

Certification Test Report - Modification

Report Number HIN-21005-CTR-01

Hart InterCivic Verity Voting 2.7 V3.0

Prepared for:

Vendor Name	<i>Hart InterCivic Inc. (Hart)</i>
Vendor System	<i>Verity Voting 2.7</i>
EAC Application No.	<i>HRT-Verity-2.6</i>
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Accredited by the National Institute of Standards and Technology (NIST) National Voluntary Lab Accreditation Program (NVLAP) and accredited by the Election Assistance Commission (EAC) for VSTL status.



Revision History

Date	Release	Author	Revision Summary
May 2, 2022	1.0	B. Watters, M. Santos	Initial release
May 4, 2022	1.1	B. Watters, M. Santos	Added Discrepancy attachment
May 13, 2022	2.0	B. Watters, M. Santos	Updated for EAC comments
May 19, 2022	3.0	B. Watters, M. Santos	Updated for EAC comments

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

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

Opinions and Interpretations

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



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1 Introduction and Document Overview

SLI Compliance is submitting this report as a summary of the certification testing efforts for the **Hart Verity Voting 2.7** voting system, as detailed in the section System Identification, against the Election Assistance Commission Voluntary Voting System Guidelines 1.0 (EAC VVSG v 1.0).

Verity Voting 2.7 is a modification of **Verity Voting 2.6**, certified by the EAC on April 20, 2021, with limited changes. The **Verity Voting 2.7** system will be tested based on the modified system requirements, as set forth in section 4.6.2.3 of the EAC Voting System Testing and Certification Program Manual, v 2.0. The purpose of this document is to provide an overview of the certification testing effort and the findings from the testing effort for this voting system.

This effort included a review of updates made to the Technical Data Package documentation, a review of all modified source code, and testing of the **Hart Verity Voting 2.7** voting system. Testing consisted of the development of a test plan, managing system configurations, executing test suites of functional and system levels tests based on the system's functionality, and analysis of results. The review and testing were performed at SLI Compliance's Wheat Ridge, Colorado facility, from November 15, 2021, to April 29th, 2022.

1.1 References

1. Election Assistance Commission Voluntary Voting System Guidelines (EACVVSG v 1.0), Version 1.0, 2005.
2. NIST Handbook 150: 2020.
3. NIST Handbook and 150-22: 2017.
4. EAC Voting System Testing and Certification Program Manual, United States Election Assistance Commission, v 2.0, May 2015.
5. SLI Compliance VSTL Quality System Manual, v 3.3, prepared by SLI Compliance, dated December 17, 2020.

1.2 Document Overview

This document contains the following sections:

- System Identification identifies hardware and software for the **Verity Voting 2.7** system.
- System Overview discusses the functionality of **Verity Voting 2.7** system software and firmware.
- The Certification Test Background discusses the testing process.



- Certification Test Results Summary contains the results and analysis of the testing effort.
- Attachments:
 - Attachment A - Warrant of Change Control for Verity Voting 2.7
 - Attachment B - Attestation of Durability for Verity Voting 2.7
 - Attachment C - Attestation of Integrity for Verity Voting 2.7
 - Attachment D - Attestation of Production Hardware and Software for Verity Voting 2.7
 - Attachment E - Trusted Build Record for Verity Voting 2.7.1
 - Attachment F - Verity Voting 2.7 Source Code Review Summary
 - Attachment G - Hart Verity Voting 2.7 Modification Test Plan v4.0-As Run
 - Attachment H - Hart Verity 2.7 EAC Electrical Hardware Test Plan v4.0_Track Changes
 - Attachment I - Hart Verity 2.7 EAC Environmental Hardware Test Plan v2.0_Track Changes
 - Attachment J - Hart Verity 2.7 EAC Temp and Power Var Test Plan v2.0_Track Change
 - Attachment K - Hart Verity 2.7 EAC Electrical Hardware Test Reports
 - Attachment L - Hart Verity 2.7 EAC Environmental Hardware Test Report
 - Attachment M – Verity Voting 2.7 Discrepancy Report

1.3 Terms and Abbreviations

The following terms and abbreviations may be used in 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.
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 layout 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.
Functional Configuration Audit	FCA	The testing activities associated with the functional testing of the system.
National Institute of Standards and Technology	NIST	A non-regulatory federal agency within the U.S. Dept. of Commerce. Its mission is to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhance economic security and improve our quality of life.
National Voluntary Laboratory Accreditation Program	NVLAP	A division of NIST that provides third-party accreditation to testing and calibration laboratories.
Physical Configuration Audit	PCA	The testing activities associated with the physical aspects of the system (hardware, documentation, builds, source code, etc.).
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.

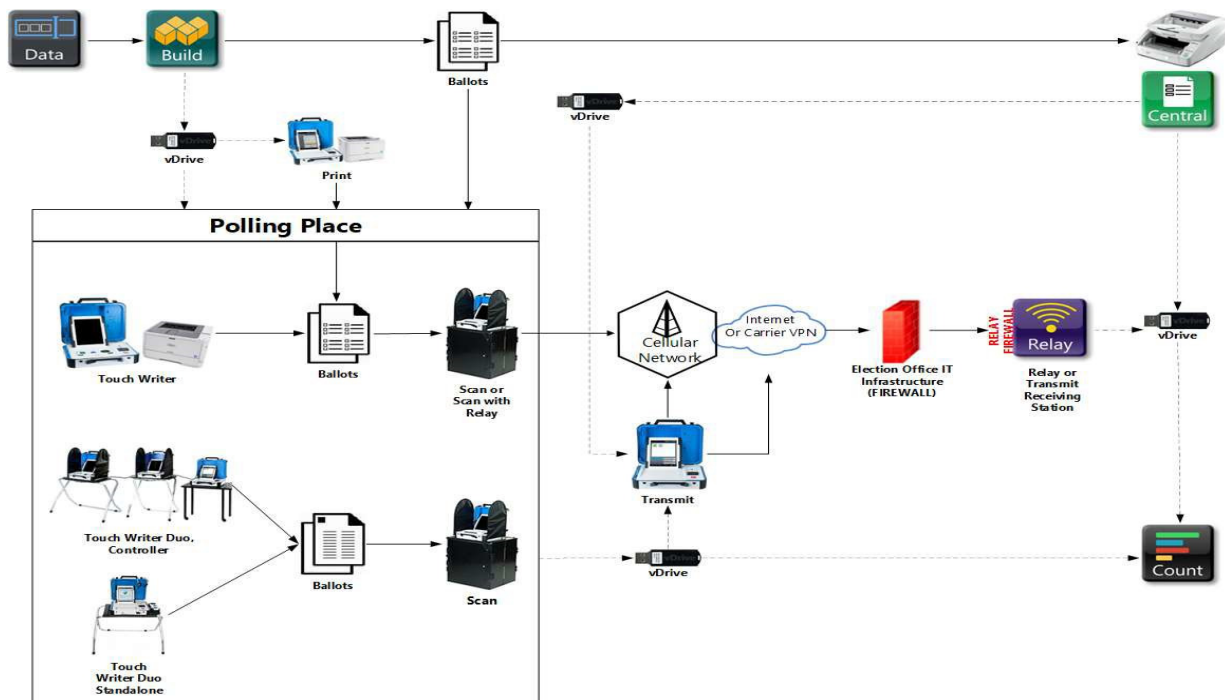
Technical Data Package	TDP	The data package supplied by the vendor, which includes Functional Requirements, Specifications, End-user documentation, Procedures, System Overview, Configuration Management Plan, Quality Assurance Program, and manuals for each of the required hardware, software, firmware 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.

2 System Identification

This section details the scope of the **Verity Voting 2.7** voting system and associated components.

The **Verity Voting 2.7** system is composed of software applications, central count location devices and polling place devices with accompanying firmware, and COTS hardware and software.

2.1 System Diagram





Overview of the diagram:

- The components are displayed as touch points of data access, transfers, and verification.
- Dotted lines show the flow of data and air gaps using 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 load elections, to use critical features, and to generate reports. Feature access depends on the roles applied to user accounts.

2.1.1 Software and Firmware

The software and firmware employed by **Hart Verity Voting 2.7** consists of two types: custom and commercial off the shelf (COTS). COTS applications were verified to be pristine or were subjected to source code review for analysis of any modifications and verification of meeting the pertinent standards.

The tables below detail each application employed by the **Hart Verity Voting 2.7** voting system. Hashes for each **Verity Voting 2.7** component are located in “Appendix C – Verity Voting 2.7 System Hashes”

Table 2 – Software and Firmware

Manufacturer	Application	Version
Verity Data	EMS Software	2.7.1
Verity Build	EMS Software	2.7.1
Verity Central	High-Speed Optical Scanner Software	2.7.1
Verity Count	Central Count Location Tabulation and Report Software	2.7.1
Verity Relay Receiving Station	Data Transmission Software	2.7.1
Verity Scan	Optical Scanner Firmware	2.7.1



Verity Touch Writer	BMD Firmware	2.7.1
Verity Touch Writer Duo	BMD Firmware	2.7.1
Verity Touch Writer Duo Standalone	BMD Firmware	2.7.1
Verity Controller	Firmware	2.7.1
Verity Print	BMD Firmware	2.7.1
Verity Transmit	Data Transmission Software	2.7.1
Verity Transmit Receiving Station	Data Transmission Software	2.7.1

Table 3 – COTS Software and 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

Verity Scan – Paper Ballot Scanner	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.36.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Touch Writer – Electronic BMD Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.36.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Touch Writer Duo – Electronic BMD Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.36.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Touch Writer Duo Standalone – Electronic BMD Device	



Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.36.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Controller – Networked Centralized Management Device	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.36.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143
Verity Transmit – Remote Transmission	
Microsoft Windows 10 Enterprise 2019 LTSC	10.0.17763
SQLite	3.36.0
McAfee Application Control for Devices (“Solidifier”)	8.2.1-143

2.1.2 Equipment (Hardware)

The hardware employed by **Hart Verity Voting 2.7** consists of two types: custom and commercial off the shelf (COTS). COTS hardware was verified to be pristine or was subjected to review for analysis of any modifications and verification of meeting the pertinent standards.

The tables below detail each device employed by the **Hart Verity Voting 2.7** voting system.

Table 4 – Manufacturer Equipment

Hardware Description	Version
Verity Print device – Ballot Printer ²	3006095 Rev A
Verity Print device – Ballot Printer	3005356 Rev E
Verity Print device – Ballot Printer ¹	3005856 Rev B
Verity Scan device – Paper Ballot Scanner ²	3006080 Rev A
Verity Scan device – Paper Ballot Scanner	3005350 Rev I
Verity Scan device – Paper Ballot Scanner ¹	3005800 Rev B
Verity Touch Writer – Electronic BMD ²	3006090 Rev A
Verity Touch Writer – Electronic BMD	3005352 Rev H
Verity Touch Writer – Electronic BMD ¹	3005852 Rev B
Verity Touch Writer Duo – Electronic BMD ²	3006070 Rev A
Verity Touch Writer Duo – Electronic BMD	3005700 Rev B



Verity Touch Writer Duo Standalone – Electronic BMD2	3006075 Rev A
Verity Touch Writer Duo Standalone – Electronic BMD	3005730 Rev A
Verity Controller – Networked Centralized Management Device2	3006085 Rev A
Verity Controller – Networked Centralized Management Device1	3005825 Rev B
Verity Transmit– Remote Transmission	3006065 Rev A

¹SmartPanel updated in previous certification modification for tablet electronics obsolescence

²Device base updated in Verity 2.7

Table 5 – COTS Equipment

COTS Hardware Description	Version
Verity Data/Build	
Verity Data and Build Applications and Workstation Kit <ul style="list-style-type: none"> • 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/m² • 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 	A



<p>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/m²</p>	
OKI Data C831dn Color Printer for existing customers only	N35100A
OKI Data C844dn Color Printer	N35301A
OKI Data C911dn Color Printer for existing customers only	N36100A
OKI Data C931e Color Printer	N36100A
OKI Data B432dn Mono Report and Ballot Printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only	N22202A
Brother HL-L6400 Series printer	HLL6400DWVS
Into Print SP1360 printer	SP1360
HP 8-port Ethernet Switch	1405-8GV3
Vinpower Digital 7-target USB Duplicator	USBShark-7T-BK
Vinpower Digital 23-target USB Duplicator	USBShark-23-BK
Verity Central	
<p>Verity Central Applications and Workstation Kit</p> <ul style="list-style-type: none"> • 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 	A



<p>Brightness – 250 cd/m²</p> <ul style="list-style-type: none"> HP Z240 Workstations (supported for existing customers only) <p>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/m²</p>	
Canon DR G1100 High-Speed Scanner	M111181
Canon DR G1130 High-Speed Scanner	M111171
Canon DR-G2110 High-Speed Scanner	6130030
Canon DR-G2140 High-Speed Scanner	6130020
OKI Data B432dn Mono Printer Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only	N22202A
Brother HL-L6400 Series printer	HLL6400DWVS
HP 8-port Ethernet Switch	1405-8GV3
Verity Count	
<p>Verity Count Applications and Workstation Kit</p> <ul style="list-style-type: none"> HP Z4 G4 Workstation <p>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</p>	A



<p>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/m²</p> <ul style="list-style-type: none"> 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 <p>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/m²</p>	
OKI Data B432dn Mono Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only.	N22202A
Brother HL-L6400 Series printer	HLL6400DWVS
HP 8-port Ethernet Switch	1405-8GV3
Verity Relay Receiving Station	
<p>Verity Relay Applications and Workstation Kit</p> <ul style="list-style-type: none"> 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 	A



<p>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/m²</p> <ul style="list-style-type: none"> 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/m² 	
OKI Data B432dn Mono Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only.	N22202A
Brother HL-L6400 Series printer	HLL6400DWVS
Verity Transmit Receiving Station – Transmission Host Software	
<p>Verity Transmit Applications and Workstation Kit</p> <ul style="list-style-type: none"> 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 	A



<p>Aspect Ratio – Widescreen (16:9) Optimal Resolution 1600 x 900 at 60 Hz Contrast Ratio – 1000: 1 Brightness – 250 cd/m²</p> <ul style="list-style-type: none"> 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/m² 	
OKI Data B432dn Mono Report printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only.	N22202A
Brother HL-L6400 Series printer	HLL6400DWVS
Verity Print	
OKI Data C831dn Color Printer	N35100A
OKI Data B432dn Mono Blank Ballot Printer	N22500A
OKI Data C844dn Color Printer	N35301A
OKI Data B431d Mono Printer for existing customers only	N22202A
Brother HL-L6400 Series printer	HLL6400DWVS
Optional AutoBallot Barcode Scanner Kit	C
Includes the following 2d barcode scanner: <ul style="list-style-type: none"> Hart part number: 1003672 Motorola/Zebra part number: DS4308 or DS4608 	
Verity Scan – Paper Ballot Scanner	
Verity Ballot Box	D



Optional Relay Accessory kit (4G LTE Cat-M1) Includes the following COTS modem: <ul style="list-style-type: none"> Hart part number: 1005248 MultiTech part number: MTD-MNA1-2.0 	A
Verity Touch Writer – Electronic BMD Device	
OKI Data B432dn Mono Marked Ballot Printer	N22500A
OKI Data B431d Mono Report Printer for existing customers only	N22202A
Brother HL-L6400 Series printer	HLL6400DWVS
Duracell UPS	DR660PSS
EATON UPS	5P1500
Accessible Voting Booth	D
Optional AutoBallot Barcode Scanner Kit Includes the following 2d barcode scanner: <ul style="list-style-type: none"> Hart part number: 1003672 Motorola/Zebra part number: DS4308 or DS4608 	C
Headphones <ul style="list-style-type: none"> Brand: V7, part number HA300-2NP or HA310-2NP 	2005230
Verity Touch Writer Duo – Electronic BMD Device	
Brother PJ700 Series Thermal Printer	PJ723
Accessible Voting Booth with ATI Tray	D
Standard Voting Booth	D
Optional detachable ATI Kit	A
Optional headphones for ATI Kit <ul style="list-style-type: none"> Brand: V7, part number HA300-2NP or HA310-2NP 	C
Verity Touch Writer Duo Standalone – Electronic BMD Device	
Brother PJ700 Series Thermal Printer	PJ723
Accessible Voting Booth with ATI Tray	A
Standard Voting Booth	D
Optional detachable ATI Kit	A
Optional AutoBallot barcode scanner kit Brand: Motorola/Zebra P/N: DS4308 or DS4608	C.
Optional headphones for ATI Kit Brand: V7, part number HA300-2NP or HA310-2NP	C



Verity Controller	
Optional AutoBallot Barcode Scanner Kit Includes the following 2d barcode scanner: <ul style="list-style-type: none"> • Hart part number: 1003672 Motorola/Zebra part number: DS4308 or DS4608 	C
Verity Transmit – Remote Transmission	
Optional Modem Accessory kit (4G LTE Cat-M1) Includes the following COTS modem: <ul style="list-style-type: none"> • Hart part number: 1005248 MultiTech part number: MTD-MNA1-2.0 	A
Optional WiFi Accessory kit Includes the following COTS modem: <ul style="list-style-type: none"> • Hart part number: N/A StarTech part number: USB433ACD1X1 	A
Optional RJ-45 Ethernet Accessory kit Includes the following COTS modem: <ul style="list-style-type: none"> • Hart part number: N/A StarTech part number: USB31000SW 	A

2.1.3 Modifications

Verity Voting 2.7 is a modification of the EAC certified **Verity Voting 2.6** system.

The modifications to **Verity Voting 2.7** address multiple aspects of the system, including features for all devices and workstations, as well as associated documentation updates.

Please see the full listing of Modifications, and the requirements that each was verified against, in “Appendix A – Requirements to Modifications.”

2.1.4 Materials

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

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



2.1.5 TDP Documents Used to Support Testing

The **Hart** documents used to support testing of the **Verity Voting 2.7** system are listed in “Appendix B – TDP Listing” of this document.

2.2 System Overview

2.2.1 Scope of the Hart Verity Voting 2.7 Voting 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 Touch Writer Duo Standalone** BMD devices.
- Configuring and programming the **Verity Controller** with **VerityTouch Writer Duo** BMD devices.
- Configuring and programming the **Verity Print** on-demand ballot production device.
- Transmission of the election results via **Verity Relay**.
- Transmission of the elections results via **Verity Transmit**.
- Producing the election definition and auditing reports.
- Providing administrative management functions for user, database, networking, and system management.
- Import of the Cast Vote Records from **Verity Scan** devices and **Verity Central**.
- Preview and validation of the election results.
- Producing election results tally according to voting variations and election



- system rules.
- Producing a variety of reports of the election results in the desired format.
 - Publishing of the official election results. Auditing of election results including ballot images and log files.
 - **Verity Scan** is a digital scan precinct ballot counter (tabulator) that is used in conjunction with an external ballot box. The unit is designed to scan marked paper ballots or Verity Touch Writer Duo printed vote records, interpret and record voter marks on the marked paper ballot or record voter selections on the printed vote records, and deposit the ballots into the secure ballot box.
 - **Verity Relay** provides remote transmission capability. Utilizing an optional modem with **Verity Scan**, at close of polls, results are transmitted from the polling place device to the **Verity Relay Receiving Station** workstation.
 - **Verity Transmit** provides remote transmission capability. Utilizing an optional modem, Wi-Fi, or Ethernet accessory kit. Results from the **Verity Scan** and **Verity Central** are transmitted to the **Verity Transmit Receiving Station** workstation.
 - The **Verity Touch Writer** is a standalone precinct level Ballot Marking Device (BMD) which also includes an Audio Tactile Interface (ATI), which allows voters who cannot complete a paper ballot to generate a machine-readable and human readable paper ballot, based on vote selections made, using the ATI.
 - The **Verity Touch Writer Duo** is a daisy chained configuration of a **Verity Controller** device configured with up to twelve **Verity Touch Writer Duo** BMD devices, which allows voters to utilize the touchscreen or optional Audio Tactile Interface to generate a machine-readable and human readable printed vote record, based on vote selections made.
 - The **Verity Touch Writer Duo Standalone** is a standalone BMD device, which allows voters to utilize the touchscreen or optional Audio Tactile Interface to generate a machine-readable and human readable printed vote record, based on vote selections made.
 - **Verity Print** is an on-demand ballot production device for unmarked paper ballots.
 - **Verity Election Management** allows users with the Administrator role to import and manage election definitions. Imported election definitions are available through the Elections chevron in Build. Users can also delete, archive, and manage the election definitions.
 - **Verity User Manager** enables users with the correct role and permissions to create and manage user accounts within the **Verity Voting** system for the local workstation in a standalone configuration, or for the network in a networked configuration.
 - **Verity Desktop** enables users with the correct roles to set the workstations' date and time, gather **Verity** application hash codes (in order to validate the correctness of the installed applications), and access to Windows desktop.



- **Verity Data** provides the user with controls for entering and proofing data and audio. **Verity Data** also performs validation on the exported information to ensure that it will successfully import into **Verity Build**.
- **Verity Build** opens the election to proof data, view reports, and print ballots, and allows for configuring and programming the **Verity Scan** digital scanners, and **Verity Touch Writer** and **Controller/Touch Writer Duo** BMD devices, **Verity Print**, as well as producing the election definition and auditing reports.
- **Verity Central** is a high-speed, central digital ballot scanning system used for high-volume processing of ballots (such as vote by mail). The unit is based on COTS scanning hardware coupled with custom **Hart**-developed ballot processing application software which resides on an attached workstation.
- **Verity Count** is an application that tabulates election results and generates reports. **Verity Count** can be used to collect and store all election logs from every **Verity** component/device used in the election, allowing for complete election audit log reviews.
- **Verity Relay Receiving Station** is a remote transmission software application that receives election 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 devices.

3 Certification Test Background

3.1 Revision History

Please see the Revision History on page 2.

3.2 Implementation Statement

Verity Voting 2.7 is a modification of Verity Voting 2.6 designed to conform to VVSG 1.0 (2005) standards.

Verity Voting 2.7 documents submitted as part of the EAC Application for Voting System Testing have been written to meet the guidance provided by the *EAC Voting System Testing and Certification Manual* Section 3.2.

The Conformance Checklist shown in Section 5 indicates the requirements of the VVSG 1.0 to which Verity Voting 2.7 is designed to conform. The following sections of Volume I are not applicable to the system being submitted for certification testing, as Verity Voting 2.7 does not include the applicable functionality:

- *Section 3.3.1.c – Biometric identification and authentication*
- *Section 7.9 – Voter Verifiable Paper Audit Trail*



As Verity Voting 2.7 is a paper-based solution only, and therefore does not incorporate Hart's DRE device suite, the following sections are not applicable to the system being submitted for certification testing.

- 2.1.2.f
- 2.1.4.k
- 2.1.4.l
- 2.3.1.3
- 2.3.2
- 2.3.3.3
- 3.1.2.f
- 3.1.2.g
- 4.1.1.b
- 4.1.4.3
- 4.1.6.2
- 4.3.5.b
- 5.4.3.b.iv
- 5.5

3.3 PCA - Document and Source Code Reviews

The Physical Configuration Audit (PCA) review of the **Verity Voting 2.7** documentation submitted in the Technical Data Package (TDP) was performed in order to verify conformance with the Election Assistance Commission Voluntary Voting System Guidelines 1.0 (EAC VVSG 1.0). Source code was reviewed for each modified software and firmware application declared within the voting system.

All PCA document reviews were conducted in accordance with Vol. 2 Section 2 of the EAC VVSG 1.0, to demonstrate that the system meets the requirements. Inconsistencies or errors in documentation were identified to **Hart** in a discrepancy report for resolution or comment. This discrepancy report is included as "Attachment N – Verity Voting 2.7 Discrepancy Report" for this document.

All PCA source code reviews were conducted in accordance with Vol. 1 Section 5.2 and Vol. 2 Section 5 of the EAC VVSG 1.0, to demonstrate that the system meets the requirements. Inconsistencies or errors in the source code were identified to **Hart** for resolution or comment. This source code review summary is included as "Attachment F - Verity Voting 2.7 Source Code Review Summary".



3.4 FCA - Functional & System Testing

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

SLI Compliance’s standard Test Suites were customized for the **Hart Verity Voting 2.7** voting system and conducted in accordance with VVSG v 1.0 Vol. 2 Section 6, in conjunction with the functional testing. Simulations of elections were conducted to demonstrate a beginning-to-end business use case process for the **Hart Verity Voting 2.7** voting system.

3.4.1 Test Methods

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

Table 6 – Test Methods

SLI Compliance VSTL Test Method Name
TM_Ballot_Formatting_and_Production v1.1
TM_Error Message and Recovery v1.3
TM_Pre-Voting_Capabilities v1.2
TM_Readiness v1.1
TM_Security_Access_Control v1.1
TM_Security_Software_Security v1.1
TM_Security_Telecommunications_and_Data_Transmission v1.2
TM_Security_Transmission_of_Official_Data_over_Public_Networks v1.1
TM_Security_Wireless_Communications v1.2
TM_Tally_and_Reporting v1.1
TM_Telecommunications v1.1
TM_Voting_Capabilities v1.3

The above listed test methods are implemented in a complementary fashion: modules are employed from various methods to form suites. Suites include a logical sequence of functionality that is used to validate the requirement addressed by each module within the suite.

4 Certification Test Results Summary

4.1 Source Code Review Summary

SLI Compliance has reviewed the modified software source code for each application in the **Verity Voting 2.7** voting system to determine the code’s compliance with the EAC VVSG 1.0, *Volume 1 Sections 5, 9* and *Volume 2 Section 5.4* and for compliance with **HART’s** internally developed coding standards. **Verity Voting 2.7** is implemented with the C, C++, and C# languages.



4.1.1 Evaluation of Source Code

As a modification project, the **Verity Voting 2.7** code base was reviewed using the final **Verity Voting 2.5** code as the baseline, to which the initial **Verity Voting 2.7** code base was compared. The differences found between those two code bases served as the starting point of the code review.

The source code is written adequately in terms of the VVSG 1.0. The code is modular and there is sufficient error handling. Readability is sufficient and supports maintainability. The source code was found to be compliant to the VVSG 1.0 and **Hart** declared industry standards. Please see “Attachment F - Verity Voting 2.7 Source Code Review Summary ” for details on the **VerityVoting 2.7** source code review.

4.2 Technical Data Package Review Summary

As this is a modification project, SLI Compliance reviewed the **Verity Voting 2.7** TDP against the final TDP for **Verity Voting 2.6**. The differences between the two TDPs were reviewed for compliance with the EAC VVSG 1.0 according to *Volume 2 Section 2*. The documents that are a part of the **Verity Voting 2.7** system are detailed in “Appendix B – TDP Listing” of this document.

4.2.1 Evaluation of TDP

One documentation discrepancy was identified for two documents during the PCA documentation review phase. The issue identified was due to missing information.

Seventeen additional documentation discrepancies were written during functional testing. Details of the discrepancies can be found in “Attachment N – Verity Voting 2.7 Discrepancy Report” for this document.

Each of the discrepancies were addressed and resolved with updated documentation prior to the writing of this report. The Technical Data Package for the **Verity Voting 2.7** voting system was found to comply with all applicable standards.

4.3 Functional Testing Summary

4.3.1 Test Suites Utilized

SLI Compliance performed tests designed to functionally verify the modifications listed in “Appendix A – Requirements to Modifications” of this report, as well as additional regression testing to verify the continued robustness of the overall voting system. The testing incorporated component specific as well as end-to-end election scenarios, testing the functionality supported by **Hart InterCivic**. The following sections detail the test suites that were executed.

4.3.1.1 Modifications

The Modification test suite examined each modification introduced into **Verity Voting 2.7** in order to verify that the modifications implemented, and the subsequent Trusted Build of the firmware, did not adversely affect operations. Various elections were used to exercise the devices and workstations such that each specific modification was functionally verified, with an appropriate quantity of regression testing performed as



determined by analysis of the modifications.

4.3.1.2 Security

Security test suites were designed and executed to verify the security posture of the **Verity Voting 2.7** system has remained unchanged from the baseline system.

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

Automated vulnerability scans were taken of all networked machines to identify system vulnerabilities as well as determine any and all open networking ports. Communications between **Verity Relay** and **Verity Scan** were monitored after leaving the public cellular network.

In addition, **Verity Transmit** send and received components were examined over Cellular, Wired, And wireless communications channels. Network analysis tools were used to obtain network packet captures to examine communication to substantiate authentication attempts between devices, and to assess that appropriate encryption is utilized. The communications between **Verity Controller** and daisy chained devices were also examined to confirm that communications were encrypted, and that “Man in the Middle” attacks were resisted, and unsuccessful.

4.3.1.3 General Election

A General Election test suite was performed in order to verify proper integration of the full **Verity Voting 2.7** system, and that all components continue to work as expected. This election variant focused on election components such as N of M, overvotes, undervotes, multiple precincts, and scanning to accept both ballots and PVRs in a single session.

4.3.1.4 Open Primary Election

An Open Primary Election test suite was performed in order to verify proper integration of the full **Verity Voting 2.7** system, and that all components continue to work as expected.

4.3.1.5 Closed Primary Election

A Closed Primary Election test suite was performed in order to verify proper integration of the full **Verity Voting 2.7** system, and that all components continue to work as expected.

4.3.1.6 Grid Ballot, General Election/Closed Primary

General Election and a Closed Primary Elections were utilized in order to verify the newly introduced Grid Ballot feature, and that all components continue to work as expected.



4.3.1.7 Verity Data/Build

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

4.3.1.8 Verity Central

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

4.3.1.9 Verity Count

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

4.3.1.10 Verity Scan

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

4.3.1.11 Verity Accuracy Test

Verity Scan and **Verity Central** were re-tested in an Accuracy test, in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect accuracy within the component.

4.3.1.12 Verity Relay

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

4.3.1.13 Verity Print

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

4.3.1.14 Verity Touch Writer

Verity Touch Writer was re-tested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect operations within the component.

4.3.1.15 Verity Controller/Touch Writer Duo

Verity Controller/Touch Writer Duo was re-tested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect operations within the component.

4.3.1.16 Verity Touch Writer Duo Standalone

Verity Touch Writer Duo Standalone was re-tested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect operations within the component.



4.3.1.17 Verity Transmit

Verity Transmit, a new component in the **Verity Voting** suite, was tested in order to verify that the new component satisfactorily meets all applicable VVSG requirements.

4.3.1.18 Data Retention and Hardware Integrity

A data retention and hardware integrity test were implemented re-tested in order to verify that the modifications implemented, and the subsequent Trusted Build of the software, did not adversely affect these aspects of the voting system.

4.3.1.19 Verity Scan

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

4.3.2 Evaluation of Functional Testing

In this test campaign, the **Verity Voting 2.7** voting system was subjected to examination for changes, updates, and modifications made from the previously certified system, **Verity Voting 2.6**, against applicable requirements within the EAC VVSG 1.0. Through the duration of testing, five functional discrepancies were written. Details of these discrepancies can be found in “Attachment N – Verity Voting 2.7 Discrepancy Report” for details on the **Verity Voting 2.7** of this document. One of the discrepancies was reported, resolved, and re-tested as applicable due to being caused by a damaged device. One of the discrepancies was reported and identified to be an intentional behavior, with a documentation update and help screens to be updated going forward. All other functional discrepancies were addressed by Hart, and a second Trusted Build was performed April 25th – 27th, 2022.

Regression testing consisted of verifying fixes for all addressed discrepancies as well as running of a General election and an Open Primary election. All discrepancies were verified to have been successfully addressed, with no new issues being introduced.

All Functional discrepancies have been successfully addressed, and all components of the **Verity Voting 2.7** voting system have successfully passed all tests.

4.4 Hardware Testing Summary

The three configurations,

1. Verity Controller w/ 2 Verity Touch Writer DUO's
2. Verity Touch Writer w/ Brother HL-L6400DWVS Laser Printer
3. Verity Scan

were successfully tested to the following non-core hardware tests:

- Radiated Electromagnetic Emissions
- Conducted Electromagnetic Emissions
- Electrostatic Disruption
- Electromagnetic Susceptibility



- Electrical Fast Transient
- Lightning Surge
- Conducted RF Immunity
- Magnetic Fields
- Electrical Power Disturbance

One configuration,

- Verity Controller w/ 1 Verity Touch Writer Duo

were successfully tested to the following non-operating environmental tests:

- Bench Handling
- Vibration
- Low Temperature
- High Temperature Test
- Humidity Test

Three configurations,

- Verity Controller w/ 2 Verity Touch Writer DUO's
- Verity Touch Writer w/ Brother HL-L6400DWVS Laser Printer
- Verity Scan

were successfully tested to the following operating environmental tests:

- Temperature and Power Variation
- Reliability

No issues were encountered.

Please see Attachments K - Hart Verity 2.7 EAC Electrical Hardware Test Report, L - Hart Verity 2.7 EAC Environmental Hardware Test Report and M - Hart Verity 2.7 EAC Temp and Power Var Test Report, for additional details.



5 Recommendation

SLI Compliance has successfully completed the testing of the **Hart Verity Voting 2.7** voting system. It has been determined that the system meets the required acceptance criteria of the Election Assistance Commission's Voluntary Voting System Guidelines 1.0.

This recommendation reflects the opinion of SLI Compliance based on testingscope and results. It is SLI Compliance's recommendation based on this testing effort that the EAC grant certification of the **Hart Verity Voting 2.7** voting system.

Signature

A handwritten signature in blue ink, appearing to read "Traci Mapps".

Traci Mapps
Vice President
SLI Compliance
May 31, 2022



Appendix A – Requirements to Modifications

Requirement	Item
	Features for all devices and workstations
7.4.5,	<ul style="list-style-type: none"> · When using the System Validation Tool on devices or workstations, the system exports hashes for all Verity-related system files, as well as the files themselves.
2.2.1.3, 3.1.3, 3.1.7.2, 3.2.2.2, 3.2.7, 7.9.5, 7.9.6	<ul style="list-style-type: none"> · Verity supports adding new languages to devices and workstations via the “Language Pack” functionality.
	<ul style="list-style-type: none"> · Verity supports the following additional languages: <ul style="list-style-type: none"> o Gujarati o Hmong o Lao o Hawaiian o Cantonese o Punjabi o Bengali
	COTS updates
4.1.7.2, 5.1.2, 7.9.4.e,f,k,l	<ul style="list-style-type: none"> · Added support for the Brother HL-L6400DWVS laser printer. This printer now replaces the OKI Data B432 printer for use on Verity Touch Writer, Verity Printer, Verity Build, and for report printing on all Verity workstation software.
4.1.2.4	<ul style="list-style-type: none"> · Added the Duracell DR660PSS UPS for battery backup for the new Brother HL-L6400DWVS printer when used with the Verity Touch Writer laser printer.
4.1.7.2, 5.1.2, 7.9.4.e,f,k,l	<ul style="list-style-type: none"> · Added support for the IntoPrint SP1360 laser printer, which is a brand of the OKI Data C931 printer that it replaces on Verity Build.
2.1.2, 4.1.7.1, 7.3	<ul style="list-style-type: none"> · Added additional CFast card vendor.
2.3.3.1, 3.1.5	<ul style="list-style-type: none"> · Added magnifying devices for use with ballots in the polling place.
	Hawaii-specific Features
2.1.7.1.d, 2.1.7.2.b	<ul style="list-style-type: none"> · Supports General and Open Primary elections only.
2.4.3, 4.1.1, 4.1.8, 5.4.4,	Verity Count Reporting
	<ul style="list-style-type: none"> · Now allows users to set a custom order for contests on results reports across all Tasks in an election.
	<ul style="list-style-type: none"> · Includes the following new reports and exports: <ul style="list-style-type: none"> o Three-Column Summary Results Report o Three-Column Precinct Results Report (export only) o Statement of Vote Report



Requirement	Item
	o Precinct Detail Export
	o Summary Export
	· Adds support for adding a Run ID to the report header of the following reports:
	o Three-Column Summary Results Report
	o Three-Column Precinct Results Report
	· Adds support for identifying the following reports as “zero reports”
	o Three-Column Summary Results Report
	o Three-Column Precinct Results Report
	· Added support for calculating ballots cast in a multi-sheet election using the highest recorded sheet count for the following reports:
	o Three-Column Summary Results
	o Three-Column Precinct Results
	o Statement of Vote Report
	o Precincts Reporting
	o Summary Export
	o Precinct Detail Export
	· Added an Election Preference to “Enable Hawaii results reports and exports.”
	· Manual vote recording now allows users to enter sheet counts for each sheet that exists in the ballot for the precinct-split/party being adjusted.
2.1.6, 2.1.7.1.d, 2.1.7.2, 2.2.2	All Ballot Features
	· Added support for Slate Choices, where two choice names can be treated as a single votable option.
2.1.6, 2.2.1	Paper Ballot Features
	· Paper ballots support a maximum paper size of 8.5”x22”, without stub capability.
	· Paper ballot stubs support adding a customizable prefix to the stub number display.
	· Verity now supports 80lb Text paper weight for ballots.
	· Added targeting landmarks to ballot corners for option box triangulation.
2.1.6, 2.1.7.1.d, 2.1.7.2, 2.2.2	Grid Ballot Features
	· Verity now supports grid-based paper ballots, where office contests appear in columns and parties in rows on odd-numbered pages, and propositions appear in a column-based layout on even-numbered pages.
	o Proposition-only ballots can utilize both sides of a sheet.
	o Select office-type contests can appear on the proposition side of the ballot.
	· Grid-based paper ballots support all paper sizes in a landscape orientation (short edge on left):
	· Grid-based paper ballots support the same stub sizes and options as column-based paper ballots.



Requirement	Item
	o 8.5" x 22" ballots do not support a stub
	· Grid-based paper ballots support all paper ballot election definition elements EXCEPT:
	o Party Selector contests
	o Open Primary Party Selector contests
	o "Ranked Choice," "Cumulative," or "Fractional Cumulative" contests
	o Ballot Additional Text
	o Rotation
	o Column or page forcing on Office type contests
	§ Column or page forcing is allowed for contests appearing on the Proposition side of the ballot.
	o Contest images
	o Dependent contests
	o Two-line write-ins
	o Uncommitted choices
	· Grid-based ballots support candidate cross-filing, where if a voter marks multiple boxes for a cross-filed choice, it will be recorded as a single vote for the choice.
	Additional Features for Verity Devices
	Features for all devices
	· Updated model for each Verity device
Volume I: 2.1.4 (b,c,d), 4.1.2.5-12, 4.1.2.13 , 4.1.2.14, 4.1.7.1 4.3.3 Volume II: 4.6.2-6 4.7.1, 4.8	o A single standardized circuit board replaces baseboard and I/O board combinations found in all Verity devices, with no change to functionality. Electronic components from the existing Tally Tape Thermal Printer are added directly to the baseboard.
	o Tally Tape thermal printer for report printing now uses Hart built plastics and firmware.
	o Rear panel connectors now recessed to increase rugged-ability and reduce cable strain if a device is handled while cables are installed.
	o Power input connector no longer contains to slide to release cable retention feature.
2.1.1, 7.3.1, 7.4.6.e, 7.9.4	o Tamper evident seal now serialized
9.6.c,d	· All Verity devices now show the first three sections (XX.XX.XX) of the system version number in the user interface, without needing to reboot the device.
	· All Verity devices now follow these optional VVSG 1.0 user-interface conventions:
3.1.4.d	o If an unrecoverable error occurs on a polling place device, the device suspends voting operations and presents a clear indication to the user of the malfunction.



Requirement	Item
3.1.4.d	<ul style="list-style-type: none"> ▪ Warnings and alerts issued to a voter on a device shall state the nature of the problem; the set of responses available to the voter; and whether the voter has performed or attempted an invalid operation, or the voting equipment itself has malfunctioned in some way.
3.1.4.e	<ul style="list-style-type: none"> ▪ When color is used to indicate status in the system, the user interface uses green, white, or blue for normal status; amber or yellow for marginal status; and red for an error status.
3.1.4.e	<ul style="list-style-type: none"> ▪ When color is used to indicate the type of information displayed, the user interface uses green, white, or blue for general information; amber or yellow for warnings; and red to indicate problems that require immediate attention.
Features for Verity Scan	
2.1.7.2.e, 2.2.4.d, 3.1.4.b	Added support for Write-in Mark Detection, where Scan will return the ballot for second-chance voting input if a mark is detected in the write-in area, but the option box is not marked.
2.1.7.2.e, 2.2.4.d, 3.1.4.b	<ul style="list-style-type: none"> ▪ If the ballot is accepted as-is, unmarked write-ins will count only if the Build setting for default counting behavior is enabled, except for ranked-choice or cumulative contests.
Features for Verity Scan with Relay	
2.2.4.d, 4.3.6	Device startup reports are now labeled "Verity Scan with Relay," not "Verity Scan."
2.2.4.d, 4.3.6	Voter-facing screens now do not display the product name "Verity Scan with Relay."
2.1.1.a,b,c,f,g, 2.1.4.h,j, 2.1.9, 2.2.4.d, 2.4.3.g,k, 4.1.2, 4.1.2.15, section 6, 7.3, 7.5, 7.6, 7.7	Features for Verity Transmit
Transmit supports transmitting vDrives written by:	
<ul style="list-style-type: none"> ▪ Verity Central ▪ Verity Scan ▪ Verity Scan with Relay 	
For Central vDrives Transmit, now displays "Central vDrive" in lieu of the vDrive polling place.	
Additional Features for Verity Workstations	
Features for all Workstations	
2.1.1, 7.2, 7.4	Secure Boot now enabled on workstations.
2.1.1, 7.2, 7.4	Full Disk Encryption now required for all deployments.
Features for Election Management	
2.2.4.d, 5.1.1, 7.4.3	Added new feature "Configuration Control," which supports limiting election variations based on what equipment and ballot types are used by a jurisdiction, eliminating unnecessary work for the user.
2.1.2, 2.1.6, 2.2.1, 2.2.2, 2.2.4.d	Features for Verity Data
The Contest Title field limit is increased to 250 characters.	



Requirement	Item
	Verity Data now supports entering separate contest instructions for devices and paper ballots.
	Verity Data proofing reports containing contest instructions display both electronic instructions and paper instructions.
	Added support for defining Candidate Slate choices on grid-based ballots.
	Added additional rich-text formatting options for Ballot Additional Text.
	The Ballot Additional Text field limit increased to 3000 characters.
4.1.5.2	Verity Data validates that fold lines do not intersect ballot landmarks, in addition to barcodes and option boxes
	The default PVR paper size changed to 8.5" x 11".
	Features for Verity Build
2.2.4.d	Verity Build includes a new setting to print single language ballots on Touch Writer.
2.1.7.2.e, 2.2.4.d, 3.1.4.b	Added support for Write-in Mark Detection, including:
2.1.7.2.e, 2.2.4.d, 3.1.4.b	<ul style="list-style-type: none"> ▪ New options to control second-chance voting behavior for unmarked write-ins on Scan devices.
2.1.7.2.e, 2.2.4.d, 3.1.4.b	<ul style="list-style-type: none"> ▪ New option to control the default counting behavior for unmarked write-ins on Scan devices.
2.2.4.d	Added a note that "Setting the default Voting Method will also apply to Verity Reader."
	Features for Verity Central
2.1.7.2.e, 2.2.4.d, 3.1.4.b	Added support for Write-in Mark Detection, including:
2.2.4.d	<ul style="list-style-type: none"> ▪ A new adjudication condition called "Unmarked Write-in."
2.2.4.d	<ul style="list-style-type: none"> ▪ An Election Preference to count unmarked write-ins as if they were marked; off by default.
2.2.4.d	<ul style="list-style-type: none"> ▪ An election setting to count unmarked write-ins as if they were marked.
2.2.4.d	<ul style="list-style-type: none"> ▪ An election setting to allow automatic acceptance of unmarked write-ins during scan, or when accepting at the batch, ballot, or page level.
2.2.4.d	<ul style="list-style-type: none"> ▪ Allowing the user to filter voter intent issues by "Unmarked Write-ins."
	Features for Verity Relay Receiving Station
2.2.4.d	Renamed Verity Relay application for clarity; now called Verity Relay Receiving Station.
2.2.4.d	Application now supports receiving vDrives written by:
2.2.4.d	<ul style="list-style-type: none"> ▪ Verity Central
2.2.4.d	<ul style="list-style-type: none"> ▪ Verity Scan
2.2.4.d	<ul style="list-style-type: none"> ▪ Verity Scan with Relay
2.2.4.d	vDrives written from Verity Relay Receiving Station support at least the same number of ballots as vDrives written from Verity Central, Scan, or Scan with Relay.
2.2.4.d	The Receiving Dashboard now displays the status of Central vDrive data separately from the status of device vDrive data.



Requirement	Item
2.2.4.d	The vDrives Written Report displays, after the "ID of the transfer vDrive" field, the type of device that wrote the CVR data ("Central" or polling place device type) for each child vDrive written to a transfer vDrive.
2.2.4.d	· The Received vDrives Report displays, before the "Polling place name" field, the type of device that wrote the CVR data ("Central" or polling place device type) for each received vDrive.
	Features for Verity Count
2.2.4.d, 2.4.3, 4.1.8	Count results reports containing contest instructions display electronic instructions only.
2.2.4.d, 2.4.3, 4.1.8	Slate Choices: On results reports, both choice names are displayed next to a single vote counter.
7.9.3.d,e.ii	Count now includes a digital signature for any exported collection of CVRs.
7.4.6.b.i, d	The digital signature is user-verifiable using a separate utility.
2.2.4.d	Improved Alias functionality:
2.2.4.d	<ul style="list-style-type: none"> ▪ Aliases Groups and Sets (collections of Alias Groups) can be exported or imported to/from removable media.
2.2.4.d	<ul style="list-style-type: none"> ▪ Alias Groups can be imported into any elections containing the same strings.
2.2.4.d	<ul style="list-style-type: none"> ▪ Alias Sets can only be imported into the election with the same Election ID from which they were generated.
2.2.4.d	<ul style="list-style-type: none"> ▪ Alias Sets can be used for reports and results exports, including the Detailed Vote Total export.
2.2.4.d	Visually updated the Verity Count dashboard.
	Corrected Defects
2.2.e, 2.2.4.d	Data/Build Help screen for: "Shared Device Behaviors" is inaccurate. The help screen states, "Require user to view all choices in each contest" however what is displayed is "Require voters to view all choices in each contest."
2.2.4.d, 4.3.4.a,d	Scan Scanner multi-feed calibration can get stuck on a spinner and not show the results screen, requiring a lock and unlock of the tablet to exit the screen.
2.2.4.d	Devices Physical keyboard input of "Alt-ESC" returns to the user to the Verity launcher splash screen.
2.2.4.d	Count If the number of columns in contest are less than or equal to 14 in the Canvass Results Report, then a blank page will follow the contest on the PDF export.



Appendix B – TDP Listing

TDP Listing:

- 462785-1.1 Hart InterCivic CofC.pdf
- 6641-056 A02_Verity_2.7_Administrators Guide_Data.pdf
- 6641-057 A01_Verity_2.7_Administrators Guide_Build.pdf
- 6641-058 A02_Verity_2.7_Administrators Guide_Central.pdf
- 6641-059 A01_Verity_2.7_Administrators Guide_Count.pdf
- 6641-060 A04_Verity_2.7_Remote Transmission Administrators Guide.pdf
- 6641-061 A02_Verity_2.7_System Administrators Guide.pdf
- 6643-062 A03_Verity_2.7_Support Procedures Guide.pdf
- 6651-053 A01_Verity_2.7_Polling Place Field Guide - CDS.pdf
- 6651-054 A01_Verity_2.7_Polling Place Field Guide - DS.pdf
- 6651-055 A01_Verity_2.7_Polling Place Field Guide - SW.pdf
- 6651-056 A01_Verity_2.7_Polling Place Field Guide - SRW.pdf
- 6651-058 A00_Verity_2.7_Verity Print Field Guide.pdf
- 6651-061 A03_Verity_2.7_Verity Transmit Field Guide.pdf
- 6653-011 A02_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
- Document Control Procedure 1000538 E06.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 Z240 Verity Win10 Workstation Manufacturing 4005673 A04.pdf
- HP Z4 G4 Verity Win10 Workstation Manufacturing 4005670 A04.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 Implementation Statement 4005699 A03.pdf
- Verity 2.7 Notice of Protected Information 1000786 A03.pdf
- Verity 2.7 NY Cross-endorsement Modification TRD 4005714 A00.pdf
- Verity 2.7 TDP Abstract 1000785 A04.pdf
- Verity 2.7 Test Cases.pdf
- Verity 2.7.X COTS List.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 A00.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 A00.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 C18.pdf
- Verity PC Application Framework User Interface Design Document.pdf
- Verity Performance Characteristics 4005497 C05.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 Usability Impact Statement.pdf
- Verity Voting 2.7.1 Source Documentation.zip
- 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



Appendix C – Verity Voting 2.7 System Hashes

Executable Files	sha2 (256)
Devices:	
Verity_Controller_v2.7.1-Kiosk-2022-04-25_15-12-05.exe	AC8B2169F272A0B639937E106CF29C29E89191D5C65A5A095C2BB33178117D1C
Verity_Print_v2.7.1-Kiosk-2022-04-25_15-13-03.exe	88CDEC7F148F07D7B75C82F45407B9413C674888C7744E23E950CAEFAA3F6B44
Verity_Reader_v2.7.1-Kiosk-2022-04-25_15-13-16.exe	42BD9AF3ABC67153F837F3BBBD87DC2BA47D6D9A4AF91CB1FB078CF886347E76F
Verity_ScanWithRelay_v2.7.1-Kiosk-2022-04-25_15-11-27.exe	6C34C13FB7FF89DCC679C1610DC30EAD622D0F40DDE3FD1199459DDEB3BBF008
Verity_Scan_v2.7.1-Kiosk-2022-04-25_15-11-02.exe	F7E1FB64F271CC3406F9A07946444F108DA6387050E371926589C4FCD5A46AFE
Verity_TouchDuoIndie_v2.7.1-Kiosk-2022-04-25_15-12-34.exe	47121E5FD3672C7C409BB246199C322683EB9AA3E93CC9029041D1D66D28A3C6
Verity_TouchDuo_v2.7.1-Kiosk-2022-04-25_15-12-13.exe	CE96BBBEFC041B3C2DAD46CC6EF5D8A03D8E8950C1D8CB3F7FA995178500FBAB
Verity_Transmit_v2.7.1-Kiosk-2022-04-25_15-12-55.exe	2A649C1028E94FA4670AC6F39B24F570D36546559231C0318D9BAE8EA6F7F463
Verity_Writer_v2.7.1-Kiosk-2022-04-25_15-11-40.exe	39C797F5F2E2DE1A549BDB34E471A0AE4D86F47940C410704205BEA306AC715B
Workstations:	
Verity_CentralClient_v2.7.1-Kiosk-64GB-2022-04-25_15-08-00.exe	E96B7D68535B1F2C9B04E1FB53AC55C145559EA1BBF7851E68224E919266DDDF
Verity_CentralDatabaseServer_v2.7.1-Kiosk-64GB-2022-04-25_15-08-52.exe	F5AE92757A1E5E44C288CCF37675D1A3D16D0C2DA81C874960F171469008FAE8
Verity_CentralServer_v2.7.1-Kiosk-64GB-2022-04-25_15-09-13.exe	71BB1C2BAC3462CC23A822F9FA5F7B694E0A792623EBE62C4595127CDC6B6AE
Verity_CountClient_v2.7.1-Kiosk-64GB-2022-04-25_15-08-27.exe	8E8C3F3B92BE45FCE26070A8C697E5538104958ED7023E6D6910181BDF4DC172
Verity_CountServer_v2.7.1-Kiosk-64GB-2022-04-25_15-09-40.exe	6C64AA4E176F737AEA15EF6F3F3EC6BE64770B91F33A5985D80E85899A96EA1B
Verity_CountStandalone_v2.7.1-Kiosk-64GB-2022-04-25_15-09-50.exe	94EDF9609F12DEBD8429BE7F4E3C19B3FE596F082D77DBF0612AFD178AB8164F
Verity_Database_v2.7.1-Kiosk-GB-2022-04-25_15-11-00.exe	896E67803932E64AE52AB711007D85A04528A058E7E0ECE920EF8131A2315411
Verity_DataBuildClient_v2.7.1-Kiosk-64GB-2022-04-25_15-08-37.exe	CBA1192414412A92EDEC06809E534470F8FF843121D70102402B3C0B9F7BEB38
Verity_DataBuildCountStandalone_v2.7.1-Kiosk-64GB-2022-04-25_15-10-00.exe	B8932CDD7E50BBAF96BB7E0E52CE895DF1246B8BB7CC3D8A51F3A2C495613B51
Verity_DataBuildServer_v2.7.1-Kiosk-64GB-2022-04-25_15-10-15.exe	79778BA21D860EA6F38E2F666AD7BA4DF71B213867C0A0BD275AE108B859C92E
Verity_DataBuildStandalone_v2.7.1-Kiosk-64GB-2022-04-25_15-10-26.exe	FD3E4D8A5DAFE9B4A8088CD5CD4F277BE9CCDBC54891FBAFDFC95E1FC2522879
Verity_RelayTransmit_v2.7.1-Kiosk-64GB-2022-04-25_15-10-51.exe	ED82B8F9FFCF523195DDF1B7649344204F62A12519B87D305A89ACC67B1B53C0
Verity_Relay_v2.7.1-Kiosk-64GB-2022-04-25_15-10-41.exe	541F56199882CD5A31FA21D136A065A234E0E8DCCDE271FCF7A35F264656090F



Appendix D – Ancillary Products

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

Ancillary systems include:

- Optional Verity Duo Go - a carrier for use with **Verity Touch Writer Duo** and **Verity Touch Writer Duo Standalone** to allow for “curbside” voting.
- Optional Full Page Magnifier
Manufacturer: by Bausch & Lomb
Model: 819007
- Optional Full Page Framed Magnifier
Manufacturer: Inclusion Solutions
Model: 436
- Optional ATI Device
Manufacturer: AbleNet
Device: Dual Jelly Bean Switch

End of Certification Test Report
