Certification Test Report - Modification

Report Number HIN-20001-CTR-01

Hart InterCivic Verity Voting 2.5

Prepared for:

Vendor Name	*Hart InterCivic Inc. (Hart)*
Vendor System	*Verity Voting 2.5*
EAC Application No.	*HRT-Verity-2.5*
Vendor Address	*15500 Wells Port Drive* *Austin, TX 78728*

Prepared by:

SLI Compliance[SM]
4720 Independence St.
Wheat Ridge, CO 80033
303-422-1566
www.SLICompliance.com

NVLAP TESTING
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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
August 14th, 2020	1.0	J. Panek	Initial Draft

Disclaimer

The Certification 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 Federal Government. Results herein relate only to the items tested.

Trademarks

- SLI is a registered trademark of SLI Compliance, a Division of Gaming Laboratories International, LLC
- Verity is a trademark of Hart InterCivic Inc.
- All products and company names are used for identification purposes only and may be trademarks of their respective owners.

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.

Other Labs Performing Hardware Testing

SLI Compliance is responsible for all core voting system tests as identified in NIST Handbook 150-22 (2017). Regarding non-core hardware testing for this certification test campaign, this report contains data that were produced under subcontract by the following labs:

Laboratory	Address
NTS – EMI / EMC	1736 Vista View Dr. Longmont, CO 80504

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1 Introduction

SLI Compliance is submitting this report as a summary of the certification testing efforts for the **Hart Verity Voting 2.5** voting system against the Voluntary Voting System Guidelines 1.0 (VVSG 1.0). The purpose of this document is to provide an overview of the certification testing effort and the findings of the testing effort for the **Verity Voting 2.5** system.

This test campaign included review of updates made to the Technical Data Package, source code review, and testing of the **Hart Verity Voting 2.5** voting system. The process consisted of the development of a test plan, managing system configurations, executing component and system level tests prepared by SLI, and analysis of results. The review and testing were performed at SLI's Wheat Ridge, Colorado facility, from June 22nd, 2020 to August 14th, 2020.

1.1 References

1. Election Assistance Commission Voluntary Voting System Guidelines version 1.0 (EAC VVSG 1.0), Volumes I and II
2. NIST Handbook 150: 2016
3. NIST Handbook and 150-22: 2017
4. EAC Voting System Testing and Certification Program Manual, United States Election Assistance Commission, v 2.0, May 2015
5. SLI VSTL Quality System Manual, v 3.2, prepared by SLI, dated June 8th, 2020

1.2 Document Overview

This document contains the following sections:

- System Identification identifies hardware and software for the **Verity Voting 2.5** system.
- System Overview discusses the functionality of **Verity Voting 2.5** system software and firmware.
- Certification Test Background is a summary of the testing process.
- Certification Test Results Summary contains the results and analysis of the testing effort.
- Attachments:
  - Attachment A - Warrant of Change Control
  - Attachment B - Attestation of Durability for Verity Voting
  - Attachment C - Attestation of Integrity for Verity Voting
  - Attachment D - Attestation of Production Hardware and Software for Verity Voting
  - Attachment E - Verity 2.5.1 Record of Trusted Build

- Attachment F - Verity Voting 2.5 Discrepancy Report
- Attachment G - Verity 2.5 Source Code Review Summary
- Attachment H - Hart Verity Voting 2.5 Modification Test Plan v1.1
- Attachment I - Hart Verity 2.5 EAC Electrical Hardware Test Plan v1.0
- Attachment J - Immunity Test Report for Verity Touch Writer Duo Standalone
- Attachment K - Radiated and Conducted Emissions Test Report for Verity Touch Writer Duo Standalone

1.3 Terms and Abbreviations

The following terms and abbreviations may be used in this document:

Table 1 – Terms and Abbreviations

Term	Abbreviation	Description
Ballot Marking Device	BMD	An accessible computer-based voting system that produces a marked paper ballot that is the result of voter interaction with visual or audio prompts.
Cast Vote Record	CVR	Record of all selections made by a single voter whether in electronic or paper. Also referred to as a ballot image when used to refer to electronic ballots.
Central Count Scanner	CCS	High Speed Digital Scanner is a ballot scanning device typically located at a central count facility and is operated by an automated multi-sheet feeding capability.
Chevron (Arrows at top of current screen)	No Abbreviation	Verity software applications are organized around easy-to-follow workflows, with specific activities associated with “chevrons” or “arrows” in the application user interface.
Compact Flash card	CF	This is a type of flash memory card in a standardized enclosure often used in voting systems to store ballot and/or vote results data.
Compact Flash AST	CFAST	A compact flash media based on the Serial ATA bus rather than the Parallel ATA bus, used by the original Compact Flash.
Commercial Off the Shelf	COTS	Commercial, readily available hardware devices (such as card readers, printers or personal computers) or software products (such as

Term	Abbreviation	Description
		operating systems, programming language compilers, or database management systems).
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 utilizes a database management system 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.
Functional Configuration Audit	FCA	Exhaustive verification of every system function and combination of functions cited in the vendor's documentation. The FCA verifies the accuracy and completeness of the system's Voter Manual, Operations Procedures, Maintenance Procedures, and Diagnostic Testing Procedures.
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 our 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	The testing activities associated with the physical aspects of the system (hardware, documentation, builds, source code, etc.).

Term	Abbreviation	Description
Primary – Closed	No Abbreviation	The Closed Primary election segregates each political party onto its own ballot, along with all pertinent non-political contests and referendums.
Primary - Open	No Abbreviation	The Open Primary election combines all political parties' contests onto a single ballot, along with all pertinent non-political contests and referendums.
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 Information	RFI	A form used by testing laboratories to request, from the EAC, interpretation of a technical issue related to testing of voting systems.
Requirements Matrix	N/A	This is the matrix created by the EAC and maintained by SLI that traces the requirements to the various test modules and test methods.
Standard Lab Procedure	SLP	SLI's quality system documentation is made up of standard lab procedures (SLPs), which are procedures required to ensure a systematic, repeatable and accurate approach to voting systems testing and governing the actual performance of SLI's work.
(Verity) Tab	No Abbreviation	Verity software applications are organized around easy-to-follow workflows and activities; a "Tab" provides specific activities associated with "chevron" workflows in the application user interface.
Technical Data Package	TDP	This is the data package that is supplied by the vendor and 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 each voting system.
Test Method	No Abbreviation	SLI proprietary documents which are designed to group sets of EAC VVSG requirements in a logical manner that can be utilized to efficiently

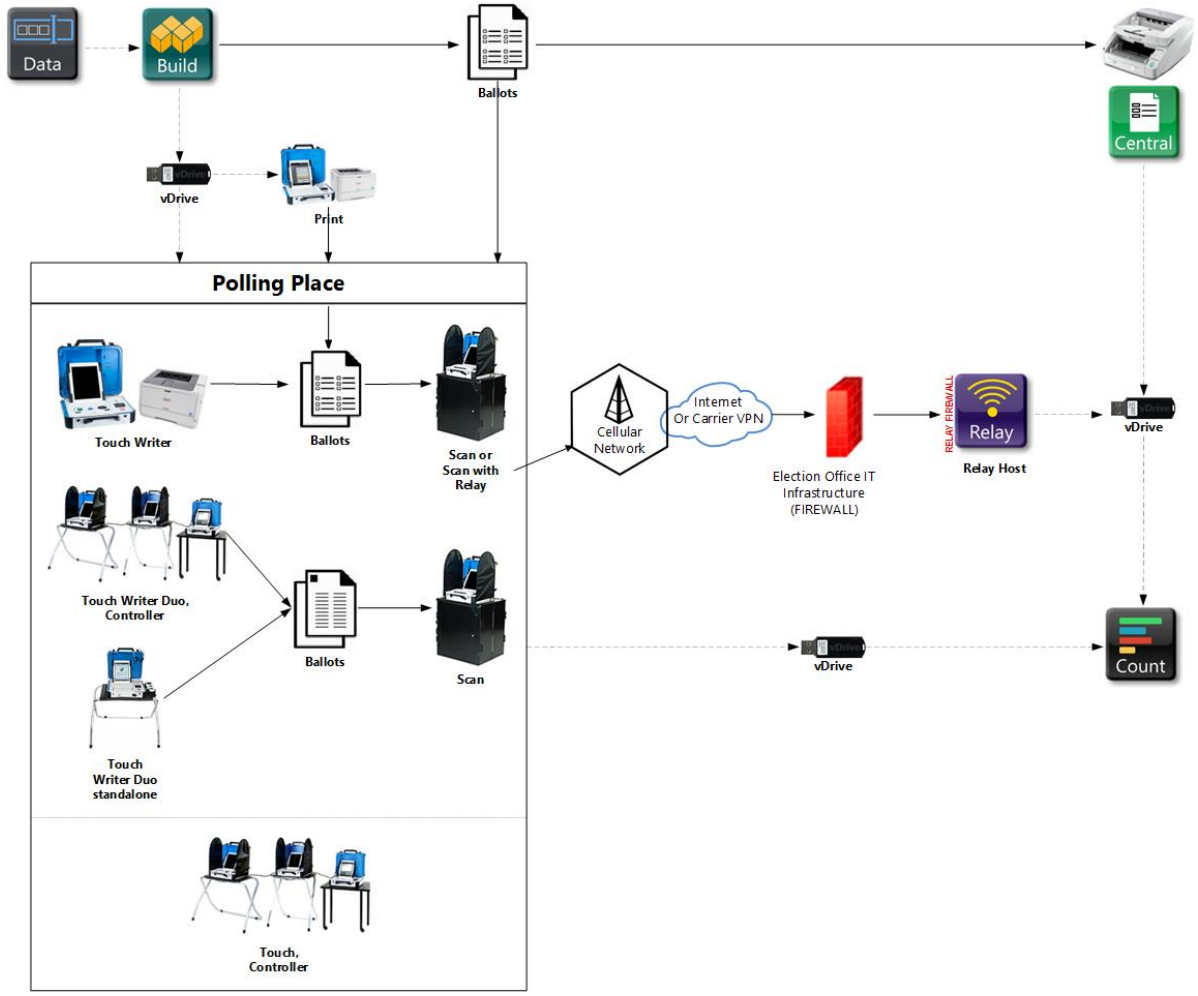
Term	Abbreviation	Description
		validate where and how requirements, or portions of a requirement, are met.
Test Module	No Abbreviation	An actionable component of a Test Method, that functionally verifies that a requirement is met within a voting system. Test Modules are at a generic level within the Test Method, and are customized for a particular voting system, within a Test Suite.
Test Suite	No Abbreviation	An actionable grouping of test modules designed to test a set of functions of a voting system or component in a specific way.
Validation	No Abbreviation	Confirmation by examination and through provision of objective evidence that the requirements for a specific intended use or application have been fulfilled (ISO 9000).
Verification	No Abbreviation	Confirmation by examination and through provision of objective evidence that specified requirements have been fulfilled (ISO 9000).
Voluntary Voting Systems Guidelines Volumes I & II	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 of these systems.
Voting System Test Lab	VSTL	The accredited lab where the voting system is being tested.
Voting System Under Test	VSUT	The designation for a voting system that is currently being tested.
Voting Test Specialist	VTS	An SLI Compliance employee who has been qualified to perform EAC voting system certification testing.

2 System Identification

This section details the scope of the **Verity Voting 2.5** voting system and associated components.

The **Verity Voting 2.5** system is composed of software applications, central count location devices and polling place devices with accompanying firmware, and COTS hardware and software.

2.1 System Diagram



Overview of the diagram:

- The components are displayed as touch points of data access, transfers, and verification.
- Dotted lines show the flow of data and air gaps using **Verity vDrives** and are also used to separate the deployment models shown within the polling place.
- **Verity Print** is a ballot production device that provides unmarked printed ballots.
- **Verity Touch Writer** and **Scan** may be installed in polling places to support paper-based voting.
- **Verity Controller**, **Touch Writer Duo**, and **Scan** may be installed in polling places to support paper-based voting.
- **Verity Touch Writer Duo Standalone** and **Scan** may be installed in polling places to support paper-based voting.

- **Verity Controller** and **Touch** may be installed in polling places to support DRE voting.
- **Verity Key** (not shown) is required for user access into components to load election elections, to use critical features, and to generate reports. Feature access depends on the roles applied to user accounts.
- **vDrive Duplicator** (not shown) is an optional device, used for populating multiple **vDrives** simultaneously.
- **Verity Relay** is an optional results transmission feature.
- **Verity AutoBallot** (not shown) is an optional barcode scanner kit for Verity Controller, Verity Print and Verity Touch Writer that allows air-gapped integration between an e-pollbook check-in process and the task of selecting the ballot style for the voting system.

2.2 Software and Firmware

The software and firmware employed by **Verity Voting 2.5** consists of 2 types, custom and commercial off the shelf (COTS). COTS applications were verified to be pristine 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 **Verity Voting 2.5** system.

Table 2 – Software and Firmware

System Component	Application(s)	Version
Verity Data	Ballot setup and configuration software	2.5.0
Verity Build	EMS software	2.5.0
Verity Central	High-speed digital scanner software	2.5.1
Verity Count	Central count location accumulation, tallying, and reporting software	2.5.0
Verity Relay	Data transmission software	2.5.0
Verity Scan	Digital scanner firmware	2.5.1
Verity Touch Writer	BMD firmware	2.5.1
Verity Touch Writer Duo	BMD firmware	2.5.1
Verity Touch Writer Duo Standalone	BMD firmware	2.5.1
Verity Controller	Verity device firmware	2.5.1
Verity Touch	DRE firmware	2.5.1
Verity Touch with Access	DRE firmware	2.5.1
Verity Print	Printer firmware	2.5.1

Table 3 – COTS Software and Firmware

Description	Version
Verity Data/Build	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
Microsoft SQL Server Standard 2017	14.0.1000.169
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Central	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
Microsoft SQL Server Standard 2017	14.0.1000.169
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Count	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
Microsoft SQL Server Standard 2017	14.0.1000.169
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Relay	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
Microsoft SQL Server Standard 2017	14.0.1000.169
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Print	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Scan – Paper Ballot Scanner	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Nuance Western OCR, Desktop, OEM	V20
Verity Touch Writer – Electronic BMD Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0

McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Touch Writer Duo – Electronic BMD Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Touch Writer Duo Standalone – Electronic BMD Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Controller – Networked Centralized Management Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Touch - Electronic DRE Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143
Verity Touch with Access - Electronic DRE Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.28.0
McAfee Application Control for Devices (McAfee Solidifier)	8.2.1-143

2.3 Equipment (Hardware)

The hardware employed by **Verity Voting 2.5** consists of 2 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 **Verity Voting 2.5** system.

Table 4 – Equipment (Hardware)

Hardware Description	Version
Verity Print – Ballot Printer	3005356 Rev E
Verity Print – Ballot Printer*	3005856 Rev B

Verity Scan – Paper Ballot Scanner	3005350 Rev I
Verity Scan – Paper Ballot Scanner*	3005800 Rev B
Verity Touch Writer – Electronic BMD Device	3005352 Rev H
Verity Touch Writer – Electronic BMD Device*	3005852 Rev B
Verity Touch Writer Duo – Electronic BMD Device	3005700 Rev B
Verity Touch Writer Duo Standalone – Electronic BMD Device	3005730 Rev A
Verity Controller – Networked Centralized Management Device	3005351 Rev E
Verity Controller – Networked Centralized Management Device*	3005825 Rev B
Verity Touch - Electronic DRE Device	3005355 Rev E
Verity Touch - Electronic DRE Device*	3005854 Rev B
Verity Touch with Access - Electronic DRE Device	3005353 Rev F
Verity Touch with Access - Electronic DRE Device*	3005853 Rev B

***** SmartPanel updated in previous certification modification for tablet electronics obsolescence

Table 5 – COTS Equipment

COTS Hardware Description	Version
Verity Data/Build	
Verity Data and Build Applications and Workstation Kit • HP Z4 G4 Workstation • HP Z230 and Z240 Workstations supported for existing customers only • Verity Data Software • Verity Build Software	A
OKI Data C831dn Color Printer for existing customers only	N35100A
OKI Data C844dn Color Printer	N35301A
OKI Data C911dn Color Printer for existing customers only	N36100A
OKI Data C931e Color Printer	N36100A
OKI Data B432dn Mono Report and Ballot Printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only	N22202A
HP 8-port Ethernet Switch	1405-8GV3
Vinpower Digital 7-target USB Duplicator	USBShark-7T-BK
Vinpower Digital 23-target USB Duplicator	USBShark-23-BK
Verity Central	
Verity Central Applications and Workstation Kit	A

• HP Z4 G4 Workstation • HP Z230 and Z240 Workstations supported for existing customers only • Verity Central Software	
Canon DR G1100 High-Speed Scanner	M111181
Canon DR G1130 High-Speed Scanner	M111171
Canon DR-G2110 High-Speed Scanner	6130030
Canon DR-G2140 High-Speed Scanner	6130020
OKI Data B432dn Mono Printer Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only	N22202A
HP 8-port Ethernet Switch	1405-8GV3
Verity Count	
Verity Count Applications and Workstation Kit • HP Z4 G4 Workstation • HP Z230 and Z240 Workstations supported for existing customers only • Verity Count Software	A
OKI Data B432dn Mono Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only.	N22202A
HP 8-port Ethernet Switch	1405-8GV3
Verity Relay	
Verity Relay Applications and Workstation Kit • HP Z4 G4 Workstation • HP Z240 Workstation supported for existing customers only • Verity Relay Software	A
OKI Data B432dn Mono Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only.	N22202A
HP 8-port Ethernet Switch	1405-8GV3
Verity Print	
OKI Data C831dn Color Printer	N35100A
OKI Data B432dn Mono Blank Ballot Printer	N22500A
OKI Data C844dn Color Printer	N35301A
OKI Data B431d Mono Printer for existing customers only	N22202A
Optional AutoBallot Barcode Scanner Kit	C

Includes the following 2d barcode scanner: • Hart part number: 1003672 Motorola/Zebra part number: DS4308 or DS4608	
Verity Scan – Paper Ballot Scanner	
Verity Ballot Box	B
Optional Relay Accessory kit (4G LTE Cat-M1)	A
Verity Touch Writer – Electronic BMD Device	
OKI Data B432dn Mono Marked Ballot Printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only	N22202A
Accessible Voting Booth	D
Optional AutoBallot Barcode Scanner Kit Includes the following 2d barcode scanner: • Hart part number: 1003672 Motorola/Zebra part number: DS4308 or DS4608	C
Headphones • Brand: V7, part number HA300-2NP or HA310-2NP	2005230
Verity Touch Writer Duo – Electronic BMD Device	
Brother PJ700 Series Thermal Printer	PJ723
Accessible Voting Booth with ATI Tray	D
Standard Voting Booth	D
Optional detachable ATI Kit	A
Optional headphones for ATI Kit • Brand: V7, part number HA300-2NP or HA310-2NP	C
Verity Touch Writer Duo Standalone – Electronic BMD Device	
Brother PJ700 Series Thermal Printer	PJ723
Accessible Voting Booth with ATI Tray	D
Standard Voting Booth	D
Optional detachable ATI Kit	A
Optional headphones for ATI Kit • Brand: V7, part number HA300-2NP or HA310-2NP	C
Verity Controller	
Optional AutoBallot Barcode Scanner Kit Includes the following 2d barcode scanner:	C

• Hart part number: 1003672 Motorola/Zebra part number: DS4308 or DS4608	
Verity Touch - Electronic DRE Device	
Standard Voting Booth	D
Verity Touch with Access - Electronic DRE Device	
Accessible Voting Booth	D
Headphones • Brand: V7, part number HA300-2NP or HA310-2NP	2005230

2.4 Documentation

The documents that are a part of the examination of the **Verity Voting 2.5** system are listed in the table below:

Table 6 – Documentation

Document Title	Version
6641-037 A01_Verity_2.5_Administrators Guide_Data.pdf	A.01
6641-038 A01_Verity_2.5_Administrators Guide_Build.pdf	A.01
6641-039 A00_Verity_2.5_Administrators Guide_Central.pdf	A.00
6641-040 A00_Verity_2.5_Administrators Guide_Count.pdf	A.00
6641-041 A00_Verity_2.5_Administrators Guide_Relay.pdf	A.00
6641-042 A01_Verity_2.5_System Administrators Guide.pdf	A.01
6643-008 A02_Verity_2.5_Support Procedures Guide.pdf	A.02
6651-030 A03_Verity_2.5_Polling Place Field Guide - CDS.pdf	A.03
6651-031 A02_Verity_2.5_Polling Place Field Guide - SW.pdf	A.02
6651-032 A02_Verity_2.5_Polling Place Field Guide - CT.pdf	A.02
6651-033 A02_Verity_2.5_Polling Place Field Guide - SRW.pdf	A.02
6651-035 A00_Verity_2.5_Verity Print Field Guide.pdf	A.00
6651-037 A04_Verity_2.5_Polling Place Field Guide - DS.pdf	A.04
6653-008 A03_Verity_2.5_Device Troubleshooting Field Guide.pdf	A.03
6673-010 E_Verity_Relay Implementation Process.pdf	E
6675-011 A_Verity_OKI B432 Tray Extension Kit Installation.pdf	A

Document Title	Version
All-In-One Code Framework Coding Standards.pdf	© 2014 Microsoft Corporation
Change Notes Hart Verity Voting 2.5.0 to 2.5.1 4005680 A00.pdf	A.00
Configuration Management Process 1001074 D01.pdf	D.01
Continual Improvement Process 1000550 E02.pdf	E.02
Control of Nonconforming Product Procedure 1000657 B02.pdf	B.02
Device Configuration Process Document 4005523 B00.pdf	B.00
Device OS Creation and Configuration Process Document Verity 2.5 4005675 A00.pdf	A.00
Device Win10 Creation Process Document Verity 4005676 A00.pdf	A.00
Document Control Procedure 1000538 E06.pdf	E.06
Factory TUV SUD inspection 2019 June report signed.pdf	N/A
Hardware 2005713-CFAST Door Security Kit Design.pdf	B
Hardware 3005018-ATI Kit Design.pdf	A
Hardware 3005174-AutoBallot Kit Design.pdf	B
Hardware 3005350-Scan Design.pdf	I
Hardware 3005351-Controller Design.pdf	E
Hardware 3005352-Touch Writer Design.pdf	H
Hardware 3005353-Touch with Access Design.pdf	F
Hardware 3005355-Touch Design.pdf	E
Hardware 3005356-Print Design.pdf	E
Hardware 3005357-Ballot Box Design.pdf	D
Hardware 3005358-Standard Booth Design.pdf	C
Hardware 3005359-Accessible Booth Design.pdf	D
Hardware 3005700-Touch Writer Duo Design.pdf	B
Hardware 3005730-Touch Writer Duo Standalone Design.pdf	A
Hardware 3005800-Scan Design.pdf	B
Hardware 3005801-Accessible Booth With ATI Tray Design.pdf	A
Hardware 3005825-Controller Design.pdf	B

Document Title	Version
Hardware 3005852-Touch Writer Design.pdf	B
Hardware 3005853-Touch with Access Design.pdf	B
Hardware 3005854-Touch Design.pdf	B
Hardware 3005856-Print Design.pdf	B
Hardware 3005905-Duo Go Design.pdf	A
Hardware Design Development Procedure 1000513 D01.pdf	D.01
Hardware PCB Photos.pdf	N/A
Hardware Verification and Validation Process 1000514 D01.pdf	D.01
Hart Safety Certificate U8 17 10 90917 004.pdf	N/A
Hart Safety Certificate U8 090917 0006.pdf	N/A
Hart Safety Certificate U8 090917 0008 Rev. 00.pdf	Rev. 00
Hart Secure Ballot Stock Specification 4005526 A01.pdf	A.01
HP Z4 G4 Verity Win10 Workstation Manufacturing 4005670 A01.pdf	A.01
HP Z230 Verity Win10 Workstation Manufacturing 4005674 A01.pdf	A.01
HP Z240 Verity Win10 Workstation Manufacturing 4005673 A01.pdf	A.01
HPQC Test Cases.pdf	N/A
Quality Manual 1000490 D04.pdf	D.04
Record Retention Matrix 1000510 E02.pdf	E.02
Software Design Development Procedure 1000566 D02.pdf	D.02
Software Production 1000551 E01.pdf	E.01
Software Test Design Development 1000508 D02.pdf	D.02
Software Verification and Validation Process 1000560 D02.pdf	D.02
Software Versioning Procedure 1001070 C05.pdf	C.05
SQA Requirements Management Process 1000540 A02.pdf	A.02
Supplier Qualification and Management 1000563 C02.pdf	C.02
The Creation and Configuration of the Access Build Environment 4005517 A01.pdf	A.01
The Creation and Configuration of the MCU Build Environment 4005519 A02.pdf	A.02

Document Title	Version
The Creation and Configuration of the Trusted Build Environment 4005518 A04.pdf	A.04
Verity 2.5 Implementation Statement 4005668 A02.pdf	A.02
Verity 2.5 Notice of Protected Information 1000781 A01.pdf	A.01
Verity 2.5 TDP Abstract 1000780 A02.pdf	A.02
Verity 2.5 VVSG 1.0 TDP Trace.pdf	N/A
Verity 2.5.X COTS List.pdf	N/A
Verity Airgap Interface Technical Reference 4005512 A02.pdf	A.02
Verity Application Framework TRD 4005634 A00.pdf	A.00
Verity Application Installer Build Process Document Verity 2.5.1 4005672 A01.pdf	A.01
Verity Application Programming Interface Specification 4005604 A04.pdf	A.04
Verity Ballot Creation TRD 4005636 A00.pdf	A.00
Verity Base Station Microcontroller Specification 4005462 A01.pdf	A.01
Verity Build TRD 4005628 A00.pdf	A.00
Verity Central TRD 4005632 A00.pdf	A.00
Verity Coding Standard 4005498 A14.pdf	A.14
Verity Controller TRD 4005624 A01.pdf	A.01
Verity Count TRD 4005629 A01.pdf	A.01
Verity Data TRD 4005627 A00.pdf	A.00
Verity Database Attributes 4005543 C04.pdf	C.04
Verity Device Suite TRD 4005621 A00.pdf	A.00
Verity Election Definition Data TRD 4005639 A01.pdf	A.01
Verity Election Management TRD 4005631 A00.pdf	A.00
Verity Electronics Specification 4005461 A21.pdf	A.21
Verity Entity Relationship Diagram Database - Devices.pdf	N/A
Verity Entity Relationship Diagram Database - Servers (Count Only).pdf	N/A
Verity Entity Relationship Diagram Database - Servers (No Count).pdf	N/A
Verity Key Design 4005514 A02.pdf	A.02

Document Title	Version
Verity Logging TRD 4005635 A00.pdf	A.00
Verity Omni Modification TRD 4005655 A01.pdf	A.01
Verity Operational Environment 4005515 C15.pdf	C.15
Verity PC Application Framework User Interface Design Document.pdf	5
Verity Performance Characteristics 4005497 C03.pdf	C.03
Verity Print TRD 4005626 A00.pdf	A.00
Verity Redstone Modification TRD 4005671 A01.pdf	A.01
Verity Relay Theory of Operations 4005571 A06.pdf	A.06
Verity Risk and Threat Assessment 4005513 C05.pdf	C.05
Verity Scan TRD 4005623 A00.pdf	A.00
Verity Security Requirements 4005464 A07.pdf	A.07
Verity Shared Device User Interface Design Document.pdf	7
Verity Software Architecture-Design 4005463 B02.pdf	B.02
Verity Summative Usability Report 4005496 A00.pdf	A.00
Verity Summative Usability Test Plan 4005495 A01.pdf	A.01
Verity Supply Chain PRD 4005302 C01.pdf	C.01
Verity Touch TRD 4005633 A00.pdf	A.00
Verity Touch Writer Duo Base Station Microcontroller Specification 4005638 A00.pdf	A.00
Verity Touch Writer Duo TRD 4005625 A00.pdf	A.00
Verity Touch Writer TRD 4005622 A00.pdf	A.00
Verity User Management TRD 4005630 A00.pdf	A.00
Verity Vote Counting and Cast Vote Records TRD 4005640 A00.pdf	A.00
Verity Voting 2.5 Change Notes 4005669 A02.pdf	A.02
Verity Voting 2.5 Usability Impact Statement.pdf	N/A
Verity Voting 2.5.1 Source Documentation.zip	N/A
Verity Voting National Certification Test Specification 4005527 B04.pdf	B.04
VirTex Q01 Quality Manual Rev R.pdf	R
Voting System Implementation and Maintenance 1000745 C02.pdf	C.02

Document Title	Version
VSTL Product Submission Procedure 1000565 D02.pdf	D.02
Workstation Configuration Process Document Verity 2.5 4005678 A02.pdf	A.02
Workstation Win10 Creation Process Document Verity 2.5 4005677 A00.pdf	A.00

2.5 Materials

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

The following test materials are required for the performance of testing including, as applicable, test ballot layout and generation materials, test ballot sheets, and any other materials used in testing.

- Ballots & blank ballot grade paper
- Thumb drives
- USB dongles
- Ballot marking pens
- Printer paper rolls

3 System Overview

3.1 Scope of the Hart Verity Voting 2.5 Voting System

This section provides a description of the scope of **Verity Voting 2.5** voting system components.

The **Verity Voting 2.5** system represents a set of software applications for pre-voting, voting and post-voting election project activities for jurisdictions of various sizes and political division complexities.

Verity Voting 2.5 functions include:

- Defining the political divisions of the jurisdiction and organizing the election with its hierarchical structure, attributes, and associations.
- Defining the election events with their attributes such as the election name, date and type, as well as contests, candidates, referendum questions, voting locations and their attributes.
- Preparing and producing ballots for polling place and absentee voting or by-mail voting.
- Preparing media for precinct voting devices and central count devices.

  - Configuring and programming the **Verity Scan** digital scanners for marked paper ballots and Verity Touch Writer printed vote records.
  - Configuring and programming the **Verity Touch Writer** BMD devices.
  - Configuring and programming the **Verity Touch Writer Duo Standalone** BMD devices.
  - Configuring and programming the **Verity Controller** with **Verity Touch Writer Duo** BMD devices.
  - Configuring and programming the **Verity Controller** with **Verity Touch** and **Touch Writer Duo** DRE devices.
  - Configuring and programming the **Verity Print** on-demand ballot production device.
  - Transmission of the election results via **Verity Relay**.
  - Producing the election definition and auditing reports.
  - Providing administrative management functions for user, database, networking and system management.
  - Import of the Cast Vote Records from **Verity Scan** devices and **Verity Central**.
  - Preview and validation of the election results.
  - Producing election results tally according to voting variations and election system rules.
  - Producing a variety of reports of the election results in the desired format.
  - Publishing of the official election results. Auditing of election results including ballot images and log files.

- **Verity Scan** is a digital scan precinct ballot counter (tabulator) that is used in conjunction with an external ballot box. The unit is designed to scan marked paper ballots or Verity Touch Writer Duo printed vote records, interpret and record voter marks on the marked paper ballot or record voter selections on the printed vote records, and deposit the ballots into the secure ballot box.
- **Verity Relay** provides remote transmission capability. Utilizing an optional modem with **Verity Scan**, at close of polls, results are transmitted from the polling place device to the **Verity Relay** workstation.
- The **Verity Touch Writer** is a standalone precinct level Ballot Marking Device (BMD) which also includes an Audio Tactile Interface (ATI), which allows voters who cannot complete a paper ballot to generate a machine-readable and human readable paper ballot, based on vote selections made, using the ATI.
- The **Verity Touch Writer Duo** is a daisy chained configuration of a **Verity Controller** device configured with up to twelve **Verity Touch Writer Duo** BMD devices, which allows voters to utilize the touchscreen or optional Audio Tactile Interface to generate a machine-readable and human readable printed vote record, based on vote selections made.

- The **Verity Touch Writer Duo Standalone** is a standalone BMD device, which allows voters to utilize the touchscreen or optional Audio Tactile Interface to generate a machine-readable and human readable printed vote record, based on vote selections made.
- The **Verity Touch** is a Direct Recording Electronic (DRE) device chained configuration of a **Verity Controller** device configured with up to twelve **Verity Touch** devices, which allows voters to cast their vote electronically via a touchscreen.
- The **Verity Touch with Access** is a DRE device chained configuration of a **Verity Controller** device configured with up to twelve **Verity Touch** or **Touch with Access** devices, which allows voters to cast their vote electronically via a touchscreen or Audio Tactile Interface (ATI).
- **Verity Print** is an on-demand ballot production device for unmarked paper ballots.
- **Verity Election Management** allows users with the Administrator role to import and manage election definitions. Imported election definitions are available through the Elections chevron in Build. Users can also delete, archive, and manage the election definitions.
- **Verity User Manager** enables users with the correct role and permissions to create and manage user accounts within the **Verity Voting** system for the local workstation in a standalone configuration, or for the network in a networked configuration.
- **Verity Desktop** enables users with the correct roles to set the workstations' date and time, gather **Verity** application hash codes (in order to validate the correctness of the installed applications), and access to Windows desktop.
- **Verity Data** provides the user with controls for entering and proofing data and audio. **Verity Data** also performs validation on the exported information to ensure that it will successfully import into **Verity Build**.
- **Verity Build** opens the election to proof data, view reports, and print ballots, and allows for configuring and programming the **Verity Scan** digital scanners, and **Verity Touch Writer** and **Controller/Touch Writer Duo** BMD devices, **Verity Print**, **Verity Controller/Touch** series devices, as well as producing the election definition and auditing reports.
- **Verity Central** is a high-speed, central digital ballot scanning system used for high-volume processing of ballots (such as vote by mail). The unit is based on COTS scanning hardware coupled with custom **Hart-**developed ballot processing application software which resides on an attached workstation.
- **Verity Count** is an application that tabulates election results and generates reports. **Verity Count** can be used to collect and store all election logs from every **Verity** component/device used in the election, allowing for complete election audit log reviews.

3.2 Engineering Changes

Verity Voting 2.5 is a modification of the EAC certified **Verity Voting 2.4** system.

The modifications to **Verity Voting 2.5** address multiple aspects of the system, including features for all devices and workstations, state specific features, updates to the operating system (OS), security enhancements, inclusion of the Touch Writer Duo Standalone, as well as associated documentation updates.

The following modifications are implemented in this release:

Features for all devices and workstations

- Windows Embedded Standard 7 OS is being replaced with Windows 10 Enterprise 2019 LTSC.
- Support has been added for the Haitian Creole language.
- The vDrive file and the folder names and paths have been added to the signed and validated content.

Wisconsin-specific features

- Support has been added for the Open Primary logic for the state of Wisconsin. This logic is a combination of Hart's current open primary logic with the addition of a party selector contest.

Additional Features for Verity Devices

All Verity Devices

- A user may now create a recovery vDrive and export temporary logs to a USB stick during a system alert. These are logs for when a vDrive for the currently loaded election is not present.
- Backup data may now be deleted.
- SQL Server 2012 is replaced with SQLite 3.29.

Features for devices with the thermal report printers

- Device Tests menu function to send a test page to the thermal roll printer has been renamed "Test report printer."

Features for devices that allow poll workers to activate a ballot

- If only one precinct-split will appear on the Select Precinct screen, the system shall automatically select it and not present the Select Precinct screen.
- If only one party will appear on the Select Party screen, the system shall automatically select it and not present the Select Party screen.

Features for devices with ballot entry and review

- An option has been added to require voters to view all contests on the ballot before finishing their voting session. This option is set in Verity Build.

Features for Touch Writer Duo

- Introduction of Standalone configuration that does not require the use of a Verity Controller. The Touch Writer Duo Standalone configuration is akin to the Touch Writer device and includes a thermal report printer and support for the optional AutoBallot barcode scanner.
- Device Tests menu function to send a test page to the full sheet thermal printer is renamed “Test vote record printer.”

Features for Verity Scan

- Scan devices that support Print Vote Record (PVR) scanning now also support standard paper ballot scanning in the same session.
- An option has been added for an automatic duplicate of the vDrive when two vDrives are inserted. This option is set in Verity Build.
- 3G modem support for use with the Relay kit has been removed.
- The single sheet ballot limit per vDrive has been increased to 25,000 to support long early voting events. The Ballot Box limit is unchanged and must be emptied every 4000 sheets.

Additional Features for Verity Workstation Software

Features for All Workstation Software

- SQL Server 2012 has been replaced with SQL Server 2017.
- TPM 2.0 support has been implemented on Z240 and Z4 G4 workstations.

Features for Workstation Software with Ballot Proofing

- A new report titled “Translation Proofing Report” has been added to Verity Data and Verity Build.

Features for Verity Data

- A Party Selector Contest may now be added in an Open Primary election.
- Keyboard shortcut keys have been added for usability and convenience:
    - Select Election screen
        - Alt+O for “Open”
    - Contest Titles screen
        - Alt+O for “Add Office”
        - Alt+P for “Add Proposition”
        - Alt+R for “Add Party Selector”
    - Choices screen
        - Alt+A for “Add Choice”
        - Alt+D for “Delete Choice”
    - Rotation
        - Alt+G for “Generate Indices”
    - Audio screen
        - Alt+I for “Import”

        - Alt+E for “Export”
        - Alt+N for “Normalize”
        - Alt+A for “Normalize All”
        - Alt+C for “Clear Entry”
    - Import screen
        - Alt+I for “Import”
    - Export screen
        - Alt+E for “Export”

Features for Verity Build

- The following feature enhancements to devices discussed above are settable in Verity Build:
    - A new option to require voters to view all contests on the ballot before finishing their voting session.
    - A new option for automatic duplicate vDrive creation in Verity Scan.
- The Print Queue import now allows write-in text to be defined for each write-in available on the ballot.

Features for Verity Central

- Support has been added for the scanning of Printed Vote Records. The default Voting Method is set in the election’s task.
- Keyboard shortcut keys have been added for usability and convenience:
    - Select Election tab
        - Alt+S for “Save” in the preferences menu
    - Scan tab
        - Enter for “Scan” in the Scan menu
        - Alt+R for “Batch Report” in the Manage Batches menu
        - Alt+T for “Change Type” in the Manage Batches menu
        - Alt+N for “Edit Notes” in the Manage Batches menu
        - Alt+D for “Delete Batch” in the Manage Batches menu
        - Enter for “Search” in the Search Ballots menu
        - Alt+S for “Save” in the Settings menu
        - Alt+T for “Test Scan” in the Settings menu
    - Review Tab
        - Alt+A for “Add Choice” in the Review images menu
        - Alt+C for “Clear Filters” in the Review images menu
        - Alt+R for “Refresh List” in the Review images menu
        - Alt+P for “Print List” in the Review images menu
        - Alt+A for “Accept” in the Review Images menu (Ballot Review)
        - Alt+R for “Revert” in the Review Images menu (Ballot Review)
        - Alt+P for “Previous” in the Review Images menu (Ballot Review)
        - Alt+N for “Next” in the Review Images menu (Ballot Review)
        - Alt+Left Arrow for “Previous Unresolved” in the Review Images menu (Ballot Review)
        - Alt+Right Arrow for “Next Unresolved” in the Review Images

menu (Ballot Review)
- ESC for “Return to Page View” in the Review Images menu (Ballot Review)

Corrected Defects

The following defects have been corrected in the Verity Voting 2.5 modification:

Product	Description of Defect	Resolution/Results in Verity Voting 2.5
Verity Count	The application does not save an update to a write-in name on the Write-in Candidate screen UI if the change made is only to the case of the alphabet (i.e. uppercase, lowercase).	The name change is now properly saved, even when the change is only to case of the alphabet.
Verity Data	The Polling Place List report does not list the name of all the precinct splits or the precincts if only one Precinct with two splits are selected or if only two precincts are selected.	No software change to Verity Data was required. A formula used for the row and column grouping in a sub report that controls the layout of the precinct/split grid was corrected in the report template.

4 Certification Test Background

This section provides a brief overview of the EAC Certification Program and the activities involved for a voting system to be considered for certification against the EAC VVSG and the EAC program manual.

4.1 PCA - Document and Source Code Reviews

The Physical Configuration Audit (PCA) review of the **Verity Voting 2.5** documentation submitted in the Technical Data Package (TDP) was performed in order to verify conformance with the Election Assistance Commission Voluntary Voting System Guidelines 1.0 (EAC VVSG 1.0). Source code was reviewed for each modified software and firmware application declared within the voting system.

All PCA document reviews were conducted in accordance with Vol. 2 Section 2 of the EAC VVSG 1.0, to demonstrate that the system meets the requirements. Inconsistencies or errors in documentation were identified to **Hart** in a Discrepancy Report for resolution or comment. This Discrepancy Report is included as Attachment F in this document.

All PCA source code reviews were conducted in accordance with Vol. 1 Section 5.2 and Vol. 2 Section 5 of the EAC VVSG 1.0, to demonstrate that the system meets the requirements. Inconsistencies or errors in the source code were identified to **Hart** for resolution or comment. This source code review summary is included as Attachment G in this document.

4.2 FCA - Functional & System Testing

The Functional Configuration Audit (FCA) review of the documentation submitted by **Hart** in the TDP was conducted according to the VVSG 1.0 Vol. 2 Section 6.7.

SLI's standard Test Suites were customized for the **Verity Voting 2.5** system and conducted in accordance with Vol. 2 Section 6 of the VVSG 1.0. Simulations of elections were conducted to demonstrate a beginning-to-end use case process for the **Verity Voting 2.5** system.

4.2.1 Test Methods

All test methods employed are within the scope of SLI's VSTL accreditation. The following validated test methods were employed during this test campaign:

Table 7 – Test Methods

SLI VSTL Test Method Name
TM_Accumulating_and_Transmitting_Results v1.1
TM_Accuracy v1.2
TM_Audit_Record_Data v1.1
TM_Error Message and Recovery v1.3
TM_Pre-Voting_Capabilities v1.2
TM_Readiness v1.1
TM_Security_Access_Control v1.1
TM_Security_Access_Control_Measures v1.1
TM_Security_Physical_Security_Measures v1.1
TM_Security_Software_Security v1.1
TM_Security_Telecommunications_and_Data_Transmission v1.2
TM_Security_Transmission_of_Official_Data_over_Public_Networks v1.1
TM_Security_Wireless_Communications v1.2
TM_Straight_Party_Voting v1.1
TM_Tally_and_Reporting v1.1
TM_Telecommunications v1.1
TM_Voting_Capabilities v1.3
TM_Voting_Straight_Party v1.2

The above listed test methods are implemented in a complementary fashion: modules are employed from various methods to form suites. Suites include a logical sequence

of functionality that is used to validate the requirement addressed by each module within the suite.

4.3 Hardware Testing

Hardware testing was conducted by a certified third-party hardware test laboratory to verify the new **Verity Touch Writer Duo Standalone** is compliant with the EAC VVSG 1.0 hardware requirements.

SLI Compliance is responsible for all core voting system tests as identified in the NIST NVLAP Handbook 150-22 (2017). Regarding non-core hardware testing for this certification test campaign, this report contains data that was produced under subcontract by the following lab:

Laboratory	Address	Test(s)	Date(s)
NTS – EMI / EMC	1736 Vista View Dr. Longmont, CO 80504	**EMC / EMI Tests:** Radiated Emissions, Conducted Emissions, ESD, Electromagnetic Susceptibility, Electrical Fast Transient, Lightning Surge, Conducted RF Immunity, Magnetic Fields Immunity, Electrical Power Disturbance	7/7/2020 – 7/10/2020

5 Certification Test Results Summary

5.1 Source Code Review Summary

SLI has reviewed the modified software source code for each application in the **Verity Voting 2.5** voting system to determine the code's compliance with the EAC VVSG 1.0, *Volume 1 Sections 5, 9* and *Volume 2 Section 5.4* and for compliance with **HART**'s internally developed coding standards. **Verity Voting 2.5** is implemented with the C, C++, and C# languages.

5.1.1 Evaluation of Source Code

As a modification project, the **Verity Voting 2.5** code base was reviewed using the final **Verity Voting 2.4** code as the baseline, to which the initial **Verity Voting 2.5** code base was compared. The differences found between those two code bases served as the starting point of the code review.

The source code was written adequately in terms of the VVSG 1.0. The code is modular and there is sufficient error handling. Readability is sufficient and supports maintainability. The source code was found to be compliant to the VVSG 1.0 and **Hart** declared industry standards. Please see Attachment G for details on the **Verity Voting 2.5** source code review.

5.2 Technical Data Package Review Summary

As this is a modification project, SLI reviewed the **Verity Voting 2.5** TDP against the final TDP for **Verity Voting 2.4.** The differences between the two TDPs were reviewed for compliance with the EAC VVSG 1.0 according to *Volume 2 Section 2*. The documents that are a part of the **Verity Voting 2.5** system are detailed in section 2.4 of this document.

5.2.1 Evaluation of TDP

Eight documentation discrepancies were written during the PCA documentation review phase. The issues identified were related to either incorrect or missing information. Details of the discrepancies can be found in Attachment F of this document.

In all instances, the discrepancies were addressed and resolved with updated documentation prior to the writing of this report. Once all identified discrepancies were resolved, the Technical Data Package for the **Verity Voting 2.5** voting system was found to comply with all applicable standards.

5.3 Functional Testing Summary

5.3.1 Test Suites Utilized

SLI performed tests designed to functionally verify the modifications listed in section 3.2 of this report. The testing incorporated end-to-end election scenarios testing the functionality supported by **Hart**. The following sections detail the test suites that were executed.

5.3.1.1 Accuracy

An Accuracy test suite was performed to verify the system's ability to record, store, consolidate, and report selections made by the voter, without error. This test suite utilized the **Verity Central** and **Verity Scan** devices. Pre-marked ballots in all supported ballot sizes were processed through the devices. Results were processed through **Verity Count** and examined for completeness and correctness.

5.3.1.2 Closed Primary Election

A Closed Primary test suite was performed in order to verify proper integration of the full **Verity Voting 2.5** system, and that all components continue to work as expected.

5.3.1.3 Error Message and Recovery

An Error Message and Recovery test suite was performed on the new **Verity Touch Writer Duo Standalone** device.

5.3.1.4 General Election 1

A General Election test suite was performed in order to verify proper integration of the full **Verity Voting 2.5** system, and that all components continue to work as

expected. This election variant focused on election components such as N of M, overvotes, undervotes multiple precincts, and scanning to accept both ballots and PVRs in a single session.

5.3.1.5 General Election 2

A second variation of a General Election test suite was performed in order to verify proper integration of the full **Verity Voting 2.5** system, and that all components continue to work as expected. This election variant included basic election components, as well as the Haitian Creole and Spanish languages.

5.3.1.6 Modifications

The Modification test suite examined each modification introduced into **Verity Voting 2.5** in order to verify that the modifications implemented, and the subsequent Trusted Build of the firmware, did not adversely affect operations. Various elections were used to exercise the devices and workstations such that each specific modification was functionally verified, with an appropriate quantity of regression testing performed as determined by analysis od the modifications.

5.3.1.7 Open Primary Election

The full **Verity Voting 2.5** system was reviewed in order to verify proper integration of the voting system and that all components continue to work as expected. This election variation included the modification for Wisconsin state-specific Party Selector Contest functionality.

5.3.1.8 Security

A security test suite was designed and executed to examine various security enhancements to the **Verity Voting 2.5** system as a primary focus. Beyond review of the modifications and enhancements to the system, additional testing was performed to verify the security posture of the system.

The examination of the McAfee Whitelisting tool version was completed to ensure it was properly implemented on a new windows-based operating system. All attempts to circumvent or render the whitelisting ineffective were unsuccessful. Software access controls were tested. All attempts to circumvent or manipulate the kiosk mode were unsuccessful. All user roles and authentication mechanisms were properly implemented per the vendor documentation. Attempts for user privilege escalation and all attempts to perform unauthorized or restricted system functionality were unsuccessful.

Automated vulnerability scans were taken of all networked machines to establish system vulnerabilities as well as determine any and all open networking ports. Communications between **Verity Relay** and **Verity Scan** were monitored after leaving the public cellular network. Network analysis tools were used to obtain network packet captures to examine communication and authentication attempts between devices, and to assess that appropriate encryption is utilized. Vulnerability

scans were conducted of all devices that were connected via public or proprietary networking. The communications between **Verity Controller** and daisy chained devices were also examined to confirm that communications were encrypted and that "Man in the Middle" attacks were resisted, and unsuccessful.

5.3.1.9 Verity Central

The **Verity Central** application was retested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect operations within the application.

5.3.1.10 Verity Count

The **Verity Count** application was re-tested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect operations within the application.

5.3.1.11 Verity Data/Build

The **Verity Data/Build** application was re-tested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect operations within the application.

5.3.1.12 Verity Relay

The **Verity Relay** application was re-tested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect operations within the application.

5.3.1.13 Verity Touch Writer Duo Standalone

All features and functionality of the new **Verity Touch Writer Duo Standalone** device were tested in-depth to verify they work as documented, and that all functionality is appropriately documented.

5.3.1.14 2-Hour Backup Battery

A 2-Hour Backup Battery test suite was performed on the new **Verity Touch Writer Duo Standalone** device.

5.3.2 Evaluation of Functional Testing

In this test campaign, **the Verity Voting 2.5** voting system was subjected to examination for changes, updates, and modifications made from the previously certified system, **Verity Voting 2.4**, against applicable requirements within the EAC VVSG 1.0.

Through the duration of testing, two functional discrepancies were written. Details of these discrepancies can be found in Attachment F. These discrepancies were reported and appropriately resolved. Once the discrepancies were addressed, no violation of conformance to EAC VVSG 1.0 requirements was observed. All

components of the **Verity Voting 2.5** voting system have successfully passed all tests.

5.4 Hardware Test Summary

SLI and their certified third-party hardware test laboratory, National Technical Systems (NTS), performed an analysis and review of the modified **Verity Voting 2.5** system hardware components. During execution of testing performed at NTS, an SLI representative was present to oversee the testing.

The test methodologies for all tests are identified in the hardware test plan and hardware test reports, listed in section 1.2 of this document.

The hardware testing for this test campaign consisted of the following electromagnetic emissions and immunity tests for the **Verity Touch Writer Duo Standalone**:

- Radiated Emissions – FCC, Part 15 Class B ANSI C63.4.
- Conducted Emissions – FCC, Part 15 Class B ANSI C63.4.
- ESD – IEC 61000-4-2 (2008) Ed. 2.0.
- Electromagnetic Susceptibility – IEC 61000-4-3 (1996).
- Electrical Fast Transient – IEC 61000-4-4 (2004-07) Ed. 2.0.
- Lightning Surge – IEC 61000-4-5 (1995-02).
- Conducted RF Immunity – IEC 61000-4-6 (1996-04).
- Magnetic Fields Immunity – IEC 61000-4-8 (1993-06).
- Electrical Power Disturbance – IEC 61000-4-11 (1996-06).

5.4.1 Evaluation of Hardware Testing

As this test campaign was a modification of an EAC certified voting system, only modified hardware components of the **Verity Voting 2.5** voting system were evaluated against applicable hardware requirements.

One discrepancy was written during this test campaign for an issue encountered during hardware testing. Details can be found in Attachment F of this document. **Hart** sufficiently addressed the issue and subsequently passed all hardware tests.

6 Recommendation

SLI has successfully completed the testing of the **Hart Verity Voting 2.5** voting system. It has been determined that the system meets the required acceptance criteria of the Election Assistance Commission's Voluntary Voting System Guidelines 1.0.

This recommendation reflects the opinion of SLI Compliance based on testing scope and results. It is SLI's recommendation based on this testing effort that the EAC grant certification of the **Hart Verity Voting 2.5** voting system.

SLI:

Traci Mapps
Director
August 17th, 2020

7 Appendix – Ancillary Products

Ancillary systems represent products and utilities that are not part of the EAC certified system configuration, however, they may be used to facilitate testing.

Ancillary systems include:

- Optional Verity Duo Go - a carrier for use with **Verity Touch Writer Duo** and **Verity Touch Writer Duo Standalone** to allow for "curbside" voting.
- Optional ATI Device

  Manufacturer: AbleNet
  Device: Dual Jelly Bean Switch

End of Certification Test Report