

# New York State Board of Elections Voting System Verification Testing

## Hart InterCivic Verity Voting 2.7 Master Test Report v1.0

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Prepared for:



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## TABLE OF CONTENTS

<b>1</b>	<b>INTRODUCTION .....</b>	<b>4</b>
1.1	PROJECT OVERVIEW .....	4
1.2	PURPOSE.....	4
1.3	REFERENCES.....	4
1.4	TERMS AND ABBREVIATIONS .....	4
1.5	SCOPE OF TESTING .....	7
1.6	APPROVED PROJECT TESTING APPROACH.....	7
1.7	FINAL MASTER TEST REPORT ATTACHMENTS .....	8
1.8	SCOPE OF VERITY VOTING 2.7 SYSTEM.....	8
<b>2</b>	<b>TEST ITEMS AND FEATURES .....</b>	<b>15</b>
2.1	FEATURES TO BE TESTED .....	15
2.2	TEST ITEM PASS/FAIL CRITERIA .....	15
<b>3</b>	<b>TEST TASKS.....</b>	<b>16</b>
3.1	PHYSICAL CONFIGURATION AUDIT .....	16
3.1.1	<i>Documentation Review .....</i>	<i>16</i>
3.1.2	<i>Source Code Review.....</i>	<i>17</i>
3.1.3	<i>Trusted Build .....</i>	<i>17</i>
3.1.4	<i>Software and Hardware Configuration Audit.....</i>	<i>17</i>
3.2	FUNCTIONAL CONFIGURATION AUDIT .....	17
3.2.1	<i>Review of Prior ITA Test Cases and Results .....</i>	<i>17</i>
3.2.2	<i>Review of EAC Certifications .....</i>	<i>18</i>
3.2.3	<i>Review of Other State Verification Testing or Risk Analysis Results.....</i>	<i>18</i>
3.2.4	<i>Review of Prior Hardware Environmental Testing .....</i>	<i>18</i>
3.2.5	<i>Hardware Environmental Testing.....</i>	<i>18</i>
3.2.6	<i>Module Testing.....</i>	<i>18</i>
3.2.7	<i>System Testing.....</i>	<i>18</i>
	<i>Regression Testing.....</i>	<i>19</i>
	<i>Formal Test Execution .....</i>	<i>19</i>
	<i>End to End .....</i>	<i>19</i>
3.2.8	<i>Security Testing.....</i>	<i>19</i>
3.2.9	<i>Review for Known Vulnerabilities.....</i>	<i>20</i>
<b>4</b>	<b>CONCLUSION .....</b>	<b>21</b>
4.1	TDP REVIEW .....	21
4.2	HART INTERCIVIC FUNCTIONAL TESTING .....	21
4.3	HARDWARE TESTING .....	21
4.4	SOURCE CODE REVIEW .....	22
4.5	SECURITY SOURCE CODE REVIEW .....	22
4.6	SECURITY FUNCTIONAL TESTING.....	22



# 1 INTRODUCTION

## 1.1 Project Overview

The New York State Board of Elections (NYSBOE) requires that before any voting system may be eligible to be purchased in New York State (NYS), it must be certified by the NYSBOE that such system(s) meet the requirements of the NYS Election Law, Section 6209 of Subtitle V of Title 9 of the Official Compilation of Codes, Rules and Regulations of the State of New York, and the federal 2005 Voluntary Voting System Guidelines (VVSG) 1.0, Volumes 1 and 2.

SLI Compliance has been engaged by the NYSBOE to provide verification testing services to support the process of voting system certification by the NYSBOE.

## 1.2 Purpose

The purpose of this Final Master Test Report (defined as Deliverable 10: Final Master Test Plan) is to create documentation of the testing that SLI Compliance, as NYSBOE's Independent Test Authority (ITA), performed throughout the course of voting system verification testing.

## 1.3 References

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

1. SLI VSTL Quality System Manual, v 3.0, February 13, 2019.
2. Voluntary Voting System Guidelines (VVSG 1.0)
3. NYS 2022 Election Law
4. NYS 6209 Regulations

## 1.4 Terms and Abbreviations

The following terms and abbreviations were used throughout this document:

**Table 1 – Terms and Abbreviations**

Term	Abbreviation	Definition
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.



Term	Abbreviation	Definition
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 Software	COTS	Computer software that is 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 layout 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	The testing activities associated with the Functional testing of the system
Independent Test Authority	ITA	This is a test lab that is not connected with the vendor or manufacturer of the voting system.
Institute of Electrical and Electronics Engineers	IEEE	A non-profit organization, IEEE is the world's leading professional association for the advancement of technology.
National Institute of Standards and Technology	NIST	NIST is 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.



Term	Abbreviation	Definition
National Voluntary Laboratory Accreditation Program	NVLAP	A division of NIST that provides third-party accreditation to testing and calibration laboratories.
New York State	NYS	Acronym for the State of New York
New York State Board Of Elections	NYSBOE	The New York State Board of Elections is a bipartisan agency vested with the responsibility for administration and enforcement of all laws relating to elections in New York State.
New York State Technology Enterprise Corporation	NYSTEC	NYSTEC is a private, not-for-profit engineering company with offices in the state of New York. It acts as a trusted technology advisor to government agencies and private institutions.
Physical Configuration Audit	PCA	The testing activities associated with the physical aspects of the system (hardware, documentation, builds, source code, etc.)
Request For Information (form)	RFI	A form used by testing laboratories to request, from the NYSBOE, interpretation of a technical issue related to testing of voting systems.
Requirements Matrix	N/A	This is the matrix created by and maintained by SLI Compliance that traces the requirements to the various test cases, test steps, and test methods.
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.
Voluntary Voting Systems Guidelines Volumes 1 & 2	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	This is a designation for a test lab that is accredited by the Election Assistance Commission.
Voting System Under Test	VSUT	The designation for a voting system that is currently being tested.



## 1.5 Scope of Testing

SLI Compliance provided verification testing on the Verity Voting 2.7 system identified by the NYSBOE based on the guidelines and test approach established for voting system verification testing as defined by the NYSBOE (please see section 1.6 – Approved Project Testing Approach).

This effort included the testing required to demonstrate testing of Verity Voting 2.7 against all the applicable requirements of the 2005 VVSG and NYS laws and regulations, as specified in the project Requirements matrices. For the voting system identified for verification, Voting System Specific Test Reports (defined as Deliverable 7: Voting System Specific Test Plans) were developed by SLI Compliance to address the areas of Source Code Review, Security Source Code Review, Hardware Testing, Functional Testing and Security Functional Testing.

## 1.6 Approved Project Testing Approach

Per the testing approach approved for the Hart InterCivic Verity Voting 2.7 project, by NYSBOE (see “Attachment B - SLI Testing Approach Verity 2.7 - 2.25.2022 Final”), the following details dictated the approach of the project:

“

*Based on review/approval by NYSBOE/NYSTEC:*

- *All previous EAC source code review to VVSG requirements will be accepted as a first round of review.*
- *All previous EAC functional testing to SHALL VVSG requirements will be accepted and leveraged.*
- *All previous EAC security testing to SHALL VVSG requirements will be accepted and leveraged.*
- *All previous EAC hardware testing to SHALL VVSG requirements will be accepted and leveraged.*

*Any of the above that is not accepted by NYSBOE or NYSTEC, will be added to the testing to be conducted by SLI Compliance.*

*Source code review to VVSG requirements will be conducted by SLI Compliance.*

- *A diff will be conducted and all source code changes from Verity 2.6 to 2.7, not included in the EAC certification, will be reviewed at 100%.*
- *Source code changes will be compared to the Change Notes to attempt to detect unidentified changes.*
- *A full source code review will be done against NYSBOE requirements.*

*A trusted build/s will be conducted by SLI Compliance, if needed.*

*Security testing will be conducted by SLI Compliance to include the following:*

- *A full security test will be done against NYSBOE requirements*



*Functional testing will be conducted by SLI Compliance to include the following:*

- An end-to-end test will be conducted to verify the build and to attempt to detect unidentified changes.*
- All functional testing of SHOULD VVSG requirements will be tested as SHALL, as needed.*
- All functional changes from Verity 2.6 to 2.7, not included in the EAC certification, will be tested along with any testing deemed necessary to confirm that the changes didn't affect other areas or cause issues around the changes made.*
- Conduct upgrade testing and identify issues found.*

*Documentation review will be conducted by SLI Compliance to include the following:*

- A diff will be conducted and all documentation changes from Verity 2.6 to 2.7, not included in the EAC certification, will be reviewed at 100%.*
- Documentation changes will be compared to the Change Notes to attempt to detect unidentified changes.*

*All NYSBOE Election Law requirements (including NYSBOE Regulations) will be tested 100% by SLI Compliance and all deliverables including test plan/test report will be met based on NYSBOE's requirements.*

*Using the requirements matrix template, SLI Compliance will update the matrix to show what testing will be leveraged from previous EAC certification testing and will identify testing to be done by SLI Compliance. This will be based on the above with the assumption that NYSBOE/NYSTEC approves the previous testing conducted under the EAC.*

“

## **1.7 Final Master Test Report Attachments**

The following attachment(s) are an integral part of this Final Master Test Report:

- Attachment A1 – Hart InterCivic Verity Voting 2.7 NYS System Requirements Matrix w Test Cases v1.0
- Attachment A2 - Hart InterCivic Verity Voting 2.7 Reader NYS Requirements Matrix w Test Cases v2.0
- Attachment B - SLI Testing Approach Verity 2.7 - 2.25.2022 Final
- Attachment C – NYS Hart InterCivic Verity Voting 2.7 JIRAs (Confidential)

## **1.8 Scope of Verity Voting 2.7 System**

This section provides a description of the scope of Verity Voting 2.7 voting system components.

The Verity Voting 2.7 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 2.7** 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 Print on-demand ballot production device.
- Configuring and programming the Verity Reader ballot reading device
- 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.
- 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.
- **Verity Print** is an on-demand ballot production device for unmarked paper ballots.
- **Verity Reader** is a polling place device that allows voters to scan and see the ballot they have voted.



- **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, Verity Print, 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 Voting component/device used in the election, allowing for complete election audit log reviews.

**Table 3 – Hart InterCivic Verity Voting 2.7 Software Components**

System Component	Application(s)	Version
Verity Data	EMS Software	2.7.1
Verity Build	EMS Software	2.7.1
Verity Central	High-Speed Scanner Software	2.7.1
Verity Count	Central Count Location Tabulation and Report Software	2.7.1
Verity Print	Printer Firmware	2.7.1
Verity Scan	Scanner Firmware	2.7.1
Verity Touch Writer	BMD Firmware	2.7.1
Verity Reader	Reader Firmware	2.7.1



**Table 4 – Hart InterCivic Verity Voting 2.7 Custom Hardware Components**

Hardware Description	Version
<b>Verity Print device</b> – Ballot Printer <sup>2</sup>	3006095 Rev A
<b>Verity Print device</b> – Ballot Printer	3005356 Rev E
<b>Verity Print device</b> – Ballot Printer <sup>1</sup>	3005856 Rev B
<b>Verity Scan device</b> – Paper Ballot Scanner <sup>2</sup>	3006080 Rev A
<b>Verity Scan device</b> – Paper Ballot Scanner	3005350 Rev I
<b>Verity Scan device</b> – Paper Ballot Scanner <sup>1</sup>	3005800 Rev B
<b>Verity Touch Writer</b> – Electronic BMD <sup>2</sup>	3006090 Rev A
<b>Verity Touch Writer</b> – Electronic BMD	3005352 Rev H
<b>Verity Touch Writer</b> – Electronic BMD <sup>1</sup>	3005852 Rev B
<b>Verity Reader</b> – Electronic Ballot Reader	3006060 Rev A

**Table 5 – Hart InterCivic Verity Voting 2.7 COTS Hardware Components**

COTS Hardware Description	Version
<b>Verity Data/Build</b>	
Verity Data and Build Applications and Workstation Kit <ul style="list-style-type: none"> <li>HP Z4 G4 Workstation                Minimum Requirements:                Processor – x86-compatible, 3.0GHz, Quad Core                Memory – 64GB                Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock                Ethernet Port – 100Mb/1Gb                USB Ports – 4 ports                Video Card – Integrated Graphics                Keyboard - USB Keyboard Mouse -                USB Mouse                No wireless functionality                Verity Display                Panel Size – 50.8 cm                Aspect Ratio – Widescreen (16:9)                Optimal Resolution 1600 x 900 at 60 Hz                Contrast Ratio – 1000: 1                Brightness – 250 cd/m<sup>2</sup></li> <li>HP Z240 Workstations (supported for existing customers only)                Minimum Requirements:                Processor – x86-compatible, 3.0GHz, Quad Core                Memory – 64GB                Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock                Ethernet Port – 100Mb/1Gb</li> </ul>	A



USB Ports – 4 ports Video Card – Integrated Graphics Keyboard - USB Keyboard Mouse - USB Mouse No wireless functionality Verity Display Panel Size – 50.8 cm Aspect Ratio – Widescreen (16:9) Optimal Resolution 1600 x 900 at 60 Hz Contrast Ratio – 1000: 1 Brightness – 250 cd/m <sup>2</sup>	
OKI Data C831dn Color Printer for existing customers only	N35100A
OKI Data C844dn Color Printer	N35301A
OKI Data C931e Color Printer	N36100A
OKI Data B432dn Mono Report and Ballot Printer	N22500A
Brother HL-L6400 Series printer	HLL6400DWVS
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
<b>Verity Central</b>	
Verity Central Applications and Workstation Kit <ul style="list-style-type: none"> <li>• HP Z4 G4 Workstation              Minimum Requirements:              Processor – x86-compatible, 3.0GHz, Quad Core              Memory – 64GB              Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock              Ethernet Port – 100Mb/1Gb              USB Ports – 4 ports              Video Card – Integrated Graphics              Keyboard - USB Keyboard Mouse -              USB Mouse              No wireless functionality              Verity Display              Panel Size – 50.8 cm              Aspect Ratio – Widescreen (16:9)</li> </ul>	A



<p>Optimal Resolution 1600 x 900 at 60 Hz          Contrast Ratio – 1000: 1          Brightness – 250 cd/m<sup>2</sup></p> <ul style="list-style-type: none"> <li>HP Z240 Workstations (supported for existing customers only)            Minimum Requirements:            Processor – x86-compatible, 3.0GHz, Quad Core            Memory – 64GB            Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock            Ethernet Port – 100Mb/1Gb            USB Ports – 4 ports            Video Card – Integrated Graphics            Keyboard - USB Keyboard Mouse            USB Mouse            No wireless functionality            Verity Display            Panel Size – 50.8 cm            Aspect Ratio – Widescreen (16:9)            Optimal Resolution 1600 x 900 at 60 Hz            Contrast Ratio – 1000: 1            Brightness – 250 cd/m<sup>2</sup></li> </ul>	
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
Brother HL-L6400 Series printer	HLL6400DWVS
HP 8-port Ethernet Switch	1405-8GV3
<b>Verity Count</b>	
<p>Verity Count Applications and Workstation Kit</p> <ul style="list-style-type: none"> <li>HP Z4 G4 Workstation            Minimum Requirements:            Processor – x86-compatible, 3.0GHz, Quad Core            Memory – 64GB            Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock            Ethernet Port – 100Mb/1Gb            USB Ports – 4 ports            Video Card – Integrated Graphics            Keyboard - USB Keyboard Mouse -            USB Mouse            No wireless functionality            Verity Display            Panel Size – 50.8 cm</li> </ul>	A



Aspect Ratio – Widescreen (16:9) Optimal Resolution 1600 x 900 at 60 Hz Contrast Ratio – 1000: 1 Brightness – 250 cd/m <sup>2</sup> <ul style="list-style-type: none"> <li>HP Z240 Workstations (supported for existing customers only)            Minimum Requirements:            Processor – x86-compatible, 3.0GHz, Quad Core            Memory – 64GB            Hard Drive – 2 x 1 TB RAID-Level 1, Removable w/ key lock            Ethernet Port – 100Mb/1Gb            USB Ports – 4 ports            Video Card – Integrated Graphics            Keyboard - USB Keyboard Mouse -            USB Mouse            No wireless functionality            Verity Display            Panel Size – 50.8 cm            Aspect Ratio – Widescreen (16:9)            Optimal Resolution 1600 x 900 at 60 Hz            Contrast Ratio – 1000: 1            Brightness – 250 cd/m<sup>2</sup></li> </ul>	
OKI Data B432dn Mono Report printer	N22500A
Brother HL-L6400 Series printer	HLL6400DWVS
HP 8-port Ethernet Switch	1405-8GV3
<b>Verity Reader</b>	
Accessible Voting Booth with ATI Tray	D
Optional: ATI dual button switch manufactured by AbleNet	Dual Jelly Bean Switch
Optional headphone for ATI Kit	2005230, v7 brand HA300-2NP
Optional detachable ATI Kit	A
<b>Verity Print</b>	
OKI Data C831dn Color Printer	N35100A
OKI Data B432dn Mono Blank Ballot Printer	N22500A
OKI Data C844dn Color Printer	N35301A
Brother HL-L6400 Series printer	HLL6400DWVS
Optional AutoBallot Barcode Scanner Kit	C
Includes the following 2d barcode scanner: <ul style="list-style-type: none"> <li>Hart part number: 1003672            Motorola/Zebra part number: DS4308 or DS4608</li> </ul>	



<b>Verity Scan Paper Ballot Scanner</b>	
Verity Ballot Box	D
Optional Relay Accessory kit (4G LTE Cat-M1) Includes the following COTS modem: <ul style="list-style-type: none"><li>Hart part number: 1005248</li><li>MultiTech part number: MTD-MNA1-2.0</li></ul>	A
<b>Verity Touch Writer Electronic BMD Device</b>	
OKI Data B432dn Mono Marked Ballot Printer	N22500A
Brother HL-L6400 Series printer	HLL6400DWVS
Accessible Voting Booth	D
Optional AutoBallot Barcode Scanner Kit Includes the following 2d barcode scanner: <ul style="list-style-type: none"><li>Hart part number: 1003672</li><li>Motorola/Zebra part number: DS4308 or DS4608</li></ul>	C
Headphones <ul style="list-style-type: none"><li>Brand: V7, part number HA300-2NP or HA310-2NP</li></ul>	2005230

## 2 TEST ITEMS AND FEATURES

### 2.1 Features to be Tested

The SLI requirements management tool stores the following:

- Requirements Matrix containing:
  - 2005 VVSG, Volume 1
  - 2005 VVSG, Volume 2
  - NYS 2022 Election Law
  - NYS 6209 Regulations
- Traceability from Requirements to test cases

### 2.2 Test Item Pass/Fail Criteria

Testing was conducted as an independent verification and validation across the Verity Voting 2.7 system. System performance to pass/fail criteria was measured against expected results for each test case and related set of test procedures as defined by the Requirements Matrices. Each feature passed or failed depending upon the results of the testing performed. If the actual output from an action was equal to the expected output specified by a test case, then the action passed; if not, it failed.



## **3 TEST TASKS**

NYSBOE Verification Testing included detailed testing required to ensure compliance to the approved Requirements Matrix are provided in this section. It should be noted that the results and discrepancy reports for each of the review/assessment and test activities are documented and maintained throughout each activity until the activity has been completed. Upon completion of the verification test engagement, all results are provided in the Hart InterCivic Verity Voting 2.7 Specific Test Reports and archived with all testing artifacts.

### **3.1 Physical Configuration Audit**

#### **3.1.1 Documentation Review**

SLI Compliance conducted a PCA document review and assessment of all documents submitted in the delivery of the Verity Voting 2.7's New York TDP, for any requirements not previously accepted by an EAC certification, as well as all NYSBOE Election Law requirements (including NYSBOE Regulations).

Documentation for Verity Reader was not part of any EAC certification effort and was therefore subjected to a full VVSG 1.0 requirements related review, as well as all NYSBOE Election Law requirements (including NYSBOE Regulations).

#### **General Documentation Review**

As applicable to the approved Test Approach (please see section 1.6 – Approved Project Test Approach), the SLI Compliance test process included conducting a TDP review of the TDP (Technical Data Package).

Hart InterCivic Verity Voting 2.7 documentation that was included in the EAC certification was accepted as meeting all relevant 2005 VVSG (1.0) requirements, including those requirements in Volume 1, Section 8.7, and 2005 VVSG Volume 2, Section 2 and Section 5.

Documentation for Verity Reader was not part of any EAC certification effort and was therefore subjected to all relevant 2005 VVSG (1.0) requirements, including those requirements in Volume 1, Section 8.7, and 2005 VVSG Volume 2, Section 2 and Section 5.

One documentation discrepancy related was noted and resolved, HV27NY-4.

#### **Security Documentation Review**

Hart InterCivic Verity Voting 2.7 documentation that was included in the EAC certification was accepted as meeting all relevant 2005 VVSG (1.0) Security requirements.

Documentation for Verity Reader was not part of any EAC certification effort and was therefore reviewed to all pertinent Security documentation requirements.

The documentation review process consisted of an automated search through all documents followed by manual review.

A string search utility was leveraged in a custom script written to scan all documents and report a list of findings based on a preconfigured wordlist.





A copy of the script source code, all wordlists used, and the resulting artifacts generated are included in the associated testing artifacts.

Following the generation of a comma-separated value (CSV) document during the automated script's execution, a manual review was conducted to evaluate the results and verify all documentation-related requirements are sufficiently met.

For additional information, please review the Security Test Report and artifacts. No documentation discrepancies were noted.

### **Document Review Summary Report**

SLI Compliance reviewed the Verity Voting 2.7 TDP against the New York State Requirements and 6209 Election Law. During the course of testing, SLI compliance found one requirement that were not sufficiently met during this documentation review. This issue was documented in JIRA; HV27NY-4.

The requirement issue was resolved with the submission of modified documentation.

#### **3.1.2 Source Code Review**

Verity Voting 2.7 source code was accepted for all applicable 2005 VVSG (1.0) requirements, as per the “Attachment B - Testing Approach for Hart InterCivic Verity Voting 2.7” document. Note that Verity Reader was sourced code reviewed during the EAC certification of Verity Voting 2.7. A review to NYS 2022 Election Law and 6209 Regulations was performed. See “NYSBOE Hart InterCivic Verity Voting 2.7 Source Code Review Test Report” and “NYSBOE Hart InterCivic Verity Voting 2.7 Security Source Code Review Test Report” for additional details.

The discrepancies found during testing may be found in in ““NYSBOE Hart InterCivic Verity Voting 2.7 Source Code Review Test Report”” “Attachment D - Source Code Review Discrepancy Review Forms (Confidential)”:

#### **3.1.3 Trusted Build**

No Trusted Builds were performed during this certification examination.

Note that Verity Reader was included in the Trusted Build process during the EAC certification of Verity Voting 2.7.

#### **3.1.4 Software and Hardware Configuration Audit**

The Software and Hardware Audit compared the voting system components (hardware and software) to the TDP submitted by Hart InterCivic.

The provided configurations conformed to Hart InterCivic specifications of the system under test, including TDP documentation, and was consistent with configurations listed within the Verity Voting 2.7 EAC certification.

## **3.2 Functional Configuration Audit**

### **3.2.1 Review of Prior ITA Test Cases and Results**

As Verity Voting 2.7 is Hart InterCivics initial entry into the State of New York, no prior verification testing completed by previous NYSBOE ITAs was submitted for review.



### **3.2.2 Review of EAC Certifications**

SLI Compliance accepted and leveraged all prior verification testing completed by previous EAC certifications, as per the NYSBOE “Attachment B - Testing Approach for Hart InterCivic Verity Voting 2.7” document.

### **3.2.3 Review of Other State Verification Testing or Risk Analysis Results**

No state certification reports, voting system test or risk assessment final reports and independent testing organization examinations were submitted for review.

### **3.2.4 Review of Prior Hardware Environmental Testing**

Hardware environmental testing completed by NVLAP or A2LA accredited test labs, within an EAC certification, for overall system capabilities, voting, and post-voting functions as well as adherence to hardware environmental and EMC standards was accepted as per the NYSBOE “Attachment B - Testing Approach for Hart InterCivic Verity Voting 2.7” document.

### **3.2.5 Hardware Environmental Testing**

All hardware environmental testing completed against the EAC 2005 VVSG hardware environmental and EMC test requirements, within EAC certifications, was accepted, as per the NYSBOE “Attachment B - Testing Approach for Hart InterCivic Verity Voting 2.7” document.

Verity Reader was not part of any EAC certification effort and was therefore reviewed to all pertinent hardware requirements.

No discrepancies were noted.

### **3.2.6 Module Testing**

SLI Compliance designed module test cases to provide coverage of the applicable requirements, as per the NYSBOE “Attachment B - Testing Approach for Hart InterCivic Verity Voting 2.7” document.

### **3.2.7 System Testing**

System Testing involved exercising the specific functions of Verity Voting 2.7 to the requirements, as per the NYSBOE “Attachment B - Testing Approach for Hart InterCivic Verity Voting 2.7” document.

Formal Test Execution was performed, within the provided environment of the Verity Voting 2.7 system, to verify all modifications and pertinent requirements, as defined in “Attachment A1 – Hart InterCivic Verity Voting 2.7 NYS System Requirements Matrix w Test Cases” and “Attachment A2 - Hart InterCivic Verity Voting 2.7 Reader NYS Requirements Matrix w Test Cases”.

This includes validation of the voting system in a true end-user environment, following all pre-election day, election day, and post-election day voting rules and processes. The intent is to provide verification that a system can be used to perform its job following the exact set of processes and steps that would be used by the target customer or end-user.



The following types of System testing were not employed for Verity Voting 2.7, as they were covered by EAC certification testing:

- Nominal Conditions
- Failure Injection
- Data Driven
- Usability
- Data Referential Integrity
- Regression
- Volume Test
- Stress Tests
- Accessibility Test
- Performance Tests
- Recovery

### **Regression Testing**

No Regression testing was performed, as no new Trusted Builds were performed during the Verity Voting 2.7 examination.

### **Formal Test Execution**

SLI Compliance performed the Formal Test Execution testing which included functional, NY Law verification applicable to the scope of the campaign, as per the NYSBOE “Attachment B - Testing Approach for Hart InterCivic Verity Voting 2.7” document and “Attachment A1 – Hart InterCivic Verity Voting 2.7 NYS System Requirements Matrix w Test Cases” and “Attachment A2 - Hart InterCivic Verity Voting 2.7 Reader NYS Requirements Matrix w Test Cases”. This is the formal functional test of the system to ensure that all Hart InterCivic modifications are fixed, and all features work as expected. See “NYSBOE Hart InterCivic Verity Voting 2.7 Functional Test Report” for details of functional testing performed.

Four discrepancies were noted: two issues related to inaccurate, HV27NY-11 and HV27NY-12, documentation was updated. one issue related to hardware failing, HV27NY-1, hardware was replaced. One issue related to amount of text on a multi-lingual ballot, HV27NY-10, compensating controls were approved by NYSBOE.

### **End to End**

End to End testing was performed, utilizing General and Primary elections during the NYS Verity Voting 2.7 examination, which encompassed system utilization from creating an election definition, preparing election media and artifacts, opening of polls, processing ballots, as well as the accumulation, adjudication, tallying and reporting of results.

### **3.2.8 Security Testing**

SLI Compliance performed the Security testing applicable to the scope of the campaign, as per the NYSBOE “Attachment B - Testing Approach for Hart InterCivic Verity Voting 2.7” document and “Attachment A1 – Hart InterCivic Verity Voting 2.7 NYS System Requirements Matrix w Test Cases” and “Attachment A2 - Hart InterCivic Verity Voting 2.7 Reader NYS Requirements Matrix w Test Cases”.

See “NYSBOE Hart InterCivic Verity Voting 2.7 Security Functional Test Report” for details of Security functional testing performed.



The following types of Security testing for Verity Voting 2.7, utilized a combination of leveraging EAC certification testing in conjunction with SLI examination as per the approved testing approach (see section 1.6). Portions covered by SLI are listed below:

- Role
  - (Was examined as a part of the “Access” section of the penetration test, which included investigation Role-based access controls (RBAC))
- Access
  - (Was examined as a part of the “Access” section of the penetration test, which included a review of physical security)
- System Security
  - (Was examined to verify executable resilience against tampering as a part of the “Privilege Escalation” section of the penetration test)
- System Log
  - (Was examined as a part of the “Defense Evasion” section of the penetration test to verify file integrity)
- Audit Records
  - (Was examined as a part of the “Defense Evasion” section of the penetration test, which included tampering with logging processes)
- Software Security
  - (Was examined to verify that software files could not be modified and that unauthorized software was prevented from being installed on devices as a part of the “Execution” section of the penetration test)
- Threat Protection
  - (Was examined as a part of the “Execution” section of the penetration test, evaluating the susceptibility to malware)
- Audit Log
  - (Was examined as a part of the “Defense Evasion” section of the penetration test to modify or delete log files and data)
- Vote Count Integrity
  - (Was examined within the “Execution”, “Exfiltration”, and “Cryptography” sections of the penetration test)
- Data Protection
  - (Was examined within the “Execution”, “Exfiltration”, and “Cryptography” sections of the penetration test)
- External Access
  - (Was examined within the “Execution”, “Exfiltration”, and “Cryptography” sections of the penetration test)

One documentation discrepancy related to was noted, HV27NY-5 and was resolved with updated documentation.

### 3.2.9 Review for Known Vulnerabilities

Any known vulnerabilities provided by Hart InterCivic are included in the Security testing process. All vulnerabilities are listed within the Security test report and associated attachments, including detailed vulnerability information and review of the potential for exploitation. For additional information, please review the “NYSBOE Hart InterCivic Verity Voting 2.7 Security Functional Test Report”.



## 4 Conclusion

This section summarizes the conclusions for each of the areas of examination within this project.

All specific details for each area can be found in the that areas specific test report and accompanying documentation.

### 4.1 TDP Review

SLI Compliance reviewed the Verity Voting 2.7 TDP against the New York State Requirements and 6209 Election Law. During the course of testing, SLI compliance found one requirement that were not sufficiently met during this documentation review. This requirement issue was documented in JIRA; HV27NY-4.

The requirement issue was resolved with the submission of modified documentation.

Additional TDP Review details can be found in the “TDP Review for Hart InterCivic Verity Voting 2.7” and accompanying documentation.

### 4.2 Hart InterCivic Functional Testing

SLI has completed functional testing of the **Hart InterCivic Verity Voting 2.7** system against the referenced VVSG 1.0 and NY 2022 Election Law requirements. All findings are included in this report and accompanying documentation. There were five findings, JIRAs: HV27NY-1, HV27NY-5, HV27NY-10, HV27NY-11, HV27NY-12.

All requirement issues were resolved with the submission of either new documentation or modified documentation or compensating controls.

Additional Functional Testing details can be found in the “NYSBOE Hart InterCivic Verity Voting 2.7 Functional Test Report” and accompanying documentation.

### 4.3 Hardware Testing

SLI has completed Hardware testing of the **Hart InterCivic Verity Voting 2.7 system** against the referenced VVSG 1.0, Hart InterCivic declared standards and NY 2022 Election Law requirements, as per “SLI Testing Approach for Hart InterCivic Verity Voting 2.7”.

All components of the EAC certified Verity Voting 2.7 system had all hardware requirements accepted from EAC certifications.

Verity Reader, as a newly introduced component to the Verity Voting system, was subjected to applicable hardware requirements.

Environment testing included the “Temperature/Power Variation”, which is a functional test where the device is deployed in its operational configuration and powered on during the test.

Electrical testing consisted of the following:

1. Radiated Electromagnetic Emissions
2. Conducted Electromagnetic Emissions
3. Electromagnetic Immunity Tests
4. Electrostatic Disruption
5. Electromagnetic Susceptibility
6. Electrical Fast Transient



7. Lightning Surge
8. Conducted RF Immunity
9. Magnetic Fields
10. Electrical Power Disturbance

No issues were found during Hardware testing and all tests were determined to be satisfactorily met. No discrepancies were noted.

Additional Hardware Testing details can be found in the “NY Hart Verity Voting 2.7 Verity Reader Hardware Test Report” and accompanying documentation.

#### **4.4 Source Code Review**

SLI has completed the source code review of the **Hart InterCivic Verity Voting 2.7 system** against the referenced VVSG 1.0, Hart InterCivic declared standards and NY 2022 Election Law requirements, as per “SLI Testing Approach for Hart InterCivic Verity Voting 2.7”.

No modified source code was found that could not be attributed to a listed modification. No discrepancies were noted.

Additional Source Code Review details can be found in the “NYSBOE Hart Verity 2.7 Source Code Review Test Report” and accompanying documentation.

#### **4.5 Security Source Code Review**

SLI has completed the security source code review of the **Hart InterCivic Verity Voting 2.7 system** against the referenced NY Election law, security concerns, and potential vulnerabilities. All findings resulting from the security source code review are included in this report and accompanying documentation.

Review of the findings resulted in determinations of potential vulnerabilities found. One testcase was failed, which was due to an automated review which returned potential vulnerabilities. Manual review of those potential vulnerabilities determined these potential vulnerabilities would be exploitable only by a vendor insider attack.

Additional Security Source Code Review details can be found in the “NYSBOE Hart InterCivic Verity Voting 2.7 Security Source Code Review Test Report” and accompanying documentation.

#### **4.6 Security Functional Testing**

SLI has completed functional testing of the **Hart InterCivic Verity Voting 2.7 system** against the referenced VVSG 1.0 and NY 2022 Election Law requirements. All findings are included in this report and accompanying documentation.

One documentation discrepancy related to was noted, HV27NY-5 and was resolved with updated documentation.

All findings are included in the “NYSBOE Hart InterCivic Verity Voting 2.7 Security Functional Test Report” and accompanying documentation.

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End of Master Test Report

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