScan prints a machine marked ballot and presents it to the voter. The ballot is scanned (but not cast) so the interpreted results can be presented to the voter on-screen. After reviewing the ballot and confirming their selections, the ballot is transitioned into the attached ballot box. At a later time, depending on election procedures, the ballot will be removed from the ballot box for tabulation.

VxScan

VxScan is the system's precinct count scanner. At the beginning of an election, it is configured with an election package from VxAdmin. The election package specifies the ballot layouts. The polls are opened by a poll worker after which casting ballots is allowed. Opening polls prints the zero report.

Voters cast ballots by inserting their ballots into the scanner in any orientation. After interpreting the scanned ballot, the scanner will drop the ballot into the ballot box and inform the voter that their ballot was successfully cast. During voting, VxScan continuously exports cast vote records to an attached USB drive.

If the election is configured to support second-chance voting and the ballot triggers a configured adjudication reason (e.g. it has an overvote), the scanner will hold the ballot while the voter is notified of the issues on their ballot. The voter then chooses whether to cast their ballot or return it to update or spoil.

When polls are closed, the CVR export is completed and a polls closed report prints. The polls closed report includes the vote tallies of all ballots cast at the scanner while polls were open. Unlike the vote tallies eventually exported from VxAdmin, the vote tallies at VxScan do not contain any post-voting adjudication information such as write-in adjudication. The CVR export on the USB drive is then taken to VxAdmin for adjudication, aggregation, and reporting.

VxCentralScan

VxCentralScan is the system's CCS, often used to scan absentee or provisional ballots. At the beginning of an election, it is configured with an election package from VxAdmin. The election package specifies the ballot layouts.

Ballots are inserted in the CCS's hopper and a batch scan is triggered from VxCentralScan. The ballots are scanned and interpreted in succession until the hopper is empty. If a ballot triggers a configured adjudication reason (e.g. it has an overvote), scanning will pause and the ballot will be displayed on screen, at which point the user can choose to tabulate the ballot anyway or remove it, untabulated.

After scanning is complete, the user can export the cast vote records to a USB drive and take the USB drive to VxAdmin for adjudication, aggregation, and reporting.



1.4.2 Supported Languages

VxSuite 4.0 supports the following 4 languages: English, Spanish, Chinese (Simplified), and Chinese (Traditional).

1.4.3 Verify VotingWorks 4.0 System Limits

Election Definition Limits

Item	Per	Upper Limit
Precincts	Election	1,000
Candidates	Election	1,000
Contests	Election	1,000
Ballot Styles	Election	1,000
Candidates	Contest	100
Vote for	Contest	50
Characters	Name, Title, Label	100
Characters	Proposition Description	10,000

Component Limits

VxAdmin

- The total number of CVRs that can be imported is limited by the total disk space on the laptop (~200GB). The exact number of CVRs depends on ballot size, ballot selections, tabulator used (VxScan or VxCentralScan), and other factors that determine expected CVR size.

VxCentralScan

- The total number of ballots scanned is limited by the total disk space on the laptop (~200GB). The exact number of ballots depends on ballot size, complexity, and selections made which determine the CVR and ballot image sizes.
- VxCentralScan is limited by the CCS maximum tabulation rate for each central scanner model:
 - Ricoh fi-8170: 80 sheets per minute
 - Ricoh fi-7600: 100 sheets per minute



VxMarkScan

- VxMarkScan supports 8" x 11" and 8" x 13.25" ballot sizes as specified in Paper Ballot Specifications
- VxMarkScan ballots are limited to 25 contests.
- A contest allows voting for n out of m candidates/choices. The upper limits for n and m are listed above: n = Vote For per Contest and m = Candidates per Contest.
 - On VxMarkScan, for any one contest, n is limited to 25 (lower than the upper limit), and m is limited to 100 (the same as the upper limit).
 - Take the sum of n across all contests on a ballot style to be N and the sum of m across all contests on a ballot style to be M. On VxMarkScan, N is limited to 75, and M is limited to 135.
- Each VxMarkScan write-in is limited to 40 characters. The sum of write-in characters across all contests on a VxMarkScan ballot is limited to 60.
- The ballot box supports up to 200 ballots before needing to be cleared.
- VxMarkScan can activate, mark, verify, and cast up to 20 ballots per hour. Exact rate depends on time spent by user marking and verifying a ballot before casting.

VxScan

- The ballot box supports up to 3000 ballots in the main compartment before needing to be cleared.
- The ballot box auxiliary compartment supports up to 100 ballots before needing to be cleared. Ballots longer than 19" must be folded.
- Total ballots scanned for a given VxScan configuration are limited to 10,000 ballots. This limit is based on the disk space available on specified external disks to ensure adequate disk space in the case of needing to re-sync CVRs.



2 Certification Test Background

2.1 Revision History

Please see the Revision History table on pg. 2.

2.2 Implementation Statement

Please see “Attachment A - VotingWorks VxSuite 4.0 Implementation Statement”.

2.3 Terms and Abbreviations

The following terms and abbreviations will be used throughout this document:

Table 5 – Terms and Abbreviations

Term	Abbreviation	Description
American Association for Laboratory Accreditation	A2LA	A nonprofit, non-governmental, public service, membership society whose mission is to provide comprehensive services in laboratory accreditation and laboratory-related training.
Ballot Marking Device	BMD	An accessible computer-based voting system that produces a marked ballot (usually paper) that is the result of voter interaction with visual or audio prompts.
Central Count Scanner	CCS	A mark sense-based ballot and vote counting device typically located at a central count facility and is operated by an automated multi-sheet feeding capability.
Commercial Off the Shelf	COTS	Term used to designate computer software, hardware or accessories that are ready-made and available for sale, lease, or license to the general public
Election Assistance Commission	EAC	An independent, bipartisan commission created by the Help America Vote Act (HAVA) of 2002 that operates the federal government's voting system certification program.
Election Management System	EMS	Typically, a database management system used to enter jurisdiction information (district, precincts, languages, etc.) as well as election specific information (races, candidates, voter groups (parties), etc.). In addition, the EMS is also used to lay out the ballots, download the election data to the voting devices, upload the results and produce the final results reports.
Electromagnetic Compatibility	EMC	The goal of EMC is to validate the correct functioning of different equipment in the same environment and the avoidance of any interference effects between them.



Term	Abbreviation	Description
Institute of Electrical and Electronics Engineers	IEEE	A non-profit professional association for the advancement of technology.
National Institute of Standards and Technology	NIST	A non-regulatory federal agency within the U.S. Dept. of Commerce. Its mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve quality of life.
National Voluntary Laboratory Accreditation Program	NVLAP	A division of NIST that provides third-party accreditation to testing and calibration laboratories.
Physical Configuration Audit	PCA	A formal process to confirm that a voting system's physical setup matches its documented, approved configuration, helping to safeguard against unauthorized changes and maintain system integrity.
Precinct Count Scanner	PCS	A precinct-count optical scanner is a mark sense-based ballot and vote counting device located at a precinct and is typically operated by scanning one ballot at a time.
Request For Interpretation	RFI	A means used by testing laboratories and manufacturers to request that the EAC provide an interpretation of a technical issue related to testing of voting systems.
Technical Data Package	TDP	The data package supplied by the vendor, which includes Functional Requirements, Specifications, End-user documentation, Procedures, System Overview, Configuration Management Plan, Quality Assurance Program, and manuals for each of the required hardware, software, firmware components of a voting system.
Voluntary Voting System Guidelines	VVSG	A set of specifications and requirements against which voting systems can be tested to determine if the systems provide all of the basic functionality, accessibility and security capabilities required for EAC certification.
Voting System Test Lab	VSTL	An independent testing organization accredited by NVLAP and the EAC to conduct voting system testing for EAC certification.
Voting System Under Test	VSUT	The designation for a voting system that is currently being tested.
Voting Test Engineer	VTE	An SLI Compliance employee who has been qualified to perform EAC voting system testing.



2.4 Document and Source Code Reviews

The review of the VotingWorks VxSuite 4.0 documentation submitted in the Technical Data Package (TDP) was reviewed in order to verify conformance with the Election Assistance Commission Voluntary Voting System Guidelines (EAC VVSG) 2.0.

Source code was reviewed for each software and firmware application declared within the VxSuite 4.0 voting system.

All document reviews were conducted in accordance with the EAC VVSG 2.0, to demonstrate that the system meets the requirements. Issues in the documentation were identified to VotingWorks in a Discrepancy Report for resolution. All issues were resolved by the end of the project.

All source code reviews were conducted in accordance with the EAC VVSG 2.0, to demonstrate that the system meets the requirements. Issues in the source code were identified to VotingWorks in a Discrepancy Report for resolution. All issues were resolved by the end of the project.

2.5 Functional & System Testing

SLI Compliance's standard Test Suites were customized for the VotingWorks VxSuite 4.0 voting system and conducted in accordance with EAC VVSG 2.0, in conjunction with the functional testing. Simulations of elections were conducted to demonstrate a beginning-to-end business use case process for the VotingWorks VxSuite 4.0 voting system.

2.6 Testing Performed

2.6.1 VVSG 2.0 Requirements Not Supported in VxSuite 4.0

The following requirements are not supported within the VxSuite voting system:

- Straight-party Voting, Casting and Tabulation (1.1.4-K, 1.1.8-E, 7.2-C.4)
- Cumulative Voting, Casting (1.1.4-L, 1.1.8-I)
- Ranked Choice Voting Contest, Casting, Tabulation, and Report Results (1.1.4-M, 1.1.8-J, 1.1.9-I, 7.2-C.5)
- Party Preference Contest (1.1.4-N, 1.1.8-B.3)
- Top-2 primary contest (blanket primary contest) (1.1.4-O)
- Presidential delegate contest, Casting and Tabulation (1.1.4-P, 1.1.8-L)
- Proportional voting contest (equal-and-even cumulative voting contest), Casting and Tabulation (1.1.4-Q, 1.1.8-N)



- Group voting contest, Casting and Tabulation (1.1.4-R, 1.1.8-K, 7.2-C.4)
- Top-2 IRV contest (supplementary or contingent vote contest) (1.1.4-S)
- Cross-party endorsement with straight-party voting (1.1.8-F)
- Recall contest pair (1.1.8-M)
- Voter speech (7.2-F)
- Cryptographic E2E verifiable (9.1.6-A-K, 6.2-A.1, 10.2.1-B-F, 10.2.4-A)
- E2E cryptographic protocols (13.3-B)
- 2.1-B COTS language extensions are acceptable
- 8.1-D Secondary ID and biometrics
- 14.3-A a reference to the template or standard used, if any, to develop the supply chain risk management strategy;
- 1.1.9-C Report categories of votes

2.6.2 Configurations Tested

VxSuite polling place devices are all standalone devices, not being physically or logically connected to any other device.

These polling place devices include:

- **VxScan** (precinct count scanner/PCS) - VxScan consists of two main components - the collapsible ballot box and the scanner itself - which are secured together during setup. VxScan is configured with a signed election package exported from VxAdmin. The election definition includes the ballot layouts necessary for interpreting ballots and the system settings which indicate what type of ballot issues (e.g. overvotes) require adjudication.
- **VxMarkScan** (ballot marking device) - VxMarkScan is the system's ballot marking device. It allows all voters to make selections in various interaction modes, print their ballot, verify their ballot, and cast their ballot independently. VxMarkScan is not a tabulator - the cast ballots must be later tabulated at VxCentralScan.

VxMarkScan is configured with a signed election package exported from VxAdmin. The election definition defines the ballot styles that will be available to voters. The election definition also includes the translations defined for text on the ballot, while the app strings file contains the translations for other text



shown on screen. The election package's audio files are played for the voter in audio-mode.

VxAdmin and VxCentralScan are both laptops that connect to peripherals as needed. The laptop is a custom configured HP Elitebook 840 14" G11.

- **VxCentralScan** workstation connects to a CCS for batch scanning. The scanner is either the smaller Ricoh fi-8170 or the larger Ricoh fi-7600. Ballots are loaded into the hopper and then, after a scan is triggered from the application, the scanner processes the ballots one-by-one, sending images to the application for interpretation.

Both CCSs can be used with Ricoh imprinters which allow printing an identifier on each ballot as it's exiting the scanner, which can be useful for certain types of post-election audits.

The CCS is powered through an APC BN1500M2 UPS (Uninterruptible Power Supply) to ensure that the scanner can operate in variable power environments.

The fi-8170 includes an RJ45 (ethernet) port which is blocked by a port blocker, as network connectivity is not required by the system.

- **VxAdmin** is a Standalone workstation and printer. The VxAdmin workstation connects to a printer for the purpose of printing reports. The printer includes an RJ45 (ethernet) port which is blocked by a port blocker, as network connectivity is not required by the system.

Smart Card Reader - Enables reading and writing to smart cards, which is the basis for authentication in VxSuite.

2.6.3 Component Level Test Suites Executed

- **VxAdmin Pre-Election** test suite: The **VxAdmin Pre-Election** component was examined in order to verify that the functionality presented in the component meets all applicable VVSG 2.0 requirements.

- 84 test cases were examined in this test suite
- The following requirements were examined within this test suite:

1.1.1-A, 1.1.1-A.1, 1.1.1-B.1, 1.1.1-A.2, 1.1.1-D.2, 1.1.1-E, 1.1.1-A.2, 1.1.1-A.3, 1.1.1-D.1, 1.1.1-E, 1.1.1-A.4, 1.1.1-B, 1.1.1-B.2, 1.1.1-D.1, 1.1.1-D.3, 1.1.1-F, 1.1.1-G, 1.1.1-H, 1.1.1-I, 1.1.1-J, 1.1.1-K, 1.1.1-L, 1.1.1-M, 1.1.1-N, 1.1.2-A, 1.1.2-A.1, 1.1.2-B, 1.1.2-I, 1.1.2-J.1-4, 1.1.2-B.3.1.2-D, 1.1.3-B, 1.1.4-G.2, 1.1.4-J, 1.1.4-B.1-3, 1.1.4-D, 1.1.4-C, 1.1.4-G.1, 1.1.4-H, 1.1.4-J, 1.1.4-G.2, 1.1.4-H, 1.1.4-J, 1.1.4-A, 1.1.4-E, 1.1.4-G.1, 1.1.4-H, 1.1.4-J, 1.1.4-F, 1.1.9-M, 2.6-A.1-3, 1.2-H, 2.6-A, 2.6-B, 2.6-C, 5.1-B, 7.1-I, 7.1-J, 7.3-O.1, 7.3-O.1.a,



7.3-O.2, 7.3-O.2.a-c, 7.3-P, 8.1-A, 8.1-A.1.a-b, 8.1-B, 8.1-D, 8.2-A, 15.1-A, 15.1-B, 15.1-D.1, 15.1-D.1.e, 15.1-D.1.j, 15.1-D.1.k, 15.1-D.16, 15.1-D.2, 15.1-D.2.a, 15.1-D.2.b, 15.1-D.2.c, 15.1-D.3, 15.1-D.3.a, 15.1-D.4.b, 15.1-D.4.c, 15.1-D.4.d, 15.1-D.4.e, 15.1-D.5.a, 15.1-D.6, 15.1-D.7, 15.1-D.8, 15.2-C, 15.2-D

- **VxMarkScan (BMD) test suite:** The **VxMarkScan** component was examined in order to verify that the functionality presented in the component meets all applicable VVSG 2.0 requirements.

- 205 test cases were examined in this test suite
- The following requirements were examined within this test suite:
RFI202301, RFI202402, 1.1.1-A, 1.1.1-E, 1.1.1-F, 1.1.1-G, 10.2.1-A, 1.1.2-A, 1.1.2-B, 1.1.2-C, 1.1.2-F, 1.1.2-H, 1.1.2-H.1-5, 1.1.2-I, 1.1.2-I.1-4, 1.1.2-K, 1.1.2-K.1-3, 3.1.2-D, 3.1.2-D, 9.1.2-A, 9.1.2-A.1-2, 1.1.3-A, 1.1.3-B, 1.1.3-B.1-2, 9.1.3-B, 10.2.3-B, 1.1.4-A, 1.1.4-C, 1.1.4-D, 1.1.4-E, 1.1.4-F, 1.1.4-G, 1.1.4-G.1, 1.1.4-G.2, 1.1.4-H, 1.1.4-I, 1.1.4-J, 1.1.4-K, 1.1.4-L, 1.1.4-M, 1.1.4-N, 1.1.4-O, 1.1.4-P, 1.1.4-Q, 1.1.4-R, 1.1.4-S, 1.1.4-B, 1.1.4-B.1-3, 2.5.4-L, 2.5.4-L.1-2, 2.5.4-M, 10.2.4-B, 10.2.4-C, 1.1.5-A, 1.1.5-B, 1.1.5-B.1-2, 1.1.5-C, 1.1.5-C.1-2, 1.1.5-D, 1.1.5-D.1-4, 1.1.5-E, 1.1.5-E.1-4, 1.1.5-F, 1.1.5-F.1-3, 9.1.5-A, 9.1.5-B, 9.1.5-C, 9.1.5-D, 9.1.5-E, 9.1.5-G, 1.1.6-B.1-2, 1.1.7-A, 1.1.7-B, 1.1.7-C, 1.1.7-D, 1.1.7-E, 1.1.9-M, 7.2-I.1 1, 5.1-C.1-2, 5.2-E.1-2, 7.1-G.1-2, 7.2-D.1-2, 7.2-F.1-2, 7.2-P.1-2, 7.2-R.1-2, 7.3-B.1-2, 7.3-M.1-2, 8.1-J.1-2, 2.6-A.1-3, 7.1-E.1-3, 7.1-K.1-3, 7.1-M.1-3, 7.1-N.1-3, 7.2-C.1-3, 7.2-N.1-3, 7.3-F.1-3, 7.3-G.1-3, 7.3-N.1-3, 8.1-A.1-3, 8.1-I.1-3, 12.1-G.1-3, 7.2-G.1-4, 7.2-O.1-4, 7.2-E.1-6, 7.3-C.1-6, 7.2-I.2 1, 1.2-F, 2.6-A, 2.6-A.3, 2.6-B, 2.6-C, 5.1-A, 5.1-B, 5.1-C, 5.1-D, 5.1-E, 5.2-C, 5.2-A, 5.2-B, 5.2-D, 5.2-E, 5.2-F, 6.1-A, 6.1-B, 6.1-C, 6.1-D, 6.2-A, 6.2-A.1, 7.1-A, 7.1-B, 7.1-C, 7.1-C.1, 7.1-C.2, 7.1-D, 7.1-D.1, 7.1-D.2, 7.1-D.2.a-c, 7.1-D.3, 7.1-E, 7.1-F, 7.1-G, 7.1-G.2.a-d, 7.1-H, 7.1-H.1, 7.1-H.2, 7.1-I, 7.1-J, 7.1-K, 7.1-K.1, 7.1-K.4, 7.1-K.5, 7.1-K.6, 7.1-K.7, 7.1-L, 7.1-M, 7.1-N, 7.1-O, 7.1-P, 7.2-A, 7.2-A.1, 7.2-A.2, 7.2-A.3, 7.2-A.4, 7.2-A.5, 7.2-B, 7.2-C, 7.2-C.4, 7.2-C.5, 7.2-D, 7.2-D.1.a-b, 7.2-D.2.a-c, 7.2-E, 7.2-F, 7.2-G, 7.2-H, 7.2-I, 7.2-J, 7.2-K, 7.2-L, 7.2-M, 7.2-N, 7.2-N.1.a-b, 7.2-O, 7.2-P, 7.2-Q, 7.2-R, 7.3-H, 7.3-H.1, 7.3-A, 7.3-B, 7.3-C, 7.3-D, 7.3-E, 7.3-F, 7.3-G, 7.3-G.1.a-c, 7.3-I, 7.3-I.1, 7.3-K, 7.3-K.1, 7.3-K.1.a-c, 7.3-K.2.a, 7.3-K.2.b, 7.3-L, 7.3-M, 7.3-N, 7.3-O.1.a, 7.3-O.1.b, 7.3-O.2.a, 7.3-O.2.b, 7.3-O.2.c, 7.3-P, 8.1-A, 8.1-A.1.a-b, 8.1-A.2.a-b, 8.1-A.3.a-b, 8.1-B, 8.1-C, 8.1-D, 8.1-E, 8.1-F, 8.1-G, 8.1-H, 8.1-I, 8.1-J, 9.4-D, 10.1-A, 11.1-B, 12.1-B, 12.1-C, 12.1-D, 12.1-G, 15.1-A, 15.1-B, 15.1-C, 15.1-D.1, 15.1-D.10, 15.1-D.11, 15.1-D.12, 15.1-D.15, 15.1-D.16, 15.1-D.18, 15.1-D.2, 15.1-D.23, 15.1-D.3, 15.1-D.4, 15.1-D.5, 15.1-D.6, 15.1-D.7, 15.1-D.8, 15.1-D.9, 15.2-A, 15.2-C, 15.2-D



- **VxScan (Precinct Scanner) test suite:** The **VxScan Suite** component was examined in order to verify that the functionality presented in the component meets all applicable VVSG 2.0 requirements.
 - 252 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
RFI202401, RFI202301, RFI202402, 1.1.1-F, 1.1.1-G, 10.2.1-A, 10.2.1-B, 10.2.1-C, 10.2.1-D, 10.2.1-E, 11.2.1-A, 11.2.1-C, 1.1.2-A, 1.1.2-B, 1.1.2-C, 1.1.2-D, 1.1.2-E, 1.1.2-F, 1.1.2-G, 1.1.2-H.1-5, 1.1.2-I.1-4, 1.1.2-K, 1.1.2-K.1-3, 1.1.2-L.1-7, 3.1.2-D, 9.1.2-A, 9.1.2-A.1-2, 10.2.2-C, 10.2.2-D, 10.2.2-D.1-2, 1.1.3-A, 1.1.3-B, 1.1.3-B.1, 1.1.3-B.2, 9.1.3-B, 10.2.3-A, 10.2.3-B, 1.1.4-D, 1.1.4-I, 1.1.4-J, 1.1.4-K, 1.1.4-L, 1.1.4-M, 1.1.4-N, 1.1.4-O, 1.1.4-P, 1.1.4-Q, 1.1.4-R, 1.1.4-S, 2.5.4-L.1-2, 2.5.4-M, 2.5.4-L, 10.2.4-B, 1.1.5-D.1-4, 1.1.5-A, 1.1.5-C.1, 1.1.5-C.2, 1.1.5-D, 1.1.5-E, 1.1.5-E.1-4, 1.1.5-F, 1.1.5-F.1-3, 1.1.5-G, 1.1.5-G.1-7, 1.1.5-H, 1.1.5-B.2, 9.1.5-E, 9.1.5-A, 9.1.5-B, 9.1.5-C, 9.1.5-D, 9.1.5-F, 9.1.5-G, 1.1.6-A, 1.1.6-B, 1.1.6-B.1, 1.1.6-B.2, 1.1.6-B.1-2, 1.1.6-D, 1.1.6-D.1-4, 1.1.6-E, 1.1.6-E.1, 1.1.6-E.2, 1.1.6-G, 1.1.6-H, 1.1.6-H.1-3, 1.1.6-I, 1.1.6-J, 1.1.6-K, 1.1.7-A, 1.1.7-B, 1.1.7-C, 1.1.7-D, 1.1.7-E, 1.1.8-D, 1.1.8-E, 1.1.8-A.1, 1.1.8-A.2, 1.1.8-A.3, 1.1.8-C.1, 1.1.8-C.2, 1.1.8-B, 1.1.8-B.1, 1.1.8-B.2, 1.1.8-B.3, 1.1.8-G, 1.1.8-H, 1.1.8-I, 1.1.8-J, 1.1.8-J.1, 1.1.8-J.2, 1.1.8-K, 1.1.8-L, 1.1.8-M, 1.1.8-N, 1.1.9-A, 1.1.9-B, 1.1.9-B.1-5, 1.1.9-C.1-5, 1.1.9-D, 1.1.9-E, 1.1.9-F, 1.1.9-G, 1.1.9-H, 1.1.9-I, 1.1.9-J, 1.1.9-K, 1.1.9-L, 1.1.9-M, 7.1-G.1-2, 7.2-F.1-2, 7.2-P.1-2, 7.3-J.1-2, 7.3-M.1-2, 8.1-J.1-2, 15.1-C.1-2, 2.6-A.1-3, 7.1-E.1-3, 7.1-M.1-3, 7.1-N.1-3, 7.2-I.1-3, 8.1-A.1-3, 8.1-I.1-3, 12.1-G.1-3, 7.2-G.1-4, 7.2-O.1-4, 7.2-E.1-6, 7.3-G.2-4, 1.2-F, 1.2-G, 1.2-H, 2.6-A, 2.6-B, 2.6-C, 3.3-C, 3.3-D, 5.1-A, 5.1-B, 5.1-C, 5.1-D, 5.1-E, 5.2-C, 5.2-A, 5.2-B, 5.2-F, 5.2-D, 6.1-A, 6.1-B, 6.1-C, 6.1-D, 6.2-A, 6.2-A.1, 7.1-A, 7.1-B, 7.1-C, 7.1-C.1, 7.1-D, 7.1-D.1, 7.1-D.2, 7.1-D.2.a-c, 7.1-D.3, 7.1-E, 7.1-F, 7.1-G, 7.1-G.2.a-d, 7.1-H, 7.1-H.1, 7.1-H.2, 7.1-J, 7.1-M, 7.1-N, 7.1-O, 7.1-P, 7.2-A, 7.2-A.1, 7.2-A.2, 7.2-A.3, 7.2-A.4, 7.2-A.5, 7.2-E, 7.2-F, 7.2-G, 7.2-H, 7.2-I, 7.2-K, 7.2-L, 7.2-M, 7.2-N, 7.2-N.1.a-b, 7.2-N.3, 7.2-O, 7.2-P, 7.2-Q, 7.2-R, 7.2-R.1, 7.2-R.2, 7.3-A, 7.3-E, 7.3-F, 7.3-F.2, 7.3-G, 7.3-G.1.a-c, 7.3-H, 7.3-H.2, 7.3-I, 7.3-I.1, 7.3-I.2, 7.3-J, 7.3-J.1, 7.3-K, 7.3-K.1, 7.3-K.1.a-c, 7.3-K.2, 7.3-K.2.a, 7.3-K.2.b, 7.3-L, 7.3-M, 7.3-N, 7.3-N.1, 7.3-N.3, 7.3-O.1.a, 7.3-O.1.b, 7.3-O.2.a, 7.3-O.2.b, 7.3-O.2.c, 7.3-P, 8.1-A, 8.1-A.1.a-b, 8.1-A.2.a-b, 8.1-A.3.a-b, 8.1-B, 8.1-C, 8.1-D, 8.1-E, 8.1-F, 8.1-G, 8.1-H, 8.1-I, 8.1-J, 8.2-A, 9.4-D, 10.1-A, 12.1-B, 12.1-C, 12.1-D, 12.1-G, 15.1-A, 15.1-B, 15.1-C, 15.1-D.1, 15.1-D.10, 15.1-D.11, 15.1-D.12, 15.1-D.15, 15.1-D.16, 15.1-D.18, 15.1-D.2, 15.1-D.23, 15.1-D.3, 15.1-D.4, 15.1-D.5, 15.1-D.6, 15.1-D.7, 15.1-D.8, 15.1-D.9, 15.2-A, 15.2-C, 15.2-D



- **VxCentralScan (Central Scanning) test suite:** The **VxCentralScan** component was examined in order to verify that the functionality presented in the component meets all applicable VVSG 2.0 requirements.
 - 168 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
RFI202301, RFI202401, 1.1.1-F, 1.1.1-G, 1.1.1-K, 1.1.1-A, 10.2.1-A, 10.2.1-B, 10.2.1-D, 10.2.1-E, 11.2.1-A, 1.1.2-A, 1.1.2-B, 1.1.2-C, 1.1.2-D, 1.1.2-E, 1.1.2-F, 1.1.2-G, 1.1.2-H.1-5, 1.1.2-I, 1.1.2-I.1-4, 1.1.2-L.1-7, 3.1.2-D, 10.2.2-C, 10.2.2-D, 10.2.2-D.1-2, 1.1.3-A, 1.1.3-B, 1.1.3-B.1, 1.1.3-B.2, 10.2.3-A, 10.2.3-B, 1.1.4-E, 1.1.4-G.2, 1.1.4-H, 1.1.4-I, 1.1.4-J, 1.1.4-K, 1.1.4-L, 1.1.4-M, 1.1.4-N, 1.1.4-P, 1.1.4-Q, 1.1.4-R, 1.1.4-S, 10.2.4-B, 1.1.5-D.1-4, 1.1.5-A, 1.1.5-C.1-2, 1.1.5-E.1-4, 1.1.5-F.1-3, 1.1.5-G, 1.1.5-G.1-7, 1.1.5-H, 9.1.5-F, 1.1.6-A, 1.1.6-B, 1.1.6-B.1-2, 1.1.6-C, 1.1.6-C.1-4, 1.1.6-F, 1.1.6-F.1-2, 1.1.6-G, 1.1.6-H, 1.1.6-H.1-3, 1.1.6-I, 1.1.6-J, 1.1.6-K, 1.1.7-A, 1.1.7-B, 1.1.7-C, 1.1.7-D, 1.1.7-E, 1.1.8-A.1-3, 1.1.8-B, 1.1.8-B.1, 1.1.8-B.2, 1.1.8-B.3, 1.1.8-C, 1.1.8-C.1-2, 1.1.8-D, 1.1.8-E, 1.1.8-G, 1.1.8-H, 1.1.8-I, 1.1.8-J, 1.1.8-J.1, 1.1.8-K, 1.1.8-L, 1.1.8-M, 1.1.8-N, 1.1.9-A, 1.1.9-B, 1.1.9-B.1-5, 1.1.9-C.1-5, 1.1.9-D, 1.1.9-E, 1.1.9-F, 1.1.9-G, 1.1.9-H, 1.1.9-I, 1.1.9-L, 1.1.9-M, 15.1-C.1-2, 2.6-A.1-3, 7.1-D.1-3, 7.1-E.1-3, 7.2-I.1-3, 8.1-A.1-3, 1.2-H, 2.6-A, 2.6-A.2, 2.6-A.3, 2.6-B, 2.6-C, 5.1-C, 7.1-C, 7.1-C.1, 7.1-D, 7.1-D.2.a-c, 7.1-E, 7.1-F, 7.1-I, 7.1-J, 7.2-H, 7.2-I, 7.3-H, 7.3-K, 7.3-K.1, 7.3-K.1.a-c, 7.3-O.1.a, 7.3-O.1.b, 7.3-O.2.a, 7.3-O.2.b, 7.3-O.2.c, 7.3-P, 8.1-A, 8.1-A.1.a-b, 8.1-A.2.a-b, 8.1-A.3.a-b, 8.1-B, 8.1-D, 9.4-D, 10.1-A, 15.1-A, 15.1-B, 15.1-C, 15.1-D.1, 15.1-D.10, 15.1-D.11, 15.1-D.12, 15.1-D.15, 15.1-D.16, 15.1-D.18, 15.1-D.2, 15.1-D.23, 15.1-D.3, 15.1-D.4, 15.1-D.5, 15.1-D.6, 15.1-D.7, 15.1-D.8, 15.1-D.9, 15.2-A, 15.2-C, 15.2-D
- **VxAdmin Post-Election (Post-Election EMS) test suite:** The **VxAdmin** component was examined in order to verify that the functionality presented in the component meets all applicable VVSG 2.0 requirements.
 - 127 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
RFI202301, 1.1.1-F, 1.1.1-K, 10.2.1-A, 10.2.1-B, 10.2.1-C, 10.2.1-D, 10.2.1-E, 10.2.1-F, 1.1.2-A, 1.1.2-C, 1.1.2-D, 1.1.2-E, 1.1.2-F, 1.1.2-H.1-5, 1.1.2-I, 1.1.2-I.1-4, 3.1.2-D, 10.2.2-A, 10.2.2-B, 10.2.2-C, 10.2.2-D, 10.2.2-D.1-2, 10.2.3-A, 10.2.3-B, 1.1.4-E, 1.1.4-G.1, 1.1.4-G.2, 1.1.4-H, 1.1.4-I, 1.1.4-J, 9.1.4-A, 10.2.4-B, 1.1.5-D.1-4, 1.1.5-A, 1.1.8-A.3, 1.1.8-B, 1.1.8-B.1, 1.1.8-B.2, 1.1.8-B.3, 1.1.8-C.1-2, 1.1.8-D, 1.1.8-E, 1.1.8-G, 1.1.8-H, 1.1.8-I, 1.1.8-J, 1.1.8-J.1-3, 1.1.8-K, 1.1.8-L, 1.1.8-M, 1.1.8-N, 1.1.9-F, 1.1.9-H, 1.1.9-A, 1.1.9-B, 1.1.9-B.1-5, 1.1.9-C.1-5, 1.1.9-D, 1.1.9-J, 1.1.9-E, 1.1.9-G, 1.1.9-I, 1.1.9-L, 1.1.9-M, 15.1-C.1-2, 2.6-A.1-3, 1.2-H, 2.6-A, 2.6-B, 2.6-C, 3.3-D, 4.1-B, 4.1-C, 4.1-D, 5.1-C, 7.3-O.1, 7.3-O.1.a, 7.3-O.2, 7.3-O.2.a-c, 7.3-P, 8.1-A, 8.1-A.1.a-b, 8.1-B, 8.1-D, 8.2-A, 9.4-D, 10.1-A, 15.1-A, 15.1-B, 15.1-C, 15.1-D.1, 15.1-D.1.d, 15.1-D.1.e, 15.1-D.1.j, 15.1-D.1.k, 15.1-D.16, 15.1-D.2, 15.1-

D.2.a, 15.1-D.2.b, 15.1-D.2.c, 15.1-D.3, 15.1-D.3.a, 15.1-D.4.b, 15.1-D.4.c, 15.1-D.4.d, 15.1-D.4.e, 15.1-D.5.a, 15.1-D.6, 15.1-D.7, 15.1-D.8, 15.1-E, 15.2-A, 15.2-C, 15.2-D

2.6.4 System Level Test Suites Executed

- **Accessibility** test suite: Accessibility testing examined the voting system's ability to take into account varying degrees of vision, dexterity, mobility, aural issues, and speech and language proficiency.
 - 78 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
3.1.2-D, 5.1-A, 5.1-B, 5.1-C, 5.1-D, 5.1-E, 5.1-F, 5.1-F.1-2, 5.2-B, 5.2-A, 5.2-C, 5.2-D, 5.2-E, 5.2-E.1-2, 5.2-F, 7.1-A, 7.1-M, 7.1-M.1-3, 7.1-N, 7.1-N.1-3, 7.1-N.2, 7.1-N.3, 7.1-O, 7.1-P, 7.2-A, 7.2-A.1, 7.2-A.2, 7.2-A.3, 7.2-A.4, 7.2-A.5, 7.2-G, 7.2-G.1-4, 7.2-P, 7.2-P.1, 7.2-P.1-2, 7.2-P.2, 7.2-Q, 7.2-R.2, 8.1-C, 8.1-E, 8.1-F, 8.1-G, 8.1-H, 8.1-I, 8.1-I.1, 8.1-I.1-3, 8.1-I.2, 8.1-I.3, 8.2-A
- **Accuracy Test** suite: Accuracy testing focused on the ability of the system to capture, record, store, consolidate and report the specific selections and absence of selections made by the voter for each ballot position without error. Required accuracy is defined in terms of an error rate that for testing purposes represents the maximum number of errors allowed while processing a specified volume of data. Accuracy testing is conducted at both the device level and the system level.
 - 22 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
RFI202302, 1.2-A, 1.2-A.1, 1.2-A.2, 1.2-A.3, 1.2-B, 1.2-C, 3.1.6-K
- **Marks Testing** suite: Marks testing focused on the ability of the system to capture and correctly respond to marginal marks, smudges, folds and perforations on marked ballots to ensure they are read correctly or marked for adjudication.
 - 10 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
1.2-A.1, 1.2-A.2, 1.2-B



- **Audit** test suite: Audit testing focused on validating the audit capability throughout the entire voting system, including availability, generation, integrity, and accuracy of the system's audit content capability to verify it meets the applicable requirements of VVSG 2.0.
 - 61 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
RFI202102, RFI202301, RFI202401, 10.2.3-B, 10.2.4-B, 10.2.4-C, 11.1-A, 11.1-A.1-3, 11.1-B, 12.1-D, 12.2-E, 13.1.1-A, 13.1.1-B, 13.1.1-C, 13.1.2-A, 13.2-A, 13.2-B, 13.2-B.1-4, 15.1-A, 15.1-B, 15.1-C, 15.1-C.1-2, 15.1-E, 3.3-A, 3.3-A.1-2, 9.1.2-A, 9.1.2-A.1-2, 9.1.2-B, 9.1.3-A, 9.1.4-A, 9.1.4-B, 9.1.5-A, 9.1.5-B, 9.1.5-C, 9.1.5-D, 9.1.5-E, 9.1.5-F, 9.1.5-G, 9.2-A, 9.3-A, 9.4-A, 9.4-B, 9.4-C,
- **Ballots** test suite: Examined both paper ballots and electronically displayed ballots.
 - Paper ballot test cases reviewed ballots for their use of contrast, color, text size, font, use of plain language, use of supported languages, ability to prevent split contests, and ability to support multipage ballots.
 - Electronic ballot testing established the ease of use by the common voter, including examination against screen requirements such as digital contrast, use of color, text size and scaling ability, font readability, use of plain language, and use of supported languages. In addition, some aspects of device functionality applicable to electronic ballots were verified to include the ability to prevent split contests, scroll, and establish a touch area for navigation and selection.
 - 50 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
2.1.1-C, 2.1.1-D, 3.1.6-M.1, 3.1.6-M.2, 3.1.6-N, 3.1.6-O, 7.1-G.1-2, 7.1-E.1-3, 7.2-I.1-3, 8.1-A.1-3, 5.1-B, 5.1-C, 5.2-B, 7.1-C, 7.1-C.1, 7.1-C.2, 7.1-D, 7.1-D.1, 7.1-D.2, 7.1-D.2.a-c, 7.1-D.3, 7.1-E, 7.1-F, 7.1-G, 7.1-G.2.a-d, 7.1-H, 7.1-H.1, 7.1-H.2, 7.1-I, 7.1-J, 7.2-D, 7.2-D.1, 7.2-D.1.a-b, 7.2-I, 7.2-J, 7.3-B, 7.3-B.1, 7.3-B.2, 7.3-P, 8.1-A, 8.1-A.1.a-b, 8.1-A.2.a-b, 8.1-A.3.a-b, 9.4-D



- **Primary Election** test suite: This primary election was created to confirm all related Primary election voting variations. (VotingWorks System does not distinguish between Open and Closed Primaries and expects that to be managed by ballot provided to the voter)
 - 105 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
1.1.1-A.1, 1.1.1-A.2, 1.1.1-A.3, 1.1.1-B, 1.1.1-B.1, 1.1.1-B.2, 1.1.1-D.1, 1.1.1-D.2, 1.1.1-D.3, 1.1.1-E, 1.1.1-G, 1.1.1-H, 1.1.1-I, 1.1.1-J, 1.1.1-K, 1.1.1-L, 1.1.1-M, 1.1.1-N, 1.1.2-A, 1.1.2-B, 1.1.2-I.1-4, 1.1.2-J.1-4, 1.1.2-K.1-3, 1.1.2-L.1-7, 1.1.3-A, 1.1.3-B, 1.1.4-B, 1.1.4-B.1-3, 1.1.4-B.3, 1.1.4-C, 1.1.4-D, 1.1.4-F, 1.1.4-G, 1.1.4-G.1, 1.1.4-G.2, 1.1.4-H, 1.1.4-I, 1.1.4-J, 1.1.5-A, 1.1.6-D.1-4, 1.1.6-E.1-2, 1.1.7-A, 1.1.7-B, 1.1.8-A.1, 1.1.8-A.3, 1.1.8-B.1, 1.1.8-C.1-2, 1.1.8-D, 1.1.8-G, 1.1.8-H, 1.1.9-A, 1.1.9-B.1-5, 1.1.9-D, 1.1.9-E, 1.1.9-F, 1.1.9-G, 1.1.9-H, 1.1.9-J, 1.1.9-K, 1.1.9-L, 1.1.9-M, 7.3-I.1-2, 7.2-C.1-3, 7.3-G.2-4, 5.1-B, 7.2-B, 7.2-C, 7.3-G.1.a-c, 7.3-H, 7.3-H.1, 7.3-H.2, 7.3-I,
- **Error Messaging Test** suite: The test suite focused on error messaging and recovery in key areas of the system identified from researching previous testing and voting system documentation to help identify potential failure points. Testing focused on the appropriate error messages being generated in response to a specific error and content of the message as well as error recovery.
 - 220 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
RFI202402, 1.1.2-H, 1.1.2-H.1-5, 9.1.2-A, 9.1.2-A.1-2, 2.5.4-L, 2.5.4-L.1-2, 2.5.4-M, 1.1.9-M, 12.1-G.1-3, 7.2-O.1-4, 7.2-O, 7.3-A, 7.3-K, 7.3-K.1, 7.3-K.1.a-c, 12.1-B, 12.1-C, 12.1-D, 12.1-G, 15.1-A, 15.1-D.1, 15.1-D.10, 15.1-D.11, 15.1-D.12, 15.1-D.13, 15.1-D.14, 15.1-D.15, 15.1-D.16, 15.1-D.17, 15.1-D.18, 15.1-D.19, 15.1-D.2, 15.1-D.20, 15.1-D.21, 15.1-D.22, 15.1-D.23, 15.1-D.3, 15.1-D.4, 15.1-D.5, 15.1-D.6, 15.1-D.7, 15.1-D.8, 15.1-D.9, 15.2-A, 15.2-B, 15.2-C, 15.2-D
- **Gen 1 General Election** test suite: Election definition was created, with a focus on a general election supporting voting variations, validating N of M voting, party affiliation, ballot formatting, precincts and districts, languages and tally and reporting functionality.
 - 114 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
1.1.1-A.1, 1.1.1-B.1, 1.1.1-A.2, 1.1.1-D.2, 1.1.1-E, 1.1.1-A.3, 1.1.1-B, 1.1.1-B.2, 1.1.1-D.1, 1.1.1-D.3, 1.1.1-G, 1.1.1-H, 1.1.1-I, 1.1.1-J, 1.1.1-L, 1.1.1-M, 1.1.1-N, 1.1.2-A, 1.1.2-A, 1.1.2-B, 1.1.2-J.1-4, 1.1.2-K.1-3, 1.1.2-L.1-7, 1.1.3-A, 1.1.3-B, 1.1.4-G.2, 1.1.4-J, 1.1.4-H, 1.1.4-B.1-2, 1.1.4-C, 1.1.4-D,



1.1.4-C, 1.1.4-A, 1.1.4-I, 1.1.5-A, 1.1.6-E.1-2, 1.1.6-D.1-4, 1.1.7-A, 1.1.7-B, 1.1.8-A.1, 1.1.8-A.3, 1.1.8-C.1-2, 1.1.8-D, 1.1.8-G, 1.1.8-H, 1.1.9-F, 1.1.9-H, 1.1.9-A, 1.1.9-B.1-5, 1.1.9-C.1-3, 1.1.9-C.1-5, 1.1.9-D, 1.1.9-J, 1.1.9-E, 1.1.9-G, 1.1.9-K, 1.1.9-M, 7.3-I.1-2, 7.2-C.1-3, 7.3-G.2-3, 5.1-B, 7.2-B, 7.2-C, 7.3-H, 7.3- H.1, 7.3-G.1.a-c, 7.3-H.2, 7.3-I, 7.3-I.1

- **Interoperable** test suite: Dealt with the concept of interoperability, as defined by VVSG 2.0. Interoperability has two main areas of focus: common data formats, and common hardware interfaces/COTS products.
 - 77 test cases were examined in this test suite
 - The following requirements were examined within this test suite: RFI202101, RFI202306, 3.3-A.1, 3.3-A.2, 3.3-B.1-3, 3.3-C, 3.3-D, 4.1-A, 4.1-A.1, 4.1-A.2, 4.1-B, 4.1-C, 4.1-D, 4.1-E, 4.1-F, 4.2-A, 4.2-B, 4.3-A, 4.4-A, 9.1.5-E
- **Stress** test suite: Stress testing verified VxSuite's ability to gracefully respond to the stressing of system limits, such that the system does not fail or halt operations suddenly.
 - 57 test cases were examined in this test suite
 - The following requirement was examined within this test suite: 1.2-E
- **Supply Chain Risk Management** test suite: Covered the requirement that a voting system's documentation contains a supply chain risk management strategy, a list of critical components defined by criticality analysis, and hardware and software information for the critical components.
 - 3 test cases were examined in this test suite
 - The following requirements were examined within this test suite: 14.3-A.1-5, 14.3-B, 14.3-C, 14.3-C.1-4
- **Software Setup Validation** test suite: Focused on verification of the system self-test and diagnostics, Installation of software and ballot styles, equipment status and readiness, installation process for each component of the voting system, as well as software installation, verification and calibration.
 - 59 test cases were examined in this test suite
 - The following requirements were examined within this test suite: 14.3.2-B, 3.1.4- B.1, 3.1.4-A, 3.1.4-B.2, 3.1.4-B.3, 3.1.4-B.4, 3.1.4-B.5, 3.1.4-B.6, 3.1.4-B.7, 3.1.4-B.8, 3.1.4-C, 3.1.4-D, 3.1.4-E, 3.1.4-F, 3.1.4-G, 3.1.4-H, 3.1.4-I.1-8, 3.1.4-I.7, 3.1.4-J, 3.1.4-K, 3.1.4-L, 3.1.4-M, 3.2-A, 3.2-B.1-4, 3.2-C, 3.2-D, 3.2-E, 3.2-F, 3.2-G, 3.2-H, 3.2-I, 3.2-J, 3.2-K, 3.2-L, 3.2-M, 3.2-N, 3.2-O, 3.2-P.1-4, 3.2-Q.1-8



- **System Identification and Installation** test suite: Focused on verification of the installation process for each component of the voting system, as well as obtaining and verifying the post-install signatures.
 - 33 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
3.1.4-A, 3.1.4-B.1, 3.1.4-B.2, 3.1.4-B.3, 3.1.4-B.4, 3.1.4-B.5, 3.1.4-B.6, 3.1.4-B.7, 3.1.4-B.8, 3.1.4-C, 3.1.4-D, 3.1.4-E, 3.1.4-F, 3.1.4-G, 3.1.4-H, 3.1.4-I, 3.1.4-I.1-8, 3.1.4-J, 3.1.4-K, 3.1.4-L, 3.1.4-M
- **Usability** test suite: Testing was conducted to ensure voters are able to negotiate the process effectively, efficiently, and comfortably.
 - 93 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
1.1.6-B.1-2, 6.1-A, 6.1-B, 6.1-C, 6.1-D, 6.2-A, 6.2-A.1, 7.1-B, 7.1-C, 7.1-C.1, 7.1-C.2, 7.1-D, 7.1-D.1, 7.1-D.2, 7.1-D.2.a-c, 7.1-D.3, 7.1-E, 7.1-E.1-3, 7.1-F, 7.1-G, 7.1-G.1-2, 7.1-G.2.a-d, 7.1-H, 7.1-H.1, 7.1-H.2, 7.1-I, 7.1-J, 7.1-K, 7.1-K.1, 7.1-K.1-3, 7.1-K.4, 7.1-K.5, 7.1-K.6, 7.1-K.7, 7.1-L, 7.2-B, 7.2-C, 7.2-C.1-3, 7.2-C.4, 7.2-C.5, 7.2-D, 7.2-D.1.a-b, 7.2-D.1-2, 7.2-D.2.a-c, 7.2-E, 7.2-E.1-6, 7.2-F, 7.2-F.1-2, 7.2-H, 7.2-I, 7.2-I.1-1, 7.2-I.1-3, 7.2-I.2-1, 7.2-J, 7.2-K, 7.2-L, 7.2-M, 7.2-N, 7.2-N.1.a-b, 7.2-N.1-3, 7.2-O, 7.2-O.1-4, 7.3-E, 7.3-F, 7.3-F.1-3, 7.3-F.2, 7.3-G, 7.3-G.1.a-c, 7.3-G.1-3, 7.3-G.2-4, 7.3-K.2.a, 7.3-K.2.b, 7.3-L, 7.3-M, 7.3-M.1-2, 7.3-N, 7.3-N.1-3, 8.1-A, 8.1-A.1.a-b, 8.1-A.1-3, 8.1-A.2.a-b, 8.1-A.3.a-b, 8.1-B, 8.3-A, 8.3-A.1.a-d, 8.3-A.1-2, 8.4-A, 8.4-A.1.a-g, 8.4-A.1-3
- **Volume** test suite: Volume testing verified the system's ability to handle maximum volume of activities, as prescribed in VxSuite specifications.
 - 60 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
1.2-D, 1.2-G
- **Voting Extensions** test suite: Voting extensions verifies that System Performance Documentation describes additional capabilities (extensions). VotingWorks does not have any documented extensions.
 - 4 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
3.1.2-D.2, 3.1.2-D.4, 3.1.2-D.5



2.6.5 Security Test Suites Executed

- **Security - Access Control** test suite: Access Control testing verified the voting system's ability to maintain authorization information and authentication capabilities for all systems, services, and users that interact with the voting system. All devices included in the test campaign received access control security testing.

Device usernames and passwords were tested for proper authentication capabilities and that password requirements are sufficient. In addition, multi-factor authentication tested to verify the bolstering of user account security such that leaked credentials alone will not expose the voting system to account misuse. Each user account was tested for permissions and role assignments based on documented roles and proper role-based access control (RBAC) implementations.

Minimum permission and access rules were tested to ensure the voting system provides each user with only the permissions relevant to the role's documented purpose. Voting system components were tested through interaction with devices and visual inspection of authentication during user login and user activity.

- 87 test cases were examined in this test suite
- The following requirements were examined within this test suite:
RFI202301, 10.2.3-A, 10.2.4-B, 11.1-A, 11.1-A.1, 11.1-A.2, 11.1-A.3, 11.1-B, 11.1-C, 11.1-C.1, 11.1-C.2, 11.1-C.3, 11.1-D, 11.2.1-A, 11.2.1-B, 11.2.1-C, 11.2.1-C.1, 11.2.1-C.2, 11.2.1-C.3, 11.2.1-C.4, 11.2.1-D, 11.2.1-E, 11.2.1-F, 11.2.2-A, 11.2.2-B, 11.2.2-C, 11.2.2-D, 11.3.1-A, 11.3.1-B, 11.3.1-B.1, 11.3.1-B.2, 11.3.1-B.3, 11.3.1-B.4, 11.3.1-B.5, 11.3.1-B.6, 11.3.1-C, 11.3.2-A, 11.3.2-B, 11.3.2-C, 11.3.2-D, 11.3.2-E, 11.4-A, 11.4-B, 11.5-A, 11.5-A.1, 11.5-A.2, 11.5-B, 11.5-C, 11.5-D, 15.1-E

- **Security - Data Protection** test suite: Data Protection testing verified that the end-to-end integrity of election system data guarantees the authenticity of the data. System and software cryptographic implementations were tested for computational security and efficacy of encrypting data. Cryptographic modules were verified against the Cryptographic Module Validation Program (CMVP) and evaluated concerning algorithm strength in bits and key lengths.

In addition, configuration files were tested for accessibility restrictions. Testing was conducted through documentation review and simulation of documented events to identify key components. Necessary cryptographic artifacts were exfiltrated and analyzed externally to verify algorithm strengths and key lengths, while configuration files were reviewed locally on voting system components to verify alignment with documented configuration procedures.

- 30 test cases were examined in this test suite



- The following requirements were examined within this test suite:
10.2.2-E, 13.1.1-A, 13.1.1-B, 13.1.1-C, 13.1.2-A, 13.2-A, 13.2-B, 13.2-B.1, 13.2-B.2, 13.2-B.3, 13.2-B.4, 13.3-A, 13.3-A.1, 13.3-A.2, 13.3-B, 13.3-C, 13.3-D, 13.3-E, 13.4-A, 13.4-A.1, 13.4-A.2, 13.4-A.3, 15.2-A, 15.4-A, 15.4-B, 15.4-D

- **Security - Physical** test suite: Physical Security testing verified that the voting system has the required physical security controls implemented to prevent and deter unauthorized access and properly produce alerts if the system encounters errors.

Connectivity or lack thereof was verified to be logged for all scanners, BMDs, and other voting system components during activated voting stages. Connections to device ports were verified to be logged and configured to minimally allow connectivity only to other voting system components for necessary documented procedures.

All physical housing for voting system storage or transportation was verified to secure the system and produce evidence if tampering is experienced. All physical locks on the voting system support different keying schemes including a key owner-unique scheme.

- 36 test cases were examined in this test suite
- The following requirements were examined within this test suite:
10.2.3-B, 12.1-A, 12.1-B, 12.1-C, 12.1-D, 12.1-E, 12.1-F, 12.1-G, 12.1-G.1, 12.1-G.2, 12.1-G.3, 12.2-A, 12.2-B, 12.2-C, 12.2-D, 12.2-E, 15.1-A, 15.1-D, 15.2-C

- **Security - System Integrity** test suite: System Integrity testing verified the overall security of the voting system with respect to environmental factors. This included consideration of supply chain attacks, attack surface analyses and limitations, and software verification. Documented risk assessments were evaluated for identified risks and associated acceptances or mitigations as well as procedural and operational security measures in place.

Physical components of the voting system were tested to ensure that connections to logical components are properly disabled or limited to documented connections with other voting system components.

In addition, software checks were completed to ensure all resident programs are verified with allow lists and that any errors or disallowed software triggered a display of obvious and accurate indications of the error.

The system was examined to verify that no wireless capability is available.

- 55 test cases were examined in this test suite



- The following requirements were examined within this test suite:
14.1-A, 14.1-B, 14.1-C, 14.1-C.1, 14.1-C.2, 14.1-C.3, 14.1-C.4, 14.1-D, 14.2-A, 14.2-B, 14.2-C, 14.2-D, 14.2-E, 14.2-E.1, 14.2-E.2, 14.2-F, 14.2-G, 14.2-H, 14.2-I, 14.2-J, 14.2-J.1, 14.2-J.2, 14.2-J.3, 14.2-J.4, 14.2-K, 14.3.1-A, 14.3.1-B, 14.3.1-C, 14.3.2-A, 14.3.2-B, 14.3.2-C, 14.3.2-D, 14.3-A, 14.3-A.1, 14.3-A.2, 14.3-A.3, 14.3-A.4, 14.3-A.5, 14.3-B, 14.3-C, 14.3-C.1, 14.3-C.2, 14.3-C.3, 14.3-C.4, 14.4-A, 14.4-B, 14.4-C, 15.3-A, 15.3-B, 15.3-C, 15.3-D, 15.3-E, 15.3-F, 15.3-G, 15.4-C

2.6.6 TDP Test Suites Executed

Documentation Review PCA – VxAdmin Review

Documentation related to the VxAdmin was reviewed for content that is supplied to jurisdictions that will use the VotingWorks system, to verify sufficient content that will enable the jurisdiction to use the system. Areas of review included Overview, Performance, Security, Setup, Installation, Operations, Maintenance, Training and Public documentation.

- 177 test cases were examined in this test suite
- The following requirements were examined within this test suite:
RFI202306, 1.3-A.1, 1.3-A.2, 1.3-A.3, 1.3-A.4, 1.3-A.5, 1.3-A.6, 1.3-A.7, 1.3-A.8, 1.3-A.9, 1.3-B, 15.1-D.1.a, 15.1-D.1.b, 15.1-D.1.c, 15.1-D.1.d, 15.1-D.1.e, 15.1-D.1.f, 15.1-D.1.g, 15.1-D.1.h, 15.1-D.1.i, 15.1-D.1.j, 15.1-D.1.k, 15.1-D.2.a, 15.1-D.2.b, 15.1-D.2.c, 15.1-D.3.a, 15.1-D.4.a, 15.1-D.4.b, 15.1-D.4.c, 15.1-D.4.d, 15.1-D.4.e, 15.1-D.5.a, 15.1-D.5.b, 15.2-B, 15.3-C, 15.4-A, 15.4-B, 15.4-C, 2.1.1-A.1, 2.1.1-A.2, 2.1.1-B.1, 2.1.1-B.2, 2.1.1-B.3, 2.1.1-B.4, 2.1.1-B.5, 2.1.1-C, 2.1.1-D, 2.1-D, 2.2-A, 2.2-A.1, 2.2-A.2, 2.2-A.3, 2.2-A.4, 2.6-A.3, 3.1.1-A, 3.1.1-B, 3.1.1-C.1, 3.1.1-C.2, 3.1.1-C.3, 3.1.1-C.4, 3.1.1-C.5, 3.1.1-C.6, 3.1.1-C.7, 3.1.1-C.8, 3.1.1-C.9, 3.1.1-D.1, 3.1.1-D.2, 3.1.1-D.3, 3.1.1-E, 3.1.2-A.1, 3.1.2-A.2, 3.1.2-A.3, 3.1.2-A.4, 3.1.2-A.5, 3.1.3-A, 3.1.3-B.1, 3.1.3-B.2, 3.1.3-B.3, 3.1.3-B.4, 3.1.3-C, 3.1.3-D, 3.1.4-A, 3.1.4-B.1, 3.1.4-B.2, 3.1.4-B.3, 3.1.4-B.4, 3.1.4-B.5, 3.1.4-B.6, 3.1.4-B.7, 3.1.4-B.8, 3.1.4-C, 3.1.4-D, 3.1.4-E, 3.1.4-F, 3.1.4-G, 3.1.4-H, 3.1.4-I.1-8, 3.1.4-J, 3.1.4-K, 3.1.4-L, 3.1.4-M, 3.1.5-A, 3.1.5-A.1, 3.1.5-A.2, 3.1.5-A.3, 3.1.5-A.4, 3.1.5-A.5, 3.1.5-A.6, 3.1.5-A.7, 3.1.5-A.8, 3.1.5-A.9, 3.1.5-B, 3.1.5-C, 3.1.5-D, 3.1.5-E, 3.1.5-F, 3.1.5-G.1-5, 3.1.5-H, 3.1.5-I.1, 3.1.5-I.2, 3.1.5-I.3, 3.1.5-I.4, 3.1.5-J.1, 3.1.5-J.2, 3.1.5-K.1, 3.1.5-K.2, 3.1.5-K.3, 3.1.6-A, 3.1.6-B, 3.1.6-C, 3.1.6-D.1, 3.1.6-D.2, 3.1.6-D.3, 3.1.6-D.4, 3.1.6-D.5, 3.1.6-D.6, 3.1.6-D.7, 3.1.6-D.8, 3.1.6-E, 3.1.6-F.1, 3.1.6-F.2, 3.1.6-F.3, 3.1.6-F.4, 3.1.6-G.1, 3.1.6-G.2, 3.1.6-G.3, 3.1.6-G.4, 3.1.6-G.5, 3.1.6-G.6, 3.1.6-H, 3.1.6-I, 3.1.6-J.1, 3.1.6-J.2, 3.1.6-J.3, 3.1.6-J.4, 3.1.6-J.5, 3.1.6-J.6, 3.1.6-K, 3.1.6-L, 3.1.6-M.1, 3.1.6-M.2, 3.1.6-N, 3.1.6-O, 3.1.6-P, 3.1.6-Q.1, 3.1.6-Q.2, 3.1.6-Q.3, 3.1.7-A, 3.1.7-B.1, 3.1.7-B.2, 3.1.7-B.4, 3.1.7-B.5, 3.1.7-B.6, 3.1.7-B.7, 3.1.7-C, 3.1.7-D, 3.2-A, 3.2-B.1-4, 3.2-C, 3.2-D, 3.2-E, 3.2-F, 3.2-G, 3.2-H, 3.2-I, 3.2-J, 3.2-K, 3.2-L, 3.2-M, 3.2-N, 3.2-O, 3.2-P.1-4, 3.2-Q.1-8, 3.3-A.1, 3.3-A.2, 3.3-B.1-3, 3.3-C, 5.1-F.1, 5.1-F.2, 7.3-O, 7.3-O.1.a, 7.3-O.1.b, 7.3-O.2.a, 7.3-O.2.b, 7.3-O.2.c, 8.1-A.1.b, 8.1-A.2.b, 8.1-A.3.b, 8.1-H, 8.1-K, 8.2-A, 8.3-A, 8.3-A.1, 8.3-A.1.a, 8.3-A.1.b, 8.3-A.1.c, 8.3-A.1.d, 8.3-A.2, 8.4-A, 8.4-A.1, 8.4-A.1.a, 8.4-A.1.b, 8.4-A.1.c, 8.4-A.1.d, 8.4-A.1.e, 8.4-A.1.f, 8.4-A.1.g, 8.4-A.2, 8.4-A.3, 9.1.3-C



Documentation Review PCA – VxCentralScan Review

Documentation related to the VxCentralScan was reviewed for content that is supplied to jurisdictions that will use the VotingWorks system, to verify sufficient content that will enable the jurisdiction to use the system. Areas of review included Overview, Performance, Security, Setup, Installation, Operations, Maintenance, Training and Public documentation.

- 177 test cases were examined in this test suite
- The following requirements were examined within this test suite:
1.3-A.1, 1.3-A.2, 1.3-A.3, 1.3-A.4, 1.3-A.5, 1.3-A.6, 1.3-A.7, 1.3-A.8, 1.3-A.9, 1.3-B, 15.1-D.1.a, 15.1-D.1.b, 15.1-D.1.c, 15.1-D.1.d, 15.1-D.1.e, 15.1-D.1.f, 15.1-D.1.g, 15.1-D.1.h, 15.1-D.1.i, 15.1-D.1.j, 15.1-D.1.k, 15.1-D.2.a, 15.1-D.2.b, 15.1-D.2.c, 15.1-D.3.a, 15.1-D.4.a, 15.1-D.4.b, 15.1-D.4.c, 15.1-D.4.d, 15.1-D.4.e, 15.1-D.5.a, 15.1-D.5.b, 15.2-B, 15.3-C, 15.4-A, 15.4-B, 15.4-C, 2.1.1-A.1, 2.1.1-A.2, 2.1.1-B.1, 2.1.1-B.2, 2.1.1-B.3, 2.1.1-B.4, 2.1.1-B.5, 2.1.1-C, 2.1.1-D, 2.1-D, 2.2-A, 2.2-A.1, 2.2-A.2, 2.2-A.3, 2.2-A.4, 2.6-A.3, 3.1.1-A, 3.1.1-B, 3.1.1-C.1, 3.1.1-C.2, 3.1.1-C.3, 3.1.1-C.4, 3.1.1-C.5, 3.1.1-C.6, 3.1.1-C.7, 3.1.1-C.8, 3.1.1-C.9, 3.1.1-D.1, 3.1.1-D.2, 3.1.1-D.3, 3.1.1-E, 3.1.2-A.1, 3.1.2-A.2, 3.1.2-A.3, 3.1.2-A.4, 3.1.2-A.5, 3.1.2-B, 3.1.2-C.1, 3.1.2-C.2, 3.1.2-C.3, 3.1.2-D.1-5, 3.1.3-A, 3.1.3-B.1, 3.1.3-B.2, 3.1.3-B.3, 3.1.3-B.4, 3.1.3-C, 3.1.3-D, 3.1.4-A, 3.1.4-B.1, 3.1.4-B.2, 3.1.4-B.3, 3.1.4-B.4, 3.1.4-B.5, 3.1.4-B.6, 3.1.4-B.7, 3.1.4-B.8, 3.1.4-C, 3.1.4-D, 3.1.4-E, 3.1.4-F, 3.1.4-G, 3.1.4-H, 3.1.4-I.1-8, 3.1.4-J, 3.1.4-K, 3.1.4-L, 3.1.4-M, 3.1.5-A, 3.1.5-A.1, 3.1.5-A.2, 3.1.5-A.3, 3.1.5-A.4, 3.1.5-A.5, 3.1.5-A.6, 3.1.5-A.7, 3.1.5-A.8, 3.1.5-A.9, 3.1.5-B, 3.1.5-C, 3.1.5-D, 3.1.5-E, 3.1.5-F, 3.1.5-G.1-5, 3.1.5-H, 3.1.5-I.1, 3.1.5-I.2, 3.1.5-I.3, 3.1.5-I.4, 3.1.5-J.1, 3.1.5-J.2, 3.1.5-K.1, 3.1.5-K.2, 3.1.5-K.3, 3.1.6-A, 3.1.6-B, 3.1.6-C, 3.1.6-D.1, 3.1.6-D.2, 3.1.6-D.3, 3.1.6-D.4, 3.1.6-D.5, 3.1.6-D.6, 3.1.6-D.7, 3.1.6-D.8, 3.1.6-E, 3.1.6-F.1, 3.1.6-F.2, 3.1.6-F.3, 3.1.6-F.4, 3.1.6-G.1, 3.1.6-G.2, 3.1.6-G.3, 3.1.6-G.4, 3.1.6-G.5, 3.1.6-G.6, 3.1.6-H, 3.1.6-I, 3.1.6-J.1, 3.1.6-J.2, 3.1.6-J.3, 3.1.6-J.4, 3.1.6-J.5, 3.1.6-J.6, 3.1.6-L, 3.1.6-M.1, 3.1.6-M.2, 3.1.6-N, 3.1.6-O, 3.1.6-P, 3.1.6-Q.1, 3.1.6-Q.2, 3.1.6-Q.3, 3.1.7-A, 3.1.7-B.1, 3.1.7-B.2, 3.1.7-B.3, 3.1.7-B.4, 3.1.7-B.5, 3.1.7-B.6, 3.1.7-B.7, 3.1.7-C, 3.1.7-D, 3.2-A, 3.2-B.1-4, 3.2-C, 3.2-D, 3.2-E, 3.2-F, 3.2-G, 3.2-H, 3.2-I, 3.2-J, 3.2-K, 3.2-L, 3.2-M, 3.2-N, 3.2-O, 3.2-P.1-4, 3.2-Q.1-8, 3.3-A.1, 3.3-A.2, 3.3-B.1-3, 3.3-C, 5.1-F.2, 7.3-O, 7.3-O.1.a, 7.3-O.2.a, 7.3-O.2.b, 7.3-O.2.c, 8.1-A.1.b, 8.1-A.3.b, 8.1-K, 8.2-A, 8.4-A, 8.4-A.1, 8.4-A.1.a, 8.4-A.1.b, 8.4-A.1.c, 8.4-A.1.d, 8.4-A.1.e, 8.4-A.1.f, 8.4-A.1.g, 8.4-A.2, 8.4-A.3, 9.1.3-C



Documentation Review PCA – VxMarkScan Review

Documentation related to the VxMarkScan was reviewed for content that is supplied to jurisdictions that will use the VotingWorks system, to verify sufficient content that will enable the jurisdiction to use the system. Areas of review included Overview, Performance, Security, Setup, Installation, Operations, Maintenance, Training and Public documentation.

- 177 test cases were examined in this test suite
- The following requirements were examined within this test suite:
1.3-A.1, 1.3-A.2, 1.3-A.3, 1.3-A.4, 1.3-A.5, 1.3-A.6, 1.3-A.7, 1.3-A.8, 1.3-A.9, 1.3-B, 15.1-D.1.a, 15.1-D.1.b, 15.1-D.1.c, 15.1-D.1.d, 15.1-D.1.e, 15.1-D.1.f, 15.1-D.1.g, 15.1-D.1.h, 15.1-D.1.i, 15.1-D.1.j, 15.1-D.1.k, 15.1-D.2.a, 15.1-D.2.b, 15.1-D.2.c, 15.1-D.3.a, 15.1-D.4.a, 15.1-D.4.b, 15.1-D.4.c, 15.1-D.4.d, 15.1-D.4.e, 15.1-D.5.a, 15.1-D.5.b, 15.2-B, 15.3-C, 15.4-A, 15.4-B, 15.4-C, 2.1.1-A.1, 2.1.1-A.2, 2.1.1-B.1, 2.1.1-B.2, 2.1.1-B.3, 2.1.1-B.4, 2.1.1-B.5, 2.1.1-C, 2.1.1-D, 2.1-D, 2.2-A, 2.2-A.1, 2.2-A.2, 2.2-A.3, 2.2-A.4, 2.6-A.3, 3.1.1-A, 3.1.1-B, 3.1.1-C.1, 3.1.1-C.2, 3.1.1-C.3, 3.1.1-C.4, 3.1.1-C.5, 3.1.1-C.6, 3.1.1-C.7, 3.1.1-C.8, 3.1.1-C.9, 3.1.1-D.1, 3.1.1-D.2, 3.1.1-D.3, 3.1.1-E, 3.1.2-A.1, 3.1.2-A.3, 3.1.2-A.4, 3.1.2-A.5, 3.1.3-A, 3.1.3-B.1, 3.1.3-B.2, 3.1.3-B.3, 3.1.3-B.4, 3.1.3-C, 3.1.3-D, 3.1.4-A, 3.1.4-B.1, 3.1.4-B.2, 3.1.4-B.3, 3.1.4-B.4, 3.1.4-B.5, 3.1.4-B.6, 3.1.4-B.7, 3.1.4-B.8, 3.1.4-C, 3.1.4-D, 3.1.4-E, 3.1.4-F, 3.1.4-G, 3.1.4-H, 3.1.4-I.1-8, 3.1.4-J, 3.1.4-K, 3.1.4-L, 3.1.4-M, 3.1.5-A, 3.1.5-A.1, 3.1.5-A.2, 3.1.5-A.3, 3.1.5-A.4, 3.1.5-A.5, 3.1.5-A.6, 3.1.5-A.7, 3.1.5-A.8, 3.1.5-A.9, 3.1.5-B, 3.1.5-C, 3.1.5-D, 3.1.5-E, 3.1.5-F, 3.1.5-G.1-5, 3.1.5-H, 3.1.5-I.1, 3.1.5-I.2, 3.1.5-I.3, 3.1.5-I.4, 3.1.5-J.1, 3.1.5-J.2, 3.1.5-K.1, 3.1.5-K.2, 3.1.5-K.3, 3.1.6-A, 3.1.6-B, 3.1.6-C, 3.1.6-D.1, 3.1.6-D.4, 3.1.6-D.5, 3.1.6-D.6, 3.1.6-D.7, 3.1.6-D.8, 3.1.6-E, 3.1.6-F.1, 3.1.6-F.2, 3.1.6-F.3, 3.1.6-F.4, 3.1.6-G.1, 3.1.6-G.2, 3.1.6-G.3, 3.1.6-G.4, 3.1.6-G.5, 3.1.6-G.6, 3.1.6-H, 3.1.6-I, 3.1.6-J.1, 3.1.6-J.2, 3.1.6-J.3, 3.1.6-J.4, 3.1.6-J.5, 3.1.6-J.6, 3.1.6-L, 3.1.6-O, 3.1.6-P, 3.1.6-Q.1, 3.1.6-Q.2, 3.1.6-Q.3, 3.1.7-A, 3.1.7-B.1, 3.1.7-B.4, 3.1.7-B.5, 3.1.7-B.6, 3.1.7-B.7, 3.1.7-C, 3.1.7-D, 3.2-A, 3.2-B.1-4, 3.2-C, 3.2-D, 3.2-E, 3.2-F, 3.2-G, 3.2-H, 3.2-I, 3.2-J, 3.2-K, 3.2-L, 3.2-M, 3.2-N, 3.2-O, 3.2-P.1-4, 3.2-Q.1-8, 3.3-A.1, 3.3-A.2, 3.3-B.1-3, 3.3-C, 5.1-F.2, 7.3-O, 8.1-A.1.b, 8.1-A.3.b, 8.1-K, 8.2-A, 8.4-A, 8.4-A.1, 8.4-A.2, 8.4-A.3, 9.1.3-C

Documentation Review PCA – VxScan Review

Documentation related to the VxScan was reviewed for content that is supplied to jurisdictions that will use the VotingWorks system, to verify sufficient content that will enable the jurisdiction to use the system. Areas of review included Overview, Performance, Security, Setup, Installation, Operations, Maintenance, Training and Public documentation.

- 177 test cases were examined in this test suite
- The following requirements were examined within this test suite:
1.3-A.1, 1.3-A.2, 1.3-A.3, 1.3-A.4, 1.3-A.5, 1.3-A.6, 1.3-A.7, 1.3-A.8, 1.3-A.9, 1.3-B, 15.1-D.1.a, 15.1-D.1.b, 15.1-D.1.c, 15.1-D.1.d, 15.1-D.1.e, 15.1-D.1.f, 15.1-D.1.g,



15.1-D.1.h, 15.1-D.1.i, 15.1-D.1.j, 15.1-D.1.k, 15.1-D.2.a, 15.1-D.2.b, 15.1-D.2.c, 15.1-D.3.a, 15.1-D.4.a, 15.1-D.4.b, 15.1-D.4.c, 15.1-D.4.d, 15.1-D.4.e, 15.1-D.5.a, 15.1-D.5.b, 15.2-B, 15.3-C, 15.4-A, 15.4-B, 15.4-C, 2.1.1-A.1, 2.1.1-A.2, 2.1.1-B.1, 2.1.1-B.2, 2.1.1-B.3, 2.1.1-B.4, 2.1.1-B.5, 2.1.1-C, 2.1.1-D, 2.1-D, 2.2-A, 2.2-A.1, 2.2-A.2, 2.2-A.3, 2.2-A.4, 2.6-A.3, 3.1.1-A, 3.1.1-B, 3.1.1-C.1, 3.1.1-C.2, 3.1.1-C.3, 3.1.1-C.4, 3.1.1-C.5, 3.1.1-C.6, 3.1.1-C.7, 3.1.1-C.8, 3.1.1-C.9, 3.1.1-D.1, 3.1.1-D.2, 3.1.1-D.3, 3.1.1-E, 3.1.2-A.1, 3.1.2-A.3, 3.1.2-A.4, 3.1.2-A.5, 3.1.3-A, 3.1.3-B.1, 3.1.3-B.2, 3.1.3-B.3, 3.1.3-B.4, 3.1.3-C, 3.1.3-D, 3.1.4-A, 3.1.4-B.1, 3.1.4-B.2, 3.1.4-B.3, 3.1.4-B.4, 3.1.4-B.5, 3.1.4-B.6, 3.1.4-B.7, 3.1.4-B.8, 3.1.4-C, 3.1.4-D, 3.1.4-E, 3.1.4-F, 3.1.4-G, 3.1.4-H, 3.1.4-I.1-8, 3.1.4-J, 3.1.4-K, 3.1.4-L, 3.1.4-M, 3.1.5-A, 3.1.5-A.1, 3.1.5-A.2, 3.1.5-A.3, 3.1.5-A.4, 3.1.5-A.5, 3.1.5-A.6, 3.1.5-A.7, 3.1.5-A.8, 3.1.5-A.9, 3.1.5-B, 3.1.5-C, 3.1.5-D, 3.1.5-E, 3.1.5-F, 3.1.5-G.1-5, 3.1.5-H, 3.1.5-I.1, 3.1.5-I.2, 3.1.5-I.3, 3.1.5-I.4, 3.1.5-J.1, 3.1.5-J.2, 3.1.5-K.1, 3.1.5-K.2, 3.1.5-K.3, 3.1.6-A, 3.1.6-B, 3.1.6-C, 3.1.6-D.1, 3.1.6-D.2, 3.1.6-D.4, 3.1.6-D.5, 3.1.6-D.6, 3.1.6-D.7, 3.1.6-D.8, 3.1.6-E, 3.1.6-F.1, 3.1.6-F.2, 3.1.6-F.3, 3.1.6-F.4, 3.1.6-G.1, 3.1.6-G.2, 3.1.6-G.3, 3.1.6-G.4, 3.1.6-G.5, 3.1.6-G.6, 3.1.6-H, 3.1.6-I, 3.1.6-J.1, 3.1.6-J.2, 3.1.6-J.3, 3.1.6-J.4, 3.1.6-J.5, 3.1.6-J.6, 3.1.6-K, 3.1.6-L, 3.1.6-M.1, 3.1.6-M.2, 3.1.6-N, 3.1.6-O, 3.1.6-P, 3.1.6-Q.1, 3.1.6-Q.2, 3.1.6-Q.3, 3.1.7-A, 3.1.7-B.1, 3.1.7-B.4, 3.1.7-B.5, 3.1.7-B.6, 3.1.7-B.7, 3.1.7-C, 3.1.7-D, 3.2-A, 3.2-B.1-4, 3.2-C, 3.2-D, 3.2-E, 3.2-F, 3.2-G, 3.2-H, 3.2-I, 3.2-J, 3.2-K, 3.2-L, 3.2-M, 3.2-N, 3.2-O, 3.2-P.1-4, 3.2-Q.1-8, 3.3-A.1, 3.3-A.2, 3.3-B.1-3, 3.3-C, 5.1-F.2, 7.3-O, 7.3-O.1.a, 7.3-O.1.b, 8.1-A.1.b, 8.1-A.3.b, 8.1-K, 8.2-A, 8.4-A, 8.4-A.2, 8.4-A.3, 9.1.3-C

2.6.7 Hardware Testing

SLI Compliance and their hardware test subcontractor, Element Materials Technology, performed an analysis and review of the VxSuite 4.0 voting system hardware components, namely **VxSuite: VxMarkScan (BMD accessible voting device)**, **VxScan (precinct count scanner)** and **VxCentralScan (central count scanner)**.

During the execution of testing performed at Element Materials Technology, an SLI Compliance representative was present to oversee the testing.

Hardware testing conducted specifically for this test campaign involved the **VxCentralScan, VxScan, and VxMarkScan**. That testing involved verification of the following Environmental and Electrical requirements:

Element Materials Technology, 1736 Vista View Drive Longmont, (A2LA certified for testing performed).

EMC / EMI Tests:

- Radiated Emissions
- Conducted Emissions
- ESD
- Electromagnetic Susceptibility
- Electrical Fast Transient
- Lightning Surge



- Conducted RF Immunity
- Electrical Power Disturbance (Voltage Dips)

Element Materials Technology, 1601 Dry Creek Drive Longmont, (A2LA certified for mechanical including MIL STD 810H)

MIL-STD-810H Tests:

- Bench Handling, Vibration
- Low Temperature
- High Temperature
- Continuous Operation – Varied Envir. Conditions Low / High Temp / Humidity
- Reliability

Additionally, hardware testing conducted specifically for this test campaign involved the **VxAdmin** (COTS) central scanning systems. That testing involved verification of the following requirements:

- Continuous Operation – Varied Environment Conditions Low / High Temp / Humidity
 - 150 test cases were examined in this test suite
 - The following requirements were examined within this test suite:
1.2-I, 1.2-I.1, 1.2-I.2, 1.2-J, 1.2-K, 1.2-L, 2.1.2-A, 2.1.2-A.1-3, 2.1.2-B, 2.1.2-B.1-5, 2.1.2-C, 2.1.2-C.1-3, 2.7-A, 2.7-A.1-3, 2.7-B, 2.7-C, 2.7-D, 2.7-E, 2.7-F, 2.7-G, 2.7-H, 2.7-I, 2.7-J, 2.7-K, 8.1-J, 8.1-J.1-2

The test methodologies for all tests are identified in the hardware test plans and hardware test reports, found in “Attachment I – VotingWorks VxSuite 4.0 Hardware Test Plans” and “Attachment J – VotingWorks VxSuite 4.0 Hardware Testing Results.

3 Test Findings and Recommendation

3.1 Summary Findings

The following subsections provide a summary review and evaluation of the pertinent VVSG 2.0 areas of review.

3.1.1 Source Code Review Summary

SLI Compliance has reviewed the software source code for each application in the VotingWorks VxSuite 4.0 voting system to determine the code’s compliance with VVSG v2.0 and for compliance with VotingWorks internally developed coding standards. “Attachment K - VotingWorks VxSuite 4.0 Source Code Reviewed and Results – PROPRIETARY” details specific information on the source code review.

3.1.1.1 Evaluation of Source Code

The source code was reviewed for compliance per the guidelines defined in the VVSG v2.0. The source code was written adequately in terms of VVSG v2.0. The code is modular and there is sufficient error handling. Readability is sufficient and supports maintainability. All source code requirements were met.

3.1.2 Technical Data Package Review Summary

SLI Compliance has reviewed the VotingWorks VxSuite 4.0 TDP for compliance with VVSG v2.0, as detailed in section 2.6.6. The specific documents are listed in “Attachment B – VotingWorks VxSuite 4.0 Technical Data Package Listing”.

3.1.2.1 Evaluation of TDP

The Technical Data Package for the VotingWorks VxSuite 4.0 voting system was found to sufficiently comply with the VVSG 2.0 standards such that a jurisdiction would be able to appropriately deploy the VotingWorks VxSuite 4.0 voting system.

The test suites, as listed in section 2.6.6, were executed against the VxSuite 4.0 voting system.

3.1.3 Functional Testing Summary

SLI Compliance performed tests on each of the system configurations identified in Section “2.6.2 Configurations Tested”. The testing incorporated end-to-end election scenarios testing the functionality supported by VotingWorks, as identified in “Attachment A - VotingWorks VxSuite 4.0 Implementation Statement.”

3.1.3.1 Evaluation of Testing

The test suites, as listed in sections 2.6.3, 2.6.4 and 2.6.5, were executed against the VxSuite 4.0 voting system:

The tests were successfully conducted using the executables delivered in the Trusted Build, in association with the appropriate hardware versions as declared in this Test Report for the **VotingWorks VxSuite 4.0** voting system.

Any relevant issues found in preliminary executions were reported, resolved and re-tested. “Attachment L – VotingWorks VxSuite 4.0 Test Suites - Proprietary”, provides specific information on the tests performed.



3.1.4 Hardware Test Summary

Based upon an examination of the equipment listed in

Table 4 – COTS Equipment and VotingWorks Hardware Specification, SLI Compliance concluded that the hardware listed is COTS. As such, COTS hardware is excluded from standalone environmental testing and is included as part of system-level testing.

SLI Compliance oversaw execution of Environmental and Electrical Hardware testing on the non-COTS hardware listed in Table 3 – VxSuite 4.0 Custom Equipment.

3.1.4.1 Evaluation of Hardware Testing

Any issues found were reported, resolved and re-tested. “Attachment J – VotingWorks VxSuite 4.0 Hardware Testing Results” contain the hardware reports from SLI Compliance’s EAC approved Hardware Environmental Test Subcontractors. These reports detail specific information on the environmental hardware testing.

All VxSuite 4.0 components comply with all applicable VVSG 2.0 standards .

3.2 Anomalies

No anomalies were identified other than those identified as discrepancies and addressed.

3.3 Correction of Deficiencies

All deficiencies identified in source code, documentation, hardware and functionality were corrected.

3.4 Recommendation

SLI Compliance has successfully completed the testing of the VotingWorks VxSuite 4.0 voting system. It has been determined that the VxSuite 4.0 voting system meets the required acceptance criteria of the Election Assistance Commission’s Voluntary Voting System Guidelines v2.0.

This recommendation reflects the opinion of SLI Compliance based on testing scope and results. It is SLI Compliance’s recommendation based on this testing effort that the EAC grant certification of VotingWorks VxSuite 4.0 voting system.



4 Signature

SLI Compliance attests that:

- All testing prescribed by the test plan or amended test plan was performed as identified or the divergence from the test plan was properly documented;
- all identified voting system anomalies or failures were reported and resolved, and;
- The test report is accurate and complete.

Michael Santos

Michael Santos

Director, VSTL, SLI Compliance

August 26th, 2026

End of Voting System Test Report
