

Elections Systems Certification Program

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State Board Members - March 28, 2023

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Election Systems Certification Program

<u>1</u> OBJECTIVES

The North Carolina State Board of Elections (State Board) strives to ensure that North Carolina's elections systems meet current, secure and uniform technology standards and further the efficient administration of fair and accurate elections by state and county officials across North Carolina. It is the mission of the State Board to serve North Carolina's citizens by ensuring the integrity of elections processes and the accuracy of voter rolls; to provide local elections officials with reliable and uniform tools and policies; to facilitate and encourage participation in the democratic process; and to contribute to the field of elections administration for the benefit of North Carolina. The State Board carries out its mission by establishing uniform rules, policies, procedures, and practices mandated by its appointed members and its executive director, who serves as North Carolina's chief state elections official.

The following objectives are furthered by the agency's commitment to public transparency and compliance with the requirements of state and federal law.

- The State Board seeks to provide a systematic and transparent certification process to election technology vendors wishing to do business in North Carolina.
- Voting systems and technologies used in North Carolina must be reliable, accurate, user-friendly, accessible to persons with disabilities in accordance with the scope of certification, and capableof secure operation and maintenance. These attributes must be demonstrated prior to certification for use in North Carolina, and continually for so long as the product is used within this state.
- The State Board requires that all components of voting systems integrate seamlessly and securely with the state's comprehensive elections technology program.
- No component may inhibit or compromise the state's core goals or impede elections administration. The components themselves must be well-tested, secure, and promote fairness and accuracy in elections.

<u>2</u> AUTHORITY

2.1 GENERAL SUPERVISORY AUTHORITY

The State Board of Elections, under the authority granted to it by the North Carolina General Statutes, has general supervision over the primaries and elections in North Carolina and has the authority to make any reasonable rules and regulations with respect to the conduct of primaries and elections as it deems advisable, provided they do not conflict with any other provisions of the law. Consistent with this authority, the certification standards and procedures outlined in this document are applicable to all county boards of elections in North Carolina and apply to the administration of all elections in this state, including elections involving federal, state, county, municipal and local contests.

Unless otherwise directed by law, all processes affecting elections fall within the supervisory authority of the State Board. The North Carolina General Statutes direct the State Board to develop and administer requirements associated with voting systems and election technologies, the terms of which are set out in the Certification Program described herein (the "Program"). The State Board is required also to investigate irregularities and to ensure the overall integrity of the elections process. Accordingly, county boards of elections (CBE) may use only products that have been certified and that may be continuously reviewed for ongoing certification, as directed by the State Board.

2.2 AUTHORITY TO APPROVE OFFICIAL BALLOTS

The State Board approves the official ballots and voter instructions used in every election. Accordingly, the State Board may establish the scheduling, benchmarks, and tasks associated with this function. The State Board is responsible for composing model ballot instructions, which county boards of elections may amend, subject to approval by the State Board as part of the certification process, and the State Board may permit a county board of elections to place instructions elsewhere than on the official ballot itself, where placing them on the official ballot would be impractical. The State Board is responsible for certifying that the content and arrangement of the official ballot substantially complies with North Carolina law and any standards adopted by the State Board. Accordingly, the State Board proofs the official ballot template in every county, if practical, prior to production.

Administrative integrity and overall security of the elections process require that the State Board maintain and exercise plenary authority in any matter involving the coding of official ballots. In order to produce the data necessary for equipment programming and accurate tabulation, each county shall either contract with a vendor certified by the State Board, become certified by the State Board to produce the data, or receive the data from the State Board directly.

2.3 ONLY CERTIFIED VOTING SYSTEMS PERMITTED

Only voting systems certified by the State Board of Elections may be used in a North Carolina election, including any in any county, municipality, or other electoral district within the state. The State Board has authority, upon notice and hearing, to decertify types, makes, and models of voting systems or to decertify vendors.

2.4 ONGOING COMPLIANCE AND ALTERATION TO PROGRAM REQUIREMENTS

Initial certification of a voting system or election technology is subject to a vote in the affirmative from a majority of the appointed members of the State Board. Certification is a status to be maintained, not a terminal event. All vendors seeking initial certification or operating certified products within North Carolina must submit to all standards, mandates, and requirements imposed by the State Board, either directly by a majority of its appointed members or through its executive director, regardless of whether such standards, mandates, or requirements were contemplated or foreseeable during initial certification.

The State Board members may, by a majority vote, alter requirements of this Program. All vendors acknowledge and agree that prior certification in no way restricts the authority of the State Board to alter certification requirements or to make demands of certified vendors, at its sole discretion and in accord with applicable law.

2.5 AUTHORITY OF THE EXECUTIVE DIRECTOR

The State Board's executive director is empowered to act under the State Board's authority in all matters associated with this certification program, including the performance of any act of the State Board described herein, unless otherwise provided and except that the State Board may revise or revoke any such act upon a majority vote. The executive director may exercise certain emergency authority to grant provisional certification, suspend or impose requirements, or temporarily decertify products for a term no longer than one (1) month, upon written notice to the appointed members of the State Board Members, who may exercise their authority to reverse that act.

<u>3 VOTING SYSTEMS CERTIFICATION</u>

3.1 OVERVIEW

3.1.1 Program Goals

The State Board has developed certification standards and procedures for voting systems to ensure the optimal administration of elections in this state. The standards provide a formal and organized process for vendors to follow when seeking state certification of their system. Likewise, these standards provide uniform guidance when a vendor seeks modification to an existing system certified for use. To this end, the procedures are designed to:

- 1. Ensure conformity with state election laws governing the acquisition and uniform price of certified products.
- 2. Provide a uniform means to test, monitor, and certify voting systems and elections technologies and equipment marketed for use in North Carolina.
- 3. Perform ongoing evaluation of certified equipment to monitor continuous compliance, security, and reliability, including continuous assessment of updates and changes in method, operation, or performance.
- 4. Provide a systematic process to decertify voting systems and equipment.

5. Ensure accurate reporting of all election results for any jurisdiction in which each a certified product is used, and to provide for monetary and procedural remedies in the event an election is affected adversely by a certified product.

Voting systems are components and processes by which a ballot is cast and tabulated, including mechanical and electronic voting equipment. All voting systems, including associated firmware, hardware, and software, must be and remain reliable, accurate, user-friendly, accessible to persons with disabilities in accordance with the scope of certification, and capable of secure operation and maintenance. Firmware, hardware and software products with performance proven in commercial applications may be deemed acceptable, provided that they are shown to be compatible with the operational and administrative requirements of this state's election management system and voting environment. The State Board may review all firmware, hardware, or software associated with a voting system.

3.1.2 Presently Certified Products

Products already certified by the State Board at the time of its adoption of this Program, and which have not since been modified or decertified will be considered provisionally certified for a period of twelve (12) months, except that any such vendor must within three (3) months post a bond and/or submit an approved letter of credit and/or place source code and documentation described in this Program into escrow, accompanied by transmission of application documentation required under this Program. Provisional certification described in this paragraph is intended to allow existing vendors to meet all certification requirements of this Program and does not certify systems otherwise not permitted under state law.

3.1.3 Testing Levels

There are three (3) distinct levels of testing that a voting system must successfully complete before a voting system may be certified by the State Board. These levels are (1) Federal Compliance Testing, (2) State Certification Testing, and (3) Acceptance Testing.

Federal Compliance Testing demonstrates that a voting system complies with the requirements of the version or versions of the Voluntary Voting System Guidelines (VVSG) currently accepted for testing by the Election Assistance Commission (EAC), along with any other then-existing federal certification requirements.

State Certification Testing is intended to ensure that a voting system complies with the requirements of the State of North Carolina. State Certification further examines the readiness of a voting system for use under the election management procedures currently in use or proposed for use with the system. State Certification Testing is distinct from Federal Compliance Testing and examines the fit between the voting system and the specific requirements and practices of North Carolina, including any requirements under law or those imposed by the State Board.

Acceptance Testing ensures that the system delivered is identical to that which was certified and operates in good working condition. This testing is conducted by the local jurisdiction with the assistance of state officials or consultants approved by the State Board. Acceptance testing will be performed as part of the procurement process for the voting system.

3.2 TERMS AND ACRONYMS

3.2.1 Definitions under this Program

Voting System: "Voting System" means the total combination of mechanical, electromechanical, or electronic equipment (including the software, firmware, hardware, and documentation required to program, control, and support the equipment) that is used to define ballots; to cast or tabulate votes; to read election media; to report or display election results; and to maintain and produce any audit trail information. In addition, a "voting system" includes the practices and associated documentation and descriptions used to identify system components and versions of such components; to test the system during its development and maintenance; to maintain records of system errors and defects; to determine specific system changes made after initial certification; and to make available any materials to the voter (such as notices, instructions, forms, or paper ballots). No product, service, practice, or policy of the State Board shall constitute a "voting system" under this Program or be subject to the requirements thereof.

Ballot: "Ballot" means an instrument on which a voter indicates a choice so that it may be recorded as a vote for or against a certain candidate or referendum proposal. The term "ballot" may include a paper ballot to be counted by hand, a paper ballot to be counted on an electronic scanner, or a paper ballot used on any other voting system. "Paper ballot" means an individual paper document that bears marks made by the voter by hand or through electronic means.

Ballot Item: "Ballot item" means a single item on a ballot in which the voters are to choose between or among the candidates or proposals listed.

Ballot Choice: "Ballot choice" means a single candidate or proposal listed on a ballot for or against which the voters are to choose among or between.

Ballot Style: "Ballot style" means the version of a ballot within a jurisdiction that an individual voter is eligible to vote. For example, in a county that uses essentially the same official ballot, a group office such as county commissioner may be divided into districts so that different voters in the same county vote for a commissioner in different districts. The different versions of the county's official ballot containing only those district ballot items one individual voter may vote are the county's different ballot styles.

Election: "Election" means the event in which voters cast votes in ballot items concerning proposals or candidates for office in this state or the United States. The term includes primaries, general elections, referenda, special, and runoff elections.

Limited Voting: "Limited Voting" means an electoral process in which voters have fewer choices than there are positions available for a ballot item.

Official Ballot: "Official ballot" means a ballot that has been certified by the State Board of Elections and produced by or with the approval of the county board of elections. The term does not include a sample ballot or a specimen ballot.

Provisional Official Ballot: "Provisional official ballot" means an official ballot that is provisionally voted and then placed in an envelope that contains an affidavit signed by the voter certifying identity and eligibility to vote. Except for its envelope, a provisional official ballot shall not be marked to make it identifiable to the voter. The ballot may be marked to identify the ballot as being a provisional official ballot.

Referendum: "Referendum" means an election in which voters cast votes for or against ballot questions other than the election of candidates to office.

Statewide Computerized Voter Registration System (SEIMS): The State Board of Elections is responsible for the development and implementation of a statewide computerized voter registration system to facilitate voter registration and to provide a central database containing voter registration information for each county. The system serves as the single system for storing and managing the official list of registered voters in the state and is the official voter registration list for the conduct of all elections in the state.

Voting Booth: "Voting booth" means the private space within which a voter is to mark an official ballot.

Vote For: The number of selections a voter can make for a single ballot item.

Voting Precinct: "Voting precinct" means the proper precinct for a voter based on the residence where a voter has resided for at least 30 days prior to the date of an election, regardless of the voting place or precinct where a voter has cast his ballot.

Voting Enclosure: "Voting enclosure" means the room within the voting place that is used for voting.

Voting Place: "Voting place" means the building or area of the building that contains the voting enclosure.

Write-in Candidates: A "write-in candidate" means a candidate who does not appear on the ballot but whose name can be written in for a specific ballot item and voted for.

3.2.2 Types of Voting Systems

Optical Scan

An electronic voting system that uses an optical scanner to read marked paper ballots and tally the results.

Electronically-assisted Ballot Marker (EBM)

Electronically-assisted Ballot Marker (EBM) refers to a voting system that first records votes by means of a ballot display, then generates a paper ballot that is viewable by the voter before the vote

is actually cast electronically. This system permits the voter to correct any discrepancy between the electronic vote and the paper ballot before the vote is cast.

Hand-count

Hand-count refers to a system of manually counting votes that have been marked by a voter without the use of any voting equipment or vote tabulation machine.

3.2.3 Other Voting Systems Components

Ballot Marking Equipment

Ballot marking equipment refers to a component of a voting system that permits the voter to mark a printed ballot by electronic means.

Ballot on Demand Printer

Ballot on demand is a dedicated application, possibly integrated with an electronic poll book and/or registration database, that prints the properly assigned ballot style as each voter is checked-in, based on the voter's registration information.

3.2.4 Voting Systems Components and Complete Voting Systems

A voting systems component is a stand-alone ballot marking device, a ballot on demand printer, or other device that can be configured or adapted to interact with other voting system components on a vendor-agnostic basis. A voting system component cannot be certified independent from a compatible voting system. Vendors cannot artificially separate a voting system into its component parts to in any manner reduce the requirements otherwise imposed by law or this Program.

3.2.5 Acronyms

- **CBE** County Board of Elections
- **CFR** Code of Federal Regulations
- **DRE** Direct Record Electronic
- EAC Election Assistance Commission
- \mathbf{GS} North Carolina General Statutes
- HAVA Help America Vote Act
- NC North Carolina

NCAC – North Carolina Administrative Code

 $\ensuremath{\textbf{SBE}}-\ensuremath{\textbf{State}}$ Board of Elections

SEIMS - State Elections Information Management System

TDP – Technical Data Package

 $\boldsymbol{USC}-\boldsymbol{United\ States\ Code}$

VSTL – Voting Systems Test Laboratory

VVSG – Voluntary Voting System Guidelines

3.3 POWERS AND RESPONSIBILITIES

3.3.1 State Board of Elections

The State Board is responsible for the certification of any new voting system, the decertification of any voting system in North Carolina, and the certification of any modification or change made to a voting system that is currently certified in North Carolina, as described in Section 3.1.2, above. Additionally, the State Board reserves the right to require recertification or review of any previously certified system.

The State Board may consider guidelines, information, testing reports, certification, decertification, recertification, and any relevant data produced by the EAC, its Standards Board, its Board of Advisors, or the Technical Guidelines Development Committee as established in Title II of the Help America Vote Act of 2002, as well as any other source it deems advisable in connection with any review, certification, decertification, or investigation of a voting system or vendor. The State Board may use, for the purposes of voting system certification, laboratories accredited by the Election Assistance Commission under the provisions of section 231(2) of the Help America Vote Act of 2002. Prior to certifying a voting system, the State Board of Elections shall review, and/or designate an independent expert to review, all source code made available by a prospective vendor and certify only those voting systems that comply with requirements under applicable law and this Program.

The State Board of Elections may specify mandatory terms of any contract for the purchase of a voting system and the maintenance and training related to that voting system. The State Board may issue model contract provisions and/or require specific terms in its administration of this Program. The State Board's general supervisory authority over elections in North Carolina and the provisions of this Program expressly authorize the State Board to alter certification requirements and to demand and receive any information, data, or explanation required of any vendor seeking certification or operating within the state.

The State Board must treat proprietary information as confidential and must prevent unauthorized disclosure. Nevertheless, it cannot guarantee the extent to which any material provided will be exempt from disclosure pursuant to an investigation, litigation, or other legal requirement.

3.3.2 County Boards of Elections

Before approving the adoption and acquisition of any voting system by the board of commissioners, the county board of elections shall:

- Recommend to the board of county commissioners which type of voting system should be acquired by the county;
- Witness a demonstration, in that county or at a site designated by the State Board of Elections, of the type of voting system to be recommended and witness a demonstration of at least one other type of voting system certified by the State Board of Elections, if more than one is available; and
- Conduct acceptance testing as described in Section 3.4.3.
- Test, during an election, the proposed voting system in at least one precinct in the county where the voting system would be used if adopted.

It is the responsibility of both the vendor and the County Board of Elections to ensure that a voting system that is supplied or purchased for use in North Carolina has been certified by the State Board of Elections.

3.3.3 Board of County Commissioners

The board of county commissioners, with the approval of the county board of elections, may acquire only a voting system of a type, make, and model certified by the State Board. The board of county commissioners may decline to adopt or to acquire any voting system recommended by the county board of elections.

3.3.4 Voting System Vendors

Failure on the part of the vendor to satisfy any of the following obligations in section 3.3.4 may result in termination of the vendor's application for certification, decertification of applicable voting systems, voidability of prior contracts for previously certified products, and may result in legal damages or other liability imposed by law. The vendor will forfeit all costs and fees already incurred pursuant to this Program. All foregoing obligations apply to recently decertified system in order to facilitate investigations conducted by the State or County Boards of Election. These obligations shall remain in effect until all investigations have been concluded. State law makes it a felony to violate certain duties required of a voting system vendor and imposes additional civil penalties to be assessed by the State Board, in its discretion. G.S. § 163-165.9A(b).

The following obligations that are documented in sections 3.3.4.1 through 3.3.4.5 apply to voting system vendors, even if they have not submitted an application to the State Board under 3.5.1.

3.3.4.1 Vendor Has Independent Duty to Obey the Law and Stay Informed of Legal Changes

The terms of this Program do not negate the vendor's obligations under applicable state or federal law, and the vendor is alone responsible to ensure it is aware of all legal requirements governing certification and operation in North Carolina. Certified vendors are expected to remain informed of legal changes that may affect its obligations.

3.3.4.2 Vendor Must Bear Costs

Vendors shall bear all costs associated with necessary certifications, reviews, and reports required under this Program, including for all VSTL and third-party review. Questions regarding this requirement and any associated costs should be directed to the State Board at the earliest possible point in the certification application process.

3.3.4.3 Manufacturer Must Prominently Mark Proprietary Information

The manufacturer must prominently mark any information that it requests be treated as confidential and proprietary before providing it to the State Board of its agent or representative for evaluation. It is not sufficient for the manufacturer to assert that everything is proprietary. Every page of documentation that contains information the manufacturer considers proprietary information must be clearly marked.

3.3.4.4 Vendor May Not Sell Uncertified Products

A voting systems vendor may not attempt to sell any voting system in North Carolina that has not been certified by the State Board. It is the responsibility of both the vendor and the County Board of Elections to ensure that a voting system that is supplied or purchased for use in North Carolina has been certified by the State Board of Elections. If any question arises involving the certification of a voting system in use in North Carolina, hardware and software system verification tools may be used to verify that the voting system in use is in fact identical to the voting system that was submitted for certification.

3.3.4.5 Vendor Expressly Consents to be Subject to this Program

By applying for certification, accepting certification, and/or operating within North Carolina, a vendor expressly consents to the authority of the State Board under all applicable law and the terms of this Program, understanding that certification is subject to ongoing review and may be conditioned on additional requirements imposed by the State Board.

The following obligations that are documented in sections 3.3.4.6 through 3.3.4.9 apply to voting system vendors after they have submitted an application to the State Board under 3.5.1. All obligations listed above continue to apply.

3.3.4.6 Make Hardware Available for Inspection

A vendor seeking certification or currently operating certified equipment within North Carolina must, upon the request of the State Board, make hardware available for inspection by the State Board. The hardware will be provided at the vendor's expense for a period of at least one month, or as requested by the State Board, and the vendor waives any claim for damages regarding that hardware, recognizing that the State Board may inspect and test any equipment seeking certification or currently in use within North Carolina.

3.3.4.7 Grant State Board Software or Firmware Use Licenses

A vendor seeking certification or currently operating certified equipment within North Carolina must provide the State Board a copy of the software or firmware, granting the State Board a non-revocable use license while such software or firmware is under review by the State Board and for so long as the certified software is used in any jurisdiction within North Carolina. The use license will be furnished at the vendor's expense.

3.3.4.8 Disclose Certain Information

A vendor seeking certification or who has been certified must timely disclose in writing all prior instances of federal non-compliance, review, or investigation. A vendor shall promptly notify the State Board and the county board of elections in writing of any county using its voting system, of any decertification of the same system in any state, of any defect in the same system known to have occurred anywhere, and of any relevant defect known to have occurred in similar systems.

The vendor's duty to disclose continues at all times during which a vendor operates within North Carolina and does not terminate upon initial certification. A vendor seeking certification or who has been certified must timely disclose in writing all prior instances in which a vendor's products have been decertified by any state or jurisdiction within the United States, regardless of whether the decertified product has been certified in North Carolina. The vendor's duty to disclose continues at all times during which a vendor operates within North Carolina and does not terminate upon initial certification.

Written disclosure must be sent to the State Board of Elections in electronic form and by U.S. mail or private courier service, to the attention of the executive director. The State Board, at its discretion, may work with the vendor to gain additional information regarding any disclosed instance and may demand whatever information, data, or explanation it deems necessary or appropriate in the exercise of its ongoing review of certified voting equipment. Where third-party review is required under this Program, the vendor must authorize the third-party to report any and all information requested by the State Board, withoutlimitation.

3.3.4.9 Provide Information to the State Board Upon Request

The State Board's general supervisory authority over elections in North Carolina and the provisions of this Program expressly authorize the State Board demand and receive any information, data, or explanation required of any vendor seeking certification or operating within the state.

The following obligations documented in sections 3.3.4.10 through 3.3.4.15 apply to voting system vendors after they have been initially certified by the State Board. All obligations listed above continue to apply.

3.3.4.10 Escrow Requirements

A vendor seeking certification of a voting system that relies on electronic hardware, firmware, or software shall place in escrow with an independent escrow agent approved by the State Board, all items presently described in G.S. § 163-165.9A(a)(1), required by state law and by this Program., accompanied by the sworn affidavit required under G.S. § 163-165.9A(a)(2), and must be available as required under G.S. § 163-165.7(a). The documentation to be escrowed includes, but is not limited to, a complete copy of the source and executable code, build scripts, object libraries, application program interfaces, and complete documentation of all aspects of the system. Further, the documentation, user documentation, hardware and software specifications, drawings, records, and data. Additionally, the vendor must provide all instructions, manuals, and resources

required by the State Board, which are relevant to functionality, setup, configuration, and operation of the voting system. Documentation in escrow shall include a list of programmers responsible for creating the software and a sworn affidavit by the chief executive officer of the vendor that the source code includes all relevant program statements in low-level and high-level languages. The chief executive officer must affirm that the source code and other material in escrow is the same being used in its voting systems in this state. The chief executive officer shall ensure that the sworn statement is true on a continuing basis. The State Board of Elections may require that additional items be escrowed. A certified voting systems vendor must notify the State Board of Elections of any change in any item required to be escrowed and must supplement escrow accordingly.

The vendor must separately agree with the purchasing county that if the vendor is granted a contract to provide software for an electronic voting system but fails to debug, modify, repair, or update the software as agreed, or in the event of the vendor having bankruptcy filed for or against it, the source code described in G.S. 163-165.9A(a) shall be turned over to the State Board and to the purchasing county by the escrow agent chosen under G.S. 163-165.9A(a)(1) for the purposes of continuing use of the software for the period of the contract and for permitting access to the persons described in the statute for the purpose of reviewing the source code.

3.3.4.11 Training

Due to variation between individual voting systems, the State Board may require additional training of state and/or local officials, including operational support prior to or during elections, to ensure the proper functioning of the system. Such requirements will be tailored to the individual voting system during initial certification processes or may be imposed as a condition of ongoing certification.

3.3.4.12 Modifications

It is the responsibility of the manufacturer to submit any modifications to a previously certified voting system to the State Board of Elections for review. Any modification to the firmware or software of an existing system which has been initially certified by the State Board under the procedures described herein will act to decertify the system, unless the vendor demonstrates to the State Board's satisfaction that the modification does not and will not compromise the reliability, accuracy, user-friendliness, or secure operation and maintenance of that system.

3.3.4.13 Incorporate Program by Reference

All contracts between a certified vendor and any elections official, county, or jurisdiction within North Carolina must incorporate by reference this Program. The State Board's general supervisory authority over elections in North Carolina and the provisions of this Program expressly authorize the State Board to alter certification requirements and to demand and receive any information, data, or explanation required of any vendor seeking certification or operating within the state.

3.3.4.14 Transmit a Copy of its Standard Purchase Contract

The vendor must transmit to the State Board a copy of its standard purchase contract prepared for use in North Carolina.

3.3.4.15 Quote a Statewide Uniform Price

The vendor must quote a statewide uniform price for each unit of the equipment. The statewide uniform price must be established and disclosed on a bimonthly basis (every other month) and may include unit pricing based on standard quantities purchased by the same county. The statewide uniform price must be transmitted to the State Board in writing on or before the first day of the bimonthly cycle. The statewide uniform price will be a matter of public record. All vendors must furnish the State Board with copies of sales receipts for all purchases of certified voting systems by any jurisdiction within North Carolina. Such receipts must be provided to the State Board on a quarterly basis. Compliance with the statewide uniform price requirement, as delineated under G.S. § 163-165.7(a)(7), is a condition of ongoing certification.

The following obligations documented in sections 3.3.4.1 through 3.3.4.2 apply to voting system vendors after they have engaged in a contract with one or more county boards of elections. All obligations listed above continue to apply.

3.3.4.16 Maintain a Local Office

A vendor that has a contract to provide a certified voting system in North Carolina shall maintain an office in North Carolina with sufficient staff to service the contract.

3.3.4.17 Post a Bond or Letter of Credit

The vendor shall post a bond or letter of credit to cover damages resulting from defects in the voting system. Damages shall include, among other items, any costs of conducting a new election attributable to those defects. The bond or letter of credit must be provided in an amount and pursuant to terms specified by a majority vote of the appointed members of the State Board. The bond must be posted and maintained on a continuous basis, without interruption, and the State Board may require assurance at any time that such bond or a letter of credit remains in place.

3.3.4.18 Privity of Contract

Notwithstanding any agreement to the contrary, and as a requirement of certification, the State Board shall have privity of contract in order to enforce the terms of or recover under any contract between a certified vendor and any elections official, county, or governmental unit within North Carolina.

3.4 VOTING SYSTEM STANDARDS AND REQUIREMENTS

3.4.1 Federal Standards

3.4.1.1 General Standards

All voting equipment certified by the State Board of Elections must meet federal standards. This means all voting systems are tested to ensure compliance with the requirements of HAVA Section 301 and reviewed to ensure compliance with any other then-existing federal requirements. Such testing shall include functional evaluation of the audio capabilities, alternative means of selection and input (other than touch screen), and over-vote prevention and/or alerts.

The voting system or equipment must meet the requirements contained in the version or versions of the Voluntary Voting System Guidelines (VVSG) currently accepted for testing by the U.S. Election Assistance Commission (EAC). Compliance with the applicable VVSG may be substantiated through federal certification by the EAC, through certification by another state that requires compliance with the applicable VVSG, or through testing conducted by a federally certified voting system test laboratory (VSTL) to the standards contained in the applicable VVSG. A system that meets the requirements contained in the VVSG is considered to be in compliance with the voting system requirements contained in HAVA Section 301.

3.4.1.2 Voting System Hardware Elements

The State Board will examine all hardware equipment associated with the voting system to determine its suitability for election use according to the appropriate procedures contained in this document. Equipment to be tested shall be identical in form and function with production units. Engineering or development prototypes are not acceptable.

3.4.1.3 Voting System Firmware and Software Elements

The State Board will examine all voting system firmware or software to ensure that it adheres to the performance standards specified in the version or versions of the VVSG currently accepted for testing by the EAC, along with any then-existing federal requirements.

3.4.1.4 Evidence of Compliance

The vendor must provide primary evidence of compliance with the requirements of its system by the EAC. However, federal compliance may also be demonstrated through certification by another state electoral authority that requires compliance with the applicable VVSG or through testing conducted by a federally certified Voting System Test Laboratory (VSTL) to the applicable VVSG. The State Board, at its option, may require other or additional evidence of current federal compliance. A vendor must maintain federal compliance at all times during which it operates in North Carolina. The State Board will make the final decision on compliance based on all available information.

3.4.1.5 Reciprocity

The State Board of Elections may accept the qualification tests of the hardware and/or software of a voting system conducted by another state electoral authority that requires compliance with the applicable VVSG or through testing conducted by a federally certified VSTL to the applicable VVSG. Any such tests that are accepted may be used to support certification approval in conjunction with, or in lieu of, EAC or State Board of Elections testing. Reciprocity is not available, however, unless the appointed members of the State Board vote to extend reciprocity under this section upon the recommendation of the executive director of the State Board.

3.4.2 State Standards

3.4.2.1 General Standards

The state certification test is not intended to result in exhaustive tests of system hardware and software attributes; these are evaluated during federal compliance testing. However, all system functions which are essential to the conduct of an election in the State of North Carolina will be evaluated by the State Board during this phase.

The voting system or equipment must comply with the provisions in of North Carolina law governing voting equipment and any applicable rule, regulation, or policy issued by the State Board of Elections.

3.4.2.2 Handling Precincts and Reporting Groups

The voting system must be able to configure, collect, process, tabulate, and store election results data in a manner that allows reporting by a voter's proper voting precinct and the method by which the ballot was cast. The system must be able to accommodate a minimum of five reporting groups or voting methods, in addition to reporting the total number of votes for each ballot choice. Any or all of reporting must be made available on an as-needed basis.

3.4.2.3 Multi-Page Ballot

The voting system must be able to configure, collect, process, tabulate, and store election results data involving a multi-page ballot.

3.4.2.4 Handling Election Contest Jurisdictions and Special Contest Elements

The voting system must permit the generation and proper tabulation of ballots such that each voter can be presented a single ballot containing all contests for which he or she is eligible to vote, and no contests for which he or she is not eligible to vote.

The ballot configuration procedures must take into account precinct, jurisdictional districts, contests, candidates, party affiliation, and other nongeographic voter classifications such as may be related to age, registration date, or other voter category. In addition, ballot configuration must also take into account the following elements that are unique to certain contests in North Carolina:

- 1. Vote For Number
- 2. Write-in Candidates
- 3. Limited Voting

3.4.2.5 Ballot Layout and Generation

The voting system must allow the definition of ballot formats for partisan primary elections, nonpartisan primary elections, general elections, special elections, election runoffs, and referendum elections. With respect to electronic voting systems, the voting system must generate a paper ballot of each individual vote cast, which paper ballot shall be maintained in a secure fashion and shall serve as a backup record for purposes of any hand-to-eye count, hand-to-eye recount, or other audit. The system must provide for the generation of ballots that can be used for absentee voting, provisional voting and Election Day voting. The system must also produce sample ballots and electronic images of ballots for military and overseas citizens who utilize absenteevoting.

3.4.2.6 Voter Privacy

The voting system must permit the voter to verify, in a private and independent manner, the vote selected by the voter on the ballot before the ballot is cast and counted.

3.4.2.7 Ballot Correction

The voting system must provide the voter with the opportunity, in a private and independent manner, to change the ballot or correct any error before the ballot is cast and counted.

3.4.2.8 Ballot Warning

The voting system must have the ability to notify the voter discretely that he or she has selected more than the allowed number of candidates for any single office, inform the voter of the effect of casting multiple votes for a single office, and provide the voter an opportunity to correct the ballot before it is cast and counted.

3.4.2.9 Accessibility

Where applicable, the voting system must be accessible for individuals with disabilities in a manner that provides the same opportunity for access and participation, including protection of privacy and independence, as is made available for other voters.

3.4.2.10 Integrity of Vote Count

The voting system must maintain the integrity of the vote by, at minimum, establishing processes and mechanisms necessary to protect the security of electronic tabulation processes, the paper ballot, and to prevent unauthorized access to any critical component of the voting system. It is the expectation of the State Board that voting systems include and maintain robust security mechanisms to preserve the integrity of the election process. The voting system shall not produce a written receipt of the voter's selection that may be removed from the voting enclosure by the voter.

3.4.2.11 Integration with SEIMS

The voting system must be capable of accepting a flat file directly from the Statewide Elections Information Management System (SEIMS) securely and <u>without</u> use of an intervening third-party software (such as Microsoft Access) and populating all necessary election definitions.

At the adoption of this Program, SEIMS can only accept one tabulated results flat file per election. Therefore, county boards of elections will need to use one vendor for all certified voting systems. This would not necessarily restrict them from using a different vendor for providing a standalone voting system component such as a ballot printer or ballot marketing device that is configured to work with multiple voting systems.

3.4.3 Acceptance Test Standards

Acceptance Testing ensures that the system delivered is identical to that which was certified and operates in good working condition. This testing is conducted by the local jurisdiction with the assistance of state officials or consultants approved by the State Board. Acceptance testing will be performed as part of the procurement process for the voting system.

The local jurisdiction will conduct tests to confirm that the purchased or leased system to be installed is identical to the certified system and that the installed equipment and/or software are fully functional and capable of satisfying the administrative and statutory requirements of the jurisdiction. The state may require localities to perform hash testing of applications software for this purpose. The State Board will request that upon acquiring equipment, the locality shall forward a letter to the State Board confirming that the versions of all software and model(s) of equipment received are identical to the certified system that was ordered.

Typically, the acceptance test will demonstrate the system's ability to execute its designed functionality as advertised and tested, including but not limited to:

- 1. Process simulated ballots for each precinct or polling place in the jurisdiction.
- 2. Reject over-votes and votes not in valid ballot positions.
- 3. Handle write-in votes.
- 4. Produce an input to or generate a final report of the election, and provide interim reports as required.
- 5. Generate system status and error messages.
- 6. Comply with and enable voter and operator compliance with all applicable procedural, regulatory, and statutory requirements.
- 7. Produce an audit log.

3.4.4 Scope of Certification

The State Board can certify a voting system so that it is approved as a certified system only for non-ADA Election Day activities or it can include one or more of the following certifications:

The State Board may certify that the voting system may be used for ADA compliance.

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In order to meet this heightened standard, the vendor must ensure that the equipment and software can accommodate interactive visual and non-visual presentation of information as well as alternative language to voters, as required. *See* HAVA, 42 USC 15481(a)(3), (4), §203 of the Voting Rights Act (42 USC 1973aa-1a), North Carolina General Statutes Chapter 163, Subchapter III, Art. 8A). The voting system must be accessible for individuals with disabilities in a manner that provides the same opportunity for access and participation, including protection of privacy and independence, as is made available for other voters.

The State Board may certify that the voting system may be used for absentee and early voting.

In order to meet this heightened standard, the voting system must be able to create a retrievable ballot, where an indication number can be placed on the ballot in a manner that protects the privacy of the voter's selections.

3.5 VOTING SYSTEM CERTIFICATION PROCEDURES

The evaluation of the voting system shall proceed in the following steps:

3.5.1 Letter of Request for Certification and Application

The Certification procedure shall be initiated by the vendor of the voting system by completing a North Carolina Elections Systems Certification Application, which is to be created and distributed by the State Board, and sending it with a letter and accompanying documentation, addressed to:

North Carolina State Board of Elections ATTN: Voting System Certification P.O. Box 27255 Raleigh, NC 27611-7255

Waiver of physical mailing requirement may be granted orally by the State Board Office and required documents may be submitted digitally as directed. The Letter of Request for Certification and Application (collectively, "Application Documentation") must include the following items, as delineated in 3.5.1.1 through 3.5.1.9. If the voting system is certified, the State Board will retain all Application Documentation for as long as the voting system is marketed or used in North Carolina. After initial certification, the vendor will be required to update all Application Documentation as information becomes available, or as changes or modifications occur, or as modifications to the system are considered for certification, and to comply with all post-certification requirements of the State Board. The executive director will serve as the point of contact for all written submission required under this Program, unless otherwise directed by the State Board.

3.5.1.1 Equipment Documentation

The vendor must identify the specific voting system to be evaluated for certification. Each different voting system or version of a voting system requires a separate request for certification. Each component of the hardware, firmware, and software must be identified by version number.

The vendor shall provide a brief description of the voting system. Typical marketing brochures may be sufficient to meet the requirements of this subsection.

3.5.1.2 Technical Data Package

Before evaluation can begin, the manufacturer must submit to the State Board a *technical data package (TDP)*. Each item in the package must be clearly identified; if the TDP is incomplete or the items in the package are not clearly identified, the entire package may be returned to the manufacturer and the evaluation of the voting system rescheduled.

The *TDP* must contain the following items:

- 1. Hardware Schematic Diagrams: Schematic diagrams of all hardware.
- 2. Hardware Theory of Operations: Documentation describing the operation of the hardware.
- 3. **Customer Maintenance Documentation:** Documentation describing any maintenance that the vendor recommends can be performed by a customer with minimal knowledge of the system.
- 4. **Operations Manual:** Operations documentation that is normally supplied to the customer for use by the person(s) who will operate the equipment.
- 5. **Recommended Use Procedures:** Specific election administration procedures recommended for use with the system.
- 6. **Software License Requirements.** The software license agreement must be perpetual. An annual renewable support fee may be included as an option.
- 7. **Software Source Code.** Source Code shall be supplied in the form of a listing and in a machine- readable form on media that is readable by the voting system. If there is any chance of ambiguity, the required compiler must be specified.
- 8. **Software System Design:** Documentation describing the logical design of the software. This documentation should clearly indicate the various modules of the software, their functions, and their interrelationships with each other. The minimum acceptable documentation is a system flowchart.
- 9. **Customer Documentation.** A complete set of all documentation that is available to the purchaser/user of the voting system. Clearly identify the documentation that is included in the cost of the system and the documentation that is available for an additional charge.
- 10. **Standard Contract.** Statement of deliverables to include: verification statement that equipment purchased is identical to equipment certified by the State Board of Elections, software licenses, warranties, support services provided, etc.
- 11. **Warranty.** The period and extent of the warranty and the method of repair/replacement for all hardware items; the circumstances under which equipment is replaced rather than repaired and the method by which a user requests such replacement; additional warranties that are available over and above the standard warranty, what these warranties cover, and their costs; the period and extent of warranty and the method of correction or replacement for all software provided as part of the voting system; and the technical documentation provided with all hardware and software that is used to certify that the individual component will perform in the manner and for the specified time.

- 12. **Test Data/Software:** Any available test data, ballot decks, and/or software that can be used to demonstrate the various functions of the voting system or verify that the version of the applications submitted are identical to the versions that have undergone federal compliance testing (i.e. hash testing tools).
- 13. **Recommended Security Practices:** Documentation of the practices recommended by the vendor to ensure the optimum security and functionality of the system.

3.5.1.3 Testing Documentation

Federal: The vendor shall provide copies of documents that substantiate the product's completion of federal compliance testing, including:

- 1. Documents that show whether the proposed voting system has been certified under the version or versions of the VVSG currently accepted for testing by the EAC in another state or by a VSTL.
- 2. A certified copy of the results of the evaluation of the voting system under the version or versions of the VVSG currently accepted for testing by the EAC that clearly identify the system evaluated and specifies the version numbers of all components of the hardware, firmware, and software;
- 3. An audit report of the business' most current fiscal year. Multiple reports may need to be submitted depending on the business' fiscal calendar and the length of time required to complete the certification process.

The vendor should also provide a copy of the system's EAC certification, as applicable.

Other States or Local Jurisdictions: The vendor must provide copies of documents substantiating completion of testing for other states or local jurisdictions where vendor has tested and holds voting system certifications and contracts.

Denial of Certification: The vendor must provide any documentation of testing on the proposed voting system if it has ever been denied certification or had certification withdrawn in any state or by the EAC. *See also* the ongoing disclosure requirements identified at Section 3.3.4.8, above.

3.5.1.4 Transfer of Certification (Reciprocity)

If the voting system has successfully completed qualification testing by the EAC or another state, the State Board of Elections may accept the results of those tests. In this case, the technical data package shall contain the following item in addition to the items described above:

Qualification Test Report. A certified copy of the results of the evaluation of the voting system under the version or versions of the VVSG currently accepted for testing by the EAC. This report must clearly identify the system evaluated, specifying the version numbers of all components of the hardware, firmware, and software. The evaluation report or an accompanying letter shall identify the state for which the evaluation was performed, the responsible state official, the organization conducting the evaluation, and the individual responsible

for the evaluation. This report must be sent to the State Board of Elections directly from the organization that conducted the evaluation.

To support a review of Federal Compliance Testing, the following documents shall be provided to the State Board:

- 1. A full copy of the technical data package.
- 2. A copy of the Test Plan, Test Report, and all Test Procedures and Test Cases used by the Voting System Test Lab (VSTL) in performing EAC certification testing or results of testing conducted by a VSTL to the applicable VVSG outside of the federal certification process.
- 3. A release to the VSTL and EAC to respond to any requests for information from the State of North Carolina.
- 4. A release to other states that have certified the system or prior versions of the system to respond to any requests for information from the State of North Carolina.
- 5. Any additional information the State Board of Elections believes is necessary to determine compliance with the applicable Voluntary Voting System Guidelines or Voting System Standards.

3.5.1.5 Corporate Information

The manufacturer must submit to the State Board the corporate information as detailed below with each item clearly identified. If the corporate information is incomplete or the items in the package are not clearly identified, the entire package may be returned to the vendor and evaluation of the voting system rescheduled.

The corporate information shall contain the following items:

- 1. History and description of the business including year established, products and services offered, areas served, branch offices and subsidiary and/or parent companies.
- 1A. Any owners or shareholders with a 5% or greater interest or share in each of the vendor's company, any subsidiary company of the vendor, and the vendor's parent company.
- 2. Management and staff organization, number of full-time employees by category, number of part-time employees by category, resumes of key employees who will assist North Carolina localities in acquiring the system if it is authorized foruse.
- 3. Audited Report of the business' most current fiscal year. Multiple reports may need to be submitted, depending on the business' fiscal calendar and the length of time to complete the certification process. The certification process may take as long as a year.
- 4. Comfort letter from the business' primary bank. If the business uses more than one bank, a letter from each bank is required.
- 5. Financial history of the business including a financial statement for the past three (3) fiscal years. If the manufacturer is not the manufacturer of the equipment for which application is made, a financial statement for the vendor for the past three (3) fiscal years shall be included.

- 6. Gross sales in voting products and services for the past three (3) years and the percent that is representative of the total sales of the business and its subsidiaries.
- 7. The location and manufacturing capability of each manufacturing facility that is used to fabricate and assemble all or any component part of the voting and/or tabulating system being submitted for certification.
- 8. The location and servicing capability of each service facility that will be used to service the voting and/or counting system for certification and the service limitation of the facility.
- 9. If publicly traded, indexes rating the business debt.
- 10. Quality assurance process used in the manufacturing of the voting system.
- 11. Configuration management process used with the voting system.

3.5.1.2 Jurisdictional References

Currently Certified: Provide the name of the state or local jurisdiction, the year in which the system was certified, the number of pieces of equipment that are in operation, and the number of elections in which the equipment has been used. Also, provide a contact name, telephone number and email address for the primary contact for the state or local jurisdiction.

Pending Certification: List of other states or local jurisdictions where certification is currently pending certification.

Rejection or Decertification: List of other states or local jurisdictions who have rejected or decertified the system.

3.5.1.3 Ballot Specification

The vendor must provide or define all ballot formats, sizes, and paper specifications. Indicate whether the system mandates the use of any special ballot paper in weight or cut. Descriptions should, whenever possible, be provided in generic and standard terms, rather than referencing a proprietary brand.

3.5.1.4 Requirements for Maintaining

Consumables: List of items that must be used by the system and whether such items must be purchased from the vendor or may be available commercially. Vendor must provide list of all consumables required to operate the system, including, but not limited to: printer ribbons, paper rolls, batteries, removable memory packs, cancellation stamps, ink pads or red stripe pens, etc., and the expected lifespan of each consumable.

COTS Components – For each Commercial Off-the-Shelf (COTS) component of the system (hardware, firmware, or software), the vendor must identify the following:

Name/Model/Version – If a component is specified for the voting system, please provide the exact name, model and version number for the component. Alternatively, if minimal

specifications are prescribed for the component, please provide a descriptive name.

Manufacturer or Specs; Description – If a particular make and version of the component is required for the voting system, please identify the manufacturer. Please also include a brief description of the component and its role in the voting system.

Preventive Maintenance: If not explicitly included in the TDP, vendor must provide the requirements to maintain the equipment, including the recommended maintenance schedule. The vendor must provide requirements of who or what entities are capable of providing the maintenance. Vendor must specify what is included in the maintenance of the equipment and what is not included.

Environmental Requirements and Storage: If not explicitly included in the TDP, vendor must list the requirements for storage.

3.5.1.5 Training and Election Support

State what training and election support is provided to purchasers of the equipment. Understanding that the State Board may require training or support in the implementation of certified voting systems, vendor must disclose foreseeable limitations on its ability to provide training and system support to the State Board as requested. *See* Section 3.3.4.11, above.

3.5.2 Receipt of Application

Upon receipt of the application, the State Board of Elections will notify the vendor that the request has been received and will inform the vendor of any apparent omissions or outstanding documentation necessary for the review process to proceed. The notification may, at the State Board's discretion, also invite the vendor or manufacturer to present a technical demonstration of the voting system at a location to be determined by the State Board of Elections.

If, based on a preliminary review of the application and its contents, the State Board finds there is a reason to deny the request for certification, the vendor shall be notified.

3.5.3 Functional Demonstration of the Voting System

At the discretion of State Board of Elections, the vendor will arrange with staff a high-level functional demonstration of the system. This is not a sales or marketing demonstration, but a demonstration of the key functions of the voting system. All expenses incurred by the voting systems vendor for this demonstration are the responsibility of the vendor.

3.5.4 Authorization to Proceed – Level 1

After the functional demonstration, the vendor will receive notification to arrange for an evaluation agent to proceed with the procedural and technical evaluation of the voting system. The evaluation agent will be selected and hired by the State Board of Elections. The vendor will be provided the contact information for the evaluation agent. The vendor will be responsible for the payment of all fees charged by the evaluation agent to proceed with certification. The State Board will provide the evaluation agent with all Application Documentation that it has received.

3.5.5 Technical Data Package and Corporate Information

The vendor shall submit the technical data package, corporate information, and other material described in the previous section of this document for inspection by the evaluation agent.

The evaluation agent will review the technical data package, corporate information, and other materials provided and notify the manufacturer of any deficiencies. Certification of the voting system will not proceed beyond this step until the technical data package and corporate information are complete, unless otherwise directed by the State Board.

3.5.6 Preliminary Review, Components of Documentation

The evaluation agent will conduct a preliminary analysis of the technical data package, corporate information, and other materials provided and prepare an *evaluation proposal* that contains the following information:

- 1. Identification of any additional materials required to ascertain financial stability and capabilities of the vendor to maintain support of the voting system.
- 2. Description of the activities required to complete the portion of the evaluation performed by the State Board of Elections.
- 3. Estimate of time required to complete the portion of the evaluation performed by the evaluation agent.

The evaluation expert shall serve as the required independent expert who must review all source code made available by the vendor. At a minimum, the review shall include a review of security, application vulnerability, application code, wireless security, security policy and processes, security/privacy program management, technology infrastructure and security controls, security organization and governance, and operational effectiveness, as applicable to that voting system.

An important focus of State Certification Testing is a review of experience with the current and prior versions of the system and the results of other state certification examinations. Any testing and or experiences of other states using the system may be considered. This review requires making inquiries of other users of the system. State certification reports and other evaluations of the system are read and analyzed for insight into the suitability of the system for use in North Carolina.

The recommended use procedures are examined along with the voting system to determine how well the system will integrate into the State of North Carolina election law and management practices.

Testing is performed to evaluate the system with respect to the specific practices of the State of North Carolina. Testing will evaluate all system operations and procedures that:

1. Define ballot formats for an election, including all voting options and instructions required by North Carolina law and the State Board.

- 2. Install application programs and election-specific programs and data in the ballot counting device.
- 3. Verify system readiness for operation.
- 4. Perform ballot tabulation.
- 5. Perform status tests.
- 6. Obtain voting data and audit data reports.
- 7. Support recount or election audits.
- 8. Address compliance with physical and language accessibility requirements.

The test environment will include the preparation and operation of election and voting databases, and the validation, consolidation, and reporting of administrative and voting data as required by law. The state may perform hash testing of applications software to verify that the versions provided by the vendor are identical to the versions that have undergone federal compliance testing.

3.5.7 Authorization to Proceed – Level 2

The manufacturer will review the *evaluation proposal* and notify the State Board of Elections, in writing, of its recommendation to continue or terminate the evaluation process. A copy of this notification will be sent to the evaluation agent.

3.5.8 Non-Operating, Environmental Evaluation

The manufacturer will arrange for any non-operating, environmental evaluation, if required, and submit the results of these tests to the State Board of Elections and the evaluation agent. After any required non-operating, environmental tests have been successfully completed, the evaluation agent will conduct the simulated election event evaluation described in the evaluation proposal and submit a report of the findings to the State Board. Any such evaluation will be at the vendor's sole expense, and the State Board must be provided any and all documentation requested.

3.5.9 Simulated Election Event Evaluation (S.E.E.)

The vendor must coordinate with agency staff designated by the State Board to conduct a *simulated election event* using the system to be certified. This is an "end-to-end" test. All election event workflow tasks necessary to conduct an election in North Carolina must be demonstrated and tested, including but not limited to setting up election definitions, equipment and ballot coding, ballot printing, generating equipment media, ballot and equipment testing, tabulating election results, importing election results into the election reporting system used in North Carolina, canvassing and adjudication procedures, recount procedures, and final reporting by precinct. *See* Section 3.6 for additional details. *See also* Testing Protocol in **Section 3.6.2**, and the Summary of NC Elections Document (Attached as Appendix A).

3.5.10 Public Demonstration Event

The State Board's executive director will notify the appointed members of the State Board of Elections of the *Simulated Election Event (S.E.E.)*. If the report received by the State Board members concludes that the voting system performed successfully in the S.E.E., the State Board may appoint a voting systems certification team to make the final recommendation for certification. Prior to any final evaluation, the State Board will designate a voting systems certification team to schedule a public demonstration event. The

public demonstration event will permit members and interested parties to directly engage with the voting system. This public event must be scheduled within 90 days following a favorable S.E.E. The public testing may span more than one day and will be held at a location to be determined by the State Board. Notice of the public demonstration must be distributed no later than 14 days before the date of the event. The notice shall be given to:

- 1. Vendor or Manufacturer
- 2. County boards of elections
- 3. Chair of each recognized political party in North Carolina
- 4. Any recognized or identified elections advocacy groups operating in NorthCarolina
- 5. Any recognized or identified disability rights advocacy groups operating in North Carolina
- 6. Media

The State Board will determine whether the public demonstration meets expectations. If the public demonstration does not meet expectations, the vendor will be notified of any deficiencies and given the opportunity to respond, correct deficiencies, or withdraw their request for certification.

3.5.11 Public Comment Period

Following the conclusion of the public demonstration event, there will be a period of at least one week to receive public comments prior to a State Board of Elections meeting to make a final recommendation on the certification of the system.

3.5.12 State Board of Elections Final Recommendation

The executive director will prepare a final recommendation regarding certification for consideration by the appointed members of the State Board. The appointed board may then consider and vote upon the certification at its discretion.

3.5.13 Notification of State Board Decision

The vendor will receive a notification of the State Board of Elections decision.

3.6 SIMULATED ELECTION EVENT PROCEDURES

The State Board must ensure that any voting system used in North Carolina will meet the need of elections administrators. During this phase of the certification process, the prospective vendor will need to work with voting system staff designated by the State Board to run the system or any component thereof through North Carolina's standard election event workflow procedures. In this phase, important tasks will include: preparing the voting system for use in an election; producing appropriate ballot formats; testing whether voting system and ballot materials have been properly prepared and are ready for use; recording and tabulating votes; consolidating and reporting election results; displaying results on-site and/or remotely; producing and maintaining a comprehensive audit trail data; and securing the process as a whole.

3.6.1 Notification of Vendor Workflow

The vendor must provide the State Board with a checklist of the information and data that is needed from a jurisdiction to produce election and ballot coding. The checklist should include the file layout and file type that the vendor's system will need to produce the coding. The vendor should specify which modules or applications within its vote tabulation software that will require some entry or import by the jurisdiction to produce its election ballot and/or tabulation coding and the timing by which this task should be performed.

3.6.2 Testing Protocol

State certification testing is intended to verify that the design and performance of the voting system under review complies with all applicable requirements of North Carolina law and State Board regulations and policies.

North Carolina law requires the state to examine a production model of such equipment and ballots associated with a vendor's request for state certification.

North Carolina's mandatory certification testing requirements prescribe the manner in which the state will conduct the certification testing. Testing will evaluate all system operations and procedures that:

- 1. Define ballot formats for a primary election and a general election, including all voting options defined by North Carolina law.
- 2. Install application programs and election-specific programs and data in the ballot counting device.
- 3. Verify system readiness for operation.
- 4. Perform ballot Tabulation.
- 5. Perform status tests;
- 6. Obtain voting data and audit data reports.
- 7. Support recount or election audits.
- 8. Address compliance with physical and language accessibility requirements.

The test environment will include the preparation and operation of election and voting databases, and the validation, consolidation, and reporting of administrative and voting data as required by law. The state may perform hash testing of applications software to verify that the versions provided by the vendor are identical to the versions that have undergone federal compliance testing.

The scope of this testing event will incorporate a sufficient spectrum of physical and functional tests to verify that the system conforms to North Carolina's requirements. Specifically, the testing event has the following goals:

- 1. Ensure voting system provides support for all North Carolina election management requirements (i.e. ballot design, results reporting, recounts, etc.).
- 2. Simulate pre-election, Election Day, recount, and post-election activities on the system under evaluation.

3.6.2.1 Scenarios

The following election scenarios will be used to test various requirements as detailed in the testing procedure:

Pre-programmed scenarios: (Sample selected elections listed below; others can be substituted with the State Board's permission)

- 1. North Carolina General Election
- 2. North Carolina Primary Election

In preparation for each pre-programmed scenario, the vendor is expected to prepare (or obtain) the pre-printed, pre-marked ballot sets for each election, and a comparison results file for each set of ballots to allow for comparison to scanned results in comma separated values (CSV), unless otherwise directed by the State Board.

Ballot marking vote targets on the General Election and Primary test decks will be marked with sufficient size and density that will result in an unambiguous vote. Partial or stray marks may also be tested.

3.6.2.2 Test Configuration

The testing event will utilize one setup of the system and its components. The vendor must provide a breakdown of the system components and configurations for the test setup.

3.6.2.3 Standard Testing Platform:

The vendor must provide a description of the system under test configuration.

3.6.2.4 Testing Components

The vendor must provide a detailed description of the components to be tested, including all software, hardware, and peripherals, both proprietary and COTS, and any test support equipment or materials necessary for test performance.

3.6.2.5 Reference Materials

The vendor must provide any relevant reference materials utilized during the evaluation.

3.6.2.6 Test Support Materials

The following materials, if needed to facilitate testing, are expected to be supplied by the vendor:

1. USB Flash Drives

- 2. Ethernet Cables
- 3. Paper Rolls
- 4. Pressurized air cans
- 5. Power Cords
- 6. Marking Devices
- 7. Lint-free cloth
- 8. Cleaning pad and isopropyl rubbing alcohol
- 9. Labels
- 10. Any other materials or equipment required

3.6.2.7 Procedure

The following procedure outlines the steps that the test team will execute to evaluate the voting system. The State Board reserves the right, without limitation, to alter the ordinary procedure as necessary.

- 1. Election Definition
- 2. Ballot Preparation
- 3. Ballot Review and Approval
- 4. Test Script Generation and/or Test Deck Printing
- 5. Election Coding and Tabulation Software
- 6. Election Equipment Setup
- 7. Voting Demonstration using the Test Deck
- 8. Vote Tabulation Review
- 9. Election Results Import and Review
- 10. Canvassing and Adjudication
- 11. Recount Procedures
- 12. Tabulation by Precinct

3.6.2.8 Schedule

The examination for Procedural steps 6 through 12 may be scheduled over multiple business days under a schedule set by the State Board. The exam will begin with testing initialization and proceed from there through the test plan.

3.6.2.9 Testing Initialization

The testing initialization will seek to establish the baseline for testing and ensure that the testing candidate matches the expected testing candidate and that all equipment and supplies are present.

The following will be completed during the testing initialization:

• Ensure proper system setup of equipment. Check network connections, power cords, keys, etc.

- Check version numbers of (system) software and firmware on all components.
- Verify the presence of only the documented COTS.
- Ensure removable media is clean.
- Ensure batteries are fully charged.
- Inspect supplies and test decks.
- Record any protective counter on all tabulators.
- Review physical security measures.
- Record basic observations of the testing setup and review.
- Record serial numbers of equipment.
- Retain proof of version numbers.

3.6.2.10 Scenario Setup

Prior to Certification Testing

- 1. Election exports listed below shall be provided to the manufacturer by the North Carolina State Board of Elections:
 - a. Primary Election from large county
 - b. General Election from large county
 - c. Primary Election from complex county
 - d. General Election from complex county
- 2. Ballot images shall be provided to the North Carolina State Board of Elections from the manufacturer and all of the following apply:
 - a. Must be provided within three (3) business days from receiving election files.
 - b. All four elections must be provided prior to scheduling certification testing at the lab.
 - c. All issues, questions, and concerns must be directed to the North Carolina State Board of Elections.
 - d. Failure to provide ballot images or inability to create elections from the exports shall prevent the manufacturer from proceeding.

Scenario Setup

- 1. Pre-election system setup:
 - a. Full voting system, ballots, and all peripherals submitted for certification shall be delivered to the North Carolina State Board of Elections-appointed VSTL.
 - b. Physical Configuration Audit (PCA) shall be performed to baseline the system

and ensure all items necessary for testing are present.

- c. Voting system setup as designated by the manufacturer supplied Technical Documentation Package (TDP).
- 2. Pre-certification elections loaded:
 - a. Open all four elections in the Election Management System (EMS).
 - b. Review offices, districts, and precincts.
 - c. Review ballot setups.
 - d. Save election.
- 3. Prepare media for election (label each one with date, election name, precinct, etc.).
- 4. Load election on each component and perform an Operational Status Check, whereby at least five (5) ballots per component are processed and results are verified against known expected results from pre-determined marking patterns.

General Election Creation Testing

- 1. Election parameters:
 - a. At least one split
 - b. Three precincts
 - c. English only
 - d. At least one ballot style to accommodate seventeen (17) year-oldvoters
 - e. At least one N of M contest
 - f. Write-ins
 - g. At least one referendum
- 2. Print ballots or burn media for EBM
- 3. Create test deck:
 - a. Test deck shall consist of 100 ballots including all fourprecincts.
 - b. Hand mark ballots according to manufacturer documentation in a predetermined voting pattern as described in the associated Election Definition to ensure expected known results.
- 4. Vote ballots on each component of the system:
 - a. The tabulators shall have 100 ballots cast two times (this can be all on one unit or split among 2-3 units for a total of 200 ballots cast).
 - b. The Central Count shall have 100 ballots cast five times (this shall be split equally among all different models included for testing with a total of 500 ballots scanned).
 - c. The EBM shall have 100 ballots created and voted once on both the tabulator and Central Count to ensure they can each tabulate the ballots.
- 5. Verify all results in the manufacturer EMS and against any machine-printed tapes or reports.

Stress, Accuracy, and Reliability

- 1. Test parameters
 - a. Election: Primary Election
 - b. Marking Pattern: as stated in Election Definition
 - c. Number of pre-marked ballots: 2520 (PCOS = 5 each ballot style, Central = 25 each ballot style)
 - d. Number of ballot styles: 84
 - e. Under Test: PCOS, Central Count
- 2. Test execution for large General Election (PCOS)
 - a. Assemble manufacturer pre-marked ballots in test decks as determined in the Election Definition.
 - b. Cast ballots on PCOS as stated in the Election Definition.
 - c. Verify results against known expected results stated in the Election Definition.
- 3. Test execution for large Primary Election (PCOS)
 - a. Assemble manufacturer pre-marked ballots in test decks as determined in the Election Definition.
 - b. Cast ballots on PCOS as stated in the Election Definition.
 - c. Verify results against known expected results stated in the Election Definition
- 4. Test execution for complex General Election (PCOS).
 - a. Assemble manufacturer pre-marked ballots in test decks as determined in the Election Definition.
 - b. Cast ballots on PCOS as stated in the Election Definition.
 - c. Verify results against known expected results stated in the ElectionDefinition.
- 5. Test execution for complex Primary Election (PCOS)
 - a. Assemble manufacturer pre-marked ballots in test decks as determined in the Election Definition.
 - b. Cast ballots on PCOS as stated in the Election Definition.
- c. Verify results against known expected results stated in the ElectionDefinition
- 6. Test execution for large Primary Election (Central Count).
 - a. Assemble manufacturer pre-marked ballots in test decks as determined in the Election Definition.
 - b. Cast ballots on Central Count as stated in the Election Definition.
 - c. Verify results against known expected results stated in the Election Definition.
- 7. Reporting
 - a. Winners: contest reports review
 - b. Results: statement of ballots cast, statement of votes cast, statement of votes cast with precincts
- 8. Testing Acceptance
 - a. Accuracy in ballot counting and tabulation shall achieve 100% for all votes cast.

- 1. Test parameters
 - a. Election: Primary Election
 - b. Marking Pattern: as stated in Election Definition
 - c. Number of ADA ballots: 100
 - d. Number of ballot styles: 84
 - e. Under Test: PCOS, Central Count, ADA
- 2. Test execution for large Primary Election (ADA)
 - a. Vote 100 ballots on the manufacturer ADA device to create test deck as determined in the Election Definition (if multiple ADA devices supported combine for total of 100 ballots).
 - b. Ballots shall be voted using a mixture of all supported peripherals such as ATI, foot pedals, sip and puff, etc. (dependent upon supported devices a minimum of one ballot shall be voted per device supported).
 - c. Cast ballots once on PCOS as stated in the Election Definition.
 - d. Cast ballots once on Central Count as stated in the ElectionDefinition.
 - e. Verify results against known expected results stated in the Election Definition.
- 3. Reporting
 - a. Winners: contest reports review
 - b. Results: statement of ballots cast, statement of votes cast, statement of votes cast with precinct
- 4. Testing Acceptance
 - a. Accuracy in ballot counting and tabulation shall achieve 100% for all votes cast.

Marginal Marks/Adjudication

- 1. Test parameters
 - a. Election: Primary Election
 - b. Marking Pattern: as stated in Election Definition
 - c. Number of ballots: 40 (20 = PCOS, 20 = Central Count folded)
 - d. Number of ballot styles: 84
 - e. Number of folded ballots: 20 (for Central Countonly)
 - f. Under Test: PCOS, Central Count
- 2. Test execution for large Primary Election (PCOS & Central Count)
 - a. Assemble manufacturer pre-marked or hand-marked ballots in test decks as determined in the Election Definition (manufacturer may pre-mark ballots below threshold if desired).
 - b. Cast ballots once on PCOS as stated in the ElectionDefinition.
 - c. Adjudicate all ballots and correct to obtain voter intent (marks should be beneath manufacturer threshold, but clearly able to identify voter intent to obtain expected result).
 - d. Verify results against known expected results stated in the Election Definition.
 - e. Cast folded ballots once on Central Count as stated in the ElectionDefinition.

- f. Adjudicate all ballots and correct to obtain voter intent (marks should be beneath manufacturer threshold, but clearly able to identify voter intent to obtain expected result).
- g. Verify results against known expected results stated in the ElectionDefinition.
- 3. Reporting
 - a. Winners: contest reports review
 - b. Results: statement of ballots cast, statement of votes cast, statement of votes cast with precincts
- 4. Testing Acceptance
 - a. Accuracy in ballot counting and tabulation shall achieve 100% for all votes cast.

Based on the information provided by the vendor in Section 3.6.1 above, the State Board of Elections will produce the necessary data and information to the vendor for purposes of election and ballot coding. The data and information will be the election definitions based on the election events and contest information created by the State Board for purposes of its review of election event workflow.

3.6.3 Ballot Preparation

Using the election event contest data provided by the State Board of Elections, the vendor must produce ballot images or .pdf proofs that will need to be reviewed and approved by the State Board.

3.6.4 Ballot Review and Approval

The SBE Voting Systems review team will review the ballot images or .pdfs produced by the vendor for approval. If the ballot proofs meet the requirements of North Carolina ballot specifications, then the review team will *approve* the ballots for printing. The workflow of balloting proofing involves:

- Initial CBE Review
- Initial SBE Review
- Final CBE Review
- Final SBE Review

3.6.5 Test Script Generation and Test Deck Printing

If applicable, the vendor must print a test deck of each ballot style for testing in the voting equipment.

3.6.6 Election Coding and Tabulation Software

The vendor must produce election coding relevant to the election event contest information provided in order to produce equipment media. The vendor must be ready to demonstrate how the media is integrated into the vote tabulation software.

3.6.7 Election Equipment Setup

The vendor must provide a demonstration of the setting up of the voting system equipment using the media generated by the election coding data.

3.6.8 Voting Demonstration using the Test Deck

The vendor must demonstrate the voting process on the coded equipment. At a minimum, the State Board of Elections will review the following:

- How voting equipment uses or generates a paper ballot.
- How voting equipment accurately records the marks made by a voter.
- How voting equipment produces a warning for an over-vote.
- How voting equipment handles undervotes.
- How voting equipment handles write-in votes.
- How voting equipment handles blank ballots.
- How voting equipment allows a voter to review his or her choices.
- How voting equipment allows a voter to make edits to his or her vote choices.
- How voting equipment has accessibility features.
- How voting equipment accurately calculates all vote totals for each equipment or device.

3.6.9 Vote Tabulation Review

The vendor must demonstrate that the voting equipment records and tabulates votes by precinct and voting method. Vote tabulation software must accurately calculate all votes cast on each voting equipment or device. Vote tabulation software must accurately separate votes for each contest by precinct or administrative precinct. Vote tabulation software accurately separates votes for each contest by voting method.

3.6.10 Election Results Import and Review

The vendor must provide the file layout from its vote tabulation software for purposes of importing the election results into the State's Election Reporting application. The data from the vote tabulation software must be able to be imported into SEIMS's election reporting application. A successful import must include all of the precincts, administrative precincts (non-geographic reporting groups), contests and candidates that have been setup in SEIMS. The results file must include the appropriate contest, precinct, and candidate codes, as required.

3.6.11 Adjudication and Canvassing

The vendor shall demonstrate that the voting system counts for manual adjudication to allow for damaged ballots, partially counted ballots, or to determine voter intent.

3.6.12 Recount Procedures

The vendor shall demonstrate that the voting system conducts a recount of an election contest without changing the ballots cast for other contests.

3.6.13 Tabulation by Voting Precinct

The vendor shall demonstrate that the voting system permits final election results to be reported by voting precinct.

3.6.14 Integration into SEIMS

The vendor must demonstrate that the voting system is capable of feeding tabulated results as a flat file directly into the Statewide Elections Information Management System (SEIMS) securely and accepting a flat file directly from the SEIMS in order to populate all necessary election definitions. *See also* Section 3.4.2.11, which is incorporated herein.

3.7 **POST-CERTIFICATION REQUIREMENTS**

3.7.1 Pre-Contract Procedures

3.7.1.1 County Demonstration

The county board of elections must witness the demonstration of at least two certified systems, as long as at least two certified systems are available.

3.7.1.2 Test in One Election

Before a county may purchase a new voting system or replace an existing system, the county board of elections must test the system in at least one precinct in an election. A county board of elections may use a one-stop precinct for this purpose. A test is considered to encompass all election procedures, from election setup and ballot configuration through reporting election results by voting district. A test will not be considered complete unless the vendor provides the testing county with all voting system equipment, relevant firmware, software, and any other required components. The county board of elections must be able to test all functionality of the system that is proposed to be purchased.

3.7.1.3 State Board Approval

After testing a voting system, a county board of elections desiring to purchase a new voting system or replace an existing voting system must first request permission from the State Board of Elections. The proposed contract must be forwarded to the State Board of Elections to permit the agency to review the contract to ensure adequate terms and a uniform price.

3.7.1.4 Recommendation to Board of County Commissioners

If the State Board of Elections grants approval to purchase a certified voting system, the county board of elections may then make a final recommendation to its board of county commissioners.

3.7.1.5 Board of County Commissioners Approval

The Board of County Commissioners is responsible for final approval of the contract to purchase a certified voting system.

3.7.2 Post County Acquisition and Adoption

3.7.2.1 Acceptance Testing

Any new voting system delivered to a county board of elections must undergo Acceptance Testing.

3.7.2.2 User's Manual

A hardcopy user's manual shall be delivered during equipment installation and acceptance; one copy per component. One hard copy and one electronic copy of each user manual shall be sent to the election official of the county responsible for conducting elections (i.e., county director).

3.7.2.3 Training

The vendor shall provide extensive training programs on all phases of the voting system(s). The training shall provide state, county, and local election personnel with sufficient training in order to operate the system without continuous support by the contractor. Vendors shall provide a minimum of five (5) training classes per program (e.g. voting unit, election management system, ballot creation and layout software) per ordering entity (each county board of elections) for the initial contract period and for each renewal period exercised. Dates for training sessions will be mutually agreed upon by county customer and vendor. The State Board reserves the right to require additional or other training as it deems necessary or beneficial.

The training must include the following, without limitation, as applicable to the particular voting system:

- Training on the use of the ballot creation and layout software.
- Programming of tabulators.
- Preparation of tabulators including set up and pre-election testing.
- Election day and early voting operations from the opening to the closing of the polls.
- Printing of zero counts before the polls open.
- Processing of voters, early voting ballots, and provisional ballots.
- Use of central counting station functions.
- Troubleshooting to solve temporary problems.
- Identifying hot points for system errors.

- Safeguards to prevent and detect tampering.
- Tabulation of results.
- Electronic transmission of election results.
- Printing, designing and reformatting of election reports.
- Methods of ensuring the accuracy of precinct results.
- Use of battery backup feature(s).
- Taking a malfunctioning piece of equipment out of service.
- Full understanding of the audit procedures.
- Conducting a recount.
- Records preservation.
- Explanation of how and when to place service calls.

The Vendor will assist county and local election officials (if requested) in conducting comprehensive training for election judges and clerks for their various precincts prior to the primary and general elections in the first year of use.

3.8 VOTING SYSTEMS MODIFICATION

Any modification to the hardware, firmware, or software of an existing system which has been initially certified by the State Board under the procedures described herein will act to decertify the system, unless the vendor demonstrates to the State Board's satisfaction that the modification does not and will not compromise the reliability, accuracy, user-friendliness, or secure operation and maintenance of that system. A change in version for a voting system or of a component is a modification thereof.

If the system being modified has been tested or certified to a previous VVSG version, the State Board may, at its discretion, allow testing of modifications to the prior standards or require testing of the modification to the most current standards.

Any unauthorized modifications to a certified system may result in decertification of the system by the State Board or bar a voting system vendor from receiving certification of voting systems in the future.

3.8.1 Application & Documentation

If all or part of any certified system is modified or changed before the modified system or component of the system is used in any North Carolina election, the vendor must request and receive certification of the modified component or system. The vendor must complete an application for certification and include a summary of the changes.

Update of currently approved system - A vendor must seek certification from the State Board of Elections if it updates a currently approved system. An update of a currently approved system includes any new components or software changes that have not previously been approved for use in North Carolina.

Blended – A vendor must seek certification from the State Board of Elections if it proposes to combine elements of separately approved systems into a new system.

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3.8.2 Notification of Receipt of Application

The State Board of Elections will review the application and determine if the application is a request for a full certification review or administrative review. If the State Board of Elections determines that the change or modification merits a full examination and testing, the vendor must follow the protocols outlined in Sections 3 and 4 of this document, as applicable. The vendor will be notified if the modification or change is a limited change that requires only an administrative review.

3.9 TERMINATION OF CERTIFICATION PROCESS

The State Board of Elections reserves the right to terminate the certification process at any time if the vendor fails to proceed in a timely manner. In particular, if a period of three (3) months expires between any request for information, data, or documentation by the State Board or its evaluation agent and the manufacturer's response to that request, or if the response is not satisfactory, the State Board may terminate the certification process, at its discretion. If the certification process is terminated under this provision, the manufacturer will forfeit any fees received by the State Board. Any certification process following terminated when any of the following occur: The State Board issues a negative determination regarding certification, the vendor withdraws from the process; or the system fails to meet expectations in any certification or performance test required under this Program.

Appendix A:

Summary of NC Elections

Total Jurisdictions	100
Total Precincts	2,709
Methods of Voting	Absentee (By-mail)
C C	Absentee One-stop
	One-stop Curbside
	Election Day
	Election Day Curbside
	Provisional
Primary System	Semi-Closed: Voters who are registered Unaffiliated may choose to
	participate in a party's partisan primary; voters who are affiliated
	with a party may only participate in their registered party's primary.
Election Event Types	General Municipal
	Partisan Primary
	Municipal Primary
	Non-partisan Primary
	Bond Referenda
Contest Jurisdictions	Precinct
	Congressional (13)
	NC Senate (50)
	NC House (120)
	Prosecutorial
	Superior Court
	District Court
	County Commissioner
	Municipality
	Township
	Municipal District
	Ward
	School
	Fire
	Rescue
	Sanitary
	Sewer
	Water
UOCAVA Ballot Method	Mail
	Fax
	Email
Ballot Notation	A unique identifier is required on absentee ballots.

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	A notation of "Provisional" on provisional ballots is allowed, but the
	ballot may not be uniquely tied to a voter.
Ballot Layout	"Official Ballot"
Dunot Eugout	Chair Signature
	List all Contests
	List all Condidates
Ballot Order	U.S. President
Danot Order	Partisan – Federal
	Partisan – State
	Partisan – County
	Partisan – Local
	Judicial – Appellate
	Judicial – Superior Court
	Judicial – District Court
	Non-partisan – County
	Non-partisan – Local
	Referenda – State
	Referenda – County
	Referenda – Local
Write-ins allowed	Partisan primary contests – No
	Partisan General Election contest – Yes, if qualified by petition
	Non-partisan primary contests – No
	Non-partisan General Election contests – Yes
	Judicial contests - No
Straight-party voting	No
Coding Options	By Ballot Style
	By Precinct/Voting Precinct
Ballots	Official Ballots (required)
	Sample Ballots (required)
	UOCAVA Ballots (required)
	Provisional Ballots ("Provisional" notation permitted)
	Absentee By-mail Ballots (required)
Logic & Accuracy Testing	Each Election
	Every Ballot Styles
	Each machine or equipment to be used in an election
	Vote Tabulation Software
	Election Import into State's Election Management System
Election Results	Imported into Election Results Application