Certification Test Report - Modification

Report Number HRT-25003-CTR-04

Hart InterCivic Verity Vanguard 1.1

v4.0

Prepared for:

Vendor Name	*Hart InterCivic Inc. (Hart)*
Vendor System	*Verity Vanguard 1.1*
EAC Application No.	*HRT-VV-1.1*
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NVLAP Lab Code 200733-0

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
Feb. 11th, 2026	1.0	M. Santos	Initial release
March 18th, 2026	2.0	M. Santos	Updates for EAC comments
March 31st , 2026	3.0	M. Santos	Updates for EAC comments
April 23rd, 2026	4.0	M. Santos	Updates for EAC comments

Disclaimer

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

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.

1 Introduction

SLI Compliance is submitting this report as a summary of the certification testing efforts for the **Hart Verity Vanguard 1.1** voting system, as detailed in the section System Identification, against the Election Assistance Commission Voluntary Voting System Guidelines v2.0 (EAC VVSG v2.0).

1.1 Description of Verity Vanguard 1.1 Voting System

Verity Vanguard 1.1 is a modification of **Verity Vanguard 1.0** (which was certified by the EAC on July 7th, 2025), with limited changes. Description of the EAC certified Verity Vanguard voting system components can be found in section "1.1.1 - Scope of the Hart Verity Vanguard Voting System". The **Verity Vanguard 1.1** system was tested based on the modified system requirements, as set forth in sections 3.4.3, 3.6, 4.7.2.2 and 4.7.2.5 of the EAC Voting System Testing and Certification Program Manual, v 3.0. 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.

1.1.1 Scope of the Hart Verity Vanguard Voting System

The **Hart InterCivic Verity Vanguard** voting system is a paper-based voting system comprised of both precinct and central count tabulators along with a Ballot Marking Device (BMD) and a hybrid BMD/Precinct Tabulator. All polling place devices are able to utilize Americans with Disabilities Act (ADA)components.

The **Verity Vanguard** voting system's major components include Vanguard **Workspace**, Vanguard **Define**, Vanguard **Deploy**, Vanguard **Capture**, Vanguard **Results**, Vanguard **Boost**, Vanguard **Flex**, Vanguard **Adapt** and Vanguard **Vault**.

The Vanguard Workspace (EMS)

Vanguard Workspace is the Vanguard workstation home screen. The Vanguard workspace displays tiles for each of the installed Vanguard components. The components displayed are based on the roles and permissions assigned to the current user by the System Administrator.

The Manage application is used to create new elections, archive and restore elections, and export signed elections.

The Users application is used to create and manage Vanguard users and write security tokens.

The Settings application is used to perform additional workstation functions such as setting the clock and exporting file hashes.

Additionally, unlockable applications may be displayed on the lower right of the Home screen. These applications provide additional functionality when working with elections in Vanguard.

Vanguard Define (Pre-Election EMS)
Vanguard Define is a component of the Verity Vanguard voting system used by election officials to enter election data for contests, candidates, proposition text, translations, and audio. Vanguard Define also provides the user with controls for proofing of data and layout and performs validation prior to locking the data to ensure its readiness for use in Vanguard Deploy, the election definition software.

Vanguard Deploy (Pre-Election EMS)
Vanguard Deploy is used by officials to complete pre-voting tasks for creating and generating an election definition and ballots. Vanguard Deploy provides a ballot layout proofing process. The process establishes relationships between election data, jurisdiction, and polling place data, for the shared election definition. Vanguard Deploy will create the portable media, vDrives, to provide a method of transferring the shared election definition to Verity Vanguard voting devices and workstations.
Note that Vanguard Define and Vanguard Deploy share the same environment, so are fielded on the same workstation.
Vanguard Define/Deploy can include a stand-alone workstation or multiple Vanguard Capture workstations that are networked on a closed LAN in a server/client configuration. The closed LAN cannot connect to other LANs or systems, ensuring the air gap remains for security of data.

Vanguard Capture (Central Scan)
Vanguard Capture is used by officials for paper ballot scanning, contest resolution, and conversion of voter selection marks to electronic Cast Vote Records (CVRs). Once the CVRs are written to vDrive(s) they can be transferred into Vanguard Results for vote tabulation and reporting of election results. Vanguard Capture records cast vote records only; it does not tabulate.
Vanguard Capture can include a stand-alone workstation or multiple Vanguard Capture workstations that are networked on a closed LAN in a server/client configuration. The closed LAN cannot connect to other LANs or systems, ensuring the air gap remains for security of data.

Vanguard Results (Post-Election EMS)
Vanguard Results is used by officials to complete post-voting functionality to tabulate election results and generate reports. Vanguard Results receives the CVRs from portable media devices (vDrives) used to record CVRs from Vanguard Vault devices or Vanguard Capture workstations. Vanguard Results can be used by officials to resolve Vault or Vanguard Capture write-in votes for paper ballots that were manually marked.
Vanguard Results can also be used to collect and store all election logs from every Verity Vanguard device used in the election, allowing for complete election audit log reviews.
Vanguard Results can include a stand-alone workstation or multiple Vanguard Results workstations that are networked on a closed LAN in a server/client configuration. The closed LAN cannot connect to other LANs or systems, ensuring the air gap remains for security of data.

Vanguard Manage (EMS)
Vanguard Manage is available only within server and standalone workstation software applications. This software enables authorized users to add, copy, import, export, archive, restore, and manage elections. Once an election is added or imported in the Election Management application, the election can be opened and handled per the features available within the Vanguard software installed on that workstation.

Vanguard Boost (Polling Place Ballot Issuance)
Vanguard Boost is a poll worker facing device designed to improve voter service by optimizing ballot issuance in the polling place. Vanguard Boost can be utilized by poll workers in two ways. Boost may be used to print blank paper ballots on demand, using an attached ballot printer. Boost may also be used to issue VotePasses, which allow voters to access, mark, and print a printed vote record using Vanguard Flex or Adapt. Vanguard Boost does not store vote data.

Vanguard Flex (Polling Place BMD)
Vanguard Flex is a universal ballot marking device that produces an auditable summary ballot of a voter's choices. Voters can mark their ballots using the touchscreen interface or a wide variety of accessible controls. Printed summary ballots are then scanned in Verity Vault for tabulation. New to Vanguard 1.1, Vanguard Flex now supports a full-faced ballot, utilizing an attached external printer.

Vanguard Vault (Polling Place Precinct Scanner)

Vanguard Vault is a polling place scanning device that captures voter choices whether using ballots marked by hand or machine, including summary ballots (printed vote records (PVRs)), utilizing OCR technology to count/process summary ballots. Vault can print a unique identifier to the ballot following scanning using an optional purpose-built Imprinter.

Vanguard Adapt (Polling Place Limited Dexterity Mark, Verify and Cast device)
Vanguard Adapt is an all-in-one voting device that produces an auditable summary ballot of a voter's choices. Voters can mark their ballots using the touchscreen interface or a wide variety of accessible controls. Vanguard Adapt enables voters to mark, verify, and cast their ballot all without touching a piece of paper.

Vanguard Libraries (EMS)
Vanguard Libraries is an application that can be unlocked on any Vanguard Define/Deploy workstation. Libraries allows users to save translations and audio from any Vanguard election and use them in future elections. Translations and audio in Vanguard Libraries can be imported into any election in the Vanguard Define application on the same workstation.

Vanguard Test Decks (EMS)
Vanguard Test Decks is an application that can be unlocked on any Vanguard Define/Deploy workstation. Test Decks allows users to generate a pre-marked set of ballots (a “Test Deck”) that can be used for Logic and Accuracy Testing of the Vanguard voting system. Test Decks allows users to select a marking pattern and generate a test deck which is then available to print and/or export within the Vanguard Deploy software application.

Vanguard Ranked Choice (EMS)
Vanguard Ranked Choice is an application that can be unlocked on any Vanguard Results workstation. Ranked Choice allows users to perform tabulation of ranked choice contest results that have been read into Vanguard Results.

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 Vanguard 1.1** 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 October 13th through November 4th, 2025.

1.2 References

1. Election Assistance Commission Voluntary Voting System Guidelines version 2.0 (EAC VVSG v2.0)
2. VVSG v2.0, Test Assertions version 1.3
3. NIST Handbook 150: 2020.
4. NIST Handbook and 150-22: 2021.
5. EAC Voting System Testing and Certification Program Manual, United States Election Assistance Commission, v 3.0.
6. SLI Compliance VSTL Quality System Manual, v4.4, prepared by SLI Compliance, dated July 21, 2025.

1.3 Terms and Abbreviations

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

Table 1 – Terms and Abbreviations

Term	Abbreviation	Description
Ballot Marking Device	BMD	An accessible computer-based voting system that produces a marked 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 ballotand/or vote results data.
Commercial Off the Shelf	COTS	Term used to designate computer software, hardwareor accessories that are ready-made and available for sale, lease, or license to the general public

Election Assistance Commission	EAC	An independent, bipartisan commission created bythe 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.
Functional Configuration Audit	FCA	The testing activities associated with the functional testing of the system.
National Instituteof 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.
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 Interpretation	RFI	A means used by testing laboratories and manufacturers to request that the EAC provide an interpretation of a technical issue related to testing of voting systems.
Requirement Matrix	N/A	A matrix that traces the VVSG requirements to the various test modules and test methods.
Technical DataPackage	TDP	The data package supplied by the vendor which includes Specifications, End-user documentation, Procedures, System Overview, Configuration Management Plan, Quality Assurance Program, and manuals for each of the required hardware, software, firmware components ofa 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 SystemTest Lab	VSTL	An independent testing organization accredited by NVLAP and the EAC to conduct voting system testing for EAC certification.

1.4 Appendices and Attachments

This test report contains the following Appendices and Attachments,

- Appendices:
  - Appendix A – Mapping of Modification to Requirements and Components
  - Appendix B – Verity Vanguard 1.1 Technical Data Package Listing
  - Appendix C – Verity Vanguard 1.1 Custom and COTS Software/Firmware
  - Appendix D – Verity Vanguard 1.1 Components
  - Appendix E – Ancillary Products
- Attachments:
  - Attachment A – Verity Vanguard 1.1 Implementation Statement
  - Attachment B – Hart InterCivic Verity Vanguard 1.1 Modification Test Plan - As Run
  - Attachment C – Verity Vanguard 1.1 Record of Trusted Build
  - Attachment D – Verity Vanguard 1.1 Hashes
  - Attachment E – Source Code Reviewed and Results – PROPRIETARY
  - Attachment F – Test Suites – PROPRIETARY

2 Certification Test Background

2.1 Revision History

- Verity Vanguard 1.0 was the initial iteration of the Verity Vanguard voting system, certified to VVSG 2.0, and was assigned EAC Certification Number “HRT-VV-1.0”, on July 7th, 2025
- Verity Vanguard 1.1 is the first modification applied to the EAC certified Verity Vanguard voting system

2.2 Scope of testing

2.2.1 Modification Overview

Verity Vanguard 1.1 is a modification of the EAC certified **Verity Vanguard 1.0** voting system.

The modifications to **Verity Vanguard 1.1** address multiple aspects of the system, including features for all devices and workstations, as well as associated documentation updates.

2.2.1.1 Detailed list of changes

The following bulleted items details changes implemented in Verity Vanguard 1.1,

- Support for printing a full ballot from Flex with an external COTS printer – Driven by a distinct software load with no change to device hardware, Flex can now be paired with

a COTS printer (HP LaserJet Pro 4001dn) to print a full ballot.

- Updated Privacy Screens – Flex now supports a new privacy screen configuration to physically block the onboard thermal ballot printer to avoid voter confusion when used with the full ballot configuration.
- Updated configuration control – Vanguard now supports the ability to define the ballot marking configuration. In “Manage” users can select “Paper Ballot”, “Printed Vote Records”, or “Paper Ballots and Printed Vote Records” as the configuration type. When only “Paper Ballot” is selected, Define and Deploy hide unrelated “PVR” only fields for data entry.
- Vanguard ID indicator update – Vanguard ID includes an onscreen indicator on Flex for at-a-glance verification of the configured ballot type. The Vanguard ID screen will indicate “PVR” for summary ballots and “Paper” for full ballots.
- Support for the DJI brand Power 1000 UPS. This UPS may be used on the Vanguard workstations or with an external printer attached to the Flex and Boost. This UPS is included in the modification as the existing Duracell DR660PSS model is end of life.
- Support for a new workstation monitor model, the HP 324pf for use on all Vanguard workstations deployments. This monitor is included in the modification as the HP P24 G5 model is end of life.
- Telerik UI for WPF, a third-party library used on workstation applications for UI development, is updated from 2023.2.606.45 to 2025.1.211.462.
- A second supported paper option is added for the Adapt device, Hammermill Premium Color Copy paper (102467)

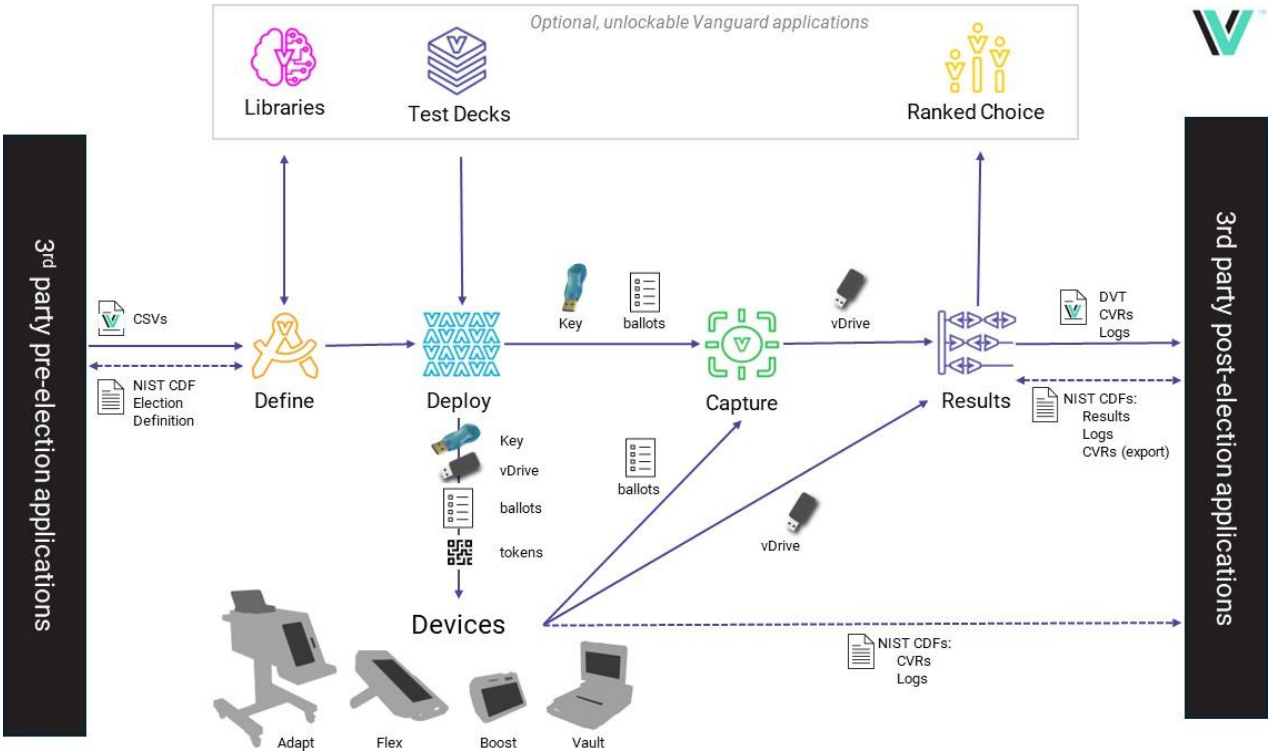
Defect Corrections

- Unclear Warning Message for Cross-Party Endorsement Functionality
- Contextual Help Screen when Create Recovery vDrive is completed mentions “Count”
- Next Unresolved button used for locating unresolved write-ins may not display the next sequential record
- The Brother HL-L6400DWVS printer, prints reports in Duplex by default (flip on long edge), inconsistent with other printers that print reports in Simplex
- A Closed Primary Entity Election may be successfully created via CSV data import when when the “AllowNonPartisanVotingOnThis Contest” value is set to true

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

2.2.2 Verity Vanguard 1.1 Block Diagram

The **Verity Vanguard 1.1** system is composed of software applications, central count location devices and polling place devices with accompanying firmware, and COTS hardware and software.



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.

2.2.3 Supported Languages

Verity Vanguard 1.1 supports the following 19 languages:

* English	* Thai	* Hmong	* Mandarin Chinese
* Spanish	* Gujarati	* Lao	* Vietnamese
* Japanese	* Tagalog	* Hawaiian	* Haitian Creole
* Korean	* Ilocano	* Punjabi	* Cantonese Chinese
* Khmer	* Hindi	* Bengali	

2.2.4 Applicable VVSG 2.0 Requirements

Please see "Appendix A – Requirements to Modifications" for a full listing of Modifications, and the applicable VVSG 2.0 requirements that each was verified against.

2.2.5 Applicable VVSG 2.0 RFIs

All EAC "Requests For Interpretation" are incorporated within the SLI test methods, which are utilized for testing efforts.

2.2.6 Applicable NOCs

No current Notices of Clarifications were incorporated in this test report.

3 Test Findings and Recommendation

3.1 Summary Finding and Recommendation

Verity Vanguard 1.1 is a modification of Verity Vanguard 1.0 designed to conform to VVSG 2.0. Please see "Appendix A – Mapping of Modification to Requirements and Components" for a listing of modifications implemented.

3.1.1 Hardware Testing

No Hardware testing was required for this test effort.

3.1.2 System Level Testing

SLI Compliance performed tests designed to functionally verify the modifications listed in the table in section "2.2.1.1 Detailed list of changes". of this report, as well as additional regression testing to verify the continued robustness of the overall voting system.

The following sections detail the test suites that were executed.

3.1.2.1 Modifications

The Modification test suite examined each modification introduced into **Verity Vanguard 1.1** in order to verify that the modifications implemented, and the subsequent Trusted Build of the software/firmware, did not adversely affect operations.

3.1.2.2 Security

The Security test suite was executed to verify the security posture of the

Verity Vanguard 1.1 system has remained unchanged from the baseline system, given the introduction of an external printer to the Flex BMD.

3.1.2.3 General Election

General Election test suites were executed in order to verify proper integration of the full **Verity Vanguard 1.1** system, and that all components continue to work as expected.

In this test campaign, the **Verity Vanguard 1.1** voting system was subjected to examination for modifications made from the previously certified system, **Verity Vanguard 1.0**, against applicable requirements within the EAC VVSG 2.0.

All components of the **Verity Vanguard 1.1** voting system have successfully passed all tests.

3.1.3 Source code review

SLI Compliance has reviewed all modified software source code for each application in the Verity Vanguard 1.1 voting system to determine the code's compliance with the EAC VVSG 2.0 and for compliance with HART's internally developed coding standards. Verity Vanguard 1.1 is implemented with the C, C++, and C# languages.

As a modification project, the Verity Vanguard 1.1 code base was reviewed using the final Verity Vanguard 1.0 code as the baseline, to which the Verity Vanguard 1.1 code base was compared. The differences found between those two code bases served as the starting point of the code review.

The modified source code is written adequately in terms of the VVSG 2.0. 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 2.0 and Hart declared industry standards.

3.1.4 TDP Review

As this is a modification project, SLI Compliance reviewed the Verity Vanguard 1.1 TDP against the final TDP for Verity Vanguard 1.0. The differences between the two TDPs were reviewed for compliance with the EAC VVSG 2.0. The documents that are a part of the Verity Vanguard 1.1 system are detailed in "Appendix B – TDP Listing" of this document.

The modified documentation within the Technical Data Package for the Verity Vanguard 1.1 voting system was found to comply with all applicable standards.

3.2 Anomalies and Resolutions

No Anomalies were found in this test effort.

3.3 Deficiencies and Resolutions

No Deficiencies were found in this test effort.

4 Recommendation for Certification

SLI Compliance has successfully completed the testing of the **Hart Verity Vanguard 1.1** voting system. It has been determined that the system meets the required acceptance criteria of the Election Assistance Commission's Voluntary Voting System Guidelines 2.0. This recommendation reflects the opinion of SLI Compliance based on testing scope and results. It is SLI Compliance's recommendation based on this testing effort that the EAC grant certification of the **Hart Verity Vanguard 1.1** voting system.

Signature

Michael Santos

Michael Santos
Director, VSTL SLI Compliance
April 23rd, 2026

Appendix A – Mapping of Modification to Requirements and Components

Modification	Requirement(s)	Component
Support for printing a full ballot from Flex with an external COTS printer – Driven by a distinct software load with no change to device hardware, Flex can now be paired with a COTS printer (HP LaserJet Pro 4001dn) to print a full ballot.	3.1.2-D – Processing capabilities 4.3-A – Standard device interfaces 4.4-A – COTS devices meet applicable requirements 12.1-A – Unauthorized physical access 12.1-B – Unauthorized physical access alert 12.1-C – Disconnecting a physical device 12.1-D – Logging of physical connections and disconnections 12.2-A – Physical port and access least functionality 12.2-B – Physical port auto-disable 12.2-D – Disabling ports 12.2-E – Logging enabled and disabled ports 15.1-D – Logging event types	Flex BMD Vault PCOS Capture CCS (Note that Vault and Capture will be used to verify that ballots can be read and tabulated)
Updated Privacy Screens – Flex now supports a new privacy screen configuration to physically block the onboard thermal ballot printer to avoid voter confusion when used with the full ballot configuration.	6.1-A – Preserving privacy for voters	Flex BMD
Updated configuration control – Vanguard now supports the ability to define the ballot marking configuration. In “Manage” users can select “Paper Ballot”, “Printed Vote Records”, or “Paper Ballots and Printed Vote Records” as the configuration type. When only “Paper Ballot” is selected, Define and Deploy hide unrelated “PVR” only fields.	3.1.2-D – Processing capabilities	Define EMS Deploy EMS Adapt BMD Flex BMD Vault PCOS Capture CCS
Vanguard ID indicator update – Vanguard ID includes an onscreen indicator on Flex for at-a-glance verification of the configured ballot type. The Vanguard ID screen will indicate “PVR” for summary ballots and “Paper” for full ballots.	3.1.2-D – Processing capabilities	Flex BMD

Modification	Requirement(s)	Component
New Supported COTS Equipment		
Support for the DJI brand Power 1000 UPS. This UPS may be used on the Vanguard workstations or with an external printer attached to the Flex and Boost. This UPS is included in the modification as the existing Duracell DR660PSS model is end of life.	3.1.2-D – Processing capabilities 2.7-H – Power outages, sags, and swells	Define EMS Deploy EMS Boost PPBI Flex BMD Capture CCS Results EMS
Support for a new workstation monitor model, the HP 324pf for use on all Vanguard workstations deployments. This monitor is included in the modification as the HP P24 G5 model is end of life.	3.1.2-D – Processing capabilities	Define EMS Deploy EMS Capture CCS Results EMS
Other Updates		
Telerik UI for WPF, a third-party library used on workstation applications for UI development, is updated from 2023.2.606.45 to 2025.1.211.462.	3.1.2-D – Processing capabilities 2.3-B – Legacy library units 3.1.1-D – Identify software and firmware by origin 3.1.4-B – Software information	Define EMS Deploy EMS Capture CCS Results EMS
A second supported paper option is added for the Adapt device, Hammermill Premium Color Copy paper (102467)	2.1.1-C – Durability of paper 3.1.6-M – Ballot stock specification	Adapt BMD
Defect Corrections		
Unclear Warning Message for Cross-Party Endorsement Functionality	3.1.2-D – Processing capabilities 7.3-A – System-related errors	Adapt BMD
Contextual Help Screen when Create Recovery vDrive is completed mentions “Count”	3.1.2-D – Processing capabilities	Boost PPBI Adapt BMD Flex BMD Vault PCOS
Next Unresolved button used for locating unresolved write-ins may not display the next sequential record	3.1.2-D – Processing capabilities	Capture CCS
The Brother HL-L6400DWVS printer prints reports in Duplex by default (flip on long edge), inconsistent with other printers that print reports in Simplex	3.1.2-D – Processing capabilities	Results EMS

Modification	Requirement(s)	Component
A Closed Primary Entity Election may be successfully created via CSV data import when when the "AllowNonPartisanVotingOnThis Contest" value is set to true	3.1.2-D – Processing capabilities 7.3-A – System-related errors	Define EMS

Appendix B – Verity Vanguard 1.1 Technical Data Package Listing

- 4007010 Flex Hardware Pack.pdf
- 4007020 Boost Hardware Pack.pdf
- 4007030 Vault Hardware Pack.pdf
- 4007040 Adapt Hardware Pack.pdf
- 4007050 Imprinter Hardware Pack.pdf
- 4007060 Ballot Box Hardware Pack.pdf
- 4007061 Booth Hardware Pack.pdf
- 4007062 Accessible Booth Hardware Pack.pdf
- 6700-002 A03_Vanguard_1.1_System Administrators Guide.pdf
- 6710-008 A01_Vanguard_1.1_Define User Guide.pdf
- 6710-009 A02_Vanguard_1.1_Deploy User Guide.pdf
- 6710-010 A02_Vanguard_1.1_Capture User Guide.pdf
- 6710-011 A02_Vanguard_1.1_Results User Guide.pdf
- 6710-012 A00_Vanguard_1.1_Test Decks User Guide.pdf
- 6710-013 A00_Vanguard_1.1_Libraries User Guide.pdf
- 6710-014 A00_Vanguard_1.1_Ranked Choice User Guide.pdf
- 6720-006 A00_Vanguard_1.1_Boost Polling Place Guide.pdf
- 6720-007 A00_Vanguard_1.1_Adapt Polling Place Guide.pdf
- 6720-008 A00_Vanguard_1.1_Flex Polling Place Guide.pdf
- 6720-009 A00_Vanguard_1.1_Flex Polling Place Guide - Full Ballot.pdf
- 6720-010 A00_Vanguard_1.1_Vault Polling Place Guide.pdf
- 6720-011 A01_Vanguard_1.1_Vault Polling Place Guide w Imprinter.pdf
- 6730-006 A01_Vanguard_1.1_Boost Device Support Guide.pdf
- 6730-007 A01_Vanguard_1.1_Adapt Device Support Guide.pdf
- 6730-008 A01_Vanguard_1.1_Flex Device Support Guide.pdf
- 6730-009 A01_Vanguard_1.1_Flex Device Support Guide - Full Ballot.pdf
- 6730-010 A01_Vanguard_1.1_Vault Device Support Guide.pdf
- 6730-011 A02_Vanguard_1.1_Vault Device Support Guide w Imprinter.pdf
- 6740-001 C_Vanguard_Ballot Printing Guide.pdf
- Change Notes Verity Vanguard 1.0 to 1.1 1000834 A00.pdf
- Hart Verity Vanguard Election Worker Usability Test Report 1000818 A00.pdf
- Hart Verity Vanguard Voter Usability Test Report 1000819 v1.1.pdf
- HartLogo.jpg
- REP082794TRFSAF[VV-500, Boost].pdf
- REP082796TRFSAF[VV-400, Flex].pdf
- REP082798TRFSAF[VV-600, Vault].pdf
- REP090127TRFSAF[VV-700, Adapt].pdf
- System Overview Attachment, Benchmark Directory Listings.zip
- Vanguard 1.0 - QA Test Cases and Results 1000821 A02.pdf
- Vanguard 1.0 VVSG 2.0 and Ext Test Case Mapping.pdf
- Vanguard 1.1 System Overview 1000812 B03.pdf
- Vanguard CDF Specification 1000803 A02.pdf

- Vanguard Creation of the Trusted Build Environment 1000811 B01.pdf
- Vanguard Device Deployment Process 1000824 A01.pdf
- Vanguard Durability Estimation and Warranty Model 1000820 A01.pdf
- Vanguard Event Code Specification 1000804 A03.pdf
- Vanguard Hart Formats Specification 1000805 A00.pdf
- Vanguard Manual Application Hash Validation 1000828 A02.pdf
- Vanguard MCUs Build and Flash Procedure 1000822 A00.pdf
- Vanguard Paper Specifications 1000802 A03.pdf
- Vanguard Quality Conformance Procedures 1000806 A01.pdf
- Vanguard Risk and Threat Assessment 1000799 A02.pdf
- Vanguard Supply Chain Risk Management 1000823 A01.pdf
- Vanguard User-centered Design Report 1000817 A00.pdf
- Vanguard Vulnerability Management Plan 1000807 A00.pdf
- Vanguard Win10 Baseline Security 1000815 A02.pdf
- Vanguard Workstation Deployment Process 1000808 A05.pdf
- Vanguard-1.1.0_08_09_2025.pdf
- Verity Vanguard 1.1 Device OS Creation & Configuration 1000810 B00.pdf
- Verity Vanguard 1.1 Implementation Statement 1000833 A01.pdf
- Verity Vanguard 1.1 Performance Specifications 1000813 B00.pdf
- Verity Vanguard 1.1 Usability Impact Statement.pdf
- Verity Vanguard 1.1 Workstation OS Creation & Configuration 1000809 B00.pdf
- Verity Vanguard Coding Standard 1000826 A01.pdf
- Verity Vanguard Software Architecture and Design Overview 1000796 A01.pdf
- VV110_DeviceSoftwareInfo.pdf
- VV110_WorkstationSoftwareInfo.pdf
- VVanguard_Small.png
- _TDPindex.html

Appendix C – Verity Vanguard 1.1 Custom and COTS Software/Firmware

The table below lists each custom application employed by the **Hart Verity Vanguard 1.1** voting system.

Verity Vanguard 1.1 Software and Firmware

Software	Application	Version
Vanguard Define	EMS Software	1.1.0
Vanguard Deploy	EMS Software	1.1.0
Vanguard Capture	High-Speed Optical Scanner Software	1.1.0
Vanguard Results	Central Count Location Tabulation and Report Software	1.1.0
Vanguard Vault	Optical Scanner Firmware	1.1.0
Vanguard Adapt	BMD Firmware	1.1.0
Vanguard Flex	BMD Firmware	1.1.0
Vanguard Boost	Ballot Issuance Firmware	1.1.0
Imprinter Firmware	Precinct Imprinter for use with Vault	REV 7
Touch Sensor Firmware	For use with all Polling Place Devices	REV 19
Verity Access Firmware	Accessibility Controller	1.0.1
Main MCU Firmware	For use with all Polling Place Devices	REV 47

Hashes for each **Verity Vanguard 1.1** component are located in “Attachment D – Verity Vanguard 1.1.0 Hashes”.

The tables below detail the Commercial Off The Shelf software and firmware utilizedwithin the **Verity Vanguard 1.1** voting system

Table 2 – Verity Vanguard 1.1 COTS Software/Firmware

Workstations (Define/Deploy, Capture, Results)		
Manufacturer	**Application**	**Version**
Microsoft	Windows 10 Enterprise 2021 LTSC, configured for kiosk operation	10.0.19044
Microsoft	SSRS - SQL Server Standard 2019	15.0.8270.42049
Microsoft	SQL Server Standard 2019	15.0.4316.3
McAfee	McAfee Application Control for Devices ("Solidifier")	8.3.5.126
Maxim	1-Wire Driver	4.1.0
Open Source	OWdotNET	0.9.0.0

Microsoft	Visual Studio C++ 2015-2022 Redistributable x86	14.36.32532.0
Microsoft	Visual Studio C++ 2015-2022 Redistributable x64	14.36.32532.0
Open Source	Tesseract Open Source OCR Engine	4.5.2.411
Brother	Brother HL-L6400DWVS Printer Driver	1.8.168.8
HP	HP LaserJet Pro 4001 4002 4002 4004 PCL 6	8.00.2101.9302
OKI Data	OKI C844 (PCL)	1.0.0.0
Canon	DR-G2000 Series Driver	1.1.11807.24001SP2
NVIDIA	NVIDIA Quadro P400 Driver	31.0.15.2748
NVIDIA	Z4G4 NVIDIA HD Audio Driver	1.3.39.16
Intel	Z2G9 Intel Graphics	31.0.101.4502
Microsoft	Help Viewer	2.3.28307
Microsoft	Visual Studio C++2013 Redistributable x64	12.0.30501.0
Microsoft	Visual Studio C++2013 Redistributable x86	12.0.30501.0
IntoPrint	SP1360(PCL6) Driver	1.0.0.0
empira Software GmbH	PDFSharp	1.50.5147.0
Open Source	Automapper	2.2.0.0
Open Source	MVVMLight	4.0.23.37706
Neodynamic ARL	Barcode Professional	11.0.23.223
Intel	Integrated Performance Primitives	2021.5.3.585
Open Source	NAudio	1.7.3.0
Open Source	NHibernate	3.3.1.4000
Prism Software,LLC	Prism	4.1.0.0
Open Source	SoundTouch	1.7.1.0
Microsoft	Unity	2.1.505.2
Open Source	OTP-Sharp	1.0.0
Open Source	Zxing.NET	0.16.4.0
Websupergoo	ABCpdf	12.3.0.0
Microsoft	Devcon	6.1.7600.16385
Telerik	UI for WPF	2025.1.211.462
Telerik	Reporting	18.1.24.709
Okidata	OKIWinIO	1.8.2.2
Open Source	Math.NET Numerics	2.6.1.30
Open Source	Zxcvbn C#/.NET	7.0.92
Microsoft	.NET Framework Runtime	4.8.1

Devices (Vault, Flex, Adapt, Boost)		
Manufacturer	**Application**	**Version**
Microsoft	Windows 10 Enterprise 2021 LTSC, configured for kiosk operation	10.0.19044
Microsoft	SQLite	3.45.3
McAfee	McAfee Application Control for Devices ("Solidifier")	8.3.5.126
Maxim	1-Wire Driver	4.1.0
Open Source	OWdotNET	0.9.0.0
Microsoft	Visual Studio C++ 2015-2022 Redistributable x86	14.36.32532.0
Microsoft	Visual Studio C++ 2015-2022 Redistributable x64	14.36.32532.0
Seiko Instruments	SII IFD50x Driver	2.5.0.0
Open Source	Tesseract Open Source OCR Engine	4.5.2.411
Brother	Brother HL-L6400DWVS Printer Driver	1.8.168.8
PDI	PageScan Scanner SDK	7.2.17
PDI	PageScan USB Scanner Driver	4.0.0301.13
PDI	PDIPrintScanCut Driver for TPH850 Printer	4.1.0.0
HP	HP LaserJet Pro 4001 4002 4002 4004 PCL 6	8.00.2101.9302
HP	HP OfficeJet 200 Mobile Series	20.79.1.6738
OKI Data	OKI C844 (PCL)	1.0.0.0
empira Software GmbH	PDFSharp	1.50.5147.0
Open Source	Automapper	2.2.0.0
Open Source	MVVMLight	4.0.23.37706
Neodynamic ARL	Barcode Professional	11.0.23.223
Intel	Integrated Performance Primitives	2021.5.3.585
Open Source	Math.NET Numerics	2.6.1.30
Open Source	NAudio	1.7.3.0
Open Source	NHibernate	3.3.1.4000
Prism Software, LLC	Prism	4.1.0.0
Open Source	SoundTouch	1.7.1.0
Microsoft	Unity	2.1.505.2
Open Source	OTP-Sharp	1.0.0
Open Source	Zxing.NET	0.16.4.0
Open Source	Zxcvbn C#/.NET	7.0.92
Brother	brUSBMon Printer Interface, x64	1.0.0.0
Brother	brUSBMon Printer Interface, x86	1.0.1.0
Microsoft	Devcon	6.1.7600.16385
Telerik	Reporting	18.1.24.709

Microsoft	.NET Framework Runtime	4.8.1
Microsoft	Brother Ports Driver	01.02.00.00
SECO	Chipset Device	10.1.19222.8341
SECO	CSME_SW_2306.4.10.0_Consumer	2306.4.10.0
Intel	Intel Graphics Driver	31.0.101.2115
SECO	HID Event Filter	2.2.2.1
SECO	Programmable Services Engine Windows Drivers	1.0.10099.968
SECO	Serial IO	5.123.1.1025
SECO	Smart Sound Technology	10.30.00.7090
Okidata	OKIWinIO	1.8.2.2

Appendix D – Verity Vanguard 1.1 Components

The **Hart Verity Vanguard 1.1** voting system consists of the following software and hardware components:

Table 4 – Verity Vanguard 1.1 Components

Component	Software Version	Component Type	High Level Functions and Capabilities

Manage	1.1.0	Workstation	• Verity Vanguard Workspace Module
			• Import, export, archive, restore, manage elections
			• Runs on the following COTS workstations and monitors:
			  ○ HP Z2 SFF G9 workstation
			  ○ HP Z4 G4 workstation
			  ○ 324pf, P24 G5, P24 G4, P244 monitors
			• Compatible with the following COTS UPS devices:
			  ○ Duracell DR660PSS
			  ○ EATON 5P1500
			  ○ DJI Power 1000

Define	1.1.0	Workstation	• Verity Vanguard Workspace Module
			• Included in the same Workspace as Deploy
			• Enter data associated with jurisdictions, polling places, contests, candidates, proposition text, etc.
			• Ballot Design
			• Create election-specific audio
			• Enter translations
			• Lock the election data
			• Runs on the following COTS workstations and monitors:
			  ○ HP Z2 SFF G9 workstation
			  ○ HP Z4 G4 workstation
			  ○ 324pf, P24 G5, P24 G4, P244 monitors
			• Compatible with the following COTS printers:
			  ○ Brother HL-L6400DW series mono laser printer
			  ○ Brother HL-EX415DW series mono laser printer
			  ○ HP LaserJet Pro 4001dn series

Component	Software Version	Component Type	High Level Functions and Capabilities
			mono laser printer • Supports local networked configuration for scale, compatible with the following COTS Ethernet switches: ○ HP 1405-8GV3 8-port Ethernet Switch ○ HPE R8R45A 8-port Ethernet Switch • Compatible with the following COTS UPS devices: ○ Duracell DR660PSS ○ EATON 5P1500 ○ DJI Power 1000
Deploy	1.1.0	Workstation	• Verity Vanguard Workspace Module • Included in the same Workspace as Define • Ballot definition and proofing • Set voting device options • Production for ballots and electronic election media • Runs on the following COTS workstations and monitors: ○ HP Z2 SFF G9 workstation ○ HP Z4 G4 workstation ○ 324pf, P24 G5, P24 G4, P244 monitors • Compatible with the following COTS printers: ○ Brother HL-L6400DW series mono laser printer ○ Brother HL-EX415DW series mono laser printer ○ HP LaserJet Pro 4001dn series mono laser printer ○ OKI Data C831dn color laser printer ○ OKI Data C844dn color laser printer ○ OKI Data C911dn color laser printer ○ OKI Data C931e color laser printer ○ IntoPrint SP1360 color laser printer • Supports local networked configuration for scale, compatible with the following COTS Ethernet switches:

Component	Software Version	Component Type	High Level Functions and Capabilities
			○ HP 1405-8GV3 8-port Ethernet Switch ○ HPE R8R45A 8-port Ethernet Switch • Compatible with the following COTS UPS devices: ○ Duracell DR660PSS ○ EATON 5P1500 ○ DJI Power 1000 • Compatible with the following USB Duplicators ○ VinPower Digital 23 target USBDupeBoxES-23T, USBShark-23TBK ○ VinPower Digital 7 target USBShark-7T-BK
Capture	1.1.0	Workstation	• Verity Vanguard Workspace Module • Central scanning • Adjudication • Runs on the following COTS workstations and monitors: ○ HP Z2 SFF G9 workstation ○ HP Z4 G4 workstation ○ 324pf, P24 G5, P24 G4, P244 monitors • Compatible with the following COTS printers: ○ Brother HL-L6400DW series mono laser printer ○ Brother HL-EX415DW series mono laser printer ○ HP LaserJet Pro 4001dn series mono laser printer • Compatible with the following COTS scanners ○ Canon DR-G2110 High-Speed scanner ○ Canon DR-G2140 High-Speed scanner • Supports local networked configuration for scale, compatible with the following COTS Ethernet switches:

Component	Software Version	Component Type	High Level Functions and Capabilities
			○ HP 1405-8GV3 8-port Ethernet Switch ○ HPE R8R45A 8-port Ethernet Switch • Compatible with the following COTS UPS devices: ○ Duracell DR660PSS ○ EATON 5P1500 ○ DJI Power 1000
Results	1.1.0	Workstation	• Verity Vanguard Workspace Module • Vote tabulation • Election results reports • Election audit reports • Runs on the following COTS workstations and monitors: ○ HP Z2 SFF G9 workstation ○ HP Z4 G4 workstation ○ 324pf, P24 G5, P24 G4, P244 monitors • Compatible with the following COTS printers: ○ Brother HL-L6400DW series mono laser printer ○ Brother HL-EX415DW series mono laser printer ○ HP LaserJet Pro 4001dn series mono laser printer • Supports local networked configuration for scale, compatible with the following COTS Ethernet switches: ○ HP 1405-8GV3 8-port Ethernet Switch ○ HPE R8R45A 8-port Ethernet Switch • Compatible with the following COTS UPS devices: ○ Duracell DR660PSS ○ EATON 5P1500 ○ DJI Power 1000
Ranked Choice	1.1.0	Workstation	• Verity Vanguard Workspace Module • Optional unlockable application included in the same Workspace

Component	Software Version	Component Type	High Level Functions and Capabilities

			as Results
			• Round-by-round results and reporting for ranked choice contests
			• Runs on the following COTS workstations and monitors:
			  ○ HP Z2 SFF G9 workstation
			  ○ HP Z4 G4 workstation
			  ○ 324pf, P24 G5, P24 G4, P244 monitors
			• Compatible with the following COTS printers:
			  ○ Brother HL-L6400DW series mono laser printer
			  ○ Brother HL-EX415DW series mono laser printer
			  ○ HP LaserJet Pro 4001dn series mono laser printer
			• Compatible with the following COTS UPS devices:
			  ○ Duracell DR660PSS
			  ○ EATON 5P1500
			  ○ DJI Power 1000

Libraries	1.1.0	Workstation	• Verity Vanguard Workspace Module
			• Optional unlockable application included in the same Workspace as Define and Deploy.
			• Integrated text, translation, and audio recording archive for re-use between elections.
			• Runs on the following COTS workstations and monitors:
			  ○ HP Z2 SFF G9 workstation
			  ○ HP Z4 G4 workstation
			  ○ 324pf, P24 G5, P24 G4, P244 monitors
			• Compatible with the following COTS UPS devices:
			  ○ Duracell DR660PSS
			  ○ EATON 5P1500
			  ○ DJI Power 1000

Component	Software Version	Component Type	High Level Functions and Capabilities

Test Decks	1.1.0	Workstation	• Verity Vanguard Workspace Module
			• Optional unlockable application included in the same Workspace as Define and Deploy.
			• Automated Test Deck Creation, supporting the following patterns “1 to max,” “Variable pattern,” and “Rotating pattern.”
			• Creates pre-marked test decks to streamline Logic and Accuracy Testing
			• Runs on the following COTS workstations and monitors:
			  ○ HP Z2 SFF G9 workstation
			  ○ HP Z4 G4 workstation
			  ○ 324pf, P24 G5, P24 G4, P244 monitors
			• Compatible with the following COTS UPS devices:
			  ○ Duracell DR660PSS
			  ○ EATON 5P1500
			  ○ DJI Power 1000

Boost	1.1.0	Polling Place Device	• Multipurpose poll worker device for ballot issuance
			• Prints blank ballots on demand for hand-marked configurations
			• Prints VotePass self-service ballot activation tickets for use on Flex
			• Compatible with the following COTS printers:
			  ○ Brother HL-L6400DW series mono laser printer
			  ○ Brother HL-EX415DW series mono laser printer
			  ○ HP LaserJet Pro 4001dn series mono laser printer
			  ○ OKI Data C844dn color laser printer
			• Supports AutoBallot which is compatible with the following COTS barcode scanners:
			  ○ Motorola/Zebra DS4308 handheld barcode scanner
			  ○ Zebra Technologies DS4608 handheld barcode scanner

Component	Software Version	Component Type	High Level Functions and Capabilities

			• Compatible with the following COTS UPS devices:
			  ○ Duracell DR660PSS
			  ○ DJI Power 1000

Flex	PVR:
	1.1.0
	
	Full Ballot:
	1.1.0
		Polling Place Device	• Ballot Marking Device
			• Option 1: Unique software load to print on integrated thermal printer.
			  ○ Prints full page, summary Printed Vote Record (PVR) ballots
			• Option 2: Unique software load to print on external laser thermal printer.
			  ○ Prints full marked ballots
			  ○ Compatible with the HP LaserJet Pro 4001dn series mono laser printer
			  ○ Includes privacy screen to cover integrated thermal printer slot
			  ○ Compatible with the following COTS UPS devices:
			  ▪ Duracell DR660PSS
			  ▪ DJI Power 1000
			• AC Power Pass-through supports up to 6 Flex devices or a maximum load of 9A.
			• Activated by poll worker or by voting with a VotePass self- service ticket generated by a poll worker from a Boost
			device's integrated report printer
			• May sit atop a tabletop or on an optional purpose-built booth that's available in Standard or Accessible configurations.
			• Two deployment positions to support optimum viewing angle for standing or sitting voters
			• Supports AutoBallot which is compatible with the following COTS barcode scanners:
			  ○ Motorola/Zebra DS4308 handheld barcode scanner
			  ○ Zebra Technologies DS4608 handheld barcode scanner
			• Supports the following full page framed

Component	Software Version	Component Type	High Level Functions and Capabilities
			magnifiers: ○ Bausch & Lomb 819007 ○ Inclusion Solutions 436
Vault	1.1.0	Polling Place Device	• Polling place scanner for hand marked ballots and PVR ballots generated from Flex • Sits atop a secure purpose-built collapsible Ballot Box • Scans hand marked, machine marked, and summary PVR ballots • Support for an optional purpose-built imprinter
Adapt	1.1.0	Polling Place Device	• All-in-one accessible voting device • Mark, verify, and cast paper ballots with a summary of a voter's choices • Integrated Ballot Bin • Utilizes the following COTS printer: ○ HP OfficeJet 200 inkjet printer • Supports AutoBallot which is compatible with the following COTS barcode scanners: ○ Motorola/Zebra DS4308 handheld barcode scanner ○ Zebra Technologies DS4608 handheld barcode scanner • Supports the following full page framed magnifiers: ○ Bausch & Lomb 819007 ○ Inclusion Solutions 436

Appendix E – 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 ATI Device
  - Model: AbleNet Dual Jelly Bean Switch 2007510
- Headphones for use on Verity Vanguard Access ATI
  - Model: HA310-2NP
- Sip-and-Puff device
  - Model: Tash 5101
- Full page framed magnifier for use with Verity Vanguard Adapt and Flex
  - Model: Bausch and Lomb 819007
- Full page framed magnifier for use with Verity Vanguard Adapt and Flex
  - Model: Inclusion Solutions 436

- **Verity Workstation Configurator** – Software used only on initial deployment of Verity workstation software to apply a unique workstation ID and client configuration, however the software itself is not included on deployed systems.

End of Certification Test Report