Certification Test Plan - Modification

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Prepared for:

Vendor Name	*Hart InterCivic (Hart)*
Vendor System	*Verity Voting 2.7.8*
EAC Application No.	HRT-Verity-2.7.8
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Accredited by the Election Assistance Commission (EAC) for Selected Voting System Test Methods or Services

Revision History

Date	Version	Author	Revision Summary
August 15th, 2025	1.0	M. Santos	Initial Version
Sept. 5th, 2025	2.0	*M. Santos*	Updates for EAC comments
Sept. 11th, 2025	3.0	*M. Santos*	Update for typo in section 1.1.4

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1 INTRODUCTION

This Modification Test Plan outlines the test approach SLI Compliance will follow when performing system modification testing on the **Hart Verity Voting 2.7.8** voting system against the Election Assistance Commission Voluntary Voting System Guidelines (EAC VVSG) version 1.0. **Verity Voting 2.7.8** is a modification of **Verity Voting 2.7**, certified by the EAC on June 7th, 2022, with limited changes. The votingsystem will be tested based on the "modified system" requirements, as set forth in section 4.7.2.2 of the "EAC Voting System Testing and Certification Program Manual,version 3.0". The purpose of this document is to provide a clear understanding of thework SLI Compliance will conduct and a detailed plan outlining the test effort.
When the testing is complete, SLI Compliance will submit a Certification Test Reportthat details all test results and findings from the Certification Test effort, as well as arecommendation to the EAC.

1.1 Description and Overview of the Certified System

This section contains a description of the previously certified **Verity Voting 2.7** votingsystem, the specific modifications to the current system version, and the impact of those modifications on the system and certification testing.

1.1.1 Definition of the Baseline Verity Voting 2.7 Certified System

This modification project builds upon the foundation established in **Verity Voting 2.7**, which contains the applications for **Verity Data**, **Verity Build, Verity Central, Verity Count**, and **Verity Relay Receiving Station**, **Verity Transmit Receiving Station** as well as the polling place devices **Verity Controller, Verity Scan, Verity Scan with Relay, Verity Print, Verity Touch Writer, Verity Touch Writer Duo, Verity Transmit** and **Verity Touch Writer Duo Standalone**.

1.1.2 Modifications

Verity Voting 2.7.8 is a modification of the EAC certified **Verity Voting 2.7** system.

The modifications to **Verity Voting 2.7.8** address multiple aspects of the system, including features for devices and workstations, as well as associated documentation updates.

The following modifications are implemented in this release:

Bug Fixes: As allowed under section 3.3.2 of the VVSG Life Cycle Policy, the following bug fixes are implemented in Verity 2.7.8:

- Update to Ballot Export Exception – Resolved an issue that could cause an “export completed” message to appear when a ballot export from Build actually failed.
- Update to Default Print Settings – Changed default setting for report printing on the Brother HL- L6400DWVS from Duplex (flip on long edge) to Simplex.
- Update to Log Generation – Removed excessive log generation in the printer event watcher which could cause a device to run out of disk space.
- Update to New Line Character in Exports – Restores functionality that stopped working in 2.7, where newlines in election definition fields are replaced with a space character in exports (DVT, NY Comprehensive Export)
- Update to Printer Messaging – Prevents an unexpected message sent by the Brother 6400 from causing an “unexpected error” system alert during ballot printing on Touch Writer.
- Update to Assignment Validation – Fixed a validation that was incorrectly blocking a write-in assignment in the following scenario - Contest with more than one write-in line, CVR that has more than 1 write-in vote for this contest.
- Text Update to Template Selection Screen – Fixed “billingual” typo on Data Template Selection screen
- Updates to Voting Type Issue – Fixed an issue where running a Count report in Election A and then editing the voting types in Election B could cause Count reports run later in Election B to fail or have incomplete data.
- Language Pack Update – Fixed an issue with loading more than two fonts from a single Language Pack.
- Ballot Layout Fix – Fixed a ballot layout issue where a contest is not included in the ballot layout in a very unique, and specific set of conditions.
- DVT Export Update – Fixed an issue that prevented the DVT from being exported when no parties are defined in a General Election.
- DVT Header Format Update – Fixed an issue where the comment symbol (#) appeared after the first word in the header row of the DVT. (“Format#” instead of “#Format”)

- Update to Idle Behavior – Fixed an issue where Touch Writer fails to load an election if powered on and left idle for an extended period (8+ hours) prior to initiating the election load.
- Update Ballots Cast on District Results – Fixed an issue where the District Results report shows incorrect ballots cast values. To encounter this issue, you must have precinct groups defined and at least two of those precinct groups must have the same number of actual ballots cast.
- Update to Custom DVT – Fixed an issue where a custom DVT export could show results from a different task within the same election. The custom DVT will always show results from the task it was created in, even if run from a different task. The workaround is to create separate custom DVTs for each task.
- Update to Central Batch Search – Fixed an issue where entering a Central batch number larger than 32,767 into the Batch Search UI gave a non-informative error message of “Error Converting data type int to smallint.”
- Update to Daylight Savings Time – Fixed an issue where the daylight savings time offset was not being applied to client workstations when synchronizing clocks with the server. This causes client clocks to be an off from the server clock. To encounter the issue, DST must be enabled on the server and the date on the server clock must be manually adjusted from a date where Standard Time is in effect to a date where Daylight Time is in effect.
- Update to Duo Go Communication – Fixed a timing issue in Duo Go that resulted in the device falsely reporting that there is “Insufficient charge to complete vote session.”

COTS Replacement: As allowed under section 3.3.3 of the VVSG Life Cycle Policy, the following COTS replacements are implemented in Verity 2.7.8:

- Support for the HP Z2 SFF G9 Workstation – The HP Z2 SFF G9 is a new workstation that can be used with Verity Voting software applications. This workstation is included due to the existing Z4 G4 workstations going end of life.
- Support for the HP-4001 DN Printer – The HP-4001DN Printer is a new printer that can be used as a report printer with Verity Workstations, or in the polling place with Verity Print and Verity Touch Writer products. This printer is included as an alternative printer option due to the Brother 6400 going end of life.
- Addition of the HPE R8R45A unmanaged Ethernet switch to the supported COTS list for locally interconnected workstations. This unmanaged Ethernet switch replaces the HP 1405-8G, which is end of life.

Jurisdictional Rule Change: As allowed under section 3.3.4 of the VVSG Life Cycle Policy, the following jurisdictional rule changes are implemented in Verity 2.7.8:

- Verity now supports the additional special characters Ö, ö, Ê, and ê in accordance with Indiana state requirements.

1.1.3 Initial Assessment of Impact of the Modifications

Review of the modifications listed in section “1.2.2 Modifications”, indicates the needfor limited Physical and Functional Configuration Audits to verify that the system continues to meet VVSG 1.0 requirements. All software, firmware and hardware modifications will be verified by execution of elections that incorporate steps to verify the modifications, or via test suites designed to specifically focus on the functional changes made to the applicable devices and applications.

1.1.4 Regression Testing

The limited FCA will consider functions that have not changed but may be impactedby the modifications. Each modified component of the system will require a new build. This will be subjected to FCA review at an appropriate level of scrutiny.

All modified components of **Verity Voting 2.7.8** will be regression tested in order to verify continued compliance to VVSG 1.0. Additionally, end-to-end system level general elections will be performed to verify proper system operation.

1.2 References

The following key documents were used in preparing this test plan.

1. Election Assistance Commission Voluntary Voting System Guidelines (EAC VVSG 1.0), Version 1.0, 2005
2. NIST Handbook 150: 2020
3. NIST Handbook 150-22: 2021
4. EAC Voting System Testing and Certification Program Manual, United States Election Assistance Commission, v 3.0
5. SLI Compliance VSTL Quality System Manual, Rev 4.4, July 21, 2025

1.3 Terms and Abbreviations

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

Table 1 – 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.
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.
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
Direct Recording Electronic	DRE	Voting systems that, using touch screen or other user interfaces, directly record the voter's selections in each race or contest on the ballot in electronic form.
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/EMI	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
Functional Configuration Audit	FCA	The testing activities associated with the functional testing of the system.
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	The testing activities associated with the physical aspects of the system (hardware, documentation, builds, source code, etc.).
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 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.
Requirements Matrix	N/A	A matrix that traces the VVSG requirements to the various test modules and test methods.
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.

1.4 Testing Responsibilities

The following project schedule contains owner assignments and identifies test procedure (module) development, test case (suite) development, 3rd party tests, and EAC and Manufacturer dependencies.

1.4.1 Project Schedule

The subsections below describe the project schedule.

1.4.1.1 Project Timeline

The following schedule outlines the expected timeline for this project

Task Name	Start	Finish
Review - Source Code (EAC)	Mon 7/14/25	Fri 7/25/25
Trusted Build	Mon 7/28/25	Tues 7/29/25
Test Readiness Review (PenTest, TRR)	Wed 7/31/25	Mon 8/11/25
Initiation of EAC Certification Project	Wed 8/13/25	Wed 8/13/25
Project Initiation	Wed 8/13/25	Wed 8/13/25
TDP Deliver/Receive Vendor Package	Wed 8/13/25	Wed 8/13/25
FCA Assessment	Wed 8/13/25	Wed 8/20/25
Test Plan Development	Wed 8/13/25	Fri 9/5/25
Preparation	Fri 9/5/25	Fri 9/5/25
Test Suite Development	Thurs 8/14/25	Thurs 8/14/25
Vendor Specific Module and Suite Creation/Validation	Wed 8/20/25	Fri 9/5/25
Modifications	Wed 8/27/25	Fri 9/5/25
Regression Testing	Wed 8/20/25	Wed 8/27/25
TDP Review	Wed 8/20/25	Tues 8/26/25
Official Execution	Tues 9/2/25	Fri 9/12/25
Execute Test Suites	Tues 9/2/25	Fri 9/12/25
Final Documentation Updates	Fri 9/12/25	Fri 9/12/25
Certification Test Report to EAC	Mon 9/15/25	Mon 9/15/25
Delivery of Artifacts to EAC Repository	Fri 9/21/25	Fri 9/21/25

1.4.1.2 Owner Assignments

Test Manager M. Santos is responsible for oversight and approvals for this test campaign. Work is conducted by SLI's trained and authorized Test Engineers.

- System Analysis and Review will be conducted by Source Code Review,Security and Voting Test Engineers, with oversight by the Test Manager.
- Source code review will be conducted by Voting Test Engineers (SourceCode Review Specialists), with oversight by the Test Manager.
- Documentation review will be conducted by Security and Voting TestEngineers, with oversight by the Test Manager.
- Test Module Development will be conducted by Security and Voting TestEngineers, with oversight by the Test Manager.
- Test Suite Development will be conducted by Security and Voting TestEngineers, with oversight by the Test Manager.
- Formal Test Execution will be conducted by Security and Voting TestEngineers, with oversight by the Test Manager.

1.4.1.3 Test Module Development

Test Modules will be developed and/or modified to provide repeatable detailed test steps. The Modules are defined at a basic level in SLI Compliance's formal Test Methods and are designed for use in any suite that employs their functionality. Thisreusability reduces the development time associated with creating Modules.

The Modules will be validated prior to formal test execution to ensure accurate testingof the voting system.

Additionally, the Test Modules will provide traceability to SLI Compliance's formal Test Methods, as well as the VVSG 1.0 requirements.

1.4.1.4 Test Suite Development

Test suites will be developed to help group and focus testing around key areas of the voting system. The test suites will contain multiple test modules providing clear and traceable test scripts and key information. As needed for the system under test, various configurations will be identified within the suites. Potentially, variations of the same suite may be run multiple times in order to verify different configurations.

1.4.1.5 Trusted Build

A Trusted Build was performed, producing softwareand firmware components for **Verity Data, Verity Build**, **Verity Central, Verity Count, Verity Print**, **Verity Controller, Verity Touch Writer, Verity Touch WriterDuo, Verity Touch Writer Duo Standalone**, **Verity Scan, Verity Scan with Relay, Verity Transmit, Verity Transmit Receiving Station** and **Verity Relay**

Receiving Station in order to include modifications made to those applications or to increment the version number to 2.7.8 when no modifications were made to those applications.

1.4.1.6 Formal Test Execution

Formal execution of the approved test suites and modules will be conducted to verify the system's compliance with the VVSG requirements.

1.4.1.7 3rd Party Hardware Testing

No hardware testing will be conducted in this test campaign.

1.4.1.8 EAC & Manufacturer Dependencies

The Test Plan will require EAC approval prior to finalization.

Hart will be required to provide all source code, documentation, equipment and supporting materials identified as part of the voting system.

The source code must have all discrepancies resolved, be successfully built and the outputs installed, and the components must pass operational status checks prior to formal test execution.

In addition, **Hart** is required to provide training on the voting system and support throughout the life of the project.

1.5 Scope of Testing

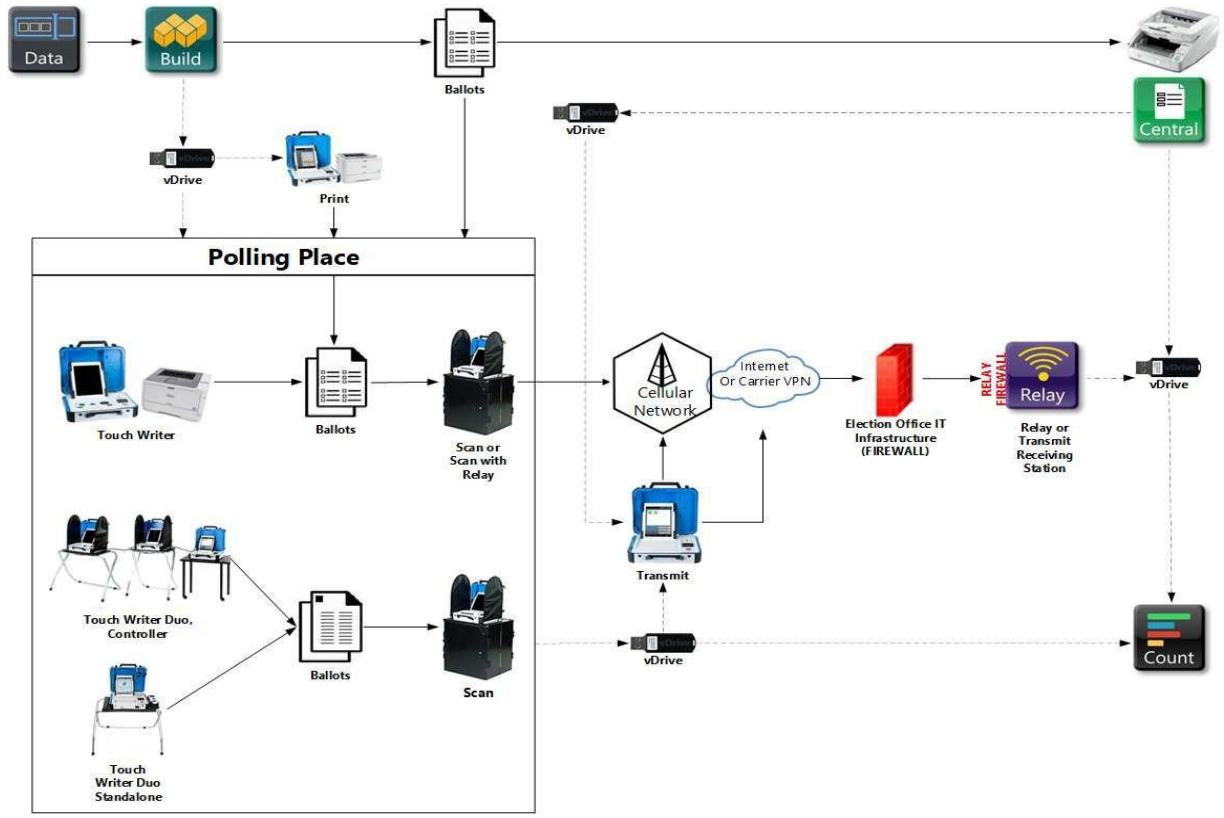
1.5.1 EAC Interpretations - RFI

This Certification Test Plan and the execution of tests for the voting systemidentified in this plan do not include any additional EAC interpretations

1.5.2 EAC Notices of Clarification - NOC

This Certification Test Plan and the execution of tests for the voting system identified in this plan do not include any additional EAC Notices of Clarification(NOC).

1.5.3 Block 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 vDrives.
- 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, Touch Writer Duo Standalone, and Scan may be installed in polling places to support paper-based voting. Verity Scan may be used with the Scan with Relay kit to remotely transmit vDrive data from that device only to a Relay Receiving Station.
- Verity Transmit is used to remotely transmit vDrive data from polling place devices or VerityCentral to a Transmit receiving station.

Verity Key (not shown) is required for user access into components to loadelections, to use critical features, and to generate reports. Feature access depends on the roles applied to user accounts.

2 PRE-CERTIFICATION TESTING AND ISSUES

2.1 Evaluation of prior VSTL testing

Prior VSTL testing has been performed on predecessor versions of the **Hart VerityVoting 2.7.8** voting system. The **Verity Voting 2.7** release, which was VSTL tested and EAC certified, constitutes the code base used for the **Verity Voting 2.7.8** release.

2.2 Evaluation of prior non-VSTL testing

No prior state or non-VSTL lab testing has been performed on the **Hart Verity Voting 2.7.8** voting system. Review of Hart's internal testing will be performed during the FCA review.

2.3 Known Field Issues

Review of the "Known Vulnerabilities" database, maintained by SLI Compliance, hasprovided no known vulnerabilities that relate to the modifications implemented in **Verity Voting 2.7.8**.

3 MATERIALS REQUIRED FOR TESTING

Any materials used in an election cycle must be provided to SLI Compliance to facilitate testing of the voting system. This section outlines these materials that are required.

3.1 Software/Firmware

All software and firmware used by the declared **Verity Voting 2.7.8** voting system, whether directly or indirectly, in a production environment must be validated during the certification process.

The following software/firmware is required for the execution of hardware, software, telecommunications, and security tests. This includes all supporting software such as operating systems, compilers, assemblers, application software, firmware, any applications used for burning of media, transmission of data or creation/managementof databases.

3.1.1 Verity Voting Custom Software/Firmware

The **Hart Verity Voting 2.7.8** voting system consists of the following software and firmware components:

Table 2 – Verity Voting 2.7.8 Custom Software/Firmware

Manufacturer	Application	Version
Verity Data	EMS Software	2.7.8
Verity Build	EMS Software	2.7.8
Verity Central	High-Speed Optical Scanner Software	2.7.8
Verity Count	Central Count Location Tabulation and Report Software	2.7.8
Verity Relay Receiving Station	Data Transmission Software	2.7.8
Verity Scan	Optical Scanner Firmware	2.7.8
Verity Touch Writer	BMD Firmware	2.7.8
Verity Touch Writer Duo	BMD Firmware	2.7.8
Verity Touch Writer Duo Standalone	BMD Firmware	2.7.8
Verity Controller	Firmware	2.7.8
Verity Print	BMD Firmware	2.7.8
Verity Transmit	Data Transmission Software	2.7.8
Verity Transmit Receiving Station	Data Transmission Software	2.7.8

3.1.2 COTS Software/Firmware

This section details the Commercial Off The Shelf software and firmware utilizedwithin the **Verity Voting 2.7.8** voting system

Table 3 – COTS Software/Firmware

Manufacturer	Application	Version
Microsoft	Windows 10 Enterprise 2019 LTSC	10.0.17763
Microsoft	Microsoft SQL Server Standard 2019	15.0.4153.1
Microsoft	SQLite	3.36.0
McAfee	McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Nuance Communications	Nuance Western OCR, Desktop, OEM	v20

3.1.3 Additional Supporting Test Software

This section outlines all test specific software that will be used in the test campaign.

Table 4 – Additional Supporting Test Software

Manufacturer	Application
CLOC	Count Lines of Code: an open source application used to determinethe counts of executable and comment lines.
SLI Compliance	Module Finder: an SLI Compliance proprietary application used to parsemodule names from source code.
SciTools	Understand: a customizable integrated development environment used forstatic code analysis.
CheckMarx	CheckMarx is an integrated development environment (IDE) that enables static code analysis.

3.2 Equipment

The following equipment is required for the execution of the hardware, software, telecommunications, and security tests. This includes system hardware, general purpose data processing and communications equipment, and any test instrumentation required.

3.2.1 Verity Voting 2.7.8 Equipment

The following **Hart Verity Voting 2.7.8** equipment will be used in testing:

Table 5 – Hart Verity Voting 2.7.8 Equipment

Hardware	Model
Verity Controller	3005825 / 3006085
Verity Print	3005356 / 3005856 / 3006095
Verity Scan (digital scanner)	3005350 / 3005800 / 3006080
Verity Ballot Box	3005357
Verity Touch Writer (BMD)	3005352 / 3005852 / 3006090
Verity Touch Writer Duo (BMD)	3005700 / 3006070
Verity Touch Writer Duo Standalone (BMD)	3005730 / 3006075
Verity Touch Writer Duo Go	3005905
Verity Transmit	3006065
Relay Accessory kit	3005251
Verity vDrive	2005535
Verity Key	2005361

3.2.2 COTS Equipment

The following Commercial Off-the-Shelf equipment will be used in testing:

Table 6 – COTS Equipment

Manufacturer	Hardware	Model
OKIDATA (for Verity Data, Verity Build, Verity Central, Verity Count, Verity Relay Receiving Station, Verity Transmit Receiving Station, Verity Print, and Verity Touch Writer)	Ballot and Report Printer	B431d, B432dn
Brother (for Verity Data, Verity Build, Verity Central, Verity Count, Verity Relay Receiving Station, Verity Transmit Receiving Station, Verity Print, and Verity Touch Writer)	Ballot and Report Printer	HL-L6400DWVS, HL-EX415DWVS
Hewlett-Packard (for Verity Data, Verity Build, Verity Central, Verity Count, Verity Relay Receiving Station, Verity Transmit Receiving Station, Verity Print, and Verity Touch Writer)	Ballot and Report Printer	Laser Jet Pro 4001dn
OKIDATA (for Verity Data, Verity Build, and Verity Print)	Ballot Printer	C831dn, C844dn
OKIDATA (for Verity Data and Verity Build)	Ballot Printer	C911dn, C931e
IntoPrint (for Verity Data and Verity Build)	Ballot Printer	SP1360
Hewlett-Packard (for Verity Data, Verity Build, Verity Central, Verity Count, Verity Relay Receiving Station, and Verity Transmit Receiving Station)	Verity Workstation	Z240, Z4 G4, Z2 SFF G9
Hewlett-Packard (for Z240 workstation deployments)	Verity Workstation Display	P231, P232

Hewlett-Packard (for Z4 G4 and Z2 SFF G9 workstation deployments)	Verity Workstation Display	P244, P24 G4 24, P24 G5
Canon (for Verity Central)	Ballot Scanner	DR-G1100, DR-G1130, DR-G2110, DR-G2140
Hewlett Packard (for locally interconnected workstations)	Ethernet switch	1405-8GV3
Hewlett-Packard Enterprises (for locally interconnected workstations)	Ethernet switch	R8R45A
Duracell UPS	Uninterruptible Power Supply	DR660PSS

3.2.3 Verity Voting equipment not utilized in this modification

Table 7 below lists equipment that is part of the certified Verity Voting 2.7.8 system but are not utilized, as they are not affected by any newly implemented modifications within the Verity Voting 2.7.8 system

Table 7 – Verity Voting equipment not utilized

Manufacturer/Item	Hardware	Hart Part Number
VinPower Digital 7-target USB Duplicator	USBShark-7T-BK	3005510
VinPower Digital 23-target USB Duplicator	USBShark-23-BK, USBDupeBoxES-23T	3005520
Motorola/Zebra AutoBallot barcode scanner kit.	DS4308, DS4608	1003672
Hart Accessible Voting Booth	D	3005359
Hart Accessible Voting Booth with ATI Tray	A	3005801
Hart Standard Voting Booth	D	3005358
Brother PJ700 Series Thermal Printer	PJ723-C149	1005714

Brother PJ700 Series Thermal Printer	PJ723-C149-F	1005851
Brother PJ800 Series Thermal Printer	PJ823-C149	1005852
Hart Optional detachable ATI Kit	A	3005018
V7 Optional headphones for ATI Kit	HA300-2NP, HA310-2NP	2005230
StarTech Optional 802.11 WiFi Accessory kit	USB433ACD1X1	3005985
StarTech Optional RJ-45 Ethernet Accessory kit	USB31000SW	3005964
Bausch & Lomb Optional Full Page Magnifier manufactured	819007	1006092
Inclusion Solutions Optional Full Page Magnifier manufactured	436	1006094
AbleNet Optional ATI dual button switch	Dual Jelly Bean Switch	1001-364
Eaton UPS	5P1500	3005362

3.3 Test Materials

The following test materials are required for the performance of testing including, as applicable, test ballot layout and generation materials, test ballot sheets, test ballot cards and control cards, standard and optional output data report formats, and any other materials used in testing.

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

3.4 Deliverable Documents

See “Appendix A – TDP Listing”, for documents to be delivered as a part of the **HartVerity Voting 2.7.8** system.

4 TEST SPECIFICATIONS

The following are the specifications for testing to be conducted on the **Hart Verity Voting 2.7.8** system. The specifications contain details on the focus of testing, configuration(s), and the functions to be tested.

4.1 Requirements

The **Verity Voting 2.7.8** modified voting system will be tested to requirements as listed below:

- 2.1.1-a
- 2.2.1.2-b
- 2.2.4-d
- 2.4.3-a
- 4.1.7.2
- 5.4.3-d
- 7.9.4

Please see "Appendix B – Requirements to Components" for additional information.

4.2 Hardware Configuration and Design

The **Hart Verity Voting 2.7.8** system, as declared in the application for certification submitted to the EAC, consists of:

- A **Verity Data/Build** workstation to create all election information and election media.
- **Verity Print** is a pre-voting ballot production device that is paired with a COTS printer to produce unmarked paper ballots.
- At the precinct level, **Verity Scan** optical scanners, **Verity Touch Writer** BMD, **Verity Touch Writer Duo** BMD, and **Verity Touch Writer Duo Standalone** BMD configurations are employed. Additionally, **Verity Scan** may be equipped with an optional accessory modem for wireless transmission. **Verity Transmit** is used to remotely transmit vDrive data.
- The central count location employs a workstation that utilizes the **Verity Central** software in combination with a high-speed COTS scanner, for tabulation of paper ballots.
- The consolidation, tally and reporting location employs a workstation with **Verity Count** software as well as a printer.
- **Verity Relay Receiving Station** is a remote transmission software application that receive selection data transmissions sent by Verity Scan devices equipped with an optional Relay modem accessory.

- **Verity Transmit Receiving Station** is a remote transmission software application that receives election data transmissions sent by Verity Transmit device.

4.3 Software System Functions

4.3.1 Software Functional Test Design and Data

SLI Compliance will prepare functional test modules using the operator/user procedures specified in the TDP. Functionality provided by the **Verity Voting 2.7.8** voting system is exercised in order to verify that each functional component performs as expected. Accept/reject criteria are based on requirements of the VVSG and the system specification documents provided within the TDP.

The following test suites will be utilized in the testing of Verity Voting 2.7.8:

General Election – The full **Verity Voting 2.7.8** voting system will be reviewed in order to verify proper integration of the voting system and that all components continue to work as expected.

Modifications – The modifications to each component and software application will be given focused testing in order to verify that the modifications implemented do not adversely affect operations. Elections will be designed and utilized, in some instances repeated.

Security – A general security review of the system will be performed to ensure no new security threat has been introduced to the system as a result of the modifications implemented. In any instance where an anomaly or possible security flaw is identified, the potential risk will be evaluated and reported.

4.4 TDP Evaluation

SLI Compliance is completing an assessment of the deliveries in the Technical Data Package for **Verity Voting 2.7.8** against the **Verity Voting 2.7** TDP. Any modifications to previously reviewed documentation will be evaluated.

SLI Compliance will conduct a PCA review of all new or modified vendor traced documents submitted for review in the delivery of the **Verity Voting 2.7.8** TDP. Documents are verified for compliance to VVSG 1.0, Volume 2, Sections 2.2 through 2.13 and Volume 2, Section 6.6. Any subsequent re-deliveries of the TDP items will be solely the result of fixes to discrepancies identified in the remaining FCA or PCA activities.

4.5 Source Code Review

The certification campaign for the **Hart Verity Voting 2.7.8** voting system includes modified software and firmware that have been created as proprietary to **Hart,** as well as review of any commercial off the shelf products. SLI Compliance has conducted a source code review of all modified proprietary source code, and modifiedCOTS products, submitted in the delivery of the voting system TDP for compliance to the EAC VVSG v 1.0, Volume 2, Section 6.6.

The coding languages involved in the vendor's applications include:

- C
- C++
- C#

Source code review Tools utilized by SLI Compliance include:

- LocMetrics Line Counter: a commercial application used to determine the counts of executable and comment lines.
- Module Finder: an SLI Compliance proprietary application used to parse module names from C/C++ and VB code and populate the identified modulenames into the review documents.
- CheckMarks: a customizable integrated development environment used for static code analysis.

Any subsequent re-reviews of source code will be the result of fixes to discrepanciesidentified in the FCA activities.

COTS operating systems and software used in the voting system have been verifiedas authentic and unmodified in the **Verity Voting 2.7.8** test campaign

4.6 Trusted Build

The Trusted Build process for **Hart Verity Voting 2.7.8** was devised to allow for the build to be performed by and under the supervision of an SLI Compliance Voting System Test Engineer, to preserve the security of the Hart Trusted Build process, andto maintain SLI Compliance's chain of custody. The steps for this process included the following:

- Preparation for the Trusted Build – Obtaining and reviewing Hart's procedure for constructing the build platform, verifying the target build platform, and verifying the proper contents of the source code package were extracted to the target build platform via hash codes.

- Execution of the Trusted Build – SLI Compliance performed the Trusted Build by

using the step-by-step build procedure, as provided by Hart to create a pristine build environment. SLI Compliance observed the following items throughout the build process:

- Build environment images at various key points
- Build environment and file hashes at various key points
- Build environment hardware characteristics
- Build results from code compilation and file hashes
- Final software install files and file hashes
- Build virtual machine files

- Deliverables to Testing – Upon completion of the Trusted Build, the product installs were created and installed on equipment at Hart's facility. Each device had a unique serialized security seal applied that was verified by SLI Compliance upon receipt. In addition, certain items were sent to the SLI Compliance test group:
  - Final software install files
  - Workstation base OS images
  - Workstation product images
  - Build output hash values to validate install files
  - Workstation and device hash files
  - Tamper seal application evidence
  - Build server artifacts

- Final Record Keeping and Archiving Procedures – At the conclusion of the Trusted Build process, SLI Compliance completed all final record keeping and archiving procedures at SLI Compliance's facility. This record keeping includes any unique identifiers, results of the build with version numbers and dates, and descriptions of all hashes and images in the repository. Hash files of the build outputs were verified against the hash files obtained from the devices to ensure the contents of the installed images. Tamper seals codes were verified and confirmed to be intact

4.7 Standard VSTL Test Methods and Uncertainty of Test Data Measurement

This test campaign utilizes Standard VSTL test methods and nominal type test data only.

5 TEST DATA

Test data for the **Hart Verity Voting 2.7.8** voting system will be compiled such that all functionality declared will be tested to determine conformance to the standards.

5.1 Data Recording

SLI Compliance will evaluate the modified system functionality, as described by **Hart** technical documentation, as well as requirements as listed in the EAC VVSG v 1.0, and make determinations as to expected results of all data inputs into the **Hart Verity Voting 2.7.8** voting system. This includes:

- Election type
- Precincts of all types
- Districts
- Offices
- Contests
- Candidates
- Parties
- Devices used
- Voting variations employed
- Issues/Referendums
- Votes cast for each candidate/issue/referendum
- Vote consolidation data from one device/level to the next

The data is contained in one master data record, including each input and expected output. This data is incorporated into the appropriate test suite, populating test modules with exact expected data for the function being tested.

Testing information is recorded in the test suites and test , which are utilized according to SLI Compliance's relevant standard lab procedures.

6 TEST PROCEDURE AND CONDITIONS

This section describes the test conditions and procedures for execution of test suites. If a particular sequence is mandatory for the execution of suites, a rationale will be given. Additionally, this section is used to describe procedures for setting up equipment to be used in the test suite execution.

6.1 Facility Requirements

Testing will be performed on site at SLI Compliance in Colorado.

Secure labs are available with appropriate power supply and space to accommodate the various configurations defined within this test plan. Temperature/humidity gauges will be employed to determine whether the appropriate conditions exist during testing.

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

- Temperature: 64°F - 79°F (17.7°C - 26.1°C)
- Relative Humidity: 20 to 90%
- Atmospheric Pressure: Local Site Pressure

All TDP and test documentation is stored on site at SLI Compliance's facility in a secure project directory on SLI Compliance's secure Voting server**.**

6.2 Test Setup

Configurations of **Verity Voting 2.7.8** will be deployed that conform to each specific test suite's needs. In all instances **Verity Voting 2.7.8** documentation will be followedin the setup of the configurations.

6.3 Test Sequence

While there is no required sequence for performing voting system certification testingand audits, there are prerequisite tasks for some testing. Tasks and any applicable predecessor tasks are identified within each suite for the test cases.

6.4 Test Operations Procedures

An inventory has been performed to verify the voting equipment received contains hardware and software elements as defined in the TDP prior to commencement of testing.

Throughout the testing effort, test suites and modules will be marked as follows:

- **Accept –** Test is accepted as successful.
- **Reject –** Test is rejected as unsuccessful.
- **NT –** Not Testable is used for test modules that cannot be completed. For example, if failure of one test modules failure precludes attempting subsequent test modules, the latter will be marked as NT.

Test results **Reject** and **NT** will include comments by the test engineer explaining the reason for the result.

Issues encountered during review and testing will be documented on the Discrepancy Report. Test findings showing that an aspect of the voting system does not conform to the requirements of the identified test standard will be marked as Documentation Discrepancies, Source Code Review Discrepancies, Hardware Discrepancies, or Functional Discrepancies.

Issues that are encountered during testing or documentation review but are not addressed by the applicable standard will be added to the Discrepancy Report and noted as Informational. The vendor has the option whether to address Informational issues. All responses provided by the vendor are noted in the Discrepancy Report attachment to the Voting System Test Report.

7 Approval Signature

Michael Santos

Michael Santos
Director – VSTL,
SLI Compliance
September 5th, 2025

8 Appendix A – TDP Listing

- 462785-1.1 Hart InterCivic CofC
- 6641-056 G_Verity_2.7_Administrators Guide_Data.pdf
- 6641-057 F_Verity_2.7_Administrators Guide_Build.pdf
- 6641-058 E_Verity_2.7_Administrators Guide_Central.pdf
- 6641-059 F_Verity_2.7_Administrators Guide_Count.pdf
- 6641-060 E_Verity_2.7_Remote Transmission Administrators Guide.pdf
- 6641-061 G_Verity_2.7_System Administrators Guide.pdf
- 6643-011 H_Verity_2.7_Support Procedures Guide.pdf
- 6651-053 F_Verity_2.7_Polling Place Field Guide - CDS.pdf
- 6651-054 G_Verity_2.7_Polling Place Field Guide - DS.pdf
- 6651-055 F_Verity_2.7_Polling Place Field Guide - SW.pdf
- 6651-056 F_Verity_2.7_Polling Place Field Guide - SRW.pdf
- 6651-058 D_Verity_2.7_Verity Print Field Guide.pdf
- 6651-061 D_Verity_2.7_Verity Transmit Field Guide.pdf
- 6653-011 F_Verity_2.7_Device Troubleshooting Field Guide.pdf
- 6673-010 E_Verity_Relay Implementation Process.pdf
- 6675-011 A_Verity_OKI B432 Tray Extension Kit Installation.pdf
- 6675-042 A_Verity_HL-L6400DWVS Tray Extension Kit.pdf
- All-In-One Code Framework Coding Standards.pdf
- Change Notes Verity Voting 2.7.0 to 2.7.1 4005724 A00.pdf
- Configuration Management Process 1001074 D01.pdf
- Continual Improvement Process 1000550 E02.pdf
- Control of Nonconforming Product Procedure 1000657 B02.pdf
- Device Configuration Process Document 4005523 B00.pdf
- Device OS Creation and Configuration Process Document Verity 2.7 4005696 A01.pdf
- Factory TUV SUD inspection 2021 December report.pdf
- Hardware 2005713-CFAST Door Security Kit Design.pdf
- Hardware 3005018-ATI Kit Design.pdf
- Hardware 3005174-AutoBallot Kit Design.pdf
- Hardware 3005350-Scan Design.pdf
- Hardware 3005352-Touch Writer Design.pdf
- Hardware 3005356-Print Design.pdf
- Hardware 3005357-Ballot Box Design.pdf
- Hardware 3005358-Standard Booth Design.pdf
- Hardware 3005359-Accessible Booth Design.pdf
- Hardware 3005700-Touch Writer Duo Design.pdf
- Hardware 3005730-Touch Writer Duo Standalone Design.pdf
- Hardware 3005800-Scan Design.pdf
- Hardware 3005801-Accessible Booth With ATI Tray Design.pdf
- Hardware 3005825-Controller Design.pdf

- Hardware 3005852-Touch Writer Design.pdf
- Hardware 3005856-Print Design.pdf
- Hardware 3005905-Duo Go Design.pdf
- Hardware 3006065-Transmit Design.pdf
- Hardware 3006070-Touch Writer Duo Design.pdf
- Hardware 3006075-Touch Writer Duo Standalone Design.pdf
- Hardware 3006080-Scan Design.pdf
- Hardware 3006085-Controller Design.pdf
- Hardware 3006090-Touch Writer Design.pdf
- Hardware 3006095-Print Design.pdf
- Hardware Design Development Procedure 1000513 D01.pdf
- Hardware PCB Photos.pdf
- Hardware Verification and Validation Process 1000514 D01.pdf
- Hart Safety Certificate U8 090917 0006.pdf
- Hart Safety Certificate U8 090917 0008 Rev. 00.pdf
- Hart Safety Certificate U8 17 10 90917 004.pdf
- Hart Secure Ballot Stock Specification 4005526 A01.pdf
- HartLogo.jpg
- HP Z2 SFF G9 Verity Win 10 Workstation Manufacturing 4005687 A00.pdf
- HP Z240 Verity Win10 Workstation Manufacturing 4005673 A05.pdf
- HP Z4 G4 Verity on Win 10 Workstation Manufacturing 4005670 A05.pdf
- HPQC Test Cases.pdf
- Quality Manual 1000490 D04.pdf
- Record Retention Matrix 1000510 E02.pdf
- Sinatra Modifications Electronics Specification 4005701 A00.pdf
- Software Design Development Procedure 1000566 D02.pdf
- Software Production 1000551 E01.pdf
- Software Test Design Development 1000508 D02.pdf
- Software Verification and Validation Process 1000560 D02.pdf
- Software Versioning Procedure 1001070 C05.pdf
- SQA Requirements Management Process 1000540 A02.pdf
- Supplier Qualification and Management 1000563 C02.pdf
- Tally Tape Thermal Printer Controller Firmware Build and Flash Procedure 4005719 A00.pdf
- The Creation and Configuration of the Access Build Environment 4005517 A01.pdf
- The Creation and Configuration of the Automated Deployment Environment 4005723 A01.pdf
- The Creation and Configuration of the MCU Build Environment 4005519 A02.pdf
- The Creation and Configuration of the Trusted Build Environment 4005518 A06.pdf
- Verity 2.7 (Sinatra) Modification TRD 4005691 A01.pdf
- Verity 2.7 Notice of Protected Information 1000786 A04.pdf
- Verity 2.7 NY Cross-endorsement Modification TRD 4005714 A00.pdf
- Verity 2.7 Add Z2 SFF G9 Process Document 4005744 A00

- Verity 2.7 TDP Abstract 1000785 A05.pdf
- Verity 2.7 Test Cases.pdf
- Verity 2.7.8 COTS List.pdf
- Verity 2.7.8 Implementation Statement 4005709 A00.pdf
- Verity Airgap Interface Technical Reference 4005512 A02.pdf
- Verity Application Framework TRD 4005634 A00.pdf
- Verity Application Installer Build Process Document Verity 2.7 4005695 A01.pdf
- Verity Application Programming Interface Specification 4005604 A04.pdf
- Verity Ballot Creation TRD 4005636 A00.pdf
- Verity Base Station Microcontroller Specification 4005462 A01.pdf
- Verity Build TRD 4005628 A00.pdf
- Verity Central TRD 4005632 A01.pdf
- Verity Coding Standard 4005498 A14.pdf
- Verity Controller TRD 4005624 A01.pdf
- Verity Count TRD 4005629 A01.pdf
- Verity Cuyahoga (Verity 2.6) Modification TRD 4005683 A00.pdf
- Verity Data TRD 4005627 A00.pdf
- Verity Database Attributes 4005543 C06.pdf
- Verity Device Suite TRD 4005621 A01.pdf
- Verity Election Definition Data TRD 4005639 A01.pdf
- Verity Election Management TRD 4005631 A00.pdf
- Verity Electronics Specification 4005461 A21.pdf
- Verity Entity Relationship Diagram Database - Devices.pdf
- Verity Entity Relationship Diagram Database - Servers (Count Only).pdf
- Verity Entity Relationship Diagram Database - Servers (No Count).pdf
- Verity Key Design 4005514 A02.pdf
- Verity Logging TRD 4005635 A00.pdf
- Verity Omni Modification TRD 4005655 A01.pdf
- Verity Operational Environment 4005515 C19.pdf
- Verity PC Application Framework User Interface Design Document.pdf
- Verity Performance Characteristics 4005497 C06.pdf
- Verity Print TRD 4005626 A00.pdf
- Verity Redstone Modification TRD 4005671 A01.pdf
- Verity Relay Theory of Operations 4005571 A06.pdf
- Verity Risk and Threat Assessment 4005513 C05.pdf
- Verity Scan TRD 4005623 A00.pdf
- Verity Security Requirements 4005464 A07.pdf
- Verity Shared Device User Interface Design Document.pdf
- Verity Software Architecture-Design 4005463 B03.pdf
- Verity Summative Usability Report 4005496 A00.pdf
- Verity Summative Usability Test Plan 4005495 A01.pdf
- Verity Supply Chain PRD 4005302 C01.pdf
- Verity Touch Writer Duo Base Station Microcontroller Specification 4005638 A00.pdf

- Verity Touch Writer Duo TRD 4005625 A00.pdf
- Verity Touch Writer TRD 4005622 A00.pdf
- Verity User Management TRD 4005630 A00.pdf
- Verity Vote Counting and Cast Vote Records TRD 4005640 A00.pdf
- Verity Voting 2.7 Change Notes 4005722 A02.pdf
- Verity Voting 2.7.8 Change Notes 4005735 A02.pdf
- Verity Voting 2.7.8 Source Documentation.zip
- Verity Voting 2.7.8 Usability Impact Statement.pdf
- Verity Voting National Certification Test Specification 4005527 B07.pdf
- VerityLogo.jpg
- VirTex Q01 Quality Manual Rev R.pdf
- Voting System Implementation and Maintenance 1000745 C02.pdf
- VSTL Product Submission Procedure 1000565 D02.pdf
- Workstation OS Creation and Configuration Process Document Verity 2.7 4005697 A01.pdf
- _TDPindex.html

9 Appendix B – Requirements to Components

Change	Data/ Build	Central	Count	Scan	Duo Go	TW	Print	Pertinent requirements
Support for the HP-4001 DN Printer – The HP-4001DN Printer is a new printer that can be used as a report printer with Verity Workstations, or in the polling place with Verity Print and Verity Touch Writer products. This printer is included as an alternative printer option due to the Brother 6400 going end of life.	x	x	x			x	x	EAC Life Cycle Policy, 3.3.3. COTS Replacement: 4.1.7.2 7.9.4 2.1.1-a
Support for the HP Z2 SFF G9 Workstation – The HP Z2 SFF G9 is a new workstation that can be used with Verity Voting software applications. This workstation is included due to the existing Z4 G4 workstations going end of life.	x	x	x					EAC Life Cycle Policy, 3.3.3. COTS Replacement: 2.1.1-a
Addition of the HPE R8R45A unmanaged Ethernet switch to the supported COTS list for locally interconnected workstations. This unmanaged Ethernet switch replaces the HP 1405-8G, which is end of life.	x	x	x					EAC Life Cycle Policy, 3.3.3. COTS Replacement: 2.1.1-a
Verity Software Workstation improvements/defect fixes								
Support for additional special characters Ö, ö, Ê, and ê.	x	x	x	x		x	x	2.2.4-d
Update to Default Print Settings – Changed default setting for report printing on the Brother HL-L6400DWVS from Duplex (flip on long edge) to Simplex.	x		x					2.2.4-d
Language Pack Update – Fixed an issue with loading more than two fonts from a single Language Pack.	x	x	x	x		x	x	2.2.4-d
Update to Daylight Savings Time – Fixed an issue where the	x	x	x					2.2.4-d

daylight savings time offset was not being applied to client workstations when synchronizing clocks with the server, causing client clocks to be an off from the server clock.								
Verity Data defect fixes								
Text Update to Template Selection Screen – Fixed "billingual" typo on the Data Template Selection screen	x							2.2.4-d
Ballot Layout Fix – Fixed a ballot layout issue where a contest is not included in the ballot layout in a very unique and specific set of conditions.	x							2.2.4-d 2.2.1.2-b
Verity Build defect fixes								
Update to Ballot Export Exception – Resolved an issue that could cause an "export completed" message to appear when a ballot export from Build actually failed.	x							2.2.4-d
Verity Central defect fixes								
Update to Central Batch Search – Fixed an issue where entering a Central batch number larger than 32,767 into the Batch Search UI gave a non-informative error message of "Error Converting data type int to smallint."		x						2.2.4-d
Verity Count defect fixes								
Update to New Line Character in Exports – Restores functionality where new lines in election definition fields are correctly represented in exports (DVT, NY Comprehensive Export)			x					2.2.4-d
Update to Assignment Validation – Fixed a validation that was blocking a write-in assignment in the following scenario: Contest with more than one write-in line, CVR that has more than 1 write-in vote for this contest.			x					2.2.4-d

Updates to Voting Type Issue – Fixed an issue where running a Count report in Election A and then editing the voting types in Election B could cause Count reports run later in Election B to fail or have incomplete data.			x					2.2.4-d
DVT Export Update – Fixed an issue that prevented the DVT from being exported when no parties are defined in a General Election.			x					2.2.4-d
DVT Header Format Update – Fixed an issue where the comment symbol (#) appeared after the first word in the header row of the DVT, instead of before. (“Format#” instead of “#Format”)			x					2.2.4-d
Update Ballots Cast on District Results – Fixed an issue where the District Results report shows incorrect ballots cast values when precinct groups are defined and at least two of those precinct groups have the same number of actual ballots cast.			x					2.2.4-d 2.4.3-a
Update to Custom DVT – Fixed an issue where a custom DVT export could show results from a different task within the same election.			x					2.2.4-d
Verity Print defect fixes								
Update to Log Generation – Removed excessive log generation in the printer event watcher which could cause a device to run out of disk space.							x	2.2.4-d 5.4.3-d
Verity Touch Writer defect fixes								
Update to Log Generation – Removed excessive log generation in the printer event watcher which could cause a device to run out of disk space.						x		2.2.4-d 5.4.3-d
Update to Idle Behavior – Fixed an issue where Touch Writer fails to load an election if powered on and left idle for an extended period (8+ hours) prior to initiating the election load.						x		2.2.4-d

Update to Printer Messaging – Prevents an unexpected message sent by the Brother 6400 from causing an "unexpected error" system alert during ballot printing on Touch Writer.						x		2.2.4-d
Verity Duo Go defect fixes								
Update to Duo Go Communication – Fixed a timing issue in Duo Go that resulted in the device falsely reporting that there is "Insufficient charge to complete vote session."					X			2.2.4-d

End of Modification Test Plan