	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
4		**General**			
5	"EAC Certification Program Manual" 5.11				
6	"VSTL Accreditation Manual" 2.4, "EAC Certification Program Manual" 1.6.2.3				
7		**Qualification Test Process**			
8	V.1:1.6.4				
9	V.2:1.8				
10	V.2:1.8.1 V.2:1.8.1.1 V.2:1.8.1.2				
11	V.2:1.8.2				
12	V1:1.5.2 V.2:1.8.2.1				
13	V.2:1.8.2.2				
14	V.2:1.8.2.3				
15	V.2:1.8.2.4 V.2:6.2.2				
16		**Perform Trusted Build**			
17	"EAC Certification Program Manual" 5.3.2.1	**Performing and documenting a trusted build pursuant to Section 5.6 of this chapter.**			
18		**Trusted Build**			
19	"EAC Certification Program Manual" 5.5	**Trusted Build. A software build (also referred to as a compilation) is the process whereby source code is converted to machine-readable binary instructions (executable code) for the computer. A "trusted build" (or trusted compilation) is a build performed with adequate security measures implemented to give confidence that the executable code is a verifiable and faithful representation of the source code. A trusted build creates a chain of evidence from the Technical Data Package and source code submitted to the VSTLs to the actual executable programs that are run on the system. Specifically, the build will do the following:**			
20		**Trusted Build**			
21	"EAC Certification Program Manual" 5.5.1	Demonstrate that the software was built as described in the Technical Data Package.	**VSTL-TP-250**	**Yes**	
22	"EAC Certification Program Manual" 5.5.2	Show that the tested and approved source code was actually used to build the executable code used on the system.	**VSTL-TP-250**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
23	"EAC Certification Program Manual" 5.5.3	Demonstrate that no elements other than those included in the Technical Data Package were introduced in the software build.	**VSTL-TP-250**	**Yes**	
24	"EAC Certification Program Manual" 5.5.4	Document for future reference the configuration of the system certified.	**VSTL-TP-250**	**Yes**	
25		**Trusted Build Procedure**			
26	"EAC Certification Program Manual" 5.6	In each step, a minimum of two witnesses from different organizations is required to participate. These participants must include a VSTL representative and vendor representative.	**VSTL-TP-200, VSTL-TP-250**	**Yes**	
27	"EAC Certification Program Manual" 5.6	Before creating the trusted build, the VSTL must complete the source code review of the software delivered from the vendor for compliance with the VVSG	**VSTL-TP-200, VSTL-TP-250**	**Yes**	
28	"EAC Certification Program Manual" 5.6	and record file signatures of all source code modules.	**VSTL-TP-200, VSTL-TP-250, VSTL-TP-300**	**Yes**	
29		**Constructing the Build Environment**			
30	"EAC Certification Program Manual" 5.6.1	The VSTL shall construct the build environment in an isolated environment controlled by the VSTL,	**VSTL-TP-200, VSTL-TP-250**	**Yes**	
31	"EAC Certification Program Manual" 5.6.1.1	The device that will hold the build environment shall be completely erased by the VSTL to ensure a total and complete cleaning of it.	**VSTL-TP-200, VSTL-TP-250**	**Yes**	
32	"EAC Certification Program Manual" 5.6.1.1	The VSTL shall use commercial off-the-shelf software, purchased by the laboratory, for cleaning the device.	**VSTL-TP-200, VSTL-TP-250**	**Yes**	
33	"EAC Certification Program Manual" 5.6.1.2	The VSTL, with vendor consultation and observation, shall construct the build environment.	**VSTL-TP-200, VSTL-TP-250**	**Yes**	
34	"EAC Certification Program Manual" 5.6.1.3	After construction of the build environment, the VSTL shall produce and record a file signature of the build environment.	**VSTL-TP-200, VSTL-TP-250**	**Yes**	
35		**Loading Source Code Onto the Build Environment**			
36	"EAC Certification Program Manual" 5.6.2	After successful source code review, the VSTL shall load source code onto the build environment	**VSTL-TP-200, VSTL-TP-210, VSTL-TP220, VSTL-TP-230, VSTL-TP-240, VSTL-TP-250**	**Yes**	
37	"EAC Certification Program Manual" 5.6.2.1	The VSTL shall check the file signatures of the source code modules and build environment to ensure that they are unchanged from their original form.	**VSTL-TP-200, VSTL-TP-210, VSTL-TP220, VSTL-TP-230, VSTL-TP-240, VSTL-TP-250**	**Yes**	
38	"EAC Certification Program Manual" 5.6.2.2	The VSTL shall load the source code onto the build environment and produce and record the file signature of the resulting combination.	**VSTL-TP-200, VSTL-TP-210, VSTL-TP220, VSTL-TP-230, VSTL-TP-240, VSTL-TP-250**	**Yes**	
39	"EAC Certification Program Manual" 5.6.2.3	The VSTL shall capture a disk image of the combination build environment and source code modules immediately before performing the build.	**VSTL-TP-200, VSTL-TP-210, VSTL-TP220, VSTL-TP-230, VSTL-TP-240, VSTL-TP-250**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
40	"EAC Certification Program Manual" 5.6.2.4	The VSTL shall deposit the disk image into an authorized archive to ensure that the build can be reproduced, if necessary, at a later date.	**VSTL-TP-200, VSTL-TP-210, VSTL-TP220, VSTL-TP-230, VSTL-TP-240, VSTL-TP-250**	**Yes**	
41		**Creating the Executable Code**			
42	"EAC Certification Program Manual" 5.6.3	Upon completion of all the tasks outlined above, the VSTL shall produce the executable code.	**VSTL-TP-250**	**Yes**	
43	"EAC Certification Program Manual" 5.6.3.1	The VSTL shall produce and record a file signature of the executable code.	**VSTL-TP-250**	**Yes**	
44	"EAC Certification Program Manual" 5.6.3.2	The VSTL shall deposit the executable code into an EAC-approved software repository	**VSTL-TP-250**	**Yes**	
45	"EAC Certification Program Manual" 5.6.3.2	and create installation disk(s) from the executable code.	**VSTL-TP-250**	**Yes**	
46	"EAC Certification Program Manual" 5.6.3.3	The VSTL shall produce and record file signatures of the installation disk(s) in order to provide a mechanism to validate the software before installation on the voting system in a purchasing jurisdiction.	**VSTL-TP-250**	**Yes**	
47	"EAC Certification Program Manual" 5.6.3.4	The VSTL shall install the executable code onto the system submitted for testing and certification before completion of system testing.	**VSTL-TP-250**	**Yes**	
48		**Trusted Build for Modifications**			
49	"EAC Certification Program Manual" 5.6.4	The process of building new executable code when a previously certified system has been modified is somewhat simplified.	**VSTL-TP-250**	**Yes**	
50	"EAC Certification Program Manual" 5.6.4.1	The build environment used in the original certification is removed from storage and its file signature verified.	**VSTL-TP-250**	**Yes**	
51	"EAC Certification Program Manual" 5.6.4.2	After source code review, the modified files are placed onto the verified build environment and new executable files are produced.	**VSTL-TP-250**	**Yes**	
52	"EAC Certification Program Manual" 5.6.4.3	If the original build environment is unavailable or its file signatures cannot be verified against those recorded from the original certification, then the more labor-intensive process of creating the build environment must be performed. Further source code review may be required of unmodified files to validate that they are unmodified from their originally certified versions.	**VSTL-TP-250**	**Yes**	
53		**Archiving Software**			
54	"EAC Certification Program Manual" 5.3.2.2	**Depositing software in an approved repository pursuant to Section 5.7 of this chapter.**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
55		**Depositing Software in an Approved Repository**			
56	"EAC Certification Program Manual" 5.6.4 and VVSG V.1:1.6.1 and VVSG V.1:1.6.2.2	After EAC certification has been granted, the VSTL project manager, or an appropriate delegate of the project manager, shall deliver for deposit the following elements in one or more trusted archive(s) (repositories) designated by the EAC: 5.7.1. Source code used for the trusted build and its file signatures. 5.7.2. Disk image of the pre-build, build environment, and any file signatures to validate that it is unmodified. 5.7.3. Disk image of the post-build, build environment, and any file signatures to validate that it is unmodified. 5.7.4. Executable code produced by the trusted build and its file signatures of all files produced. 5.7.5. Installation device(s) and file signatures. Also VVSG V.1:1.6.1 To ensure that correct voting system software has been distributed without modification, the Guidelines include requirements for certified voting system software to be deposited in a national software repository. This provides an independent means for election officials to verify the software they purchase. and VVSG V.1:1.6.2.2 Upon issuance of a certification number by the EAC, the test lab shall deposit a copy of the certified voting system software with the National Software Reference Library.	**VSTL-TP-250**	**Yes**	
57		**System Verification Tools**			
58	"EAC Certification Program Manual" 5.3.2.3	**Creating and making available system verification tools pursuant to Section 5.8 of this chapter.**			
59		**System Identification Tools**			
60	"EAC Certification Program Manual" 5.8	The Manufacturer shall provide tools through which a fielded voting system may be identified and demonstrated to be unmodified from the system that was certified. The purpose of this requirement is to make such tools available to Federal, State, and local officials to identify and verify that the equipment used in elections is unmodified from its certified version. Manufacturers may develop and provide these tools as they see fit. The tools, however, must provide the means to identify and verify hardware and software. The EAC may review the system identification tools developed by the Manufacturer to ensure compliance. System identification tools include the following examples:	**VSTL-TP-300**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
61	"EAC Certification Program Manual" 5.8.1	Hardware is commonly identified by model number and revision number on the unit, its printed wiring boards (PWBs), and major subunits. Typically, hardware is verified as unmodified by providing detailed photographs of the PWBs and internal construction of the unit. These images may be used to compare with the unit being verified.	**VSTL-TP-300**	**Yes**	
62	"EAC Certification Program Manual" 5.8.2	Software operating on a host computer will typically be verified by providing a self-booting compact disk (CD) or similar device that verifies the file signatures of the voting system application files	**VSTL-TP-300**	**Yes**	
63	"EAC Certification Program Manual" 5.8.2	... AND the signatures of all nonvolatile files that the application files access during their operation.	**VSTL-TP-300**	**Yes**	
64	"EAC Certification Program Manual" 5.8.2	...Note that the creation of such a CD requires having a file map of all nonvolatile files that are used by the voting system. Such a tool must be provided for verification using the file signatures of the original executable files provided for testing. If during the certification process modifications are made and new executable files created, then the tool must be updated to reflect the file signatures of the final files to be distributed for use.	**VSTL-TP-300**	**Yes**	
65	"EAC Certification Program Manual" 5.8.2	...For software operating on devices in which a self-booting CD or similar device cannot be used, a procedure must be provided to allow identification and verification of the software that is being used on the device.	**VSTL-TP-300**	**Yes**	
66		**Documentation**			
67	"EAC Certification Program Manual" 5.9	Manufacturers shall provide documentation to the Program Director verifying that the trusted build has been performed, software has been deposited in an approved repository, and system identification tools are available to election officials.	**VSTL-TP-250**	**Yes**	
68	"EAC Certification Program Manual" 5.9	...The Manufacturer shall submit a letter, signed by both its management representative and a VSTL official, stating (under penalty of law) that it has: (1) performed a trusted build consistent with the requirements of Section 5.6 of this Manual, (2) deposited software consistent with Section 5.7 of this Manual, and (3) created and made available system identification tools consistent with Section 5.8 of this Manual. This letter shall also include (as attachments) a copy and description of the system identification tool developed under Section 5.8 above.	**VSTL-TP-250**	**Yes**	
69	V.2:1.8.2.5	**Qualification Test Data**			
70	V.2:1.8.2.6	**Qualification Test Practices**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
71	V.2:1.8.3 V.2:1.8.4	**Test Report & Post-Test Activities**			
72		**Evolution of Testing**			
73		**Evolution of Testing**			
74		**TDP Documentation Requirements**			
75	V.2:1.5	**General Requirement**			
76	V.2:2.1	**TDP - Scope**			
77	V.2:2.1.1	**TDP - Content and Format**			
78		**The content of the Technical Data Package (TDP) is intended to provide clear, complete descriptions of the following information about the system:**			
79	a.	Overall system design, including subsystems, modules and the interfaces among them	**VSTL-TP-100**	**Yes**	
80	b.	Specific functional capabilities provided by the system	**VSTL-TP-100**	**Yes**	
81	c.	Performance and design specifications	**VSTL-TP-100**	**Yes**	
82	d.	Design constraints, applicable standards, and compatibility requirements	**VSTL-TP-100**	**Yes**	
83	e.	Personnel, equipment, and facility requirements for system operation, maintenance, and logistical support	**VSTL-TP-100**	**Yes**	
84	f.	Vendor practices for assuring system quality during the system's development and subsequent maintenance	**VSTL-TP-100**	**Yes**	
85	g.	Vendor practices for managing the configuration of the system during development and for modifications to the system throughout its life cycle	**VSTL-TP-100**	**Yes**	
86		The vendor shall provide a list of all documents submitted controlling the design, construction, operation, and maintenance of the system. Documents shall be listed in order of precedence.	**VSTL-TP-100**	**Yes**	
87	V.1:8.7 V.2:2.2 V.2:2.2.1 V.2:2.2.2	**System Overview**			

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2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
88	V1:1.5.2 V.2:2.3 V.2:3.2.3	**System Functionality Description**			
89	V1:1.5.2 V.2:2.4 V.2:2.4.1 V.2:2.4.2	**System Hardware Specification**			
90	V.2:2.5 - 2.5.10	**Software Design & Specifications**			
91	V.2:2.6 - 2.6.6	**System Security Specification**			
92	V.2:2.7 - 2.7.2	**System Test/Verification Specification**			
93	V.2:2.8 - 2.8.7	**System Operations Procedures**			
94	V.2:2.9 - 2.9.6	**System Maintenance Procedures**			
95	V.2:2.10 - 2.10.2	**Personnel Deployment / Training Req**			
96	V.2:2.11 - 2.11.7	**Configuration Management Plan**			
97	V.2:2.12 - 2.12.4	**Quality Assurance Program**			
98	V.2:2.13 V.2:3.2.4	**System Change Notes**			
99	V.2:2.1.1.3	**General Documentation Requirements**			

Cell: B8
Comment: V.1:1.6.4 Implementation Statement

The voting system implementation statement describes the voting system and documents the VVSG Volume 1 requirements that have been implemented by the voting system. It can also identify optional features and capabilities supported by the voting system, as well as any extensions (i.e., additional functionality beyond what is required in the guidelines). The implementation statement must include a checklist identifying all the requirements for which a claim of conformance is made.
The implementation statement must be submitted with the vendor's application to the EAC for national certification testing. It must provide a concise summary and narrative description of the voting system's capabilities. It shall include identifying information about the voting system, including the hardware and software components, version number and date.

Cell: A9
Comment: The qualification test process may be performed by one or more ITAs that together perform the full scope of tests required by the Standards. Where multiple ITAs are involved, testing shall be conducted first for the voting system hardware, firmware, and related documentation; then for the system software and communications; and finally for the integrated system as a whole. Voting system hardware and firmware testing may be performed by one ITA independently of the other testing performed by other ITAs. Testing may be coordinated across ITAs so that hardware/firmware tested by one ITA can be used in the overall system tests performed by another ITA.

Whether one or more ITAs are used, the testing generally consists of three phases:
• Pre-test Activities;
• Qualification Testing; and
• Qualification Report Issuance and Post-test Activities.

Cell: B9
Comment: The certification test process may be performed by one or more accredited test labs that together perform the full scope of tests required. Where multiple accredited test labs are involved, testing shall be conducted first for the voting system hardware, firmware, and related documentation; then for the system software and communications; and finally for the integrated system as a whole. Voting system hardware and firmware testing may be performed by one accredited test lab independently of the other testing performed by other accredited test labs. Testing may be coordinated across accredited test labs so that hardware/firmware tested by one accredited test lab can be used in the overall system tests performed by another accredited test lab.

When multiple accredited test labs are being used, the development of the National
Certification Test Plan (see Appendix A) and the National Certification Test Report (see Appendix B) shall be coordinated by a lead accredited test lab. The lead lab is responsible for ensuring that all testing has been performed and documented in accordance with the Guidelines.

Whether one or more accredited test labs are used, the testing generally consists of three phases:
• Pre-test Activities
• National Certification Testing
• National Certification Report Issuance and Post-test Activities

Cell: A10
Comment: V.1:9.6.1 Pre-test Activities
Pre-test activities include the request for initiation of testing and the pre-test preparation.

V.1:9.6.1.1 Initiation of Testing
Qualification testing shall be conducted at the request of the vendor, consistent with the provision of the Standards. The vendor shall:
a. Request the performance of qualification testing from among the certified ITAs,

b. Enter into formal agreement with the ITAs for the performance of testing, and
c. Prepare and submit materials required for testing consistent with the requirements of the Standards.
Qualification testing shall be conducted for the initial version of a voting system as well as for all subsequent changes to the system prior to release for sale or for installation. As described in Section 9.5.2, the nature and scope of testing for system changes or new versions shall be determined by the ITA based on the nature and scope of the modifications to the system and on the quality of system documentation and configuration management records submitted by the vendor.

V.1:9.6.1.2 Pre-test Preparation
Pre-test preparation encompasses the following activities:
a. The vendor shall prepare and submit a complete TDP to the ITA. The TDP should consist of the items listed in Section 9.2 and specified in greater detail in Standards Volume II;
b. The ITA shall perform an initial review of the TDP for completeness and clarity and request additional information as required;
c. The vendor shall provide additional information, if requested by the ITA;
d. The vendor and ITA shall enter into an agreement for the testing to be performed by the ITA in exchange for payment by the vendor;
e. The vendor shall deliver to the ITA all hardware and software needed to perform testing.

Cell: B10
Comment: V.2:1.8.1 Pre-test Activities
Pre-test activities include the request for initiation of testing and the pre-test preparation.

V.2:1.8.1.1 Initiation of Testing
Certification testing shall be conducted at the request of the vendor, consistent with the provision of the Guidelines. The vendor shall:
a. Request the performance of certification testing from among the accredited testing laboratories
b.Enter into formal agreement with the accredited test lab for the performance of testing
c. Prepare and submit materials required for testing consistent with the requirements of the Guidelines

Certification testing shall be conducted for the initial version of a voting system as well as for all subsequent changes to the system prior to release for sale or for installation. As described in Subsection 1.6.2, the nature and scope of testing for system changes or new versions shall be determined by the accredited test lab based on the nature and scope of the modifications to the system and on the quality of system documentation and configuration management records submitted by the vendor.

V.2:1.8.1.2 Pre-test Preparation
Pre-test preparation encompasses the following activities:
a. The vendor shall prepare and submit a complete TDP to the accredited test lab. The TDP should consist of the materials described in Section 2

b.The accredited test lab shall perform an initial review of the TDP for completeness and clarity and request additional information as required

c. The vendor shall provide additional information, if requested by the accredited test lab

d.The vendor and accredited test lab shall enter into an agreement for the testing to be performed by the accredited test lab in exchange for payment by the vendor

e. The vendor shall deliver to the accredited test lab all hardware and software needed to perform testing

Cell: A11
Comment: Qualification testing encompasses the preparation of a test plan, the establishment of the appropriate test conditions, the use of appropriate test fixtures, the witness of the system build and installation, the maintenance of qualification test data, and the evaluation of the data resulting from tests and examinations.

Cell: B11
Comment: Certification testing encompasses the preparation of a test plan, the establishment of the appropriate test conditions, the use of appropriate test fixtures, the witness of the system build and installation, the maintenance of certification test data, and the evaluation of the data resulting from tests and examinations.

Cell: A12
Comment: V.1:1.5.1

Vendors also shall submit a proposed test plan to the appropriate independent test authority recognized by the National Association of State Election Directors (NASED) to conduct national qualification testing of voting systems.

V.1:9.6.2.1

The ITA shall prepare a Qualification Test Plan to define all tests and procedures required to demonstrate compliance with Standards, including:
a. Verifying or checking equipment operational status by means of manufacturer operating procedures;
b. Establishing the test environment or the special environment required to perform the test;
c. Initiating and completing operating modes or conditions necessary to evaluate the specific performance characteristic under test;
d. Measuring and recording the value or range of values for the characteristic to be tested, demonstrating expected performance levels;
e. Verifying, as above, that the equipment is still in normal condition and status after all required measurements have been obtained;
f. Confirming that documentation submitted by the vendor corresponds to the actual configuration and operation of the system; and
g. Confirming that documented vendor practices for quality assurance and configuration management comply with the Standards.
A recommended outline for the test plan and the details of required testing are contained in Standards Volume II.

Cell: B12
Comment: V.1:1.5.2

Vendors shall also submit a proposed test plan to the EAC for use in national certification testing.

V.2:1.8.2.1

The accredited test lab shall prepare a National Certification Test Plan to define all tests and procedures required to demonstrate compliance with the Guidelines, including:

Verifying or checking equipment operational status by means of manufacturer operating procedures

a. Establishing the test environment or the special environment required to perform the test

b.Initiating and completing operating modes or conditions necessary to evaluate the specific performance characteristic under test

c. Measuring and recording the value or range of values for the characteristic to be tested, demonstrating expected performance levels

d.Verifying, as above, that the equipment is still in normal condition and status after all required measurements have been obtained

e. Confirming that documentation submitted by the vendor corresponds to the actual configuration and operation of the system

f. Confirming that documented vendor practices for quality assurance and configuration management comply with the Guidelines

A recommended outline for the test plan and the details of required testing are contained in Appendix A.

Cell: A13
Comment: The ITA may perform Qualification tests in any facility capable of supporting the test environment. The following practices shall be employed:

a. Preparations for testing, arrangement of equipment, verification of equipment status, and the execution of procedures shall be witnessed by at least one independent, qualified observer, who shall certify that all test and data acquisition requirements have been satisfied;
b. When a test is to be performed at “standard” or “ambient” conditions, this requirement shall refer to a nominal laboratory or office environment, with a temperature in the range of 68 to 75 degrees Fahrenheit, and prevailing atmospheric pressure and relative humidity; and
c. Otherwise, all tests shall be performed at the required temperature and electrical supply voltage, regulated within the following tolerances:

1) Temperature +/- 4 degrees F
2) Electrical supply voltage +/- 2 vac.

Cell: B13
Comment: The accredited test lab may perform the tests in any facility capable of supporting the test environment. The following practices shall be employed:

a. Preparations for testing, arrangement of equipment, verification of equipment status, and the execution of procedures shall be witnessed by at least one independent, qualified observer in the form of an accredited testing laboratory, which shall certify that all test and data acquisition requirements have been satisfied

b.When a test is to be performed at “standard” or “ambient” conditions, this
requirement shall refer to a nominal laboratory or office environment, with a
temperature in the range of 68 to 75 degrees Fahrenheit, and prevailing atmospheric pressure and relative humidity

c. Otherwise, all tests shall be performed at the required temperature and electrical supply voltage, regulated within the following tolerances:

i. Temperature +/- 4 degrees F

ii. Electrical supply voltage +/- 2 voltage alternating current

Cell: A14
Comment: ITAs may use test fixtures or ancillary devices to facilitate qualification testing. These fixtures and devices may include arrangements for automating the operation of voting devices and the acquisition of test data:

a. For systems that use a light source as a means of detecting voter selections, the generation of a suitable optical signal by an external device is acceptable. For systems that rely on the physical activation of a switch, a mechanical fixture with suitable motion generators is acceptable;

b. ITAs may use a simulation device, and appropriate software, to speed up the process of testing and eliminate human error in casting test ballots, provided that the simulation covers all voting data detection and control paths that are used in casting an actual ballot. In the event that only partial simulation is achieved, then an independent method and test procedure shall be used to validate the proper operation of those portions of the system not tested by the simulator; and

c. If the vendor provides a means of simulating the casting of ballots, the simulation device is subject to the same performance, reliability, and quality requirements that apply to the voting device itself.

Cell: B14
Comment: The accredited test lab may use test fixtures or ancillary devices to facilitate testing. These fixtures and devices may include arrangements for automating the operation of voting devices and the acquisition of test data:

a. For systems that use a light source as a means of detecting voter selections, the generation of a suitable optical signal by an external device is acceptable. For systems that rely on the physical activation of a switch, a mechanical fixture with suitable motion generators is acceptable

b.The accredited test lab may use a simulation device, and appropriate software, to speed up the process of testing and eliminate human error in casting test ballots, provided that the simulation covers all voting data detection and control paths that are used in casting an actual ballot. In the event that only partial simulation is achieved, then an independent method and test procedure shall be used to validate the proper operation of those portions of the system not tested by the simulator

c. If the vendor provides a means of simulating the casting of ballots, the simulation device is subject to the same performance, reliability, and quality requirements that apply to the voting device itself

Cell: A15
Comment: Although most testing is conducted at facilities operated by the ITA, a key element of voting system testing shall be conducted at the vendor site. The ITA responsible for testing voting system software, telecommunications, and integrated system operation (i.e., system wide testing) shall witness the final system build, encompassing hardware, software and communications, and the version of associated records and documentation. The system elements witnessed, including their specific versions, shall become the specific system version that is recommended for qualification.

Cell: B15
Comment: V.2:1.8.2.3

Although most testing is conducted at facilities operated by the accredited test lab, a key element of voting system testing shall be conducted at either the vendor site or the accredited test lab site. The

accredited test lab responsible for testing voting system software,
telecommunications, and integrated system operation (i.e., system level testing) shall witness the final system build, encompassing hardware, software and communications, and the version of associated records and documentation. The system elements witnessed, including their specific versions, shall become the specific system version that is recommended for certification.

V.2:6.2.2 - System Baseline for Testing

The system level certification tests are conducted using the version of the system intended to be sold by the vendor and delivered to jurisdictions. To ensure that the system version tested is the correct version, the accredited test lab shall witness the build of the executable version of the system immediately prior to or as part of, the physical configuration audit. Additionally, should components of the system be modified or replaced during the testing process, the accredited test lab shall require the vendor to conduct a new “build” of the system to ensure that the certified executable release of the system is built from tested components.

Cell: A69
Comment: The following qualification test data practices shall be employed:

a. A test log of the procedure shall be maintained. This log shall identify the system and equipment by model and serial number;
b. Test environment conditions shall be noted; and
c. All operating steps, the identity and quantity of simulated ballots, annotations of output reports, the elapsed time for each procedure step, and observations of equipment performance and, in the case of non-operating hardware tests, the condition of the equipment shall be recorded.

Cell: B69
Comment: The following test data practices shall be employed:

a. A test log of the procedure shall be maintained. This log shall identify the system and equipment by model and serial number

b.Test environment conditions shall be noted

c. All operating steps, the identity and quantity of simulated ballots, annotations of output reports, the elapsed time for each procedure step, and observations of equipment performance and, in the case of non-operating hardware tests, the condition of the equipment shall be recorded

Cell: A70
Comment: The ITA shall conduct the examinations and tests defined in the Test Plan such that all applicable tests identified in Standards Volume II are executed to determine compliance with the requirements in Sections 2-8 of the Standards. The ITA shall evaluate data resulting from examinations and tests, employing the following practices:

a. If any malfunction or data error is detected that would be classified as a relevant failure using the criteria in Volume II, its occurrence, and the duration of operating time preceding it, shall be recorded for inclusion in the analysis of data obtained from the test, and the test shall be interrupted;

b. If a malfunction is due to a defect in software, then the test shall be terminated and system returned to the vendor for correction;

c. If the malfunction is other than a software defect, and if corrective action is taken to restore the equipment to a fully operational condition within 8 hours, then the test may be resumed at the point of suspension;

d. If the test is suspended for an extended period of time, the ITA shall maintain a record of the procedures that have been satisfactorily completed. When testing is resumed at a later date, repetition of the successfully completed procedures may be waived, provided that no design or manufacturing change has been made that would invalidate the earlier test results;

e. Any and all failures that occurred as a result of a deficiency shall be classified as purged, and test results shall be evaluated as though the failure or failures had not occurred, if the:
1) Vendor submits a design, manufacturing, or packaging change notice to correct the deficiency, together with test data to verify the adequacy of the change;
2) Examiner of the equipment agrees that the proposed change will correct the deficiency; and
3) Vendor certifies that the change will be incorporated into all existing and future production units; and

f. If corrective action cannot be successfully taken as defined above, then the test shall be terminated, and the equipment shall be rejected.

Cell: B70

Comment: The accredited test lab shall conduct the examinations and tests defined in the National Certification Test Plan such that all applicable tests identified in Volume II, National Certification Testing Guidelines are executed to determine compliance with the voting system requirements described in Volume I. The accredited testing laboratory shall evaluate data resulting from examinations and tests, employing the following practices:

a. If any malfunction or data error is detected that would be classified as a relevant failure using the criteria in Volume II, National Certification Testing Guidelines, its occurrence, and the duration of operating time preceding it, shall be recorded for inclusion in the analysis of data obtained from the test, and the test shall be interrupted

b.If a malfunction is due to a defect in software, then the test shall be terminated and system returned to the vendor for correction

c. If the malfunction is other than a software defect, and if corrective action is taken to restore the equipment to a fully operational condition within 8 hours, then the test may be resumed at the point of suspension

d.If the test is suspended for an extended period of time, the accredited test lab shall maintain a record of the procedures that have been satisfactorily completed. When testing is resumed at a later date, repetition of the successfully completed procedures may be waived, provided that no design or manufacturing change has been made that would invalidate the earlier test results

e. Any and all failures that occurred as a result of a deficiency shall be classified as purged, and test results shall be evaluated as though the failure or failures had not occurred, if the:

i. Vendor submits a design, manufacturing, or packaging change notice to correct the deficiency, together with test data to verify the adequacy of the change

ii. Examiner of the equipment agrees that the proposed change will correct the deficiency

iii.Vendor certifies that the change will be incorporated into all existing and future production units

f. If corrective action cannot be successfully taken as defined above, then the test shall be terminated, and the equipment shall be rejected

Cell: A71

Comment: V.1:9.6.3 Qualification Report Issuance and Post-test Activities

Qualification report issuance and post-test activities encompass the activities described below:

a. The ITA may issue interim reports to the vendor, informing the vendor of the testing status, findings to date, and other information. Such reports do not constitute official test reports for voting system qualification;

b. The ITA shall prepare a Qualification Test Report that confirms the voting has passed the testing conducted by the ITA. The ITA shall include in the Qualification Test Report the date testing was completed, the specific system version addressed by the report, the version numbers of all system elements separately identified with a version number by the vendor, and the scope of tests conducted. A recommended outline for the test report is contained in Volume II;

c. Where a system is tested by multiple ITAs, each ITA shall prepare a Qualification Test Report;

d. The ITA shall deliver the Qualification Test Report to the vendor and to NASED;

e. NASED shall issue a single Qualification Number for the system to the vendor and to the ITAs. The issuance of a Qualification Number indicates that the system has been tested by certified ITAs for compliance with the national test standards and qualifies for the certification process of states that have adopted the national standards;

f. This number applies to the system as a whole only for the configuration and versions of the system elements tested by the ITAs and identified in the Qualification Test Reports. The Qualification Number does not apply to individual system components or untested configurations; and

g. The Qualification Number is intended for use by the states and their jurisdictions to support state and jurisdiction processes concerning voting systems. States and their jurisdictions shall request ITA Qualification Test Reports based on the Qualification Number as part of their voting system certification and procurement processes systems that rely on the Standards.

V.1:9.6.4 Resolution of Testing Issues

The NASED Voting Systems Board (the Board) is responsible for resolving questions about the application of the Standards in the testing of voting systems. The Secretariat for the Board will relay its decisions to the NASED certified ITAs and voting system vendors. The Federal Election Commission will monitor these decisions in order to determine which of them, if any, should be reflected in a subsequent version of the standards.

Cell: B71

Comment: V.2:1.8.3 Post-test Activities

Certification report issuance and post-test activities encompass the activities described below.

a. The accredited test lab may issue interim reports to the vendor, informing the vendor of the testing status, findings to date, and other information.

b.The accredited test lab shall prepare a National Certification Test Report that confirms the voting system has passed the required testing. This report shall include the date testing was completed, the specific system version addressed by the report, the version numbers of all system elements separately identified with a version number by the vendor, and the scope of tests conducted. A recommended outline for the test report is contained in Appendix B.

c. Where a system is tested by multiple accredited test labs, the lead accredited test lab shall prepare a consolidated National Certification Test Report.

d.The accredited test lab shall deliver the report to the vendor and to the EAC.

e. Upon review and acceptance of the test report, EAC shall issue a Certification Number for the system to the vendor and to the accredited test lab. The issuance of a Certification Number indicates that the system has been tested by the accredited test lab for compliance with the Guidelines.

f. This number applies to the system as a whole only for the configuration and versions of the system elements tested and identified in the National Certification Test Report. The Certification Number does not apply to individual system components or untested configurations.

g.The EAC Certification Number is intended for use by the states and their jurisdictions to support state and jurisdiction processes concerning voting systems. States and their jurisdictions shall request National Certification Test Reports based on the EAC Certification Number to support their voting system certification and procurement processes.

V.2:1.8.4 Resolution of Testing Issues
Prior to the transition of this function to the EAC, the NASED Voting Systems Board (the Board) was responsible for resolving questions about the application of the Guidelines in the testing of voting systems. The EAC will have a process for the accredited test labs, vendors and election officials to request an interpretation of the Guidelines. The interpretation will be publicly documented for reference by interested parties. The EAC will periodically assess the interpretations provided to determine which topics should be reflected in a future version of
the Guidelines.

Cell: A73
Comment: The ITA will conduct extensive tests on a voting system to evaluate it against the requirements of the Standards. Taking advantage of the experience gained in examining other voting systems, ITAs will design tests specifically for the system design, configuration, and documentation provided by the vendor. Additionally, new threats may be identified that are not directly addressed by the Standards or the system. As new threats to a voting system are discovered, either during the system's operation or during the operation of other computer-based systems that use technologies comparable to those of another voting system, ITAs shall expand the tests used for system security to address the threats that are applicable to a particular design of voting system.

Cell: B75
Comment: V.2:1.5

The vendor shall submit all the documentation necessary for the identification of the full system configuration submitted for evaluation and for the development of an appropriate test plan by the accredited test lab for conducting system certification testing. This documentation collectively is referred to as the Technical Data Package (TDP). The TDP provides information that defines the voting system design, method of operation, and related resources. It provides a system overview and documents the system's functionality, hardware, software, security, test and verification specifications, operations procedures, maintenance procedures, and personnel deployment and training requirements. It also documents the vendor's configuration management plan and quality assurance program. If another version of the system was previously certified, the TDP would also include appropriate system change notes.

Cell: A76
Comment: V.2:2.1 Scope

This section contains a description of vendor documentation relating to the voting system that shall be submitted with the system as a precondition of qualification testing. These items are necessary to define the product and its method of operation; to provide technical and test data supporting the vendor's claims of the system's functional capabilities and performance levels; and to document instructions and procedures governing system operation and field maintenance. Other items relevant to the system evaluation shall be submitted along with this documentation (such as disks, tapes, source code, object code, and sample output report formats).

Both formal documentation and notes of the vendor's system development process shall be submitted for qualification tests. Documentation outlining system development permits assessment of the vendor's systematic efforts to test the system and correct defects. Inspection of this process also enables the design of a more precise qualification test plan. If the vendor's developmental test data is incomplete, the

test agency shall design and conduct the appropriate tests.

Cell: B76
Comment: V.2:2.1 Scope

This subsection contains a description of vendor documentation relating to the voting system that shall be submitted with the system as a precondition of national certification testing. These items are necessary to define the product and its method of operation; to provide technical and test data supporting the vendor's claims of the system's functional capabilities and performance levels; and to document instructions and procedures governing system operation and field maintenance. Any information relevant to the system evaluation shall be submitted to include source code, object code, and sample output report formats.

Both formal documentation and notes of the vendor's system development process shall be submitted for qualification tests. Documentation describing the system development process permits assessment of the vendor's systematic efforts to develop and test the system and correct defects. Inspection of this process also enables the design of a more precise test plan. If the vendor's developmental test data are incomplete, the accredited test lab shall design and conduct the appropriate tests to cover all elements of the system and to ensure conformance with all system requirements.

Cell: A77
Comment: The content of the Technical Data Package (TDP) is intended to collect clear, complete descriptions of the following information about the system:

- Overall system design, including subsystems, modules and the interfaces among them;
- Specific functional capabilities provided by the system;
- Performance and design specifications;
- Design constraints, applicable standards, and compatibility requirements;
- Personnel, equipment, and facility requirements for system operation, maintenance, and logistical support;
- Vendor practices for assuring system quality during the system’s development and subsequent maintenance; and
- Vendor practices for managing the configuration of the system during development and for modifications to the system throughout its life cycle.

The vendor shall list all documents controlling the design, construction, operation, and maintenance of the system. Documents shall be listed in order of precedence.

Cell: A87
Comment: V.1:7.7 Documentation
Vendors are required to produce documentation to support the development and formal testing of voting systems. To meet documentation requirements, vendors shall provide complete product documentation with each voting systems or components, as described Volume II, Section 2 for the TDP. This documentation shall:

a. Be sufficient to serve the needs of the ITA, voters, election officials, and maintenance technicians;
b. Be prepared and published in accordance with standard industrial practice for information technology and electronic and mechanical equipment; and
c. Consist, at a minimum, of the following:
1) System overview;
2) System functionality description;
3) System hardware specification;
4) Software design and specifications;
5) System security specification;
6) System test and verification specification;
7) System operations procedures;

V.2:2.2 System Overview
In the system overview, the vendor shall provide information that enables the test authority to identify the functional and physical components of the system, how the components are structured, and the interfaces between them.

V.2:2.2.1 System Description
The system description shall include written descriptions, drawings and diagrams that present:
a. A description of the functional components (or subsystems) as defined by the vendor (e.g., environment, election management and control, vote recording, vote conversion, reporting, and their interconnection);
b. A description of the operational environment of the system that provides an overview of the hardware, software, and communications structure;
c. A theory of operation that explains each system function, and how the function is achieved in the design;
d. Descriptions of the functional and physical interfaces between subsystems and components;
e. Identification of all COTS hardware and software products and communications services used in the development and/or operation of the voting system, identifying the name, vendor and version used for each such component, including:

1) Operating systems;
2) Database software;
3) Communications routers;
4) Modem drivers; and
5) Dial-up networking software;

f. Interfaces among internal components, and interfaces with external systems. For components that interface with other components for which multiple products may be used, the TDP shall provide an identification of:
1) File specifications, data objects, or other means used for information exchange; and
2) The public standard used for such file specifications, data objects, or other means; and

g. Benchmark directory listings for all software (including firmware elements) and associated documentation included in the vendor's release in order of how each piece of software would normally be installed upon setup and installation.

V.2:2.2.2 System Performance
The vendor shall provide system performance information that includes descriptions of:
a. The performance characteristics of each operating mode and function in terms of expected and maximum speed, throughput capacity, maximum volume (maximum number of voting positions and maximum number of ballot styles supported), and processing frequency;
b. Quality attributes such as reliability, maintainability, availability, usability, and portability;
c. Provisions for safety, security, privacy, and continuity of operation; and
d. Design constraints, applicable standards, and compatibility requirements.

Cell: B87
Comment: V.1:8.7
Vendors are required to produce documentation to support the independent testing required for their products to be granted national certification. Volume II, Section 2, Description of the Technical Data Package, identifies the documentation required for the national

certification testing process. This documentation shall be sufficient to serve the needs of the test lab, election officials, and maintenance technicians. It shall be prepared and published in accordance with standard commercial practice for information technology and electronic and mechanical equipment. It shall include, at a minimum, the following:

- System overview;
- System functionality description;
- System hardware specification;
- Software design and specifications;
- System security specification;
- System test and verification specification;
- System operations procedures;
- System maintenance procedures
- Personnel deployment and training requirements
- Configuration management plan
- Quality assurance program
- System change notes

V.2:2.2 System Overview
In the system overview, the vendor shall provide information that enables the accredited test lab to identify the functional and physical components of the system, how the components are structured, and the interfaces between them.

V.2:2.2.1 System Description
The system description shall include written descriptions, drawings and diagrams that present:

A. A description of the functional components (or subsystems) as defined by the vendor (e.g., environment, election management and control, vote recording, vote conversion, reporting, and their logical relationships)

B. A description of the operational environment of the system that provides an overview of the hardware, software, and communications structure

C. A concept of operations that explains each system function, and how the function is achieved in the design

D. Descriptions of the functional and physical interfaces between subsystems and components

E. Identification of all COTS hardware and software products and communications services used in the development and/or operation of the voting system, identifying the name, vendor, and version used for each such component, including:
1) Operating systems
2) Database software
3) Communications routers
4) Modem drivers
5) Dial-up networking software

F. Interfaces among internal components, and interfaces with external systems. For components that interface with other components for which multiple products may be used, the TDP shall provide an identification of:

1) File specifications, data objects, or other means used for information exchange
2) The public standard used for such file specifications, data objects, or other means

G. Benchmark directory listings for all software (including firmware elements) and associated documentation included in the vendor's release in the order in which each piece of software would normally be installed upon system setup and installation

V.2:2.2.2 System Performance
The vendor shall provide system performance information including:

A) The performance characteristics of each operating mode and function in terms of expected and maximum speed, throughput capacity, maximum volume (maximum number of voting positions and maximum number of ballot styles supported), and processing frequency

B) Quality attributes such as reliability, maintainability, availability, usability, and portability

C) Provisions for safety, security, privacy, and continuity of operation

D) Design constraints, applicable standards, and compatibility requirements

Cell: A88
Comment: V.1:1.5.1

As such, vendors that submit a system that integrates components from more than one traditional system type or a system that includes components not addressed in this Standard shall submit the results of all beta tests of the new system.

V.2:2.3 System Functionality Description

The vendor shall declare the scope of the system's functional capabilities, thereby establishing the performance, design, test, manufacture, and acceptance context for the system.

The vendor shall provide a listing of the system's functional processing capabilities, encompassing capabilities required by the Standards and any additional capabilities provided by the system. This listing shall provide a simple description of each capability. Detailed specifications shall be provided in other documentation required for the TDP as indicated by the standards for that documentation.

a. The vendor shall organize the presentation of required capabilities in a manner that corresponds to the structure and sequence of functional capabilities indicated in Volume I, Section 2 of the Standards. The contents of Volume I Section 2 may be used as the basis for a checklist whereby the vendor indicates the specific functions provided and those not provided by the system;
b. Additional capabilities shall be clearly indicated. They may be presented using the same structure as that used for required capabilities (i.e., overall system capabilities, pre-voting functions, voting functions, post-voting functions), or may be presented in another format of the vendor's choosing;
c. Required capabilities that may be bypassed or deactivated during installation or operation by the user shall be clearly indicated;
d. Additional capabilities that function only when activated during installation or operation by the user shall be clearly indicated; and
e. Additional capabilities that normally are active but may be bypassed or deactivated during installation or operation by the user shall be clearly indicated.

V.2:3.2.3 Testing to Reflect Additional Capabilities

The requirements for voting system functionality provided by Volume I, Section 2 reflect a minimum set of capabilities. Vendors may, and often do, provide additional capabilities in systems that are submitted

for qualification testing in order to respond to the requirements of individual states. These additional capabilities shall be identified by the vendor within the TDP as described in Volume II, Section 2. Based on this information, ITAs shall design and perform system functionality testing for additional functional capabilities as well as the capabilities required by Volume I, Section 2 of the Standards.

Cell: B88
Comment: V.1:1.5.2

Consequently, vendors that submit a system that integrates components from more than one traditional system type or a system that includes components or technology not addressed in the Guidelines shall submit the results of all beta tests of the new system when applying for national certification.

V.2:2.3 System Functionality Description

The vendor shall declare the scope of the system's functional capabilities, thereby establishing the performance, design, test, manufacture, and acceptance context for the system.

The vendor shall provide a listing of the system's functional processing capabilities, encompassing capabilities required by the Guidelines and any additional capabilities provided by the system. This listing shall provide a simple description of each capability. Detailed specifications shall be provided in other documentation required for the TDP.

A. The vendor shall organize the presentation of required capabilities in a manner that corresponds to the structure and sequence of functional capabilities indicated in Volume I, Section 2. The contents of Volume I, Section 2 may be used as the basis for a checklist to indicate the specific functions provided and those not provided by the system

B. Additional capabilities shall be clearly indicated. They may be presented using the same structure as that used for required capabilities (i.e., overall system capabilities, pre-voting functions, voting functions, post-voting functions), or may be presented in another format of the vendor's choosing

C. Required capabilities that may be bypassed or deactivated during installation or operation by the user shall be clearly indicated

D. Additional capabilities that function only when activated during installation or operation by the user shall be clearly indicated

E. Additional capabilities that normally are active but may be bypassed or deactivated during installation or operation by the user shall be clearly indicated

V.2:3.2.3 Testing to Reflect Additional Capabilities

The requirements for voting system functionality provided by Volume I, Section 2 reflect a minimum set of capabilities. Vendors may, and often do, provide additional capabilities in systems in order to respond to the requirements of individual states. These additional capabilities shall be identified by the vendor within the TDP, as described in Volume II, Section 2. Based on this information, the accredited test lab shall design and perform system functionality testing for these additional functional capabilities.

Cell: A89
Comment: V.1:1.5.1

As such, vendors that submit a system that integrates components from more than one traditional system type or a system that includes components not addressed in this Standard shall submit the results of all beta tests of the new system.

V.2:2.4 System Hardware Specification

The vendor shall expand on the system overview by providing detailed specifications of the hardware components of the system, including specifications of hardware used to support the telecommunications

capabilities of the system, if applicable.

V.2:2.4.1 System Hardware Characteristics

The vendor shall provide a detailed discussion of the characteristics of the system, indicating how the hardware meets individual requirements defined in Volume I, Sections 3, 4, 5 and 6 of the Standards, including:

a. Performance characteristics: This discussion addresses basic system performance attributes and operational scenarios that describe the manner in which system functions are invoked, describe environmental capabilities, describe life expectancy, and describe any other essential aspects of system performance;

b. Physical characteristics: This discussion addresses suitability for intended use, requirements for transportation and storage, health and safety criteria, security criteria, and vulnerability to adverse environmental factors;

c. Reliability: This discussion addresses system and component reliability stated in terms of the systems operating functions, and identification of items that require special handling or operation to sustain system reliability;

d. Maintainability: Maintainability represents the ease with which maintenance actions can be performed based on the design characteristics of equipment and software and the processes the vendor and election officials have in place for preventing failures and for reacting to failures. Maintainability includes the ability of equipment and software to self-diagnose problems and make non-technical election workers aware of a problem. Maintainability also addresses a range of scheduled and unscheduled events; and

e. Environmental conditions: This discussion addresses the ability of the system to withstand natural environments, and operational constraints in normal and test environments, including all requirements and restrictions regarding electrical service, telecommunications services, environmental protection, and any additional facilities or resources required to install and operate the system.

V.2:2.4.2 Design and Construction

The vendor shall provide sufficient data, or references to data, to identify unequivocally the details of the system configuration submitted for qualification testing. The vendor shall provide a list of materials and components used in the system and a description of their assembly into major system components and the system as a whole. Paragraphs and diagrams shall be provided that describe:

a. Materials, processes, and parts used in the system, their assembly, and the configuration control measures to ensure compliance with the system specification;

b. The electromagnetic environment generated by the system;

c. Operator and voter safety considerations, and any constraints on system operations or the use environment;

d. Human engineering considerations, including provisions for access by disabled voters.

Cell: B89
Comment: V.1:1.5.2

Consequently, vendors that submit a system that integrates components from more than one traditional system type or a system that includes components or technology not addressed in the Guidelines shall submit the results of all beta tests of the new system when applying for national certification.

V.2:2.4 System Hardware Specification

The vendor shall expand on the system overview by providing detailed specifications of the hardware components of the system, including specifications of hardware used to support the telecommunications capabilities of the system, if applicable.

V.2:2.4.1 System Hardware Characteristics

The vendor shall provide a detailed discussion of the characteristics of the system, indicating how the hardware meets individual requirements defined in Volume I, Section 4, including:

A. Performance characteristics: This discussion addresses basic system performance attributes and operational scenarios that describe the manner in which system functions are invoked, describe environmental capabilities, describe life expectancy, and describe any other essential aspects of system performance

B. Physical characteristics: This discussion addresses suitability for intended use, requirements for transportation and storage, health and safety criteria, security criteria, and vulnerability to adverse environmental factors

C. Reliability: This discussion addresses system and component reliability stated in terms of the system's operating functions, and identification of items that require special handling or operation to sustain system reliability

D. Maintainability: Maintainability represents the ease with which maintenance actions can be performed based on the design characteristics of equipment and software and the processes the vendor and election officials have in place for preventing failures and for reacting to failures. Maintainability includes the ability of equipment and software to self-diagnose problems and make non-technical election workers aware of a problem. Maintainability also addresses a range of scheduled and unscheduled events

E. Environmental conditions: This discussion addresses the ability of the system to withstand natural environments, and operational constraints in normal and test environments, including all requirements and restrictions regarding electrical service, telecommunications services, environmental protection, and any additional facilities or resources required to install and operate the system

V.2:2.4.2 Design and Construction

The vendor shall provide sufficient data, or references to data, to identify unequivocally the details of the system configuration submitted for testing. The vendor shall provide a list of materials and components used in the system and a description of their assembly into major system components and the system as a whole. Paragraphs and diagrams shall be provided that describe:

A. Materials, processes, and parts used in the system, their assembly, and the configuration control measures to ensure compliance with the system specification

B. The electromagnetic environment generated by the system

C. Operator and voter safety considerations, and any constraints on system operations or the use environment

D. Human factors considerations, including provisions for access by disabled voters

Cell: A90
Comment: V.2:2.5 Software Design and Specification

The vendor shall expand on the system overview by providing detailed specifications of the software components of the system, including software used to support the telecommunications capabilities of the system, if applicable.

V.2:2.5.1 Purpose and Scope
The vendor shall describe the function or functions that are performed by the software programs that comprise the system, including software used to support the telecommunications capabilities of the system, if applicable.

V.2:2.5.2 Applicable Documents
The vendor shall list all documents controlling the development of the software and its specifications. Documents shall be listed in order of precedence.

V.2:2.5.3 Software Overview
The vendor shall provide an overview of the software that includes the following items:

a. A description of the software system concept, including specific software design objectives, and the logic structure and algorithms used to accomplish these objectives;
b. The general design, operational considerations, and constraints influencing the design of the software;
c. Identification of all software items, indicating items that were:
1) Written in-house;
2) Procured and not modified; and
3) Procured and modified including descriptions of the modifications to the software and to the default configuration options;
d. Additional information for each item that includes:
1) Item identification;
2) General description;
3) Software requirements performed by the item;
4) Identification of interfaces with other items that provide data to, or receive data from, the item; and
5) Concept of execution for the item;
The vendor shall also include a certification that procured software items were obtained directly from the manufacturer or a licensed dealer or distributor.

V.2:2.5.4 Software Standards and Conventions
The vendor shall provide information that can be used by an ITA or state certification board to support software analysis and test design. The information shall address standards and conventions developed internally by the vendor as well as published industry standards that have been applied by the vendor. The vendor shall provide information that addresses the following standards and conventions:

a. System development methodology;
b. Software design standards, including internal vendor procedures;
c. Software specification standards, including internal vendor procedures;
d. Software coding standards, including internal vendor procedures;
e. Software testing and verification standards, including internal vendor procedures, that can assist in determining the program's correctness and ACCEPT/REJECT criteria; and
f. Quality assurance standards or other documents that can be used by the ITA to examine and test the software. These documents include standards for program flow and control charts, program documentation, test planning, and for test data acquisition and reporting.

V.2:2.5.5 Software Operating Environment
This section shall describe or make reference to all operating environment factors that influence the software design.

V.2:2.5.5.1 Hardware Environment and Constraints
The vendor shall identify and describe the hardware characteristics that influence the design of the software, such as:

a. The logic and arithmetic capability of the processor;
b. Memory read-write characteristics;
c. External memory device characteristics;
d. Peripheral device interface hardware;
e. Data input/output device protocols; and
f. Operator controls, indicators, and displays.

V.2:2.5.5.2 Software Environment
The vendor shall identify the compilers or assemblers used in the generation of executable code, and describe the operating system or system monitor.

V.2:2.5.6 Software Functional Specification
The vendor shall provide a description of the operating modes of the system and of software capabilities to perform specific functions.

V.2:2.5.6.1 Configurations and Operating Modes
The vendor shall describe all software configurations and operating modes of the system, such as ballot preparation, election programming, preparation for opening the polling place, recording votes and/or counting ballots, closing the polling place, and generating reports. For each software function or operating mode, the vendor shall provide:

a. A definition of the inputs to the function or mode (with characteristics, tolerances or acceptable ranges, as applicable);
b. An explanation of how the inputs are processed; and
c. A definition of the outputs produced (again, with characteristics, tolerances, or acceptable ranges as applicable).

V.2:2.5.6.2 Software Functions
The vendor shall describe the software's capabilities or methods for detecting or handling:
a. Exception conditions;
b. System failures;
c. Data input/output errors;
d. Error logging for audit record generation;
e. Production of statistical ballot data;
f. Data quality assessment; and
g. Security monitoring and control.

V.2:2.5.7 Programming Specifications
The vendor shall provide in this section an overview of the software design, its structure, and implementation algorithms and detailed specifications for individual software modules.

V.2:2.5.7.1 Programming Specifications Overview
This overview shall include such items as flowcharts, HIPOs, data flow diagrams, and other graphical techniques that facilitate understanding of the programming specifications. This section shall be prepared to facilitate understanding of the internal functioning of the individual software modules. Implementation of the functions shall be described in terms of the software architecture, algorithms, and data structures.

V.2:2.5.7.2 Programming Specifications Details
The programming specifications shall describe individual software modules and their component units, if applicable. For each module and unit, the vendor shall provide the following information:

a. Module and unit design decisions, if any, such as algorithms used;
b. Any constraints, limitations, or unusual features in the design of the software module or unit;
c. The programming language to be used and rationale for its use if other than the specified module or unit language;

d. If the software module or unit consists of or contains procedural commands (such as menu selections in a database management system (DBMS) for defining forms and reports, on-line DBMS queries for database access and manipulation, input to a graphical user interface (GUI) builder for automated code generation, commands to the operating system, or shell scripts), a list of the procedural commands and reference to user manuals or other documents that explain them;
e. If the software module or unit contains, receives, or outputs data, a description of its inputs, outputs, and other data elements as applicable. (Section 2.5.9 describes the requirements for documenting system interfaces.) Data local to the software module or unit shall be described separately from data input to or output from the software module or unit;
f. If the software module or unit contains logic, the logic to be used by the software unit, including, as applicable:
1) Conditions in effect within the software module or unit when its execution is initiated;
2) Conditions under which control is passed to other software modules or units;
3) Response and response time to each input, including data conversion, renaming, and data transfer operations;

Cell: B90
Comment: V.2:2.5 Software Design and Specification
The vendor shall expand on the system overview by providing detailed specifications of the software components of the system, including software used to support the telecommunications capabilities of the system, if applicable.

V.2:2.5.1 Purpose and Scope
The vendor shall describe the function or functions that are performed by the software programs that comprise the system, including software used to support the telecommunications capabilities of the system, if applicable.

V.2:2.5.2 Applicable Documents
The vendor shall list all documents controlling the development of the software and its specifications. Documents shall be listed in order of precedence.

V.2:2.5.3 Software Overview
The vendor shall provide an overview of the software that includes the following items:

a. A description of the software system concept, including specific software design objectives, and the logic structure and algorithms used to accomplish these objectives;
b. The general design, operational considerations, and constraints influencing the design of the software;
c. Identification of all software items, indicating items that were:
1) Written in-house;
2) Procured and not modified; and
3) Procured and modified including descriptions of the modifications to the software and to the default configuration options;
d. Additional information for each item that includes:
1) Item identification;
2) General description;
3) Software requirements performed by the item;
4) Identification of interfaces with other items that provide data to, or receive data from, the item; and
5) Concept of execution for the item.

The vendor shall also include a certification that procured software items were obtained directly from the manufacturer or a licensed dealer or distributor.

V.2:2.5.4 Software Standards and Conventions
The vendor shall provide information that can be used by an accredited test lab or state certification board to support software analysis and test design. The information shall address standards and conventions developed internally by the vendor as well as published industry standards that have been applied by the vendor. The vendor shall provide information that addresses the following standards and conventions:

a. Software System development methodology;
b. Software design standards, including internal vendor procedures;
c. Software specification standards, including internal vendor procedures;
d. Software coding standards, including internal vendor procedures;
e. Testing and verification standards, including internal vendor procedures, that can assist in determining the program's correctness and ACCEPT/REJECT criteria; and
f. Quality assurance standards or other documents that can be used by the ITA to examine and test the software. These documents include standards for program flow and control charts, program documentation, test planning, and for test data acquisition and reporting.

V.2:2.5.5 Software Operating Environment
This section shall describe or make reference to all operating environment factors that influence the software design.

V.2:2.5.5.1 Hardware Environment and Constraints
The vendor shall identify and describe the hardware characteristics that influence the design of the software, such as:
a. The logic and arithmetic capability of the processor;
b. Memory read-write characteristics;
c. External memory device characteristics;
d. Peripheral device interface hardware;
e. Data input/output device protocols; and
f. Operator controls, indicators, and displays.

V.2:2.5.5.2 Software Environment
The vendor shall identify the compilers or assemblers used in the generation of executable code, and describe the operating system or system monitor.

V.2:2.5.6 Software Functional Specification
The vendor shall provide a description of the operating modes of the system and of software capabilities to perform specific functions.

V.2:2.5.6.1 Configurations and Operating Modes
The vendor shall describe all software configurations and operating modes of the system, such as ballot preparation, election programming, preparation for opening the polling place, recording votes and/or counting ballots, closing the polling place, and generating reports. For each software function or operating mode, the vendor shall provide:

a. A definition of the inputs to the function or mode (with characteristics, tolerances or acceptable ranges, as applicable);
b. An explanation of how the inputs are processed; and
c. A definition of the outputs produced (again, with characteristics, tolerances, or acceptable ranges as applicable).

V.2:2.5.6.2 Software Functions
The vendor shall describe the software's capabilities or methods for detecting or handling:
a. Exception conditions;
b. System failures;
c. Data input/output errors;
d. Error logging for audit record generation;
e. Production of statistical ballot data;
f. Data quality assessment; and
g. Security monitoring and control.

V.2:2.5.7 Programming Specifications
The vendor shall provide in this section an overview of the software design, its structure, and implementation algorithms and detailed specifications for individual software modules.

V.2:2.5.7.1 Programming Specifications Overview
This overview shall include such items as flowcharts, HIPOs, data flow diagrams, and other graphical techniques that facilitate understanding of the programming specifications. This section shall be prepared to facilitate understanding of the internal functioning of the individual software modules. Implementation of the functions shall be described in terms of the software architecture, algorithms, and data structures.

V.2:2.5.7.2 Programming Specifications Details
The programming specifications shall describe individual software modules and their component units, if applicable. For each module and unit, the vendor shall provide the following information:

a. Module and unit design decisions, if any, such as algorithms used;
b. Any constraints, limitations, or unusual features in the design of the software module or unit;
c. The programming language to be used and rationale for its use if other than the specified module or unit language;
d. If the software module or unit consists of or contains procedural commands (such as menu selections in a database management system (DBMS) for defining forms and reports, on-line DBMS queries for database access and manipulation, input to a graphical user interface (GUI) builder for automated code generation, commands to the operating system, or shell scripts), a list of the procedural commands and reference to user manuals or other documents that explain them;
e. If the software module or unit contains, receives, or outputs data, a description of its inputs, outputs, and other data elements as applicable. (Subsection 2.5.9 describes the requirements for documenting system interfaces.) Data local to the software module or unit shall be described separately from data input to or output from the software module or unit;
f. If the software module or unit contains logic, the logic to be used by the software unit, including, as applicable:
1) Conditions in effect within the software module or unit when its execution is initiated;
2) Conditions under which control is passed to other software modules or units;

Cell: A91
Comment: V.2:2.6 System Security Specification
Vendors shall submit a system security specification that addresses the security requirements of Volume I, Section 6 of the Standards. This specification shall describe the level of security provided by the system in terms of the specific security risks addressed by the system, the means by which each risk is addressed, the process used to test and verify the effective operation of security capabilities and, for systems that use public telecommunications networks as defined in Volume I, Section 5, the means used to keep the security capabilities of the system current to respond to the evolving threats against these systems.
Information provided by the vendor in this section of the TDP may be duplicative of information required by other sections. Vendors may cross reference to information provided in other sections provided that the means used provides a clear mapping to the requirements of this section.
Information submitted by the vendor shall be used by the test authority to assist in developing and executing the system qualification test plan. The Security Specification shall contain the sections identified below.

V.2:2.6.1 Access Control Policy
The vendor shall specify the features and capabilities of the access control policy recommended to purchasing jurisdictions to provide effective voting system security to meet the specific requirements of Volume I, Section 6.2.1. The access control policy shall address the general features and capabilities and individual access privileges indicated in Volume I, Section 6.2.1.

V.2:2.6.2 Access Control Measures
The vendor shall provide a detailed description of all system access control measures and mandatory procedures designed to permit access to system states in accordance with the access policy, and to prevent all other types of access to meet the specific requirements of Volume I, Section 6.2.2.
The vendor also shall define and provide a detailed description of the methods used to preclude unauthorized access to the access control capabilities of the system itself.

V.2:2.6.3 Equipment and Data Security
The vendor shall provide a detailed description of system capabilities and mandatory procedures for purchasing jurisdictions to prevent disruption of the voting process and corruption of voting data to meet the

specific requirements of Volume I, Section 6.3 of the Standards. This information shall address measures for polling place security and central count location security.

V.2:2.6.4 Software Installation
The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure software (including firmware) installation to meet the specific requirements of Volume I, Section 6.4 of the Standards. This information shall address software installation for all system components.

V.2:2.6.5 Telecommunications and Data Transmission Security
The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure data transmission to meet the specific requirements of Volume I, Section 6.5:
a. For all systems, this information shall address access control, and prevention of data interception; and
b. For systems that use public communications networks as defined in Volume I Section 5, this information shall also include:
1) Capabilities used to provide protection against threats to third party products and services;
2) Policies and processes used by the vendor to ensure that such protection is updated to remain effective over time;
3) Policies and procedures used by the vendor to ensure that current versions of such capabilities are distributed to user jurisdictions and are installed effectively by the jurisdiction;
4) A detailed description of the system capabilities and procedures to be employed by the jurisdiction to diagnose the occurrence of a denial of service attack, to use an alternate method of voting, to determine when it is appropriate to resume voting over the network, and to consolidate votes cast using the alternate method;
5) A detailed description of all activities to be performed in setting up the system for operation that are mandatory to ensure effective system security, including testing of security before an election; and
6) A detailed description of all activities that should be prohibited during system setup and during the timeframe for voting operations, including both the hours when polls are open and when polls are closed.

V.2:2.6.6 Other Elements of an Effective Security Program
The vendor shall provide a detailed description of the following additional procedures required for use by the purchasing jurisdiction:
a. Administrative and management controls for the voting system and election management, including access controls;
b. Internal security procedures, including operating procedures for maintaining the security of the software for each system function and operating mode;
c. Adherence to, and enforcement of, operational procedures (e.g., effective password management);
d. Physical facilities and arrangements; and
e. Organizational responsibilities and personnel screening.
This documentation shall be prepared such that these requirements can be integrated by the jurisdiction into local administrative and operating procedures.

Cell: B91
Comment: V.2:2.6 System Security Specification
Vendors shall submit a system security specification that addresses the security requirements of Volume I, Section 7 of the Standards. This specification shall describe the level of security provided by the system in terms of the specific security risks addressed by the system, the means by which each risk is addressed, the process used to test and verify the effective operation of security capabilities and, for systems that use public telecommunications networks as defined in Volume I, Section 6, the means used to keep the security capabilities of the system current to respond to the evolving threats against these systems.

Information provided by the vendor in this section of the TDP may be duplicative of information required by other sections. Vendors may cross reference to information provided in other sections provided that the means used provides a clear mapping to the requirements of this section.

Information submitted by the vendor shall be used by the test authority to assist in developing and executing the system qualification test plan. The Security Specification shall contain the sections identified below.

V.2:2.6.1 Access Control Policy

The vendor shall specify the features and capabilities of the access control policy recommended to purchasing jurisdictions to provide effective voting system security. The access control policy shall address the general features and capabilities and individual access privileges indicated in Volume I, Subsection 7.2.

V.2:2.6.2 Access Control Measures
The vendor shall provide a detailed description of all system access control measures and mandatory procedures designed to permit access to system states in accordance with the access policy, and to prevent all other types of access to meet the specific requirements of Volume I, Subsection 7.2.

The vendor also shall define and provide a detailed description of the methods used to preclude unauthorized access to the access control capabilities of the system itself.

V.2:2.6.3 Equipment and Data Security
The vendor shall provide a detailed description of system capabilities and mandatory procedures for purchasing jurisdictions to prevent disruption of the voting process and corruption of voting data to meet the specific requirements of Volume I, Subsection 7.3 of the Standards. This information shall address measures for polling place security and central count location security.

V.2:2.6.4 Software Installation
The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure software (including firmware) installation to meet the specific requirements of Volume I, Subsection 7.4. This information shall address software installation for all system components.

V.2:2.6.5 Telecommunications and Data Transmission Security
The vendor shall provide a detailed description of the system capabilities and mandatory procedures for purchasing jurisdictions to ensure secure data transmission to meet the specific requirements of Volume I, Subsection 7.5:
a. For all systems, this information shall address access control, and prevention of data interception; and
b. For systems that use public communications networks as defined in Volume I Section 6, this information shall also include:
1) Capabilities used to provide protection against threats to third party products and services;
2) Policies and processes used by the vendor to ensure that such protection is updated to remain effective over time;
3) Policies and procedures used by the vendor to ensure that current versions of such capabilities are distributed to user jurisdictions and are installed effectively by the jurisdiction;
4) A detailed description of the system capabilities and procedures to be employed by the jurisdiction to diagnose the occurrence of a denial of service attack, to use an alternate method of voting, to determine when it is appropriate to resume voting over the network, and to consolidate votes cast using the alternate method;
5) A detailed description of all activities to be performed in setting up the system for operation that are mandatory to ensure effective system security, including testing of security before an election; and
6) A detailed description of all activities that should be prohibited during system setup and during the timeframe for voting operations, including both the hours when polls are open and when polls are closed.

V.2:2.6.6 Other Elements of an Effective Security Program
The vendor shall provide a detailed description of the following additional procedures required for use by the purchasing jurisdiction:
a. Administrative and management controls for the voting system and election management, including access controls;
b. Internal security procedures, including operating procedures for maintaining the security of the software for each system function and operating mode;
c. Adherence to, and enforcement of, operational procedures (e.g., effective password management);
d. Physical facilities and arrangements; and
e. Organizational responsibilities and personnel screening.

This documentation shall be prepared such that these requirements can be integrated by the jurisdiction into local administrative and operating procedures.

Cell: A92
Comment: V.2:2.7 System Test and Verification Specification

The vendor shall provide test and verification specifications for:
a. Development test specifications; and
b. Qualification test specifications.

V.2:2.7.1 Development Test Specifications
The vendor shall describe the plans, procedures, and data used during software development and system integration to verify system logic correctness, data quality, and security. This description shall include:
a. Test identification and design, including:
1) Test structure;
2) Test sequence or progression; and
3) Test conditions;
a. Standard test procedures, including any assumptions or constraints;
b. Special purpose test procedures including any assumptions or constraints;
c. Test data; including the data source, whether it is real or simulated, and how test data is controlled;
d. Expected test results; and
e. Criteria for evaluating test results.
Additional details for these requirements are provided by MIL-STD-498, Software Test Plan (STP) and Software Test Description (STD). In the event that test data is not available, the ITA shall design test cases and procedures equivalent to those ordinarily used during product verification.

V.2:2.7.2 Qualification Test Specifications
The vendor shall provide specifications for verification and validation of overall software performance. These specifications shall cover:
a. Control and data input/output;
b. Acceptance criteria;
c. Processing accuracy;
d. Data quality assessment and maintenance;
e. Ballot interpretation logic;
f. Exception handling;
g. Security; and
h. Production of audit trails and statistical data.
The specifications shall identify procedures for assessing and demonstrating the suitability of the software for elections use.

Cell: B92
Comment: V.2:2.7 System Test and Verification Specification
The vendor shall provide test and verification specifications for:
a. Development test specifications; and
b. Qualification test specifications.

V.2:2.7.1 Development Test Specifications
The vendor shall describe the plans, procedures, and data used during software development and system integration to verify system logic correctness, data quality, and security. This description shall include:
a. Test identification and design, including:
1) Test structure;
2) Test sequence or progression; and
3) Test conditions;
a. Standard test procedures, including any assumptions or constraints;

b. Special purpose test procedures including any assumptions or constraints;
c. Test data; including the data source, whether it is real or simulated, and how test data is controlled;
d. Expected test results; and
e. Criteria for evaluating test results.
Additional details for these requirements are provided by MIL-STD-498, Software Test Plan (STP) and Software Test Description (STD). In the event that test data is not available, the accredited test lab shall design test cases and procedures equivalent to those ordinarily used during product verification.

V.2:2.7.2 Qualification Test Specifications
The vendor shall provide specifications for verification and validation of overall software performance. These specifications shall cover:
a. Control and data input/output;
b. Acceptance criteria;
c. Processing accuracy;
d. Data quality assessment and maintenance;
e. Ballot interpretation logic;
f. Exception handling;
g. Security; and
h. Production of audit trails and statistical data.

The specifications shall identify procedures for assessing and demonstrating the suitability of the software for elections use.

Cell: A93
Comment: V.2:2.8 System Operations Procedures
This documentation shall provide all information necessary for system use by all personnel who support pre-election and election preparation, polling place activities and central counting activities, as applicable, with regard to all system functions and operations identified in Section 2.3 above. The nature of the instructions for operating personnel will depend upon the overall system design and required skill level of system operations support personnel.
The system operations procedures shall contain all information that is required for the preparation of detailed system operating procedures, and for operator training, including the sections listed below:

V.2:2.8.1 Introduction
The vendor shall provide a summary of system operating functions and modes, in sufficient detail to permit understanding of the system's capabilities and constraints. The roles of operating personnel shall be identified and related to the operating modes of the system. Decision criteria and conditional operator functions (such as error and failure recovery actions) shall be described.
The vendor shall also list all reference and supporting documents pertaining to the use of the system during elections operations.

V.2:2.8.2 Operational Environment
The vendor shall describe the system environment, and the interface between the user or operator and the system. The vendor shall identify all facilities, furnishings, fixtures, and utilities that will be required for equipment operations, including equipment that operates at the:
a. Polling place;
b. Central count facility; and
c. Other locations.

V.2:2.8.3 System Installation and Test Specification
The vendor shall provide specifications for validation of system installation, acceptance, and readiness. These specifications shall address all components of the system and all locations of installation (e.g., polling place central count facility), and shall address all elements of system functionality and operations identified in Section 2.3 above, including:
a. Pre-voting functions;

b. Voting functions;
c. Post-voting functions; and
d. General capabilities.
These specifications also serve to provide guidance to the procuring agency in developing its acceptance test plan and procedure according to the agency's contract provisions, and the election laws of the state.

V.2:2.8.4 Operational Features
The vendor shall provide documentation of system operating features that meets the following requirements:
a. Provides a detailed description of all input, output, control, and display features accessible to the operator or voter;
b. Provide examples of simulated interactions in order to facilitate understanding of the system and its capabilities;
c. Provide sample data formats and output reports; and
d. Illustrate and describe all status indicators and information messages.

2.8.5 Operating Procedures
The vendor shall provide documentation of system operating procedures that meets the following requirements:
a. Provides a detailed description of procedures required to initiate, control, and verify proper system operation;
b. Provides procedures that clearly enable the operator to assess the correct flow of system functions (as evidenced by system-generated status and information messages);
c. Provides procedures that clearly enable the operator to intervene the system operations to recover from an abnormal system state;
d. Defines and illustrates the procedures and system prompts for situations where operator intervention is required to load, initialize, and start the system;
e. Define and illustrate procedures to enable and control the external interface to the system operating environment if supporting hardware and software are involved (such information shall be provided for the interaction of the system with other data processing systems or data interchange protocols as well);
f. Provide administrative procedures and off-line operator duties (if any) if they relate to the initiation or termination of system operations, to the assessment of system status, or to the development of an audit trail;
g. To support successful ballot and program installation and control by election officials, provide a detailed work plan or other form of documentation providing a schedule and steps for the software and ballot installation, which includes a table outlining the key dates, events and deliverables; and
h. To support diagnostic testing, specify diagnostic tests that may be employed to identify problems in the system, verify the correction of maintenance problems; and isolate and diagnose faults from various systems states.

V.2:2.8.6 Operations Support
The vendor shall provide documentation of system operating procedures that meets the following requirements:
a. Defines the procedures required to support system acquisition, installation, and readiness testing (these procedures may be provided by reference, if they are contained either in the system hardware specifications, or in other vendor documentation provided to the ITA and to system users); and
b. Describe procedures for providing technical support, system maintenance and correction of defects, and for incorporating hardware upgrades and new software releases.

V.2:2.8.7 Appendices
The vendor may provide descriptive material and data supplementing the various sections of the body of the System Operations Manual. The content and arrangement of appendices shall be at the discretion of the vendor. Topics recommended for discussion include:
a. Glossary: A listing and brief definition of all terms that may be unfamiliar to persons not trained in either voting systems or computer operations;
b. References: A list of references to all vendor documents and to other sources related to operation of the system;
c. Detailed Examples: Detailed scenarios that outline correct system responses to faulty operator input. Alternative procedures may be specified depending on the system state; and
d. Manufacturer's Recommended Security Procedures: This appendix shall contain the security procedures that are to be executed by the system operator.

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Comment: V.2:2.8 System Operations Procedures

This documentation shall provide all information necessary for system use by all personnel who support pre-election and election preparation, polling place activities and central counting activities, as applicable, with regard to all system functions and operations identified in Section 2.3 above. The nature of the instructions for operating personnel will depend upon the overall system design and required skill level of system operations support personnel.

The system operations procedures shall contain all information that is required for the preparation of detailed system operating procedures, and for operator training, including the sections listed below:

V.2:2.8.1 Introduction

The vendor shall provide a summary of system operating functions and modes, in sufficient detail to permit understanding of the system's capabilities and constraints. The roles of operating personnel shall be identified and related to the operating modes of the system. Decision criteria and conditional operator functions (such as error and failure recovery actions) shall be described.

The vendor shall also list all reference and supporting documents pertaining to the use of the system during elections operations.

V.2:2.8.2 Operational Environment

The vendor shall describe the system environment, and the interface between the user or operator and the system. The vendor shall identify all facilities, furnishings, fixtures, and utilities that will be required for equipment operations, including equipment that operates at the:

a. Polling place;
b. Central count facility; and
c. Other locations.

V.2:2.8.3 System Installation and Test Specification

The vendor shall provide specifications for validation of system installation, acceptance, and readiness. These specifications shall address all components of the system and all locations of installation (e.g., polling place central count facility), and shall address all elements of system functionality and operations identified in Section 2.3 above, including:

a. Pre-voting functions;
b. Voting functions;
c. Post-voting functions; and
d. General capabilities.

These specifications also serve to provide guidance to the procuring agency in developing its acceptance test plan and procedure according to the agency's contract provisions, and the election laws of the state.

V.2:2.8.4 Operational Features

The vendor shall provide documentation of system operating features that meets the following requirements:

a. A detailed description of all input, output, control, and display features accessible to the operator or voter;
b. Examples of simulated interactions in order to facilitate understanding of the system and its capabilities;
c. Sample data formats and output reports; and
d. Illustrate and describe all status indicators and information messages.

2.8.5 Operating Procedures

The vendor shall provide documentation of system operating procedures that meets the following requirements:

a. Provides a detailed description of procedures required to initiate, control, and verify proper system operation;
b. Provides procedures that clearly enable the operator to assess the correct flow of system functions (as evidenced by system-generated status and information messages);
c. Provides procedures that clearly enable the operator to intervene the system operations to recover from an abnormal system state;

d. Defines and illustrates the procedures and system prompts for situations where operator intervention is required to load, initialize, and start the system;
e. Defines and illustrates procedures to enable and control the external interface to the system operating environment if supporting hardware and software are involved (such information shall be provided for the interaction of the system with other data processing systems or data interchange protocols as well);
f. Provides administrative procedures and off-line operator duties (if any) if they relate to the initiation or termination of system operations, to the assessment of system status, or to the development of an audit trail;
g. Supports successful ballot and program installation and control by election officials, provide a detailed work plan or other form of documentation providing a schedule and steps for the software and ballot installation, which includes a table outlining the key dates, events and deliverables; and
h. Supports diagnostic testing, specify diagnostic tests that may be employed to identify problems in the system, verify the correction of maintenance problems; and isolate and diagnose faults from various systems states.

V.2:2.8.6 Operations Support
The vendor shall provide documentation of system operating procedures that meets the following requirements:
a. Defines the procedures required to support system acquisition, installation, and readiness testing (these procedures may be provided by reference, if they are contained either in the system hardware specifications, or in other vendor documentation provided to the ITA and to system users); and
b. Describes procedures for providing technical support, system maintenance and correction of defects, and for incorporating hardware upgrades and new software releases.

V.2:2.8.7 Appendices
The vendor may provide descriptive material and data supplementing the various sections of the body of the System Operations Manual. The content and arrangement of appendices shall be at the discretion of the vendor. Topics recommended for discussion include:
a. Glossary: A listing and brief definition of all terms that may be unfamiliar to persons not trained in either voting systems or computer operations;
b. References: A list of references to all vendor documents and to other sources related to operation of the system;
c. Detailed Examples: Detailed scenarios that outline correct system responses to faulty operator input. Alternative procedures may be specified depending on the system state; and
d. Manufacturer's Recommended Security Procedures: This appendix shall contain the security procedures that are to be executed by the system operator.

Cell: A94
Comment: V.2:2.9 System Maintenance Procedures
The system maintenance procedures shall provide information in sufficient detail to support election workers, data personnel, or maintenance personnel in the adjustment or removal and replacement of components or modules in the field. Technical documentation needed solely to support the repair of defective components or modules ordinarily done by the manufacturer or software developer is not required.

Recommended service actions to correct malfunctions or problems shall be discussed, along with personnel and expertise required to repair and maintain the system; and equipment, materials, and facilities needed for proper maintenance. This manual shall include the sections listed below.

V.2:2.9.1 Introduction
The vendor shall describe the structure and function of the equipment (and related software) for election preparation, programming, vote recording, tabulation, and reporting in sufficient detail to provide an overview of the system for maintenance, and for identification of faulty hardware or software. The description shall include a theory of operation that fully describes such items as:

a. The electrical and mechanical functions of the equipment;
b. How the processes of ballot handling and reading are performed (paper-based systems);
c. How vote selection and casting of the ballot are performed (DRE systems);
d. How transmission of data over a network are performed (DRE systems, where applicable);
e. How data are handled in the processor and memory units;
f. How data output is initiated and controlled;

g. How power is converted or conditioned; and
h. How test and diagnostic information is acquired and used.

V.2:2.9.2 Maintenance Procedures
The vendor shall describe preventive and corrective maintenance procedures for hardware and software.

V.2:2.9.2.1 Preventive Maintenance Procedures
The vendor shall identify and describe:
a. All required and recommended preventive maintenance tasks, including software tasks such as software backup, database performance analysis, and database tuning;
b. Number and skill levels of personnel required for each task;
c. Parts, supplies, special maintenance equipment, software tools, or other resources needed for maintenance; and
d. Any maintenance tasks that must be coordinated with the vendor or a third party (such as coordination that may be needed for off-the-shelf items used in the system).

V.2:2.9.2.2 Corrective Maintenance Procedures
The vendor shall provide fault detection, fault isolation, correction procedures, and logic diagrams for all operational abnormalities identified by design analysis and operating experience.

The vendor shall identify specific procedures to be used in diagnosing and correcting problems in the system hardware (or user-controlled software). Descriptions shall include:
a. Steps to replace failed or deficient equipment;
b. Steps to correct deficiencies or faulty operations in software;
c. Modifications that are necessary to coordinate any modified or upgraded software with other software modules;
d. The number and skill levels of personnel needed to accomplish each procedure;
e. Special maintenance equipment, parts, supplies, or other resources needed to accomplish each procedure; and
f. Any coordination required with the vendor, or other party for off the shelf items.

V.2:2.9.3 Maintenance Equipment
The vendor shall identify and describe any special purpose tests or maintenance equipment recommended for fault isolation and diagnostic purposes.

V.2:2.9.4 Parts and Materials
Vendors shall provide detailed documentation of parts and materials needed to operate and maintain the system. Additional requirements apply for paper-based systems.

V.2:2.9.4.1 Common Standards
The vendor shall provide a complete list of approved parts and materials needed for maintenance. This list shall contain sufficient descriptive information to identify all parts by:
a. Type;
b. Size;
c. Value or range;
d. Manufacturer's designation;
e. Individual quantities needed; and
f. Sources from which they may be obtained.

V.2:2.9.4.2 Paper-Based Systems
For marking devices manufactured by multiple external sources, the vendor shall provide a listing of sources and model numbers that are compatible with the system.
The TDP shall specify the required paper stock, size, shape, opacity, color, watermarks, field layout, orientation, size and style of printing, size and location of punch or mark fields used for vote response fields and to identify unique ballot formats, placement of alignment marks, ink for printing, and folding and bleed-through limitations for preparation of ballots that are compatible with the system

V.2:2.9.5 Maintenance Facilities and Support
The vendor shall identify all facilities, furnishings, fixtures, and utilities that will be required for equipment maintenance. In addition, vendors shall specify the assumptions made with regard to any parameters that impact the mean time to repair. These factors shall include at a minimum:
a. Recommended number and locations of spare devices or components to be kept on hand for repair purposes during periods of system operation;
b. Recommended number and locations of qualified maintenance personnel who need to be available to support repair calls during system operation; and
c. Organizational affiliation (i.e., jurisdiction, vendor) of qualified maintenance personnel.

V.2:2.9.6 Appendices
The vendor may provide descriptive material and data supplementing the various sections of the body of the System Maintenance Manual. The content and arrangement of appendices shall be at the discretion of the vendor. Topics recommended for amplification or treatment in appendix include:
a. Glossary: A listing and brief definition of all terms that may be unfamiliar to persons not trained in either voting systems or computer maintenance;
b. References: A list of references to all vendor documents and other sources related to maintenance of the system;
c. Detailed Examples: Detailed scenarios that outline correct system responses to every conceivable faulty operator input. Alternative procedures may be specified depending on the system state; and
d. Maintenance and Security Procedures: This appendix shall contain technical illustrations and schematic representations of electronic circuits unique to the system.

Cell: B94
Comment: V.2:2.9 System Maintenance Procedures
The system maintenance procedures shall provide information in sufficient detail to support election workers, data personnel, or maintenance personnel in the adjustment or removal and replacement of components or modules in the field. Technical documentation needed solely to support the repair of defective components or modules ordinarily done by the manufacturer or software developer is not required.

Recommended service actions to correct malfunctions or problems shall be discussed, along with personnel and expertise required to repair and maintain the system; and equipment, materials, and facilities needed for proper maintenance. This manual shall include the sections listed below.

V.2:2.9.1 Introduction
The vendor shall describe the structure and function of the equipment (and related software) for election preparation, programming, vote recording, tabulation, and reporting in sufficient detail to provide an overview of the system for maintenance, and for identification of faulty hardware or software. The description shall include a theory of operation that fully describes such items as:

a. The electrical and mechanical functions of the equipment;
b. How the processes of ballot handling and reading are performed (paper-based systems);
c. How vote selection and casting of the ballot are performed (DRE systems);
d. How transmission of data over a network are performed (DRE systems, where applicable);
e. How data are handled in the processor and memory units;
f. How data output is initiated and controlled;
g. How power is converted or conditioned; and
h. How test and diagnostic information is acquired and used.

V.2:2.9.2 Maintenance Procedures
The vendor shall describe preventive and corrective maintenance procedures for hardware and software.

V.2:2.9.2.1 Preventive Maintenance Procedures
The vendor shall identify and describe:
a. All required and recommended preventive maintenance tasks, including software tasks such as software backup, database performance analysis, and database tuning;
b. Number and skill levels of personnel required for each task;

c. Parts, supplies, special maintenance equipment, software tools, or other resources needed for maintenance; and
d. Any maintenance tasks that must be coordinated with the vendor or a third party (such as coordination that may be needed for off-the-shelf items used in the system).

V.2:2.9.2.2 Corrective Maintenance Procedures
The vendor shall provide fault detection, fault isolation, correction procedures, and logic diagrams for all operational abnormalities identified by design analysis and operating experience.

The vendor shall identify specific procedures to be used in diagnosing and correcting problems in the system hardware (or user-controlled software). Descriptions shall include:
a. Steps to replace failed or deficient equipment;
b. Steps to correct deficiencies or faulty operations in software;
c. Modifications that are necessary to coordinate any modified or upgraded software with other software modules;
d. The number and skill levels of personnel needed to accomplish each procedure;
e. Special maintenance equipment, parts, supplies, or other resources needed to accomplish each procedure; and
f. Any coordination required with the vendor, or other party for off the shelf items.

V.2:2.9.3 Maintenance Equipment
The vendor shall identify and describe any special purpose tests or maintenance equipment recommended for fault isolation and diagnostic purposes.

V.2:2.9.4 Parts and Materials
Vendors shall provide detailed documentation of parts and materials needed to operate and maintain the system. Additional requirements apply for paper-based systems.

V.2:2.9.4.1 Common Standards
The vendor shall provide a complete list of approved parts and materials needed for maintenance. This list shall contain sufficient descriptive information to identify all parts by:
a. Type;
b. Size;
c. Value or range;
d. Manufacturer's designation;
e. Individual quantities needed; and
f. Sources from which they may be obtained.

V.2:2.9.4.2 Paper-Based Systems
For marking devices manufactured by multiple external sources, the vendor shall provide a listing of sources and model numbers that are compatible with the system.

The TDP shall specify the required paper stock, size, shape, opacity, color, watermarks, field layout, orientation, size and style of printing, size and location of punch or mark fields used for vote response fields and to identify unique ballot formats, placement of alignment marks, ink for printing, and folding and bleed-through limitations for preparation of ballots that are compatible with the system

V.2:2.9.5 Maintenance Facilities and Support
The vendor shall identify all facilities, furnishings, fixtures, and utilities that will be required for equipment maintenance. In addition, vendors shall specify the assumptions made with regard to any parameters that impact the mean time to repair. These factors shall include at a minimum:
a. Recommended number and locations of spare devices or components to be kept on hand for repair purposes during periods of system operation;
b. Recommended number and locations of qualified maintenance personnel who need to be available to support repair calls during system operation; and
c. Organizational affiliation (i.e., jurisdiction, vendor) of qualified maintenance personnel.

V.2:2.9.6 Appendices
The vendor may provide descriptive material and data supplementing the various sections of the body of the System Maintenance Manual. The content and arrangement of appendices shall be at the discretion

of the vendor. Topics recommended for amplification or treatment in appendix include:
a. Glossary: A listing and brief definition of all terms that may be unfamiliar to persons not trained in either voting systems or computer maintenance;
b. References: A list of references to all vendor documents and other sources related to maintenance of the system;
c. Detailed Examples: Detailed scenarios that outline correct system responses to every conceivable faulty operator input. Alternative procedures may be specified depending on the system state; and
d. Maintenance and Security Procedures: This appendix shall contain technical illustrations and schematic representations of electronic circuits unique to the system.

Cell: A95
Comment: V.2:2.10 Personnel Deployment and Training Requirements
The vendor shall describe the personnel resources and training required for a jurisdiction to operate and maintain the system.

V.2:2.10.1 Personnel
The vendor shall specify the number of personnel and skill level required to perform each of the following functions:
a. Pre-election or election preparation functions (e.g., entering an election, race and candidate information; designing a ballot; generating pre-election reports;
b. System operations for voting system functions performed at the polling place;
c. System operations for voting system functions performed at the central count facility;
d. Preventive maintenance tasks;
e. Diagnosis of faulty hardware or software;
f. Corrective maintenance tasks; and
g. Testing to verify the correction of problems.
A description shall be presented of which functions may be carried out by user personnel, and those that must be performed by vendor personnel.

V.2:2.10.2 Training
The vendor shall specify requirements for the orientation and training of the following personnel:
a. Poll workers supporting polling place operations;
b. System support personnel involved in election programming;
c. User system maintenance technicians;
d. Network/system administration personnel (if a network is used);
e. Data personnel; and
f. Vendor personnel.

Cell: B95
Comment: V.2:2.10 Personnel Deployment and Training Requirements
The vendor shall describe the personnel resources and training required for a jurisdiction to operate and maintain the system.

V.2:2.10.1 Personnel
The vendor shall specify the number of personnel and skill level required to perform each of the following functions:
a. Pre-election or election preparation functions (e.g., entering an election, race and candidate information; designing a ballot; generating pre-election reports;
b. System operations for voting system functions performed at the polling place;
c. System operations for voting system functions performed at the central count facility;
d. Preventive maintenance tasks;
e. Diagnosis of faulty hardware or software;
f. Corrective maintenance tasks; and

g. Testing to verify the correction of problems.

A description shall be presented of which functions may be carried out by user personnel, and those that must be performed by vendor personnel.

V.2:2.10.2 Training
The vendor shall specify requirements for the orientation and training of the following personnel:
a. Poll workers supporting polling place operations;
b. System support personnel involved in election programming;
c. User system maintenance technicians;
d. Network/system administration personnel (if a network is used);
e. Data personnel; and
f. Vendor personnel.

Cell: A96
Comment: V.2:2.11 Configuration Management Plan
Vendors shall submit a Configuration Management Plan that addresses the configuration management requirements of Volume I, Section 8 of the Standards. This plan shall describe all policies, processes and procedures employed by the vendor to carry out these requirements. Information submitted by the vendor shall be used by the test authority to assist in developing and executing the system qualification test plan. This information is particularly important to support the design of test plans for system modifications. A well-organized, robust and detailed Configuration Management Plan will enable the test authority to more readily determine the nature and scope of tests needed to fully test the modifications. The Configuration Management Plan shall contain the sections identified below.

V.2:2.11.1 Configuration Management Policy
The vendor shall provide a description of its organizational policies for configuration management, addressing the specific requirements of Volume I, Section 8.3 of the Standards. These requirements pertain to:
a. Scope and nature of configuration management program activities; and
b. Breadth of application of vendor's policy and practices to the voting system.

V.2:2.11.2 Configuration Identification
The vendor shall provide a description of the procedures and naming conventions used to address the specific requirements of Volume I, Section 8.4. These requirements pertain to:
a. Classifying configuration items into categories and subcategories;
b. Uniquely numbering or otherwise identifying configuration items; and
c. Naming configuration items.

V.2:2.11.3 Baseline, Promotion, and Demotion Procedures
The vendor shall provide a description of the procedures and naming conventions used to address the specific requirements of Volume I, Section 8.5 of the Standards. These requirements pertain to:
a. Establishing a particular instance of a system component as the starting baseline;
b. Promoting subsequent instances of a component to baseline throughout the system development process for the first complete version of the system submitted for qualification testing; and
c. Promoting subsequent instances of a component to baseline status as the component is maintained throughout its life cycle.

V.2:2.11.4 Configuration Control Procedures
The vendor shall provide a description of the procedures used by the vendor to approve and implement changes to a configuration item to prevent unauthorized additions, changes, or deletions to address the specific requirements of Volume I, Section 8.6 of the Standards. These requirements pertain to:
a. Developing and maintaining internally developed items;
b. Developing and maintaining third-party items;

c. Resolve internally identified defects; and
d. Resolve externally identified and reported defects.

V.2:2.11.5 Release Process
The vendor shall provide a description of the contents of a system release, and the procedures and related conventions by which the vendor installs, transfers, or migrates the system to ITAs and customers to address the specific requirements of Volume I, Section 8.7 of the Standards. These requirements pertain to:
a. A first release of the system to an ITA;
b. A subsequent maintenance or upgrade release of a system, or particular components, to an ITA;
c. The initial delivery and installation of the system to a customer; and
d. A subsequent maintenance or upgrade release of a system, or particular components, to a customer.

V.2:2.11.6 Configuration Audits
The vendor shall provide a description of the procedures and related conventions for the two audits required by Volume I, Section 8.8 of the Standards. These requirements pertain to:
a. Physical configuration audit that verifies the voting system components submitted for qualification to the vendor's technical documentation; and
b. Functional configuration audit that verifies the system performs all the functions described in the system documentation.

V.2:2.11.7 Configuration Management Resources
The vendor shall provide a description of the procedures and related conventions for the maintaining information about configuration management tools required by Volume I, Section 8.9 of the Standards. These requirements pertain to information regarding:
a. Specific tools used, current version, and operating environment;
b. Physical location of the tools, including designation of computer directories and files; and
c. Procedures and training materials for using the tools.

Cell: B96
Comment: V.2:2.11 Configuration Management Plan
Vendors shall submit a Configuration Management Plan that addresses the configuration management requirements of Volume I, Section 9. This plan shall describe all policies, processes and procedures employed by the vendor to carry out these requirements. Information submitted by the vendor shall be used by the test authority to assist in developing and executing the system qualification test plan. This information is particularly important to support the design of test plans for system modifications. A well-organized, robust and detailed Configuration Management Plan will enable the test authority to more readily determine the nature and scope of tests needed to fully test the modifications. The Configuration Management Plan shall contain the sections identified below.

V.2:2.11.1 Configuration Management Policy
The vendor shall provide a description of its organizational policies for configuration management, addressing the specific requirements of Volume I, Subsection 9.2. These requirements pertain to:
a. Scope and nature of configuration management program activities; and
b. Breadth of application of vendor's policy and practices to the voting system.

V.2:2.11.2 Configuration Identification
The vendor shall provide a description of the procedures and naming conventions used to address the specific requirements of Volume I, Subsection 9.3. These requirements pertain to:
a. Classifying configuration items into categories and subcategories;
b. Uniquely numbering or otherwise identifying configuration items; and
c. Naming configuration items.

V.2:2.11.3 Baseline, Promotion, and Demotion Procedures

The vendor shall provide a description of the procedures and naming conventions used to address the specific requirements of Volume I, Subsection 9.4. These requirements pertain to:
a. Establishing a particular instance of a system component as the starting baseline;
b. Promoting subsequent instances of a component to baseline throughout the system development process for the first complete version of the system submitted for qualification testing; and
c. Promoting subsequent instances of a component to baseline status as the component is maintained throughout its life cycle until system retirement (i.e., the system is no longer sold or maintained).

V.2:2.11.4 Configuration Control Procedures
The vendor shall provide a description of the procedures used by the vendor to approve and implement changes to a configuration item to prevent unauthorized additions, changes, or deletions to address the specific requirements of Volume I, Subsebtion 9.5. These requirements pertain to:
a. Developing and maintaining internally developed items;
b. Developing and maintaining third-party items;
c. Resolving internally identified defects; and
d. Resolving externally identified and reported defects.

V.2:2.11.5 Release Process
The vendor shall provide a description of the contents of a system release, and the procedures and related conventions by which the vendor installs, transfers, or migrates the system to accredited voting system testing laboratories and customers to address the specific requirements of Volume I, Subsection 9.6. These requirements pertain to:
a. A first release of the system to an accredited test lab;
b. A subsequent maintenance or upgrade release of a system, or particular components, to an accredited test lab;
c. The initial delivery and installation of the system to a customer; and
d. A subsequent maintenance or upgrade release of a system, or particular components, to a customer.

V.2:2.11.6 Configuration Audits
The vendor shall provide a description of the procedures and related conventions for the two audits required by Volume I, Subsection 9.7. These requirements pertain to:
a. Physical configuration audit that verifies the voting system components submitted for qualification to the vendor's technical documentation; and
b. Functional configuration audit that verifies the system performs all the functions described in the system documentation.

V.2:2.11.7 Configuration Management Resources
The vendor shall provide a description of the procedures and related conventions for the maintaining information about configuration management tools required by Volume I, Subsection 9.8. These requirements pertain to information regarding:
a. Specific tools used, current version, and operating environment;
b. Physical location of the tools, including designation of computer directories and files; and
c. Procedures and training materials for using the tools.

Cell: A97
Comment: V.2:2.12 Quality Assurance Program
Vendors shall submit a Quality Assurance Program that addresses the quality assurance requirements of Volume I, Section 7. This plan shall describe all policies, processes and procedures employed by the vendor to ensure the overall quality of the system for its initial development and release and for subsequent modifications and releases. This information is particularly important to support the design of test plans by the test authority. A well-organized, robust and detailed Quality Assurance Program will enable the test authority to more readily determine the nature and scope of tests needed to test the system appropriately. The Quality Assurance Program shall, at a minimum, address the topics indicate below.

V.2:2.12.1 Quality Assurance Policy
The vendor shall provide a description of its organizational policies for quality assurance, including:

a. Scope and nature of QA activities; and
b. Breadth of application of vendor's policy and practices to the voting system.

V.2:2.12.2 Parts & Materials Special Tests and Examinations
The vendor shall provide a description of its practices for parts and materials tests and examinations that meet the requirements of Volume I, Section 7.3 of the Standards.

V.2:2.12.3 Quality Conformance Inspections
The vendor shall provide a description of its practices for quality conformance inspections that meet the requirements of Volume I, Section 7.4 of the Standards. For each test performed, the record of tests provided shall include:
a. Test location;
b. Test date;
c. individual who conducted the test; and
d. Test outcomes.

V.2:2.12.4 Documentation
The vendor shall provide a description of its practices for documentation of the system and system development process that meet the requirements of Volume I, Section 7.5 of the Standards.

Cell: B97
Comment: V.2:2.12 Quality Assurance Program
Vendors shall submit a Quality Assurance Program that addresses the quality assurance requirements of Volume I, Section 8. This plan shall describe all policies, processes and procedures employed by the vendor to ensure the overall quality of the system for its initial development and release and for subsequent modifications and releases. This information is particularly important to support the design of test plans by the test authority. A well-organized, robust and detailed Quality Assurance Program will enable the test authority to more readily determine the nature and scope of tests needed to test the system appropriately. The Quality Assurance Program shall, at a minimum, address the topics indicate below.

V.2:2.12.1 Quality Assurance Policy
The vendor shall provide a description of its organizational policies for quality assurance, including:
a. Scope and nature of QA activities; and
b. Breadth of application of vendor's policy and practices to the voting system.

V.2:2.12.2 Parts & Materials Special Tests and Examinations
The vendor shall provide a description of its practices for parts and materials tests and examinations that meet the requirements of Volume I, Subsection 8.5.

V.2:2.12.3 Quality Conformance Inspections
The vendor shall provide a description of its practices for quality conformance inspections that meet the requirements of Volume I, Subsection 8.6. For each test performed, the record of tests provided shall include:
a. Test location;
b. Test date;
c. Individual who conducted the test; and
d. Test outcomes.

V.2:2.12.4 Documentation
The vendor shall provide a description of its practices for documentation of the system and system development process that meet the requirements of Volume I, Subsection 8.7.

Cell: A98

Comment: V.2:2.13 System Change Notes

Vendors submitting a system for testing that has been tested previously by the test authority and issued a qualification number shall submit system change notes. These will be used by the test authority to assist in developing and executing the test plan for the modified system. The system change notes shall include the following information:

a. Summary description of the nature and scope of the changes, and reasons for each changes;

b. A listing of the specific changes made, citing the specific system configuration items changed and providing detailed references to the sections of documentation changed;

c. The specific sections of the documentation that are changed (or complete revised documents, if more suitable to address a large number of changes) ;

d. Documentation of the test plan and procedures executed by the vendor for testing the individual changes and the system as a whole, and records of test results.

V.2:3.2.4 Variation of System Functionality Testing to Reflect Voting Systems that Incorporate Previously Tested Functionality

The required functional capabilities of voting systems defined in Volume I, Section 2 reflect a broad range of system functionality needed to support the full life cycle of an election, including post election activities. Many systems submitted for qualification testing are designed to address this scope, and are tested accordingly.

However, some new systems seek qualification using a combination of new subsystems or system components interfaced with the components of an previously qualified system. For example, a vendor can submit a voting system for qualification testing that has a new DRE voting device, but that integrates the election management component from a previously qualified system.

In this situation, the vendor is strongly encouraged to identify in its TDP the functional capabilities supported by new subsystems/components and those supported by subsystems/components taken from a previously qualified system. The vendor is also encouraged to indicate in its system design documentation and configuration management records the scope and nature of any modifications made to the reused subsystems or components. Following these suggestions will assist the ITA in developing efficient test procedures that rely in part on the results of testing of the previously qualified subsystems or components.

In this situation the ITA may design and perform a test procedure that draws on the results of testing performed previously on reused subsystems or components. However, the scope of testing shall include, irrespective of previous testing, certain functionality tests:

a. All functionality performed by new subsystems/modules;
b. All functionality performed by modified subsystems/modules;
c. Functionality that is accomplished using any interfaces to new modules, or that shares inputs or outputs from new modules;
d. All functionality related to vote tabulation and election results reporting; and
e. All functionality related to audit trail maintenance.

Cell: B98

Comment: V.2:2.13 System Change Notes

Vendors submitting a system for testing that has been tested previously by the test authority and issued a qualification number shall submit system change notes. These will be used by the test authority to assist in developing and executing the test plan for the modified system. The system change notes shall include the following information:

a. Summary description of the nature and scope of the changes, and reasons for each changes;

b. A listing of the specific changes made, citing the specific system configuration items changed and providing detailed references to the sections of documentation changed;

c. The specific sections of the documentation that are changed (or complete revised documents, if more suitable to address a large number of changes) ;

d. Documentation of the test plan and procedures executed by the vendor for testing the individual changes and the system as a whole, and records of test results.

V.2:3.2.4 Testing to Reflect Previously Tested Capabilities
The required functional capabilities of voting systems defined in Volume I, Section 2 reflect a broad range of system functionality needed to support the full life cycle of an election, including post election activities. Many systems submitted for qualification testing are designed to address this scope, and are tested accordingly.

However, some new systems seek qualification using a combination of new subsystems or system components interfaced with the components of an previously qualified system. For example, a vendor can submit a voting system for qualification testing that has a new DRE voting device, but that integrates the election management component from a previously qualified system.

In this situation, the vendor is strongly encouraged to identify in its TDP the functional capabilities supported by new subsystems/components and those supported by subsystems/components taken from a previously qualified system. The vendor is also encouraged to indicate in its system design documentation and configuration management records the scope and nature of any modifications made to the reused subsystems or components. Following these suggestions will assist the accredited test lab in developing efficient test procedures that rely in part on the results of testing of the previously qualified subsystems or components.

In this situation the accredited test lab may design and perform a test procedure that draws on the results of testing performed previously on reused subsystems or components. However, the scope of testing shall include, irrespective of previous testing, certain functionality tests:
a. All functionality performed by new subsystems/modules;
b. All functionality performed by modified subsystems/modules;
c. Functionality that is accomplished using any interfaces to new modules, or that shares inputs or outputs from new modules;
d. All functionality related to vote tabulation and election results reporting; and
e. All functionality related to audit trail maintenance.

Cell: A99
Comment: V.2:2.1.1.3 Format
The requirements for formatting the TDP are general in nature; specific format details are of the vendor’s choosing. Other items submitted by the vendor, such as documentation of tests conducted by other test authorities, performance history, failure analysis, and corrective action may be provided in a format of the vendor's choosing.

The TDP shall include a detailed table of contents for the required documents, an abstract of each document and a listing of each of the informational sections and appendices presented. A cross-index shall be provided indicating the portions of the documents that are responsive to documentation requirements for any item presented using the vendor's format.

Cell: B99
Comment: V.2:2.1.1.3 Format
The requirements for formatting the TDP are general in nature; specific format details are of the vendor’s choosing. The TDP shall include a detailed table of contents for the required documents, an abstract of each document and a listing of each of the informational sections and appendices presented. A cross-index shall be provided indicating the portions of the documents that are responsive to documentation requirements for any item presented.

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria?**	**Requirement Addressed?**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
4	**V.1:1.5.2**	**Functional Capabilities**			
5		**The listing below summarizes the functional requirements that HAVA Section 301 mandates to assist voters. While these requirements may be implemented in a different manner for different types of voting systems, all types of voting systems must provide these capabilities:**			
6		• 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	**VSTL-TP-800, VSTL-TP-900**	**Yes**	
7		• 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	**VSTL-TP-800, VSTL-TP-900**	**Yes**	
8		• notify the voter if he or she has selected more than one candidate for a 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	**VSTL-TP-800, VSTL-TP-900**	**Yes**	
9		• be accessible for individuals with disabilities in a manner that provides the same opportunity for access and participation (including privacy and independence) as for other voters	**VSTL-TP-800, VSTL-TP-900**	**Yes**	
10		• provide alternative language accessibility pursuant to Section 203 of the Voting Rights Act	**VSTL-TP-800, VSTL-TP-900**	**Yes**	
11	**V.2:1.7.1**	**General Applicability**			
12		**Voting system hardware, software, communications and documentation are examined and tested to determine suitability for elections use. Examination and testing addresses the broad range of system functionality and components, including system functionality for:** **All products custom designed for election use shall be tested in accordance with the required procedures contained in this section**			
13		pre-voting functions	**VSTL-TP-700**	**Yes**	
14		voting functions	**VSTL-TP-700**	**No**	
15		post-voting functions	**VSTL-TP-700**	**Yes**	

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria?**	**Requirement Addressed?**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
16		COTS hardware, system software and communications components with proven performance in commercial applications other than elections, however, are exempted from certain portions of the test as long as such products are not modified for use in a voting system. Compatibility of these products with other components of the voting system shall be determined through functional tests integrating these products with the remainder of the system.	**VSTL-TP-700**	**Yes**	
17	**V.2:1.3.1.4**	**System Integration Testing**			
18		**The accredited test lab tests the interface of all system modules and subsystems with each other against the vendor's specifications. Some systems use telecommunications capabilities as defined in Volume 1, Section 6. For those systems that do use such capabilities, components that are located at the poll site or separate vote counting site are tested for effective interface, accurate vote transmission, failure detection, and failure recovery. For voting systems that use telecommunications lines or networks that are not under the control of the vendor (e.g., public telephone networks), the accredited test lab tests the interface of vendor-supplied components with these external components for effective interface, vote transmission, failure detection, and failure recovery.**			
19		**Volume Tests**	**V.2:A.4.3.5, VSTL-TP-1200**	**Yes**	
20		**Stress Tests**	**V.2:A.4.3.5, VSTL-TP-1200**	**Yes**	
21		**Performance Tests**	**V.2:A.4.3.5, VSTL-TP-1200**	**Yes**	
22		**Error Recovery Tests**	**V.2:A.4.3.5, VSTL-TP-1200**	**Yes**	
23	**V.2:1.3.1.4**	**Physical Configuration Audit**			
24		The Physical Configuration Audit (PCA) compares the voting system components submitted for qualification to the vendor's technical documentation and confirms that the documentation submitted meets the requirements of the Guidelines. As part of the PCA, the accredited test lab also witnesses the build of the executable system to ensure that the qualified executable release is built from the tested components	**V.2:6.6, VSTL-TP-300**	**Yes**	
25	**V.2:1.3.1.4**	**Functional Configuration Audit**			

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria?**	**Requirement Addressed?**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
26		The Functional Configuration Audit (FCA) is an exhaustive verification of every system function and combination of functions cited in the vendor's documentation. Through use, the FCA verifies the accuracy and completeness of the system Technical Data Package (TDP). The various options of software counting logic that are claimed in the vendor's documentation shall be tested during the system-level FCA. Generic test ballots or test entry data for DRE systems, representing particular sequences of ballot-counting events, will test the counting logic during this audit.	**V.2:6.7, VSTL-TP-700**	**Yes**	
27		**Functional Capabilities**	**V.2:3.2.2** **V.2:6.2.1**		
28		Scope & extent of functional testing The system level certification tests shall include the tests (functionality, volume, stress, usability, security, performance, and recovery) indicated in the National Certification Test Plan, described in Appendix A. These tests assess the system's response to a range of both normal and abnormal conditions initiated in an attempt to compromise the system. These tests may be part of the audit of the system's functional attributes, or may be conducted separately.	**V.2:6.1, VSTL-TP-700, VSTL-TP-1310**	**Yes**	
29		Test plan completeness for functionality.	**V.2:3.2.3, VSTL-TP-700, VSTL-TP-1310, VSTL-TP-100**	**Yes**	
30		Modification of previously certified systems.	**V.2:3.2.4, VSTL-TP-1300, VSTL-TP-700, VSTL-TP-100**	**Yes**	
31		Complete functional testing	**V.2:3.3, VSTL-TP-700, VSTL-TP-100**	**Yes**	
32		Non-Standard systems	**V.2:3.5, VSTL-TP-700, VSTL-TP-100**	**Yes**	
33		System functional testing	**V.2:6.2.1, VSTL-TP-700, VSTL-TP-100**	**Yes**	
34		System software branch analysis	**V.2:6.2.1, VSTL-TP-700, VSTL-TP-100**	**Yes**	
35		System volume testing	**V.2:6.2.3, VSTL-TP-1210** **V.2:A.4.3.5**	**Yes**	
36		**Scope**			
37	**2.1**	**Overall System Capabilities**	**V.2:3.2.1**		
38	**2.1.1**	**Security**			
39	a.	Provide security access controls that limit or detect access to critical system components.			
40	b.	Provide system functions that are executable only in the intended manner and order, and only under the intended conditions.			

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41	c.	Use the system's control logic to prevent a system function from executing, if any preconditions to the function have not been met.	**See Sections 6, Security Evaluation.**		
42	d.	Provide safeguards that protects against tampering during system repair, or interventions in system operations, in response to system failure.			
43	e.	Provide security provisions that are compatible with the procedures and administrative tasks involved in equipment preparation, testing, and operation.			
44	f.	Incorporate a means of implementing a capability if access to a system function is to be restricted or controlled			
45	g.	Provide documentation of mandatory administrative procedures for effective system security			
46	**2.1.2**	**Accuracy**			
47		**Common Standards to Ensure Vote Accuracy**			
48		**All systems shall:**			
49	a.	Record the election contests, candidates, and issues exactly as defined by election officials.	**VSTL-TP-1200, VSTL-TP-1220, VSTL-TP-700**	**Yes**	
50	b.	Record the appropriate options for casting and recording votes.	**VSTL-TP-1200, VSTL-TP-1220, VSTL-TP-700**	**Yes**	
51	c.	Record each vote precisely as indicated by the voter and have the ability to produce an accurate report of all votes cast.	**VSTL-TP-1200, VSTL-TP-1220, VSTL-TP-700**	**Yes**	
52	d.	Include control logic and data processing methods incorporation parity and check sums (or equivalent error detection and correction methods) to demonstrate the system has been designed for accuracy.	**VSTL-TP-1200, VSTL-TP-1220, VSTL-TP-700**	**Yes**	
53	e.	Provide the software that monitors the overall quality of data read-write and transfer quality status, checking the number and types of errors that occur in any of the relevant operations on data and how they were corrected.	**VSTL-TP-1200, VSTL-TP-1220, VSTL-TP-700**	**Yes**	
54		**DRE System Standards**			
55	f.	In DRE systems, voting devices shall record and retain redundant copies of the original ballot image. A ballot image is an electronic record of all votes cast by the voter, including undervotes.	**VSTL-TP-700**	**No**	
56	**2.1.3**	**Error Recovery**			
57		**To recover from a non-catastrophic failure of a device, or from any error or malfunction that is within the operator's ability to correct, the system shall provide the following capabilities:**			
58	a.	Restoration of the device to the operating condition existing immediately prior to an error or failure, without loss or corruption of voting data previously stored in the device.	**VSTL-TP-1200, VSTL-TP-1220, VSTL-TP-700**	**Yes**	

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59	b.	Resumption of normal operation following the correction of a failure in a memory component, or in a data processing component, including the central processing unit.	**VSTL-TP-1200, VSTL-TP-1220, VSTL-TP-700**	**Yes**	
60	c.	Recovery from any other external condition that causes equipment to become inoperable, provided that catastrophic electrical or mechanical damage due to external phenomena has not occurred.	**VSTL-TP-1200, VSTL-TP-1220, VSTL-TP-700**	**Yes**	
61	**2.1.4**	**Integrity**			
62		Functional Testing of Precinct Count Systems	**V.2:3.3.1 , VSTL-TP-1200, VSTL-TP-700**	**No**	
63		Functional Testing of Central Count Systems	**V.2:3.3.2, VSTL-TP-1200, VSTL-TP-700**	**Yes**	
64		**Common Standards to Ensure System Integrity.**			
65		**All systems shall:**			
66	a.	Protect, by a means compatible with these Standards, against a single point of failure that would prevent further voting at the polling place.	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
67	b.	Protect against the interruption of electronic power.	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
68	c.	Protect against generated or induced electromagnetic radiation.	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
69	d.	Protect against ambient temperature and humidity fluctuations.	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
70	e.	Protect against failure of any data input or storage device.	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
71	f.	Protect against any attempt at improper data entry or retrieval.	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
72	g.	Record and report the date and time of normal and abnormal events.	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
73	h.	Maintain a permanent record of all original audit data that cannot be modified or overridden but may be augmented by designated authorized officials in order to adjust for errors or omissions (e.g. during the canvassing process).	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
74	i.	Detect and record every event, including the occurrence of an error condition that the system cannot overcome, and time-dependent or programmed events that occur without the intervention of the voter or a polling place operator.	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
75	j.	Include built-in measurement, self-test, and diagnostic software and hardware for detecting and reporting the system's status and degree of operability.	**VSTL-TP-1200, VSTL-TP-700**	**Yes**	
76		**DRE Systems Standards**			
77		**In addition to the common standards, DRE systems shall:**			
78	k.	Maintain a record of each ballot cast using a process and storage location that differs from the main vote detection, interpretation, processing, and reporting path.	**VSTL-TP-1200, VSTL-TP-700**	**No**	
79	l.	Provide a capability to retrieve ballot images in a form readable by humans.	**VSTL-TP-1200, VSTL-TP-700**	**No**	
80	**2.1.5**	**System Audit**			

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81		Functional Testing of Precinct Count Systems	**V.2:3.3.1, VSTL-TP-1200, VSTL-TP-700**	**No**	
82		Functional Testing of Central Count Systems	**V.2:3.3.2, VSTL-TP-1200, VSTL-TP-700**	**Yes**	
83		**System Audit Purpose and Context**			
84	**2.1.5.1**	**Operational Requirements**			
85		Audit records shall be prepared for all phases of elections operations performed using devices controlled by the jurisdiction or its contractors. These records rely upon automated audit data acquisition and machine-generated reports, with manual input of some information.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
86		These records shall address the ballot preparation and election definition phase, system readiness tests, and voting and ballot-counting operations.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
87		The software shall activate the logging and reporting of audit data as described in the following sections.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
88	**a.**	**Time, Sequence, and Preservation of Audit Records**			
89		**All voting systems shall:**			
90	i.	Except where noted, provide the capability to create and maintain a real-time audit record.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
91	ii.	All systems shall include a real-time clock as part of the system's hardware. The system shall maintain an absolute record of the time and date or a record relative to some event whose time and data are known and recorded.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
92	iii.	On all systems, audit record entries shall include the time-and-date stamp.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
93	iv.	The audit records shall be active whenever the system is in an operating mode. This record shall be available at all times, though it need not be continually visible.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
94	v.	The generation of audit record entries shall not be terminated or altered by program control, or by the intervention of any person. The physical security and integrity of the record shall be maintained at all times.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
95	vi.	Once the system has been activated for any function, the system shall preserve the contents of the audit record during any interruption of power to the system until processing and data reporting have been completed.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
96	vii.	The system shall be capable of printing a copy of the audit record. A separate printer is No for the audit record, and the record may be produced on the standard system printer if all the following conditions are met:	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
97		The generation of the audit trail records does not interfere with the production of output reports.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
98		The entries can be identified to facilitate recognition, segregation and retention.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
99		The audit record entries are kept physically secure.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	

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100	**b.**	**Error messages**			
101		**All voting systems shall meet the following requirements:**			
102	i.	The system shall generate, store and report to the use all error messages as they occur.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
103	ii.	All error messages requiring intervention by an operator or precinct official shall be displayed or printed unambiguously in easily understood language text, or by means of other suitable visual indicators.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
104	iii.	When the system uses of numerical error codes for trained technician maintenance or repair, the text corresponding to the code shall be self-contained, or affixed inside the unit device.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
105	iv.	All error messages for which correction impacts vote recording or vote processing shall be written in a manner that is understandable to an election official who possesses training on system use and operation, but does not possess technical training on system servicing and repair.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
106	v.	The message cue for all systems shall clearly state the action to be performed in the event that voter or operator response is Yes.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
107	vi.	System design shall ensure that erroneous responses will not lead to irreversible error.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
108	vii.	Nested error conditions shall be corrected in a controlled sequence such that system status shall be restored to the initial state existing before the first error occurred.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
109	**c.**	**Status Messages**			
110		Jurisdictions may require some status and information messages to be displayed and reported in real-time.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
111		Messages that do not require operator intervention may be stored in memory to be recovered after ballot processing is completed.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
112		The system shall display and report of critical status messages using unambiguous indicators or English language text.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
113		The voting system need not display non-critical status messages at the time of occurrence.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
114		Voting systems may display non-critical status messages (i.e., those that do not require operator intervention) by means of numerical codes for subsequent interpretation and reporting as unambiguous text.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
115		Systems shall provide a capability for the status messages to become part of the real-time audit record.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
116		The system shall provide a capability for a jurisdiction to designate critical status messages.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	

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117	**2.1.5.2**	**COTS operation system (common off the shelf)/Use of Shared Computing Platforms.**			
118		Three operating system protections are Yes on all such systems.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
119		Authentication shall be configured on the local terminal (display screen and keyboard) and on all external connection devices (network cards and ports).	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
120		The operating system audit shall be enabled for all session openings and closings, for all process executions and terminations, and for the alteration or deletion of any memory or file object.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
121		The system shall be configured to execute only intended and necessary processes during the execution of election software.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
122		The system shall also be configured to halt election software processes upon the termination of any critical system process (such as system audit) during the execution of election software.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
123	**2.1.6**	**Election Management System**			
124		**An EMS shall generate and maintain a database, or one or more interactive databases, that enables election officials or their designees to perform the following:**			
125		Define political subdivision boundaries and multiple election districts as indicated in the system documentation.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
126		Identify contests, candidates, and issues.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
127		Define ballot formats and appropriate voting options.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
128		Generate ballots and election-specific programs for vote recording and vote counting equipment.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
129		Install ballots and election-specific programs.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
130		Test that ballots and programs have been properly prepared and installed.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
131		Accumulate vote totals at multiple reporting levels as indicated in the system documentation.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
132		Generate post-voting reports per Section 2.5 (2002) / 2.4 (2005).	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
133		Process and produce audit reports of the data indicated in Section 4.5 (2002) / 5.5 (2005).	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
134		**Accessibility**			
135				**No**	
136	**2.1.7**	**Vote Tabulating Program**			
137	**2.1.7.1**	**Functions**			
138		**The vote tabulating program software resident in each voting device, vote count server, or other devices shall include all software modules required to:**			

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139	a.	Monitor system status and generating machine-level audit reports.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
140	b.	Accommodate device control functions performed by polling place officials and maintenance personnel.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
141	c.	Register and accumulate votes.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
142	d.	Accommodate variations in ballot counting logic.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
143	**2.1.7.2**	**Voting Variation**			
144		There are significant variations among the election laws of the 50 states with respect to permissible ballot contents, voting options, and the associated ballot counting logic. The TDP accompanying the system shall specifically identify which of the following items *can* and *cannot* be supported by the system, as well as *how* the system can implement the items supported:	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
145		Closed primaries.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
146		Open primaries.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
147		Partisan offices.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
148		Non-partisan offices.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
149		Write-in voting.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
150		Primary presidential delegation nomination	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
151		Ballot rotation.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
152		Straight party voting.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
153		Cross-party endorsement	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
154		Split precincts.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
155		Vote for N of M.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
156		Recall issues with options.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
157		Cumulative voting.	**VSTL-TP-700, VSTL-TP-1200**	**No**	
158		Ranked over voting.	**VSTL-TP-700, VSTL-TP-1200**	**No**	
159		Provisional or challenged ballots.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
160	**2.1.8**	**Ballot Counter**			
161		**For all voting systems, each device that tabulates ballots shall provide a counter that:**			
162	a.	Can be set to zero before any ballots are submitted for tally.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
163	b.	Records the number of ballots cast during a particular test cycle or election.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
164	c.	Increases the count only by the input of a ballot.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
165	d.	Prevents or disables the resetting of the counter by any person other than authorized persons at authorized points.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
166	e.	Is visible to designated election officials.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	

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167	**2.1.9**	**Telecommunications**	**V.2:6.4.2**	**V.2:6.4.19**	**V.2:6.4.20**
168		For all voting systems that use telecommunications for the transmission of data during pre-voting, voting or post-voting activities, capabilities shall include capabilities to ensure data are transmitted with no alternation or unauthorized disclosure during transmission.	**See Section 5, Telecom worksheet.**		
169		Such transmissions shall not violate the privacy, secrecy, and integrity demands of the *Guidelines* . Section [2002: 5] [2005: 6] describes telecommunications standards that apply to, at a minimum, the following types of data transmissions:			
170		• Voter Authentication			
171		• Ballot Definition			
172		• Vote Transmission to Central Site			
173		• Vote Count			
174		• List of Voters			
175	**2.1.10**	**Data Retention**			
176		All voting systems shall provide for maintaining the integrity of voting and audit data during an election and for a period of at least 22 months thereafter.	**VSTL-TP-1370**	**Yes**	
177	**2.2**	**Pre-voting Functions**	**V.2:3.2.1**		
178	**2.2.1**	**Ballot Preparation**			
179	**2.2.1.1**	**General Capabilities**			
180		**All systems shall provide the general capabilities for ballot preparation:**			
181		**Common Standards**			
182					
183		**All systems shall be capable of:**			
184	a.	Enabling the automatic formatting of ballots in accordance with the requirements for offices, candidates, and measures qualified to be placed on the ballot for each political subdivision and election district.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
185	b.	Collecting and maintaining the following data:	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
186	b. i.	Offices and their associated labels and instructions.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
187	b. ii.	Candidate names and their associated labels.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
188	b. iii.	Issues or measures and their text.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
189	c.	Supporting the maximum number of potentially active voting positions as indicated in the system documentation.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	

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190	d.	For a primary election, generating ballots that segregate the choices in partisan races by party affiliation.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
191	e.	Generating ballots that contain identifying codes or marks uniquely associated with each format.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
192	f.	Ensuring that the vote response fields, selection buttons, or switches properly align with the specific candidate names and/or issues printed on the ballot display, ballot card or sheet, or separate ballot pages.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
193		**Paper-Based System Standards**			
194		**In addition to the common standards, paper-based systems shall meet the following standards Yes to the technology used:**			
195	g.	Enable voters to make selections by punching a hole or by making a mark in areas designated for this purpose upon each ballot card or sheet.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
196		For punchcard systems, ensure that the vote response fields can be properly aligned with punching devices used to record votes.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
197	h.	For marksense systems, ensure that the timing marks align properly with the vote response fields.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
198	**2.2.1.2**	**Ballot Formatting**			
199		**All shall provide a capability for:**			
200	a.	Creation of newly defined elections.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
201	b.	Rapid and error-free definition of elections and their associated ballot layouts.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
202	c.	Uniform allocation of space and fonts used for each office, candidate, and contest such that the voter perceives no active voting position to be preferred to any other.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
203	d.	Simultaneous display of the maximum number of choices for a single contest as indicated by the vendor in the system documentation.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
204	e.	Retention of previously defined formats for an election.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
205	f.	Prevention of unauthorized modification of any ballot formats.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
206	g.	Modification by authorized persons of a previously defined ballot format for use in a subsequent election.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
207	**2.2.1.3**	**Ballot Production**			
208		**Common Standards**			
209		**The voting system shall provide a means of printing or otherwise generating a ballot display that can be installed in all system voting devices for which it is intended. All systems shall provide a capability to ensure:**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
210	a.	The electronic display or printed document on which the user views the ballot is capable of rendering an image of the ballot in any of the languages required by The Voting Rights Act of 1965, as amended.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
211	b.	The electronic display or printed document on which the user views the ballot does not show any advertising or commercial logos of any kind, whether public service, commercial, or political, unless specifically provided for in State law. Electronic displays shall not provide connection to such material through hyperlink.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
212	c.	The ballot conforms to vendor specifications for type of paper stock, weight, size, shape, size and location of punch or mark field used to record votes, folding, bleed through, and ink for printing if paper ballot documents or paper displays are part of the system.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
213		**Paper-Based System Standards (marksense ballots)**			
214		Vendor documentation for marksense systems shall include specifications for ballot materials to ensure that vote selections are read from only a single ballot at a time, without detection of marks from multiple ballots concurrently (e.g., reading of bleed-through from other ballots).	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
215	**2.2.2**	**Election Programming**			
216		**All systems shall provide for the:**			
217	a.	Logical definition of the ballot, including the definition of the number of allowable choices for each office and contest.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
218	b.	Logical definition of political and administrative subdivisions, where the list of candidates or contests varies between polling places.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
219	c.	Exclusion of any contest on the ballot in which the voter is prohibited from casting a ballot because of place of residence, or other such administrative or geographical criteria.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
220	d.	Ability to select from a range of voting options to conform to the laws of the jurisdiction in which the system will be used.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
221	e.	Generation of all required master and distributed copies of the voting program, in conformance with the definition of the ballots for each voting device and polling place, and for each tabulating device.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
222	**2.2.3**	**Ballot and Program Installation and Control**			
223		**All systems shall provide a means of installing ballots and programs on each piece of polling place or central count equipment in accordance with the ballot requirements of the election and the requirements of the jurisdiction in which the equipment will be used. All systems shall include the following at the time of ballot and program installation:**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
224	a.	A detailed work plan providing a schedule and steps for the software and ballot installation, including a table outlining the key dates, events and deliverables.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
225	b.	A capability for automatically verifying that the software has been properly selected and installed in the equipment or in programmable memory devices and for indicating errors.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
226	c.	A capability for automatically validating that software correctly matches the ballot formats that it is intended to process, for detecting errors, and for immediately notifying an election official of detected errors.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
227	**2.2.4**	**Readiness Testing**			
228		**Standards**			
229		**All voting systems shall provide the capabilities to:**			
230	a.	[2002: Verify that voting machines or vote recording and data processing equipment, precinct count equipment, and central count equipment are properly prepared for an election, and collect data that verifies equipment readiness]. [2005: Verify that voting equipment and precinct count equipment is properly prepared for an election and collect data that verifies equipment readiness].	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
231	b.	Obtain status and data reports from each set of equipment.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
232	c.	Verify the correct installation and interface of all system equipment.	**V.2:6.3, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
233	d.	Verify that hardware and software function correctly.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
234	e.	Generate consolidated data reports at the polling place and higher jurisdictional levels.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
235	f.	Segregate test data from actual voting data, either procedurally or by hardware/software features.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
236		**Resident test software, external devices, and special purpose test software connected to or installed in voting devices to simulate operator and voter functions may be used for these tests provided that the following standards are met:**			
237	g.	These elements shall be capable of being tested separately, and shall be proven to be reliable verification tools prior to their use.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
238	h.	These elements shall be incapable of altering or introducing any residual effect on the intended operation of the voting device during any succeeding test and operational phase.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
239		**Paper-Based Systems**			
240		**Paper-based systems shall:**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
241	i.	Support conversion testing that uses all potential ballot positions as active positions.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
242	j.	Support conversion testing of ballots with active position density for systems without pre-designated ballot positions.	**VSTL-TP-700, VSTL-TP-1200**	**Yes**	
243	**2.2.5**	**Verification at Polling Place**			
244		**All systems shall provide a formal record of the following, in any media, upon verification of the authenticity of the command source:**			
245	a.	The election's identification data.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
246	b.	The identification of all equipment units.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
247	c.	The identification of the polling place.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
248	d.	The identification of all ballot formats.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
249	e.	The contents of each active candidate register by office and of each active measure register at all storage locations (showing that they contain only zeros).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
250	f.	A list of all ballot fields that can be used to invoke special voting options.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
251	g.	Other information needed to confirm the readiness of the equipment, and to accommodate administrative reporting requirements.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
252		All voting systems shall provide the capability to test each device prior to opening to verify that each is operating correctly. At a minimum, the tests shall include:	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
253	h.	Confirmation that there are no hardware or software failures.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
254	i.	Confirm that the device is ready to be activated for accepting votes.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
255		If a precinct count system includes equipment for the consolidation of polling place data at one or more central counting places, it shall have means to verify the correct extraction of voting data from transportable memory devices, or to verify the transmission of secure data over secure communication links.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
256	**2.2.6**	**Verification at Central Location**			
257		**Upon verification of the authenticity of the command source, any system used in a central count environment shall provide a printed record of the following:**			
258	a.	The election's identification data.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
259	b.	The contents of each active candidate register by office and of each active measure register at *all* storage locations (showing that they contain only zeros).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
260	c.	Other information needed to confirm the readiness of the equipment, and to accommodate administrative reporting requirements.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
261		**Voting Functions**	**V.2:3.2.1**		
262	**2.3**	**Voting Capabilities**			
263		**All voting systems shall support:**			
264		• Opening the polls.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
265		• Casting the ballot.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
266		**In addition, all DRE systems shall support:**			
267		• Activating the ballot.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
268		• Augmenting the election counter.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
269		• Augmenting the life-cycle counter.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
270	**2.3.1**	**Opening the Polls**			
271	**2.3.1.1**	**Opening the Polling Place** (Precinct Count Systems)			
272		**To allow voting devices to be activated for voting, the system shall provide:**			
273	a.	An internal test or diagnostic capability to verify that all of the polling place tests specified in 2.3.5 (2002) / 2.2.5 (2005) have been successfully completed.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
274	b.	Automatic disabling any device that has not been tested until it has been tested.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
275	**2.3.1.2**	**Paper-Based System Standards**			
276		**All Paper-Based Systems**			
277		**All paper-based systems shall include:**			
278	a.	A means of verifying that ballot punching or marking devices are properly prepared and ready to use.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
279	b.	A voting booth or similar facility, in which the voter may punch or mark the ballot in privacy.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
280	c.	Secure receptacles for holding voted ballots.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
281		**Precinct Count Paper-Based Systems**			
282		**In addition to the above requirements, all paper-based precinct count equipment shall include a means of:**			
283	d.	Activating the ballot counting device.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
284	e.	Verifying correct activation and proper function.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
285	f.	Identifying device failures and corrective action needed.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
286	**2.3.1.3**	**DRE System Standards.**			
287		**All DRE systems shall include:**			
288	a.	A security seal, a password, or a data code recognition capability to prevent the inadvertent or unauthorized actuation of the poll-opening function.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	

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289	b.	A means of enforcing the execution of steps in the proper sequence if more than one step is required.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
290	c.	A means of verifying the system has been activated correctly.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
291	d.	A means of identifying system failure and any corrective action needed.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
292	**2.3.2**	**Activating the Ballot (DRE Systems)**			
293		**All DRE systems shall:**			
294	a.	Enable election officials to control the content of the ballot presented to the voter, either printed form or electronic display, such that each voter is permitted to record votes only in contests in which that voter is authorized to vote.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
295	b.	Allow each eligible voter is allowed to cast a ballot.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
296	c.	Prevent a voter from voting on a ballot to which (s)he is not entitled.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
297	d.	Prevent a voter from casting more than one ballot in the same election.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
298	e.	Activate the casting of a ballot in a general election.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
299	f.	Enable the selection of the ballot that is appropriate to the party affiliation declared by the voter in a primary election.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
300	g.	Activate all parts of the ballot upon which the voter is entitled to vote.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
301	h.	Disable all parts of the ballot upon which the voter is not entitled to vote.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
302	**2.3.3**	**Casting a Ballot**			
303	**2.3.3.1**	**Casting Ballot Common Standards**			
304		**All systems shall:**			
305	a.	Provide text that is at least 3 millimeters high and provide the capability to adjust or magnify the text to an apparent size of 6.3 millimeters.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
306	b.	Protect the secrecy of the vote such that the system cannot reveal any information about how a particular voter voted, except as otherwise required by individual state law.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
307	c.	Record selection and non-selection (undervote) of individual vote choices for each contest and ballot measure.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
308	d.	Record the voter's selection of candidates whose names do not appear on the ballot, if permitted under State law, and record as many write-in votes as the number of candidates the voter is allowed to select.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
309	e.	In the event of a failure of the main power supply external to the voting system, provide the capability for any voter who is voting at the time to complete casting a ballot, allow for the graceful shutdown of the voting system without loss or degradation of the voting and audit data, and allow voters to resume voting once the voting system has reverted to back-up power.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
310	f.	Provide the capability for voters to continue casting ballots in the event of a failure of a telecommunications connection within the polling place or between the polling place and any other location.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
311	**2.3.3.2**	**Paper Based System Standards**			
312		**All Paper-Based Systems**			
313		**All paper-based systems shall:**			
314	a.	Allow the voter to easily identify the voting field that is associated with each candidate or ballot measure response.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
315	b.	Allow the voter to punch or mark the ballot to register a vote.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
316	c.	Allow either the voter or the appropriate election official to place the voted ballot into the ballot counting device (precinct count systems) or a secure receptacle (central count systems).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
317	d.	Protect of the secrecy of the vote throughout the process.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
318		**Precinct Count Paper-Based Systems**			
319		**In addition to the above requirements, all paper-based precinct count systems shall:**			
320		Provide feedback to the voter identifies specific contests or ballot issues for which an overvote or undervote is detected.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
321		Allow the voter, at the voter's choice, to vote a new ballot or submit the ballot 'as is' without correction.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
322		Allow an authorized election official to turn off the capabilities defined in the two immediately prior provisions.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
323	e.	Provide feedback to the voter that identifies specific contests for which he or she has made no selection or fewer than the allowable number of selections (e.g., undervotes).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
324	f.	Notify the voter if he or she has made more than the allowable number of selections for any contest (e.g., overvotes).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
325	g.	Notify the voter before the ballot is cast and counted of the effect of making more than the allowable number of selections for a contest.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
326	h.	Provide the voter opportunity to correct the ballot for either an undervote or overvote before the ballot is cast and counted.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
327	**2.3.3.3**	**DRE Systems Standards**			
328		**In addition to the above requirements, DRE systems shall:**			
329	a.	Prohibit the voter from accessing or viewing any information on the display screen that has not been authorized by election officials and preprogrammed into the voting system (i.e., no potential for display of external information or linking to other information sources).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	

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330	b.	Enable the voter to easily identify the selection button or switch, or the active area of the ballot display that is associated with each candidate or ballot measure response.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
331	c.	Allow the voter to select his or her preferences on the ballot in any legal number and combination.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
332	d.	Indicate that a selection has been made or canceled.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
333	e.	Indicate to the voter when no selection, or an insufficient number of selections, has been made in a contest.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
334		Prevent the voter from overvoting.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
335	f.	Notify the voter if he or she has made more than the allowable number of selections for any contest (e.g., overvotes).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
336	g.	Notify the voter before the ballot is cast and counted of the effect of making more than the allowable number of selections for a contest.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
337	h.	Provide the voter opportunity to correct the ballot for either an undervote or overvote before the ballot is cast and counted.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
338	i.	Notify the voter when the selection of candidates and measures is completed.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
339	j.	Allow the voter, before the ballot is cast, to review his or her choices and, if the voter desires, to delete or change his or her choices before the ballot is cast.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
340	k.	For electronic image displays, prompt the voter to confirm the voter's choices before casting his or her ballot, signifying to the voter that casting the ballot is irrevocable and directing the voter to confirm the voter's intention to cast the ballot.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
341	l.	Notify the voter after the vote has been stored successfully that the ballot has been cast.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
342	m.	Notify the voter that the ballot has not been cast successfully if it is not stored successfully, including storage of the ballot image, and provide clear instruction as to the steps the voter should take to cast his or her ballot should this event occur.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
343	n.	Provide sufficient computational performance to provide responses back to each voter entry in no more than three seconds.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
344	o.	Ensure that the votes stored accurately represent the actual votes cast.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
345	p.	Prevent modification of the voter's vote after the ballot is cast.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
346	q.	Provide a capability to retrieve ballot images in a form readable by humans (in accordance with the requirements of [2002: Section 2.2.2.2 and 2.2.4.2] [2005: Subsections 2.1.2 (f) and 2.1.4 (k) and (l)).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
347	r.	Increment the proper ballot position registers or counters.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	

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348	s.	Protect the secrecy of the vote throughout the voting process.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
349	t.	Prohibit access to voted ballots until after the close of polls.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
350	u.	Provide the ability for election officials to submit test ballots for use in verifying the end-to-end integrity of the system.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
351	v.	Isolate test ballots such that they are accounted for accurately in vote counts and are not reflect in official vote counts for specific candidates or measures.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
352	**2.4**	**Post-Voting Functions**	**V.2:3.2.1**		
353	**2.4.1**	**Closing the Polling Place (Precinct Count)**			
354		**The voting system shall provide the means for:**			
355	a.	Preventing the further casting of ballots once the polling place has closed.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
356	b.	Providing an internal test that verifies that the prescribed closing procedure has been followed, and that the device status is normal.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
357	c.	Incorporating a visible indication of system status.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
358	d.	Producing a diagnostic test record that verifies the sequence of events, and indicates that the extraction of voting data has been activated.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
359	e.	Precluding the unauthorized reopening of the polls once the poll closing has been completed for that election.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
360	**2.4.2**	**Consolidating Vote Data**			
361		All systems provide a means to consolidate vote data from all polling places, and optionally from other sources such as absentee ballots, provisional ballots, and voted ballots requiring human review (e.g., write-in votes).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
362	**2.4.3**	**Producing Reports**			
363		**All systems shall be able to create reports summarizing the vote data on multiple levels. All systems shall provide capabilities to:**			
364		**Standards**			
365	a.	Support geographic reporting, which requires the reporting of all results for each contest at the precinct level and additional jurisdictional levels.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
366	b.	Produce a printed report of the number of ballots counted by each tabulator.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
367	c.	Produce a printed report for each tabulator of the results of each contest that includes the votes cast for each selection, the count of undervotes, and the count of overvotes.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria?**	**Requirement Addressed?**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
368	d.	Produce a consolidated printed report of the results for each contest of all votes cast (including the count of ballots from other sources supported by the system as specified by the vendor) that includes the votes cast for each selection, the count of undervotes, and the count of overvotes.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
369	e.	Be capable of producing a consolidated printed report of the combination of overvotes for any contest that is selected by an authorized official (e.g.; the number of overvotes in a given contest combining candidate A and candidate B, combining candidate A and candidate C, etc.).	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
370	f.	Produce all system audit information required in Section 4.5 in the form of printed reports, or in electronic memory for printing centrally.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
371	g.	Prevent data from being altered or destroyed by report generation, or by the transmission of results over telecommunications lines.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
372		**Precinct Count Systems**			
373		**In addition to the common reporting requirements, all precinct count voting systems shall:**			
374	h.	Prevent the printing of reports and the unauthorized extraction of data prior to the official close of the polling place.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
375	i.	Provide a means to extract information from a transportable programmable memory device or data storage medium for vote consolidation.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
376	j.	Consolidate the data contained in each unit into a single report for the polling place when more than one voting machine or precinct tabulator is used.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
377	k.	Prevent data in transportable memory from being altered or destroyed by report generation, or by the transmission of results over telecommunications lines.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**No**	
378	**2.4.4**	**Broadcasting Results**			
379		**Some voting systems offer the capability to make unofficial results available to external organizations such as the news media, political party officials, and others. Although this capability is No, systems that make unofficial results available shall:**			
380	a.	Provide only aggregated results, and not data from individual ballots.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
381	b.	Provide no access path from unofficial electronic reports or files to the storage devices for official data.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
382	c.	Clearly indicate on each report or file that the results it contains are unofficial.	**VSTL-TP-700, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
383	**2.5**	**Maintenance, Transportation and Storage**	**V.2:3.2.1**		

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria?**	**Requirement Addressed?**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
384		**All systems shall be designed and manufactured to facilitate preventive and corrective maintenance, conforming to the hardware standards described in [2002: Section 3] [2005: Subsection 4.1]. All vote casting and tally equipment designated for storage between elections shall:**			
385	a.	Function without degradation in capabilities after transit to and from the place of use, as demonstrated by meeting the performance standards described in [2002: Section 3] [2005: Subsection 4.1].	**VSTL-TP-400, VSTL-TP-500, VSTL-TP-600**	**No**	
386	b.	Function without degradation in capabilities after storage between elections, as demonstrated by meeting the performance standards described in [2002: Section 3] [2005: Subsection 4.1].	**VSTL-TP-400, VSTL-TP-500, VSTL-TP-600**	**No**	

Cell: D19
Comment: A.4.4.5 System-level Test Case Design

Volume tests: These tests investigate the system's response to processing more than the expected number of ballots/voters per precinct, to processing more than the expected number of precincts, or to any other similar conditions that tend to overload the system's capacity to process, store, and report data.

Cell: E19
Comment: A.4.3.5 System-level Test Case Design

Volume tests: These tests investigate the system's response to processing more than the expected number of ballots/voters per precinct, to processing more than the expected number of precincts, or to any other similar conditions that tend to overload the system's capacity to process, store, and report data.

Cell: D20
Comment: A.4.4.5 System-level Test Case Design

These tests investigate the system's response to transient overload conditions. Polling place devices shall be subjected to ballot processing at the high volume rates at which the equipment can be operated to evaluate software response to hardware-generated interrupts and wait states. Central counting systems shall be subjected to similar overloads, including, for systems that support more than one card reader, continuous processing through all readers simultaneously.

Cell: E20
Comment: A.4.3.5 System-level Test Case Design

These tests investigate the system's response to transient overload conditions. Polling place devices shall be subjected to ballot processing at the high volume rates at which the equipment can be operated to evaluate software response to hardware-generated interrupts and wait states. Central counting systems shall be subjected to similar overloads, including, for systems that support more than one card reader, continuous processing through all readers simultaneously.

Cell: D21
Comment: A.4.4.5 System-level Test Case Design

Performance tests: These tests verify accuracy, processing rate, ballot format handling capability, and other performance attributes claimed by the vendor;

Cell: E21
Comment: A.4.3.5 System-level Test Case Design

Performance tests: These tests verify accuracy, processing rate, ballot format handling capability, and other performance attributes claimed by the vendor;

Cell: D22

Comment: A.4.4.5 System-level Test Case Design

Recovery tests: These tests verify the ability of the system to recover from hardware and data errors.

Cell: E22
Comment: A.4.3.5 System-level Test Case Design

Recovery tests: These tests verify the ability of the system to recover from hardware and data errors.

Cell: D24
Comment: V.2:6.6
The Physical Configuration Audit compares the voting system components submitted for qualification to the vendor's technical documentation, and shall include the following activities:

a. The audit shall establish a configuration baseline of the software and hardware to be tested. It shall also confirm whether the vendor's documentation is sufficient for the user to install, validate, operate, and maintain the voting system. MIL-STD-1521 can be used as a guide when conducting this audit;

b. The test agency shall examine the vendor's source code against the submitted documentation during the Physical Configuration Audit to verify that the software conforms to the vendor's specifications. This review shall include an inspection of all records of the vendor's release control system. If changes have been made to the baseline version, the test agency shall verify that the vendor's engineering and test data are for the software version submitted for qualification;

c. If the software is to be run on any equipment other than a COTS mainframe data processing system, minicomputer, or microcomputer, the Physical Configuration Audit shall also include a review of all drawings, specifications, technical data, and test data associated with the system hardware. This examination shall establish the system hardware baseline associated with the software baseline;

d. To assess the adequacy of user acceptance test procedures and data, vendor documents containing this information shall be reviewed against the system's functional specifications. Any discrepancy or inadequacy in the vendor's plan or data shall be resolved prior to beginning the system-level functional and performance tests; and

e. All subsequent changes to the baseline software configuration made during the course of qualification testing shall be subject to reexamination. All changes to the system hardware that may produce a change in software operation shall also be subject to reexamination.

The vendor shall provide a list of all documentation and data to be audited, cross-referenced to the contents of the TDP. Vendor technical personnel shall be available to assist in the performance of the Physical Configuration Audit.

Cell: E24
Comment: V.2:6.6
The Physical Configuration Audit compares the voting system components submitted for qualification to the vendor's technical documentation, and shall include the following activities:

a. The audit shall establish a configuration baseline of the software and hardware to be tested. It shall also confirm whether the vendor's documentation is sufficient for the user to install, validate, operate, and maintain the voting system. MIL-STD-1521 can be used as a guide when conducting this audit.

b. The test agency shall examine the vendor's source code against the submitted documentation during the Physical Configuration Audit to verify that the software conforms to the vendor's specifications. This review shall include an inspection of all records of the vendor's release control system. If changes have been made to the baseline version, the accredited test lab shall verify that the vendor's engineering and test data are for the software version submitted for certification.

c. If the software is to be run on any equipment other than a COTS mainframe data processing system, minicomputer, or microcomputer, the Physical Configuration Audit shall also include a review of all drawings, specifications, technical data, and test data associated with the system hardware. This examination shall establish the system hardware baseline associated with the software baseline;

d. To assess the adequacy of user acceptance test procedures and data, vendor documents containing this information shall be reviewed against the system's functional specifications. Any discrepancy or inadequacy in the vendor's plan or data shall be resolved prior to beginning the system integration functional and performance tests.

e. All subsequent changes to the baseline software configuration made during the course of testing shall be subject to re-examination. All changes to the system hardware that may produce a change in software operation shall also be subject to re-examination.

The vendor shall provide a list of all documentation and data to be audited, cross-referenced to the contents of the TDP. Vendor technical personnel shall be available to assist in the performance of the Physical Configuration Audit.

The vendor shall provide a list of all documentation and data to be audited, cross-referenced to the contents of the TDP. Vendor technical personnel shall be available to assist in the performance of the Functional Configuration Audit.

Cell: D26
Comment: V.2:6.7
The Functional Configuration Audit encompasses an examination of vendor tests, and the conduct of additional tests, to verify that the system hardware and software perform all the functions described in the vendor's documentation submitted for the TDP. It includes a test of system operations in the sequence in which they would normally be performed, and shall include the following activities (MIL-STD-1521 may be used as a guide when conducting this audit.):

a. The test agency shall review the vendor's test procedures and test results to determine if the vendor's specified functional requirements have been adequately tested. This examination shall include an assessment of the adequacy of the vendor's test cases and input data to exercise all system functions, and to detect program logic and data processing errors, if such be present; and

b. The test agency shall perform or supervise the performance of additional tests to verify nominal system performance in all operating modes, and to verify on a sampling basis the vendor's test data reports. If vendor developmental test data is incomplete, the ITA shall design and conduct all appropriate module and integrated functional tests. The functional configuration audit may be performed in the facility either of the test agency or of the vendor, and shall use and verify the accuracy and completeness of the System Operations, Maintenance, and Diagnostic Testing Manuals.
The vendor shall provide a list of all documentation and data to be audited, cross-referenced to the contents of the TDP. Vendor technical personnel shall be available to assist in the performance of the Functional Configuration Audit.

Cell: E26
Comment: V.2:6.7
The Functional Configuration Audit encompasses an examination of vendor tests, and the conduct of additional tests, to verify that the system hardware and software perform all the functions described in the vendor's documentation submitted for the TDP. It includes a test of system operations in the sequence in which they would normally be performed, and shall include the following activities. MIL-STD-1521 may be used as a guide when conducting this audit:

a. The accredited test lab shall review the vendor's test procedures and test results to determine if the vendor's specified functional requirements have been adequately tested. This examination shall include an assessment of the adequacy of the vendor's test cases and input data to exercise all system functions, and to detect program logic and data processing errors, if such be present.

b. The accredited test lab shall perform or supervise the performance of additional tests to verify nominal system performance in all operating modes, and to verify on a sampling basis the vendor's test data reports. If vendor developmental test data is incomplete, the accredited test lab shall design and conduct all appropriate module and integrated functional tests. The functional configuration audit may be performed in the facility either of the accredited test lab or of the vendor, and shall use and verify the accuracy and completeness of the System Operations, Maintenance, and Diagnostic Testing Manuals

The vendor shall provide a list of all documentation and data to be audited, cross-referenced to the contents of the TDP. Vendor technical personnel shall be available to assist in the performance of the Functional Configuration Audit.

Cell: D27
Comment: V.2:3.2.2
Voting systems are not designed according to a standard design template. Instead, system design reflects the vendor's selections from a variety of technologies and design configurations. Such variation is recognized in the definitions of voting systems in Volume I, Section 1, and serves as the basis for delineating various functional capability requirements.

Functional capabilities will vary according to the relative complexity of a system and the manner in which the system integrates various technologies. Therefore, the testing procedure designed and performed by the ITA for a particular system shall reflect the specific technologies and design configurations used by that system.

V.2:6.2.1
ITAs shall design and perform procedures that test the voting system capabilities for the system as a whole. These procedures follow the testing of the systems hardware and software, and address voting system requirements defined in Volume I, Sections 2, 5, 6 and 8.
These procedures shall also address the requirements for testing system functionality provided in Volume II, Section 3. Where practical, the ITA will perform coverage reporting of the software branches executed in the functional testing. The selection of the baseline test cases will follow an operational profile of the common procedures, sequencing, and options among the shared state requirements and those that are specifically recognized and supported by the vendor. The ITA will use the coverage report to identify any portions of the source code that were not covered and determine:

a. The additional functional tests that are needed;
b. Where more detailed source code review is needed; or
c. Both of the above.

The specific procedures to be used shall be identified in the Qualification Test Plan prepared by the ITA. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for testing performed by the ITA.

Recognizing variations in system design and the technologies employed by different vendors, the ITAs shall design test procedures that account for these variations.

Cell: E27
Comment: V.2:3.2.2
Voting systems are not designed according to a standard design template. Instead, system design reflects the vendor's selections from a variety of technologies and design configurations. Such variation is recognized in the definitions of voting systems in Volume I, Section 1, and serves as the basis for delineating various functional capability requirements.

Functional capabilities will vary according to the relative complexity of a system and the manner in which the system integrates various technologies. Therefore, the testing procedure designed and performed for a particular system shall reflect the specific technologies and design configurations used by that system.

V.2:6.2.1
The accredited test lab shall design and perform procedures that test the voting system capabilities for the system as a whole. These procedures follow the testing of the systems hardware and software, and address voting system requirements defined in Volume I, Sections 2, 4, 5, and 6.

These procedures shall also address the requirements for testing system functionality provided in Section 3. Where practical, the accredited test lab will perform coverage reporting of the software branches executed in the functional testing. The selection of the baseline test cases will follow an operational profile of the common procedures, sequencing, and options among the shared state requirements and those that are specifically recognized and supported by the vendor. The accredited test lab will use the coverage report to identify any portions of the source code that were not covered and determine:

a. The additional functional tests that are needed;
b. Where more detailed source code review is needed; or
c. Both of the above.

The specific procedures to be used shall be identified in the National Certification Test Plan. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for testing performed by the accredited test lab.

Recognizing variations in system design and the technologies employed by different vendors, the ITAs shall design test procedures that account for these variations.

Cell: D28
Comment: This section contains a description of the testing to be performed by the ITAs to confirm the proper functioning of the fully integrated components of a voting system submitted for qualification testing. It describes the scope and basis for integration testing, testing of internal and external system interfaces, testing of security capabilities, and the configuration audits, including the testing of system documentation.

System-level qualification tests address the integrated operation of both hardware and software, along with any telecommunications capabilities. The system-level qualification tests shall include the tests (functionality, volume, stress, usability, security, performance, and recovery) indicated in the ITAs' Qualification Test Plan, described in Appendix A. These tests assess the system's response to a range of both normal and abnormal conditions initiated in an attempt to compromise the system. These tests may be part of the audit of the system's functional attributes, or may be conducted separately.

The system integration tests include two audits: a Physical Configuration Audit that focuses on physical attributes of the system, and a Functional Configuration Audit that focuses on the system's functional attributes, including attributes that go beyond the specific requirements of the Standards.
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Cell: E28
Comment: This section contains a description of the testing to be performed by the accredited test lab to confirm the proper functioning of the fully integrated components of a voting system submitted for national certification testing. It describes the scope and basis for integration testing, testing of internal and external system interfaces, testing of security capabilities, and the configuration audits, including the testing of system documentation.

System level certification tests address the integrated operation of both hardware and software, along with any telecommunications capabilities. The system level certification tests shall include the tests (functionality, volume, stress, usability, security, performance, and recovery) indicated in the National Certification Test Plan, described in Appendix A. These tests assess the system's response to a range of both normal and abnormal conditions initiated in an attempt to compromise the system. These tests may be part of the audit of the system's functional attributes, or may be conducted separately.

The system integration tests include two audits: a Physical Configuration Audit that focuses on physical attributes of the system, and a Functional Configuration Audit that focuses on the system's functional attributes, including attributes that go beyond the specific requirements of the Standards.

Cell: D29
Comment: The requirements for voting system functionality provided by Volume I, Section 2 reflect a minimum set of capabilities. Vendors may, and often do, provide additional capabilities in systems that are submitted for qualification testing in order to respond to the requirements of individual states. These additional capabilities shall be identified by the vendor within the TDP as described in Volume II, Section 2. Based on this information, ITAs shall design and perform system functionality testing for additional functional capabilities as well as the capabilities required by Volume I, Section 2 of the Standards.

Cell: E29
Comment: The requirements for voting system functionality provided by Volume I, Section 2 reflect a minimum set of capabilities. Vendors may, and often do, provide additional capabilities in systems that are submitted for qualification testing in order to respond to the requirements of individual states. These additional capabilities shall be identified by the vendor within the TDP as described in Volume II, Section 2. Based on this information, the accredited test lab shall design and perform system functionality testing for these additional functional capabilities.

Cell: D30
Comment: The requirements for voting system functionality provided by Volume I, Section 2 reflect a minimum set of capabilities. In this situation the ITA may design and perform a test procedure that draws on the results of testing performed previously on reused subsystems or components. However, the scope of testing shall include, irrespective of previous testing, certain functionality tests:

a. All functionality performed by new subsystems/modules;
b. All functionality performed by modified subsystems/modules;
c. Functionality that is accomplished using any interfaces to new modules, or that shares inputs or outputs from new modules;
d. All functionality related to vote tabulation and election results reporting; and
e. All functionality related to audit trail maintenance.

Cell: E30
Comment: The required functional capabilities of voting systems defined in Volume I, Section 2 reflect a broad range of system functionality needed to support the full life cycle of an election, including post election activities. Many systems submitted for certification are designed to address this scope, and are to be tested accordingly.

However, some new systems using a combination of new subsystems or system components interfaced with the components of a previously certified system. For example, a vendor can submit a voting system certification testing that has a new DRE voting device, but that integrates the election management component from a previously certified system.

In this situation, the vendor shall identify in the TDP the functional capabilities supported by new subsystems/components and those supported by subsystems/components taken from a previously certified system. The vendor shall indicate in its system design documentation and configuration management records the scope and nature of any modifications made to the re-used subsystems or components. This will assist the accredited test lab to develop efficient test procedures that rely in part on the results of testing of the previously certified subsystems or components.

In this situation the accredited test lab may design and perform a test procedure that draws on the results of testing performed previously on re-used subsystems or components. However, irrespective of previous testing performed, the scope of testing shall include certain functionality tests:

a. All functionality performed by new subsystems/modules;
b. All functionality performed by modified subsystems/modules;
c. Functionality that is accomplished using any interfaces to new modules, or that shares inputs or outputs from new modules;
d. All functionality related to vote tabulation and election results reporting; and
e. All functionality related to audit trail maintenance.

Cell: D31
Comment: ...the full qualification testing process shall include functionality testing for all system functions of a voting system, minus the exceptions noted in Section 3.2.

Cell: E31
Comment: ...Regardless of the sequence of testing used, the full certification testing process shall include functionality testing for all system functions of a voting system.

Cell: D32
Comment: 3.5 Functionality Testing for Systems that Operate on Personal Computers

For systems intended to use non-standard voting devices, such as a personal computer, provided by the local jurisdiction, ITAs shall conduct functionality tests using hardware provided by the vendor that meets the minimum configuration specifications defined by the vendor.

Volume II, Section 4, provides additional information on hardware to be used to conduct functionality testing of such voting devices, as well as hardware to be used to conduct security testing and other forms of testing.

Cell: E32
Comment: 3.5 Functionality Testing for Systems that Operate on Personal Computers

For systems intended to use non-standard voting devices, such as a personal computer, provided by the local jurisdiction, the accredited test lab shall conduct functionality tests using hardware provided by the vendor that meets the minimum configuration specifications defined by the vendor.

Section 4, provides additional information on hardware to be used to conduct functionality testing of such voting devices, as well as hardware to be used to conduct security testing and other forms of testing.

Cell: D33
Comment: ITAs shall design and perform procedures that test the voting system capabilities for the system as a whole. These procedures follow the testing of the systems hardware and software, and address voting system requirements defined in Volume I, Sections 2, 5, 6 and 8.

These procedures shall also address the requirements for testing system functionality provided in Volume II, Section 3.

Cell: E33
Comment: The accredited test lab shall design and perform procedures that test the voting system capabilities for the system as a whole. These procedures follow the testing of the systems hardware and software, and address voting system requirements defined in Volume I, Sections 2, 4, 5 and 6.

These procedures shall also address the requirements for testing system functionality provided in Volume II, Section 3.

Cell: D34
Comment: Where practical, the ITA will perform coverage reporting of the software branches executed in the functional testing. The selection of the baseline test cases will follow an operational profile of the common procedures, sequencing, and options among the shared state requirements and those that are specifically recognized and supported by the vendor. The ITA will use the coverage report to identify any portions of the source code that were not covered and determine:

a. The additional functional tests that are needed;
b. Where more detailed source code review is needed; or
c. Both of the above.

Cell: E34

Comment: Where practical, the accredited test lab will perform coverage reporting of the software branches executed in the functional testing. The selection of the baseline test cases will follow an operational profile of the common procedures, sequencing, and options among the shared state requirements and those that are specifically recognized and supported by the vendor. The accredited test lab will use the coverage report to identify any portions of the source code that were not covered and determine:

a. The additional functional tests that are needed;
b. Where more detailed source code review is needed; or
c. Both of the above.

Cell: D35
Comment: For all systems, the total number of ballots to be processed by each precinct counting device during these tests shall reflect the maximum number of active voting positions and the maximum number of ballot styles that the TDP claims the system can support.

.....
A.4.4.5 System-level Test Case Design

Volume tests: These tests investigate the system's response to processing more than the expected number of ballots/voters per precinct, to processing more than the expected number of precincts, or to any other similar conditions that tend to overload the system's capacity to process, store, and report data.

Cell: E35
Comment: For all systems, the total number of ballots to be processed by each precinct counting device during these tests shall reflect the maximum number of active voting positions and the maximum number of ballot styles that the TDP claims the system can support.

.....
A.4.3.5 System-level Test Case Design

Volume tests: These tests investigate the system's response to processing more than the expected number of ballots/voters per precinct, to processing more than the expected number of precincts, or to any other similar conditions that tend to overload the system's capacity to process, store, and report data.

Cell: D37
Comment: V.2:3.2.1
ITAs shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Tests procedures shall be designed and performed by the ITA that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the Qualification Test Plan prepared by the ITA. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for functionality testing performed by the ITA.

Recognizing variations in system design and the technologies employed by different vendors, the ITAs shall design test procedures that account for such variations and reflect the system-specific functional capabilities in Volume I, Section 2.

Cell: E37
Comment: V.2:3.2.1

The accredited test lab shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Test procedures shall be designed and performed that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the National Certification Test Plan prepared by the accredited test lab. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for independent functionality testing.

Recognizing variations in system design and the technologies employed by different vendors, the accredited test lab shall design test procedures that account for such variations and reflect the system-specific functional capabilities in Volume I, Section 2.

Cell: D62
Comment: 3.3.1 Functionality Testing in Parallel with Hardware Testing for Precinct Count Systems

For testing voting functions defined in Volume I, Sections 2.4 and 2.5, the following procedures shall be performed during the functionality tests of voting equipment and precinct counting equipment.

a. The procedure to prepare election programs shall:
1) Verify resident firmware, if any;
2) Prepare software (including firmware) to simulate all ballot format and logic options for which the system will be used;
3) Verify program memory device content; and

4) Obtain and design test ballots with formats and voting patterns sufficient to verify performance of the test election programs.

b. The procedures to program precinct ballot counters shall:
1) Install program and data memory devices, or verify presence if resident; and
2) Verify operational status of hardware as in Volume II, Section 4.

c. The procedures to simulate opening of the polls shall:
1) Perform procedures required to prepare hardware for election operations;
2) Obtain "zero" printout or other evidence that data memory has been cleared;
3) Verify audit record of pre-election operations; and
4) Perform procedure required to open the polling place and enable ballot counting.

d. The procedure to simulate counting ballots shall cast test ballots in a number sufficient to demonstrate proper processing, error handling, and generation of audit data as specified in Volume I, Sections 2 and 4.

e. The procedure to simulate closing of polls shall:
1) Perform hardware operations required to disable ballot counting and close the polls;
2) Obtain data reports and verify correctness; and
3) Obtain audit log and verify correctness.
They need not be performed in the sequence listed, provided the necessary precondition of each procedure has been met.

Cell: E62
Comment: 3.3.1 Functionality Testing in Parallel with Precinct Count Systems

For testing voting functions defined in Volume I, Section, 2 the following procedures shall be performed during the functionality tests of voting equipment and precinct counting equipment.

a. The procedure to prepare election programs shall:
1) Verify resident firmware, if any;
2) Prepare software (including firmware) to simulate all ballot format and logic options for which the system will be used;
3) Verify program memory device content; and
4) Obtain and design test ballots with formats and voting patterns sufficient to verify performance of the test election programs.

b. The procedures to program precinct ballot counters shall:
1) Install program and data memory devices, or verify presence if resident; and
2) Verify operational status of hardware as in Volume II, Section 4.

c. The procedures to simulate opening of the polls shall:
1) Perform procedures required to prepare hardware for election operations;
2) Obtain "zero" printout or other evidence that data memory has been cleared;
3) Verify audit record of pre-election operations; and
4) Perform procedure required to open the polling place and enable ballot counting.

d. The procedure to simulate counting ballots shall cast test ballots in a number sufficient to demonstrate proper processing, error handling, and generation of audit data as specified in Volume I, Sections 2 and

5.

e. The procedure to simulate closing of polls shall:
1) Perform hardware operations required to disable ballot counting and close the polls;
2) Obtain data reports and verify correctness; and
3) Obtain audit log and verify correctness.

These procedures need not be performed in the sequence listed, provided the necessary precondition of each procedure has been met.

Cell: D63
Comment: 3.3.2 Functionality Testing in Parallel with Hardware Testing for Central Count Systems

For testing voting functions defined in Volume I, Sections 2.4 and 2.5, the following procedures shall be performed during the functional tests.

a. The procedure to prepare election programs shall:
1) Verify resident firmware, if any;
2) Prepare software (including firmware) to simulate all ballot format and logic options for which the system will be used, and to enable simulation of counting ballots from at least 10 polling places or precincts;
3) Verify program memory device content; and
4) Procure test ballots with formats, voting patterns, and format identifications sufficient to verify performance of the test election programs;

b. The procedure to simulate counting ballots shall count test ballots in a number sufficient to demonstrate proper processing, error handling, and generation of audit data as specified in Volume I, Sections 2 and 4; and

c. The procedure to simulate election reports shall:
1) Obtain reports at polling places or precinct level;
2) Obtain consolidated reports;
3) Provide query access, if this is a feature of the system;
4) Verify correctness of all reports and queries; and
5) Obtain audit log and verify correctness.

They need not be performed in the sequence listed, provided the necessary preconditions of each procedure have been met.

Cell: E63
Comment: 3.3.2 Functionality Testing in Parallel with Central Count Systems

For testing voting functions defined in Volume I, Section 2, the following procedures shall be performed during the functional tests.

a. The procedure to prepare election programs shall:
1) Verify resident firmware, if any;
2) Prepare software (including firmware) to simulate all ballot format and logic options for which the system will be used, and to enable simulation of counting ballots from at least 10 polling places or precincts;
3) Verify program memory device content; and
4) Procure test ballots with formats, voting patterns, and format identifications sufficient to verify performance of the test election programs;

b. The procedure to simulate counting ballots shall count test ballots in a number sufficient to demonstrate proper processing, error handling, and generation of audit data as specified in Volume I, Sections 2 and 5;

c. The procedure to simulate election reports shall:
1) Obtain reports at polling places or precinct level;
2) Obtain consolidated reports;
3) Provide query access, if this is a feature of the system;
4) Verify correctness of all reports and queries; and
5) Obtain audit log and verify correctness.

They need not be performed in the sequence listed, provided the necessary preconditions of each procedure have been met.

Cell: D81
Comment: 3.3.1 Functionality Testing in Parallel with Hardware Testing for Precinct Count Systems

For testing voting functions defined in Volume I, Sections 2.4 and 2.5, the following procedures shall be performed during the functionality tests of voting equipment and precinct counting equipment.

a. The procedure to prepare election programs shall:
1) Verify resident firmware, if any;
2) Prepare software (including firmware) to simulate all ballot format and logic options for which the system will be used;
3) Verify program memory device content; and
4) Obtain and design test ballots with formats and voting patterns sufficient to verify performance of the test election programs.

b. The procedures to program precinct ballot counters shall:
1) Install program and data memory devices, or verify presence if resident; and
2) Verify operational status of hardware as in Volume II, Section 4.

c. The procedures to simulate opening of the polls shall:
1) Perform procedures required to prepare hardware for election operations;
2) Obtain "zero" printout or other evidence that data memory has been cleared;
3) Verify audit record of pre-election operations; and
4) Perform procedure required to open the polling place and enable ballot counting.

d. The procedure to simulate counting ballots shall cast test ballots in a number sufficient to demonstrate proper processing, error handling, and generation of audit data as specified in Volume I, Sections 2 and 4.

e. The procedure to simulate closing of polls shall:
1) Perform hardware operations required to disable ballot counting and close the polls;
2) Obtain data reports and verify correctness; and
3) Obtain audit log and verify correctness.
They need not be performed in the sequence listed, provided the necessary precondition of each procedure has been met.

Cell: E81
Comment: 3.3.1 Functionality Testing in Parallel with Precinct Count Systems

For testing voting functions defined in Volume I, Section, 2 the following procedures shall be performed during the functionality tests of voting equipment and precinct counting equipment.

a. The procedure to prepare election programs shall:
1) Verify resident firmware, if any;
2) Prepare software (including firmware) to simulate all ballot format and logic options for which the system will be used;
3) Verify program memory device content; and
4) Obtain and design test ballots with formats and voting patterns sufficient to verify performance of the test election programs.

b. The procedures to program precinct ballot counters shall:
1) Install program and data memory devices, or verify presence if resident; and
2) Verify operational status of hardware as in Volume II, Section 4.

c. The procedures to simulate opening of the polls shall:
1) Perform procedures required to prepare hardware for election operations;
2) Obtain "zero" printout or other evidence that data memory has been cleared;
3) Verify audit record of pre-election operations; and
4) Perform procedure required to open the polling place and enable ballot counting.

d. The procedure to simulate counting ballots shall cast test ballots in a number sufficient to demonstrate proper processing, error handling, and generation of audit data as specified in Volume I, Sections 2 and 5.

e. The procedure to simulate closing of polls shall:
1) Perform hardware operations required to disable ballot counting and close the polls;
2) Obtain data reports and verify correctness; and
3) Obtain audit log and verify correctness.

These procedures need not be performed in the sequence listed, provided the necessary precondition of each procedure has been met.

Cell: D82
Comment: 3.3.2 Functionality Testing in Parallel with Hardware Testing for Central Count Systems

For testing voting functions defined in Volume I, Sections 2.4 and 2.5, the following procedures shall be performed during the functional tests.

a. The procedure to prepare election programs shall:
1) Verify resident firmware, if any;
2) Prepare software (including firmware) to simulate all ballot format and logic options for which the system will be used, and to enable simulation of counting ballots from at least 10 polling places or precincts;
3) Verify program memory device content; and
4) Procure test ballots with formats, voting patterns, and format identifications sufficient to verify performance of the test election programs;

b. The procedure to simulate counting ballots shall count test ballots in a number sufficient to demonstrate proper processing, error handling, and generation of audit data as specified in Volume I, Sections 2

and 4; and

c. The procedure to simulate election reports shall:
1) Obtain reports at polling places or precinct level;
2) Obtain consolidated reports;
3) Provide query access, if this is a feature of the system;
4) Verify correctness of all reports and queries; and
5) Obtain audit log and verify correctness.

They need not be performed in the sequence listed, provided the necessary preconditions of each procedure have been met.

Cell: E82
Comment: 3.3.2 Functionality Testing in Parallel with Central Count Systems

For testing voting functions defined in Volume I, Section 2, the following procedures shall be performed during the functional tests.

a. The procedure to prepare election programs shall:
1) Verify resident firmware, if any;
2) Prepare software (including firmware) to simulate all ballot format and logic options for which the system will be used, and to enable simulation of counting ballots from at least 10 polling places or precincts;
3) Verify program memory device content; and
4) Procure test ballots with formats, voting patterns, and format identifications sufficient to verify performance of the test election programs;

b. The procedure to simulate counting ballots shall count test ballots in a number sufficient to demonstrate proper processing, error handling, and generation of audit data as specified in Volume I, Sections 2 and 5;

c. The procedure to simulate election reports shall:
1) Obtain reports at polling places or precinct level;
2) Obtain consolidated reports;
3) Provide query access, if this is a feature of the system;
4) Verify correctness of all reports and queries; and
5) Obtain audit log and verify correctness.

They need not be performed in the sequence listed, provided the necessary preconditions of each procedure have been met.

Cell: D167
Comment: For systems that use telecommunications to transmit official voting data, the ITA shall review, and conduct tests of, the data interception and prevention safeguards specified by the vendor in its TDP. The ITA shall evaluate safeguards provided by the vendor to ensure their proper operation, including the proper response to the detection of efforts to monitor data or otherwise compromise the system.
For systems that use public communications networks the ITA shall also review the vendor's documented procedures for maintaining protection against newly discovered external threats to the telecommunications network. This review shall assess the adequacy of such procedures in terms of:

a. Identification of new threats and their impact;
b. Development or acquisition of effective countermeasures;

c. System testing to ensure the effectiveness of the countermeasures;
d. Notification of client jurisdictions that use the system of the threat and the actions that should be taken;
e. Distribution of new system releases or updates to current system users; and
f. Confirmation of proper installation of new system releases.

Cell: E167
Comment: For systems that use telecommunications to transmit official voting data, the accredited test lab shall review, and conduct tests of, the data interception and prevention safeguards specified by the vendor in its TDP. The accredited test lab shall evaluate safeguards provided
by the vendor to ensure their proper operation, including the proper response to the detection of efforts to monitor data or otherwise compromise the system.

For systems that use public communications networks the accredited test lab shall also review the vendor's documented procedures for maintaining protection against newly discovered external threats to the telecommunications network. This review shall assess the adequacy of such procedures in terms of:

a. Identification of new threats and their impact.
b. Development or acquisition of effective countermeasures.
c. System testing to ensure the effectiveness of the countermeasures.
d. Notification of client jurisdictions that use the system of the threat and the actions that should be taken
e. Distribution of new system releases or updates to current system users.
f. Confirmation of proper installation of new system releases.

Cell: A176
Comment: 2.2.11 Data Retention

United States Code Title 42, Sections 1974 through 1974e, states that election administrators shall preserve for 22 months "all records and paper that came into (their) possession relating to an application, registration, payment of poll tax, or other act requisite to voting." This retention requirement applies to systems that will be used at anytime for voting of candidates for Federal offices (e.g., Member of Congress, United States Senator, and/or Presidential Elector). Therefore, all systems shall provide for maintaining the integrity of voting and audit data during an election and for a period of at least 22 months thereafter.

Because the purpose of this law is to assist the Federal government in discharging its law enforcement responsibilities in connection with civil rights and elections crimes, its scope must be interpreted in keeping with that objective. The appropriate state or local authority must preserve all records that may be relevant to the detection and prosecution of federal civil rights or election crimes for the 22-month federal retention period, if the records were generated in connection with an election that was held in whole or in part to select federal candidates. It is important to note that Section 1974 does not require that election officials generate any specific type or classification of election record. However, if a record is generated, Section 1974 comes into force and the appropriate authority must retain the records for 22 months.
For 22-month document retention, the general rule is that all printed copy records produced by the election database and ballot processing systems shall be so labeled and archived. Regardless of system type, all audit trail information spelled out in subsection 4.5 of the Standards shall be retained in its original format, whether that be real-time logs generated by the system, or manual logs maintained by election personnel. The election audit trail includes not only in-process logs of election-night (and subsequent processing of absentee or provisional ballots), but also time logs of baseline ballot definition formats, and system readiness and testing results.

In many voting systems, the source of election-specific data (and ballot formats) is a database or file. In precinct count systems, this data is used to program each machine, establish ballot layout, and generate tallying files. It is not necessary to retain this information on electronic media if there is an official, authenticatable printed copy of all final database information. However, it is recommended that the state or local jurisdiction also retain electronic records of the aggregate data for each device so that reconstruction of an election is possible without data re-entry. The same requirement and recommendation applies to vote results generated by each precinct device or system.

Cell: D177

Comment: ITAs shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Tests procedures shall be designed and performed by the ITA that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the Qualification Test Plan prepared by the ITA. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for functionality testing performed by the ITA.

Recognizing variations in system design and the technologies employed by different vendors, the ITAs shall design test procedures that account for such variations and reflect the system-specific functional capabilities in Volume I, Section 2.

Cell: E177

Comment: V.2:3.2.1

The accredited test lab shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Test procedures shall be designed and performed that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the National Certification Test Plan prepared by the accredited test lab. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for independent functionality testing.

Recognizing variations in system design and the technologies employed by different vendors, the accredited test lab shall design test procedures that account for such variations and reflect the system-specific functional capabilities in Volume I, Section 2.

Cell: D232

Comment: The ITA shall design and perform test procedures that test the interfaces of all system modules and subsystems with each other against the vendor's specifications. These tests shall be documented in the ITA's Qualification Test Plan, and shall include the full range of system functionality provided by the vendor's specifications, including functionality that exceeds the specific requirements of the Standards. Some voting systems may use components or subsystems from previously tested and qualified systems, such as ballot preparation. For these scenarios, the ITA shall, at a minimum,

a. Confirm that the version of previously approved components and subsystems are unchanged; and

b. Test all interfaces between previously approved modules/subsystems and all other system modules and subsystems. Where a component is expected to interface with several different products, especially from different manufacturers, the vendor shall provide a public data specification of files or data objects used to exchange information.

Some systems use telecommunications capabilities as defined in Section 5. For those systems that do use such capabilities, components that are located at the poll site or separate vote counting site shall be tested for effective interface, accurate vote transmission, failure detection, and failure recovery. For voting systems that use telecommunications lines or networks that are not under the control of the vendor (e.g., public telephone networks), the ITA shall test the interface of vendor-supplied components with these external components for effective interface, vote transmission, failure detection, and failure recovery.

Cell: E232

Comment: The accredited test lab shall design and perform test procedures that test the interfaces of all system modules and subsystems with each other against the vendor's specifications. These tests shall be documented in the National Certification Test Plan, and shall include the full range of system functionality provided by the vendor's specifications, including functionality that exceeds the specific requirements of these Guidelines.

Some voting systems may use components or subsystems from previously tested and qualified systems, such as ballot preparation. For these scenarios, the accredited test lab shall, at a minimum:

a. Confirm that the version of previously approved components and subsystems are unchanged.

b. Test all interfaces between previously approved modules/subsystems and all other system modules and subsystems. Where a component is expected to interface with several different products, especially from different manufacturers, the vendor shall provide a public data specification of files or data objects used to exchange information.

Some systems use telecommunications capabilities. For those systems that do use such capabilities, components that are located at the polling place or separate vote counting location shall be tested for effective interface, accurate vote transmission, failure detection, and failure recovery. For voting systems that use telecommunications lines or networks that are not under the control of the election official (e.g., public telephone networks), the accredited test lab shall test the interface of vendor-supplied components with these external components for effective interface, vote transmission, failure detection, and failure recovery.

Cell: D261

Comment: ITAs shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Tests procedures shall be designed and performed by the ITA that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the Qualification Test Plan prepared by the ITA. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP,

but shall not rely on vendor testing as a substitute for functionality testing performed by the ITA.

Recognizing variations in system design and the technologies employed by different vendors, the ITAs shall design test procedures that account for such variations and reflect the system-specific functional capabilities in Volume I, Section 2.

Cell: E261
Comment: V.2:3.2.1
The accredited test lab shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Test procedures shall be designed and performed that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the National Certification Test Plan prepared by the accredited test lab. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for independent functionality testing.

Recognizing variations in system design and the technologies employed by different vendors, the accredited test lab shall design test procedures that account for such variations and reflect the system-specific functional capabilities in Volume I, Section 2.

Cell: D352
Comment: ITAs shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Tests procedures shall be designed and performed by the ITA that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the Qualification Test Plan prepared by the ITA. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for functionality testing performed by the ITA.

Recognizing variations in system design and the technologies employed by different vendors, the ITAs shall design test procedures that account for such variations and reflect the system-specific functional

capabilities in Volume I, Section 2.

Cell: E352
Comment: V.2:3.2.1
The accredited test lab shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Test procedures shall be designed and performed that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the National Certification Test Plan prepared by the accredited test lab. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for independent functionality testing.

Recognizing variations in system design and the technologies employed by different vendors, the accredited test lab shall design test procedures that account for such variations and reflect the system-specific functional capabilities in Volume I, Section 2.

Cell: D383
Comment: ITAs shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Tests procedures shall be designed and performed by the ITA that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the Qualification Test Plan prepared by the ITA. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for functionality testing performed by the ITA.

Recognizing variations in system design and the technologies employed by different vendors, the ITAs shall design test procedures that account for such variations and reflect the system-specific functional capabilities in Volume I, Section 2.

Cell: E383
Comment: V.2:3.2.1

The accredited test lab shall design and perform procedures to test a voting system against the functional requirements outlined in Volume I, Section 2. Test procedures shall be designed and performed that address:

a. Overall system capabilities;
b. Pre-voting functions;
c. Voting functions;
d. Post-voting functions;
e. System maintenance; and
f. Transportation and storage.

The specific procedures to be used shall be identified in the National Certification Test Plan prepared by the accredited test lab. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for independent functionality testing.

Recognizing variations in system design and the technologies employed by different vendors, the accredited test lab shall design test procedures that account for such variations and reflect the system-specific functional capabilities in Volume I, Section 2.

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
4	**V.2:1.7.1.1**	**General Applicability - Hardware**			
5		Specifically, the hardware test requirements shall apply in full to all equipment used in a voting system with the exception of the following: a. Commercially available models of general purpose information technology equipment that have been designed to an ANSI or IEEE standard, have a documented history of successful performance for relevant requirements of the standards, and have demonstrated compatibility with the voting system components with which they interface b. Production models of special purpose information technology equipment that have a documented history of successful performance under conditions equivalent to election use for relevant requirements of the standards and that have demonstrated compatibility with the voting system components with which they interface c. Any ancillary devices that do not perform ballot definition, election database maintenance, ballot reading, ballot data processing, or the production of an official output report; and that do not interact with these system functions (e.g. modems used to broadcast results to the press, printers used to generate unofficial reports, or CRTs used to monitor the vote counting process) This equipment shall be subject to functional and operating tests performed during software evaluation and system level testing. However, it need not undergo hardware non-operating tests. If the system is composed entirely of off-the-shelf hardware, then the system also shall not be subject to the 48-hour environmental chamber segment of the hardware operating tests.		**Yes**	
6	**4**	**Hardware Standards**	**V.2:4.2.1** **V.2:4.2.2** **V.2:4.3** **V.2:4.4** **V.2:4.5**		
7	**4.1**	**Performance Requirements**			
8	4.1	**Performance requirements for voting systems represent the combined operational capability of both system hardware and software.**			
9	4.1	All systems shall meet the performance requirements under operating conditions and after storage under non-operating conditions	**V.2:4.6.1, VSTL-TP-1200**	**Yes**	
10		**Accuracy Requirements**	**V.2:4.7.1.1**		

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
11	4.1.1	The system can capture, record, store, consolidate and report the specific selections and absence of selections, made by the voter for each ballot position without error. Accuracy Requirements: A target error rate of no more than one in 10,000,000 ballot positions, with a maximum acceptable error rate in the test process of one in 500,000 ballot positions.	**VSTL-TP-1200, VSTL-TP-1220**	**Yes**	
12	**a.**	**For all paper-based systems:**			
13	a.1	Scanning ballot positions on paper ballots to detect selections for individual candidates and contests;	**VSTL-TP-1200, VSTL-TP-1220**	**Yes**	
14	a.2	Conversion of selections detected on paper ballots into digital data	**VSTL-TP-1200, VSTL-TP-1220**	**Yes**	
15	**b.**	**For all DRE systems:**			
16	b.1	Recording the voter selections of candidates and contests into voting data storage; and	**VSTL-TP-1200, VSTL-TP-1220**	**No**	
17	b.2	Independently from voting data storage, recording voter selections of candidates and contests into ballot image storage.	**VSTL-TP-1200, VSTL-TP-1220**	**No**	
18	**c.**	**For precinct-count systems (paper-based and DRE):**			
19	c.	Consolidation of vote selection data from multiple precinct-based systems to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data.	**VSTL-TP-1200, VSTL-TP-1220**	**No**	
20	**d.**	**For central-count systems (paper-based and DRE):**			
21	d.	Consolidation of vote selection data from multiple counting devices to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data	**VSTL-TP-1200, VSTL-TP-1220**	**Yes**	
22	**4.1.2**	**Environmental Requirements**			
23		These procedures will be applied to all devices for casting, scanning and counting ballots, except those that constitute COTS devices that have not been modified in any manner to support their use as part of a voting system and that have a documented record of performance under conditions defined in the Standards.	**V.2:4.2.1**	**Yes**	

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
24		The TDP supplied by the vendor shall include a statement of all requirements and restrictions regarding environmental protection, electrical service, recommended auxiliary power, telecommunications service, and any other facility or resource required for the proper installation and operation of the system.	**Inspection , VSTL-TP-100**	**Yes**	
25	**4.1.2.1**	**Shelter Requirements**			
26		All precinct count systems shall be designed for storage and operation in any enclosed facility ordinarily used as a warehouse or polling place, with prominent instructions as to any special storage requirements.	**Inspection, VSTL-TP-100**	**No**	
27	**4.1.2.2**	**Space Requirements**			
28		There is no restriction on space allowed for the installation of voting systems, except that the arrangement of these systems shall not impede performance of their duties by polling place officials, the orderly flow of voters through the polling place, or the ability for the voter to vote in private.	**Inspection, VSTL-TP-100**	**No**	
29	**4.1.2.3**	**Furnishings and Fixtures**			
30		Any furnishings or fixtures provided as a part of voting systems, and any components provided by the vendor that are not a part of the system but that are used to support its storage, transportation, or operation, shall comply with the design and safety requirements of Subsection 3.4.8.	**Inspection, VSTL-TP-100, VSTL-TP-430**	**Yes**	
31	**4.1.2.4**	**Electrical Supply**			
32		For components of voting systems that require an electrical supply:			
33	**a.**	**precinct-count systems:**			
34	a.	Precinct count systems operate with the electrical supply ordinarily found in polling places (120vac/60hz/1)	**Inspection, VSTL-TP-600**	**No**	
35	**b.**	**central count systems:**			
36	b.	Central count systems operate with the electrical supply ordinarily found in central tabulation facilities or computer room facilities (120vac/60hz/1, 208vac/60hz/3, or 240vac/60hz/2);	**Inspection, VSTL-TP-600**	**Yes**	
37	**c.**	**all systems:**			

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
38	c.	All systems shall also be capable of operating for a period of at least 2 hours on backup power, such that no voting data is lost or corrupted, nor normal operations interrupted. When backup power is exhausted the system shall retain the contents of all memories intact. The backup power capability is No to provide lighting of the voting area.	**VSTL-TP-600**	**Yes**	
39	**4.1.2.5**	**Electrical Power Disturbance**			
40		**All vote scanning and counting equipment for paper-based and all DRE equipment connected to mains powers shall be able to withstaned without disruption of normal operation or loss of data: Includes polling place voter access peripherals, polling place accumlator, and data transfer equipment.**			
41	a.	Surges of 30% dip @10 ms;	**V.2:4.8, VSTL-TP-600**	**Yes**	
42	b.	Surges of 60% dip @100 ms & 1 sec		**Yes**	
43	c.	Surges of >95% interrupt @5 sec;		**Yes**	
44	d.	Surges of ±15% line variations of nominal line voltage; and		**Yes**	
45	e.	Electric power increases of 7.5% and reductions of 12.5% of nominal specified power supply for a period of up to four hours at each power level.		**Yes**	
46	**4.1.2.6**	**Electrical Fast Transient**			
47		**All vote scanning and counting equipment for paper-based and all DRE equipment (connected to exterior power supplies) shall be able to withstaned without disruption of normal operation or loss of data: Includes polling place peripherals or devices that are required to support voter access, data transfer, and or ADA accessibility for vote recording.**			
48	a	±2 kV AC & DC external power lines;	**V.2:4.8, VSTL-TP-600**	**Yes**	
49	b	±1 kV all external wires >3m (*data, no control)* ; and		**Yes**	
50	c.	±2 kV all external wires (*any)* control		**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
51	**4.1.2.7**	**Lighting Surge**			
52		**All vote scanning and counting equipment for paper-based and all DRE equipment shall be able to withstaned without disruption of normal operation or loss of data, surges of: Includes polling place peripherals or devices that are required to support voter access, data transfer, and or ADA accessibility for vote recording.**			
53	a	±2 kV AC line to line;	**V.2:4.8, VSTL-TP-600**	**Yes**	
54	b	±2 kV AC line to earth;		**Yes**	
55	c.	±.5 kV DC line to line >10m;		**Yes**	
56	d.	±.5 kV DC line to earth >10m; and		**Yes**	
57	e.	±1 kV I/O sig/control >30m.		**Yes**	
58	**4.1.2.8**	**Electrostatic Disruption**			
59		**All vote scanning and counting equipment for paper-based and all DRE equipment shall be able to withstaned without disruption of normal operation or loss of data: (The equipment may reset or have momentary interruption so long as normal operation is resumed without human intervention or loss of data. Loss of data means votes that have been completed and confirmed to the voter.)**			
60	a	±15 kV air discharge and	**V.2:4.8, VSTL-TP-600**	**Yes**	
61	b	±8 kV contact discharge without damage or loss of data.		**Yes**	
62	**4.1.2.9**	**Electromagnetic Radiation**			
63		Vote scanning and counting equipment for paper-based systems, and all DRE equipment, complies with the Rules and Regulations of the Federal Communications Commission, Part 15, Class B requirements for both radiated and conducted emissions	**V.2:4.8, VSTL-TP-600**	**Yes**	
64	**4.1.2.10**	**Electromagnetic Susceptibility**			
65		**Vote scanning and counting equipment for paper-based systems, and all DRE equipment, is able to withstand an electromagnetic field of::**			
66		10 V/m modulated by a 1 kHz 80% AM modulation over the frequency range of 80 MHz to 1000 MHz, without disruption of normal operation or loss of data	**V.2:4.8, VSTL-TP-600**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
67	**4.1.2.11**	**Conducted RF Immunity**			
68		**Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall withstand, without disruption of normal operation or loss of data, conducted RF energy of:**			
69	a	10V AC & DC power; and	**V.2:4.8, VSTL-TP-600**	**Yes**	
70	b	10V, 20 sig/control >3m.		**Yes**	
71	**4.1.2.12**	**Magnetic Fields Immunity**			
72		Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand, without disruption of normal operation or loss of data, AC magnetic fields of 30 A/m at 60 Hz	**V.2:4.8, VSTL-TP-600**	**Yes**	
73	**4.1.2.13**	**Environmental Control – Operating Environment**			
74		Equipment used for election management activities or vote counting (including both precinct and central count systems) shall be capable of operation in temperatures ranging from 50 to 95 degrees Fahrenheit.	**V.2:4.7.1, VSTL-TP-400, VSTL-TP-420 V2:App. C.4**	**Yes**	
75	**4.1.2.14**	**Environmental Control – Transit and Storage**	**V.2:4.6.1**	**V.2:4.6.18**	**V.2:4.6.19**
76		**Equipment used for vote casting, or for counting votes in a precinct count system, shall meet specific minimum performance standards that simulate exposure to physical shock and vibration associated with handling and transportation by surface and air common carriers, and to temperature conditions associated with delivery and storage in an uncontrolled warehouse environment.**			
77	a.	High and low storage temperatures ranging from -4 to +140 degrees Fahrenheit, equivalent to MIL-STD-810D, Methods 501.2 and 502.2, Procedure I-Storage;.	**V.2:4.6.4, VSTL-TP-500 V.2:4.6.5**	**Yes**	
78	b.	Bench handling equivalent to the procedure of MIL-STD-810D, Method 516.3, Procedure VI.	**V.2:4.6.2, VSTL-TP-500**	**Yes**	
79	c.	Vibration equivalent to the procedure of MIL-STD-810D, Method 514.3, Category 1- Basic Transportation, Common Carrier.	**V.2:4.6.3, VSTL-TP-500**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
80	d.	Uncontrolled humidity equivalent to the procedure of MIL-STD-810D, Method 507.2, Procedure I-Natural Hot-Humid.	**V.2:4.6.6, VSTL-TP-500**	**Yes**	
81	**4.1.2.15**	**Data Network Requirements**			
82		Voting systems may use a local or remote data network. If such a network is used, then all components of the network shall comply with the telecommunications requirements described in Section 5 of the Standards and the Security requirements described in Section 6.	**VSTL-TP-1000**	**Yes**	
83	**4.1.3**	**Election Management System (EMS) Requirements**			
84	**4.1.3.1**	**Recording Requirements**			
85		**Voting systems shall accurately record all election management data entered by the user, including election officials or their designees. For recording accuracy, all systems shall:**			
86	a.	Record every entry made by the user;	**VSTL-TP-1200**	**Yes**	
87	b.	Add permissible voter selections correctly to the memory components of the device;	**VSTL-TP-1200**	**Yes**	
88	c.	Verify correctness of detection of the user selections and the addition of the selections correctly to memory;	**VSTL-TP-1200**	**Yes**	
89	d.	Add various forms of data entered directly by the election official, such as text, line art, logos, and images;	**VSTL-TP-1200**	**Yes**	
90	e.	Verify correctness of detection of data entered by the user and the addition of the selections to memory;	**VSTL-TP-1200**	**Yes**	
91	f.	Preserve the integrity of election management data stored in memory against corruption by stray electromagnetic emissions, and internally generated spurious electrical signals; and	**VSTL-TP-1200**	**Yes**	
92	g.	Log corrected data errors by the system.	**VSTL-TP-1200**	**Yes**	
93	**4.1.3.2**	**Memory Stability. Electronic system memory devices, used to retain election management data, shall:**			
94		Electronic system memory devices, used to retain election management data, shall have demonstrated error-free data retention for a period of 22 months.		**Yes**	
95	**4.1.4**	**Vote Recording Requirements**			
96	**4.1.4.1**	**Common Standards**			
97		**All systems shall provide voting booths or enclosures for poll site use. Such booths or enclosures may be integral to the voting system or supplied as components of the voting system, and shall:**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
98	a.	Are integral or make provisions for installation of the voting device;	**Inspection, VSTL-TP-1230, VSTL-TP-700**	**Yes**	
99	b.	Ensure structure stability against movement, or overturning during entry occupancy or exit by a voter;	**Inspection , VSTL-TP-1230, VSTL-TP-700**	**Yes**	
100	c.	Provides voter privacy preventing observation of the ballot by any person other than the voter; and	**Inspection VSTL-TP-1230, VSTL-TP-800**	**Yes**	
101	d.	Capable of meeting the accessibility requirements of Section 2.2.7.1.	**Inspection, VSTL-TP-900**	**Yes**	
102	**4.1.4.2**	**Paper Based Recording Standards**			
103		**The paper-based recording requirements govern:**			
104		Ballot cards or sheets, and pages or assemblies of pages containing ballot field identification data;•	**Inspection**	**No**	
105		Punching devices;	**Inspection**	**No**	
106		Marking devices;	**Inspection**	**No**	
107		Frames or fixtures to hold the ballot while it is being punched;	**Inspection**	**No**	
108		Compartments or booths where voters record selections; and	**Inspection**	**No**	
109		Secure containers for the collection of voted ballots.	**Inspection**	**No**	
110		**Paper Ballot Standards**			
111	4.1.4.2 a.	**Paper ballots used by paper-based voting systems shall meet the following standards:**			
112	a. i.	Punches or marks that identify the unique ballot format, in accordance with Section 2.3.1.1.1.c., shall be outside the area in which votes are recorded, so as to minimize the likelihood that these punches or marks will be mistaken for vote responses and the likelihood that recorded votes will obliterate these punches or marks;	**Inspection, VSTL-TP-1200, VSTL-TP-100**	**Yes**	
113	a. ii.	If printed or punched alignment marks are used to locate the vote response fields on the ballot, these marks shall be outside the area in which votes are recorded, so as to minimize the likelihood that these marks will be mistaken for vote responses and the likelihood that recorded votes will obliterate these marks; and	**Inspection , VSTL-TP-1200, VSTL-TP-100**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
114	a. iii.	c. The TDP shall specify the Yes paper stock, size, shape, opacity, color, watermarks, field layout, orientation, size and style of printing, size and location of punch or mark fields used for vote response fields and to identify unique ballot formats, placement of alignment marks, ink for printing, and folding and bleed-through limitations for preparation of ballots that are compatible with the system.	**Inspection , VSTL-TP-1200, VSTL-TP-100**	**Yes**	
115		**Punching Devices**			
116		**Punching devices used by voting systems shall:**			
117		Be suitable for the type of ballot card specified;	**Inspection , VSTL-TP-1200, VSTL-TP-100**	**No**	
118		Facilitate the clear and accurate recording of each vote intended by the voter;	**Inspection , VSTL-TP-1200, VSTL-TP-100**	**No**	
119		Be designed to avoid excessive damage to vote recorder components; and	**Inspection , VSTL-TP-1200, VSTL-TP-100**	**No**	
120		Incorporate features to ensure that chad/debris is removed, without damage to other parts of the ballot card.	**Inspection , VSTL-TP-1200, VSTL-TP-100**	**No**	
121		**Marking Devices**			
122	4.1.4.2 b.	**The TDP shall specify marking devices (such as pens or pencils) that, if used to make the prescribed form of mark, produce readable marked ballots such that the system meets the performance requirements for accuracy specified previously. These specifications shall identify:**			
123	b. i.	Specific characteristics of marking devices that affect readability of marked ballots;	**Inspection , VSTL-TP-1200, VSTL-TP-100**	**Yes**	
124	b. ii.	Performance capabilities with regard to each characteristic; and	**Inspection , VSTL-TP-100**	**Yes**	
125	b. iii.	For marking devices manufactured by multiple external sources, a listing of sources and model numbers that are compatible with the system.	**Inspection , VSTL-TP-100**	**Yes**	
126		**Frames or Fixtures for Punchcard Ballots**			
127		**The TDP shall specify marking devices (such as pens or pencils) that, if used to make the prescribed form of mark, produce readable marked ballots such that the system meets the performance requirements for accuracy specified previously. These specifications shall identify:**			
128		Hold the ballot card securely in its proper location and orientation for voting;	**Inspection, VSTL-TP-100**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
129		When contests not directly printed on the ballot card incorporate ballot label pages the identified offices and issues correspond and are aligned with the assigned voting fields; and	**Inspection , VSTL-TP-100**	**No**	
130		Incorporate a template to preclude perforation of the card except in the specified voting fields; a mask to allow punches only in fields designated by the format of the ballot; and a backing plate for the capture and removal of chad. The requirement may	**Inspection , VSTL-TP-100**	**No**	
131		Positioning the card;	**Inspection , VSTL-TP-100**	**No**	
132		Association of ballot label information with corresponding punch fields;	**Inspection , VSTL-TP-100**	**No**	
133		Enabling only those voting fields that correspond to the format of the ballot;	**Inspection , VSTL-TP-100**	**No**	
134		Punching the fields and the positive removal of chad.	**Inspection , VSTL-TP-100**	**No**	
135		**Frames or Fixtures for Printed Ballots**			
136	4.1.4.2 c.	**A frame or fixture for printed ballot cards is optional. However, if such a device is provided, it shall:**			
137	c. i.	Be of any size and shape consistent with its intended use;	**Inspection , VSTL-TP-700, VSTL-TP-100**	**Yes**	
138	c. ii.	Position the card properly;	**Inspection ,VSTL-TP-700**	**Yes**	
139	c. iii.	Hold the ballot card securely in its proper location and orientation for voting; and	**Inspection , VSTL-TP-700, VSTL-TP-100**	**Yes**	
140	c. iv.	Comply with the design and construction requirements in Section 3.4.	**Inspection , VSTL-TP-100**	**Yes**	
141		**Ballot Boxes and Ballot Transfer Boxes**			
142	4.1.4.2 d.	**Ballot boxes and ballot transfer boxes, which serve as secure containers for the storage and transportation of voted ballots, shall:**			
143	d. i.	Be of any size, shape, and weight commensurate with their intended use;	**Inspection , VSTL-TP-100**	**No**	
144	d. ii.	Incorporate locks or seals, and specifications in the system documentation;	**Inspection , VSTL-TP-100**	**No**	
145	d. iii.	Provide specific points where ballots are inserted, with all other points on the box constructed in a manner that prevents ballot insertion; and	**Inspection , VSTL-TP-100**	**No**	
146	d. iv.	For precinct count systems, contain separate compartments for the segregation of unread ballots, ballots containing write-in votes, or any irregularities that may require special handling or processing. In lieu of compartments, the conversion processing may mark such ballots with an identifying spot or stripe to facilitate manual segregation.	**Inspection , VSTL-TP-100**	**No**	
147	**4.1.4.3**	**DRE Systems Recording Requirements**			
148		**Activity Indicator**			
149	4.1.4.3 a.	**DRE systems shall include an audible or visible activity indicator providing the status of each voting device. This indicator shall:**			
150	a. i.	Indicate whether the device has been activated for voting; and	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
151	a. ii.	Indicate whether the device is in use.	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
152		**DRE System Vote Recording**			
153	4.1.4.3 b.	**To ensure vote recording accuracy and integrity while protecting the anonymity of the voter, all DRE systems shall:**			
154	b. i.	Contain all mechanical, electromechanical, and electronic components; software; and controls required to detect and record the activation of selections made by the voter in the process of voting and casting a ballot;	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**No**	
155	b. ii.	Incorporate redundant memories to detect and allow correction of errors caused by the failure of any of the individual memories;	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**No**	
156	b. iii.	Provide at least two processes that record the voter's selections that:	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**No**	
157		To the extent possible, are isolated from each other;	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**No**	
158		Designate one process and associated storage location as the main vote detection, interpretation, processing and reporting path; and	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**No**	
159	b. iv.	Use a different process to store ballot images, for which the method of recording may include any appropriate encoding or data compression procedure consistent with the regeneration of an unequivocal record of the ballot as cast by the voter.	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**No**	
160	b.v.	Provide a capability to retrieve ballot images in a form readable by humans; and	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**No**	
161	b. vi.	Ensure that all processing and storage protects the anonymity of the voter.	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**No**	
162		**Recording Accuracy**			
163	4.1.4.3 c.	**DRE systems shall meet the following requirements for recording accurately each vote and ballot cast:**			
164	c. i.	Detect every selection made by the voter;	**Inspection , VSTL-TP-1220**	**No**	
165	c. ii.	Correctly add permissible selections to the memory components of the device;	**Inspection , VSTL-TP-1220**	**No**	
166	c. iii.	Verify the correctness of the detection of the voter selections and the addition of the selections to memory;	**Inspection , VSTL-TP-1220**	**No**	
167	c. iv.	Achieve an error rate not to exceed the requirement indicated in Section 3.2.1;	**Inspection , VSTL-TP-1220**	**No**	
168	c. v.	Preserve the integrity of voting data and ballot images (for DRE machines) stored in memory for the official vote count and audit trail purposes against corruption by stray electromagnetic emissions, and internally generated spurious electrical signals; a	**Inspection , VSTL-TP-1220**	**No**	
169	c. vi.	Maintain a log of corrected data.	**Inspection , VSTL-TP-1220**	**No**	
170		**Recording Reliability**			
171		The DRE system records votes accurately at its maximum rated processing volume for a specified period of time in accordance with the requirements of 3.4.3	**VSTL-TP-1220, VSTL-TP-1200**	**No**	
172	**4.1.5**	**Paper based Conversion Requirements**			
173	**4.1.5.1**	**Ballot Handling**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
174		**Ballot handling consists of a ballot card's acceptance, movement through the read station and transfer into a collection station or receptacle.**			
175	**a.**	**Capacity (Central Count)**			
176		The capacity to convert the punches or marks on individual ballots into signals is uniquely important to central count systems. The capacity for a central count system shall be documented by the vendor. This documentation shall include the capacity for individual components that impact the overall capacity.	**Inspection , VSTL-TP-100**	**Yes**	
177		**Exception Handling (Central Count).**			
178		This requirement refers to the handling of ballots for a central count system when they are unreadable or when some condition is detected requiring that the cards be segregated from normally processed ballots for human review. In response to an unreadable ballot or a write-in vote all central count paper-based systems shall:		**Yes**	
179	b.	When ballots are unreadable or some condition is detected requiring that the cards be segregated from normally processed ballots for human review (e.g. write-ins), all central count paper-based systems shall do one of the following:		**Yes**	
180	i	Outstack the ballot, or	**Inspection , VSTL-TP-100, VSTL-TP-700**	**Yes**	
181	iii	Stop the ballot reader and display a message prompting the election official or designee to remove the ballot, or	**Inspection , VSTL-TP-100, VSTL-TP-700**	**Yes**	
182	iii	Mark the ballot with an identifying mark to facilitate its later identification.	**Inspection , VSTL-TP-700, VSTL-TP-100**	**Yes**	
183	c.	Additionally, the system shall provide a capability that can be activated by an authorized election official to identify ballots containing overvotes, blank ballots, and ballots containing undervotes in a designated race. If enabled, these capabilities shall perform one of the above actions in response to the indicated condition.	**Inspection , VSTL-TP-100, VSTL-TP-700**	**Yes**	
184	**d.**	**Exception Handling (Precinct Count)**			
185		**This requirement refers to the handling of ballots for a precinct count system when they are unreadable or when some condition is detected requiring that the cards be segregated from normally processed ballots for human review. All paper based precinct count systems shall:**			
186	b.	**When ballots are unreadable or when some condition is detected requiring that the cards be segregated from normally processed ballots for human review (e.g. write-ins), all precinct count systems shall:**			
187	i	In response to an unreadable or blank ballot, return the ballot and provide a message prompting the voter to examine the ballot;	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
188	iii	In response to aballot with a write-in vote, segregate the ballot or mark the ballot with an identifying mark to facilitate its later identification;	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
189	iii	In response to a ballot with an overvote the system shall:		**No**	
190		Provide a capability to identify an overvoted ballot;	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
191		Return the ballot;	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
192		Provide an indication prompting the voter to examine the ballot;	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
193		Allow the voter to submit the ballot with the overvote; and	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
194		Provide a means for an authorized election official to deactivate this capability entirely and by contest; and	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
195	iv	In response to a ballot with an undervote the system shall:		**No**	
196		Provide a capability to identify an under voted ballot;	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
197		Return the ballot;	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
198		Provide an indication prompting the voter to examine the ballot;	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
199		Allow the voter to submit the ballot with the undervote.	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
200		Provide a means for an authorized election official to deactivate this capability.	**Inspection , VSTL-TP-100, VSTL-TP-700**	**No**	
201	**e.**	**Multiple Feed Prevention**			
202		**Multiple feed refers to the situation arising when a ballot reader attempts to read more than one ballot at a time. The requirements govern the ability of a ballot reader to prevent multiple feed or to detect and provide an alarm indicating multiple feed.**			
203	e.	Ballot readers shall prevent multiple feed or detect and provide an alarm indicating multiple feed. Multiple feed occurs when a ballot reader attempts to read more than one ballot at a time.		**Yes**	
204	e. i.	If multiple feed is detected, the card reader shall halt in a manner that permits the operator to remove the unread cards causing the error, and reinsert them in the card input hopper.	**Inspection , VSTL-TP-100, VSTL-TP-700**	**Yes**	
205	e. ii.	The frequency of multiple feeds with ballots intended for use with the system shall not exceed l in 10,000.	**Inspection , VSTL-TP-100, VSTL-TP-700**	**Yes**	
206	**4.1.5.2**	**Ballot Reading Accuracy.**			
207		**This paper-based system requirement governs the conversion of the physical ballot into electronic data. Reading accuracy for ballot conversion refers to the ability to:**			
208	a.	Recognize vote punches or marks, or the absence thereof, for each possible selection on the ballot;	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
209	b.	Discriminate between valid punches or marks and extraneous perforations, smudges, and folds; and	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
210	c.	Convert the vote punches or marks, or the absence thereof, for each possible selection on the ballot into digital signals.	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
211		To ensure accuracy, paper-based systems shall:		**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
212	d.	Detect punches or marks that conform to vendor specifications with an error rate not exceeding the requirement indicated in Section 3.2.1;	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
213	e.	Ignore, and not record, extraneous perforations, smudges, and folds; and	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
214	f.	Reject ballots that meet all vendor specifications at a rate not to exceed 2 percent.	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
215	**4.1.6**	**Tabulation Processing Requirements**			
216		**Processing requirements apply to the hardware and software required to accumulate voting data for all candidates and measures within voting machines and polling places, and to consolidate the voting data at a central level or multiple levels. These requirements also address the generation and maintenance of audit records, the detection and disabling of improper use or operation of the system, and the monitoring of overall system status. Separate and distinct requirements for paper-based and DRE voting systems are presented below.**			
217	**4.1.6.1**	**Paper Based Processing Requirements**			
218		**The paper-based processing requirements address all mechanical devices, electromechanical devices, electronic devices, and software required to perform the logical and numerical functions of interpreting the electronic image of the voted ballot, and assigning votes to the proper memory registers.**			
219	**a.**	**Processing Accuracy**			
220		**Processing accuracy refers to the ability of the system to receive electronic signals produced by punches for punchcard systems and vote marks and timing information for marksense systems; perform logical and numerical operations upon these data; and reproduce the contents of memory when required, without error. Specific requirements are detailed below:**			
221	i	Processing accuracy shall be measured by vote selection error rate, the ratio of uncorrected vote selection errors to the total number of ballot positions that could be recorded across all ballots when the system is operated at its nominal or design rate	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
222	iii	The vote selection error rate shall include data that denotes ballot style or precinct as well as data denoting a vote in a specific contest or ballot proposition;	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
223	iii	The vote selection error rate shall include all errors from any source;	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
224	iv	Vote selection error rate shall not exceed the requirement indicated in Section 3.2.1./4.1.1	**Inspection , VSTL-TP-1200, VSTL-TP-700**	**Yes**	
225	**b.**	**Memory Stability.**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
226		Paper-based system memory devices, used to retain control programs and data, shall have demonstrated error-free data retention for a period of 22 months, under the environmental conditions for operation and non-operation (i.e. storage).	**Inspection , VSTL-TP-1370**	**Yes**	
227	**4.1.6.2**	**DRE System Processing Requirements**			
228		**The DRE system processing requirements address all mechanical devices, electromechanical devices, electronic devices, and software required to process voting data after the polling places are closed.**			
229	**a.**	**Processing Speed**			
230		**DRE voting systems shall meet the following requirements for processing speed:**			
231	a. i.	DREs operate at a speed sufficient to respond to any operator and voter input without perceptible delay (no more than three seconds)	**Inspection , VSTL-TP-700**	**No**	
232	a. ii.	If the consolidation of polling place data is done locally, perform this consolidation in a time not to exceed five minutes for each device in the polling place.	**Inspection , VSTL-TP-700**	**No**	
233	**b.**	**Processing Accuracy**			
234		**Processing accuracy is defined as the ability of the system to process voting data stored in DRE voting devices, or in removable memory modules installed in such devices. Processing includes all operations to consolidate voting data after the polling places have been closed. DRE voting systems shall:**			
235	b. i.	Produce reports that are completely consistent, with no discrepancy among reports of voting device data produced at any level; and	**Inspection , VSTL-TP-700**	**No**	
236	b. ii.	Produce consolidated reports containing absentee, provisional, or other voting data that are similarly error-free. Any discrepancy, regardless of source, is resolvable to a procedural error, to the failure of a non-memory device, or to an external cause. (See also 3.2.7)	**Inspection , VSTL-TP-700**	**No**	
237	**c.**	**Memory Stability**			
238		DRE system memory devices used to retain control programs and data shall have demonstrated error-free data retention for a period of 22 months.	**Inspection , VSTL-TP-1370**	**No**	
239		Error-free retention may be achieved by the use of redundant memory elements, provided that the capability for conflict resolution or correction among elements is included.	**Inspection , VSTL-TP-1370**	**No**	
240	**4.1.7**	**Reporting Requirements**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
241		**The reporting requirements govern all mechanical, electromechanical, and electronic devices required for voting systems to print audit record entries and results of the tabulation. These requirements also address data storage media for transportation of data to other sites.**		**Yes**	
242	**4.1.7.1**	**Removable Storage Memory**			
243		In voting systems that use storage media that can be removed from the system and transported to another location for readout and report generation, these media shall use devices with demonstrated error-free retention for a period of 22 months under the environmental conditions for operation and non-operation contained in Section 3.2.2. Examples of removable storage media include: programmable read-only memory (PROM), random access memory (RAM) with battery backup, magnetic media, or optical media	**Inspection , VSTL-TP-1370, VSTL-TP-100**	**Yes**	
244	**4.1.7.2**	**Printers**			
245		**All printers used to produce reports of the vote count shall be capable of producing:**		**Yes**	
246	a.	Alphanumeric headers;	**Inspection , VSTL-TP-700**	**Yes**	
247	b.	Election, office and issue labels; and	**Inspection , VSTL-TP-700**	**Yes**	
248	c.	Alphanumeric entries generated as part of the audit record.	**Inspection , VSTL-TP-700**	**Yes**	
249	**4.1.8**	**Vote Data Management Requirements**			
250		**The vote data management requirements for all systems address capabilities that manage, process, and report voting data after the data has been consolidated at the polling place or other intermediate levels.** **The requirements address all hardware and software required to generate output reports in the various formats required by the using jurisdiction.** **These capabilities allow the system to:**		**Yes**	
251		Consolidate voting data from polling place data memory or transfer devices;	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**Yes**	
252		Report polling place summaries;	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**No**	
253		Process absentee ballots, data entered manually, and administrative ballot definition data.	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**Yes**	
254	**4.1.8.1**	**Data File Management**			
255		**All voting systems shall provide the capability to:**		**Yes**	
256	a.	Integration of voting data files with ballot definition files	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**Yes**	
257	b.	Verification of file compatibility.	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
258	c.	Editing and updating of files as required:	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**Yes**	
259	**4.1.8.2**	**Data Report Generation,** All systems shall provide report generators			
260		**All voting systems shall include report generators for producing output reports at:**		**Yes**	
261		the device	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**Yes**	
262		the polling place	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**Yes**	
263		the summary level	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**Yes**	
264		with provisions of administrative and judicial subdivisions as required by the jurisdiction	**Inspection , VSTL-TP-700, VSTL-TP-1200**	**Yes**	
265	**4.2**	**Physical Characteristics**			
266		**This section covers physical characteristics of all voting systems and components that affect their general utility and suitability for election operations.**			
267	**4.2.1**	**Size.**			
268		**There is no numerical limitation on the size of any voting system equipment, but the size of each device should be compatible with its intended use and the location at which the equipment is to be used.**			
269	**4.2.2**	**Weight.**			
270		**There is no numerical limitation on the weight of any voting system equipment, but the weight of each device should be compatible with its intended use and the location at which the equipment is to be used.**			
271	**4.2.3**	**Transport and Storage of Precinct Systems**			
272		**All precinct systems shall:**			
273	a.	Provides a means to safely and easily handle, transport, and install polling place equipment (example: wheels or handles.)	**VSTL-TP-500, VSTL-TP-430**	**No**	
274	b.	Be capable of using, or be provided with, a protective enclosure rendering the equipment capable of withstanding:	**VSTL-TP-500**	**No**	
275	b. i.	Impact, shock and vibration loads accompanying surface and air transportation; and	**VSTL-TP-500**	**No**	
276	b. ii.	Stacking loads accompanying storage.	**VSTL-TP-500**	**No**	
277	**4.3**	**Design, Construction, and Maintenance Characteristics**			
278		**This section covers voting system materials, construction workmanship, and specific design characteristics important to the successful operation and efficient maintenance of the system.**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
279	**4.3.1**	**Materials Process and Parts**			
280		**The approach to system design is unrestricted, and may incorporate any form or variant of technology capable of meeting the voting systems requirements and standards. Precinct count systems shall be designed in accordance with best commercial practice for microcomputers, process controllers, and their peripheral components. Central count voting systems and equipment used in a central tabulating environment shall be designed in accordance with best commercial and industrial practice. All voting systems:**			
281	a.	Be designed and constructed so that the frequency of equipment malfunctions and maintenance requirements are reduced to the lowest level consistent with cost constraints.	**VSTL-TP-1000**	**Yes**	
282	b.	Include, an approved parts list; and	**Inspection , VSTL-TP-100**	**Yes**	
283	c.	exclude parts or components not included in the approved parts list.	**VSTL-TP-1000**	**Yes**	
284	**4.3.2**	**Durability**			
285		All voting systems shall be designed to withstand normal use without deterioration and without excessive maintenance cost for a period of ten years.	**VSTL-TP-400, VSTL-TP_500, VSTL-TP-600**	**Yes**	
286	**4.3.3**	**Reliability**			
287		**The reliability of voting system devices shall be measured as mean time between Failure (MTBF) for the system submitted for testing. MBTF is defined as the value of the ratio of operating time to the number of failures which have occurred in the specified time interval. A typical system operations scenario consist of approximately 45 hours of equipment operation, consisting of 30 hours of equipment set-up and readiness testing and 15 hours of elections operations. For the purpose of demonstrating compliance with this requirement, a failure is defined as any event which results in either the:**			
288		Loss of one or more functions.	**V.2:4.7.3, VSTL-TP-420**	**Yes**	
289		Degradation of performance such that the device is unable to perform its intended function for longer than 10 seconds.		**Yes**	
290		The MTBF demonstrated during qualification testing shall be at least 163 hours.		**Yes**	
291	**4.3.4**	**Maintainability**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
292		Maintainability represents the ease with which maintenance actions can be performed based on the design characteristics of equipment and software and the processes the vendor and election officials have in place for preventing failures and for reacting to failures. Maintainability includes the ability of equipment and software to self-diagnose problems and make non-technical election workers aware of a problem. Maintainability addresses all scheduled and unscheduled events, which are performed to: • Determine the operational status of the system or a component; • Adjust, align, tune, or service components; • Repair or replace a component having a specified operating life or replacement interval; • Repair or replace a component that exhibits an undesirable predetermined physical condition or performance degradation; • Repair or replace a component that has failed; and • Verify the restoration of a component, or the system, to operational status. Maintainability shall be determined based on the presence of specific physical attributes that aid	**V.2:4.7.2, VSTL-TP-440**	**Yes**	
293	**4.3.4.1**	**Physical Attributes**			
294		**The following physical attributes will be examined to assess reliability:**			
295	a.	Presence of labels and the identification of test points.	**Inspection , VSTL-TP-300**	**Yes**	
296	b.	Provision of built-in test and diagnostic circuitry or physical indicators of condition.	**Inspection , VSTL-TP-700**	**Yes**	
297	c.	Presence of labels and alarms related to failures.	**Inspection , VSTL-TP-100, VSTL-TP-700**	**Yes**	
298	d.	Presence of features that allow non-technicians to perform routine maintenance tasks (such as update of the system database).	**Inspection , VSTL-TP-100**	**Yes**	
299	**4.3.4.2**	**Additional Attributes**			
300		**The following additional attributes will be considered to assess system maintainability.**			
301	a.	Ease of detecting that equipment has failed by a non-technician;	**Inspection , VSTL-TP-100, VSTL-TP-800**	**Yes**	
302	b.	Ease of diagnosing problems by a trained technician;	**Inspection , VSTL-TP-100, VSTL-TP-800**	**Yes**	
303	c.	Low false alarm rates (i.e., indications of problems that do not exist);	**Inspection , VSTL-TP-100, VSTL-TP-800**	**Yes**	
304	d.	Ease of access to components for replacement;	**Inspection , VSTL-TP-100, VSTL-TP-800**	**Yes**	
305	e.	Ease with which adjustment and alignment can be performed;	**Inspection , VSTL-TP-100, VSTL-TP-800**	**Yes**	
306	f.	Ease with which database updates can be performed by a non-technician;	**Inspection , VSTL-TP-100, VSTL-TP-800**	**Yes**	
307	g.	Adjust, align, tune, or service components.	**Inspection , VSTL-TP-100, VSTL-TP-800**	**Yes**	
308	**4.3.5**	**Availability**	**V.2:4.7.4**		

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
309		**The availability of a voting system is defined as the probability that the equipment (and supporting software) needed to perform designated voting functions will respond to operational commands and accomplish the function. System availability is measured as the ratio of the time during which the system is operational a (up time) to the total time period of operation (up time plus down time). Inherent availability (Ai) is a the fraction of time a system is functional, based upon Mean Time Between Failure (MTBF) and Mean Time to Repair (MTTR), that is: Ai = (MTBF)/(MTBF + MTTR)**			
310		**Mean Time to Repair (MTTR) is the average time required to perform a corrective maintenance task during periods of system operation. Corrective maintenance task time is active repair time, plus the time attributable to other factors that could lead to logistic or administrative delays, such as travel notification of qualified maintenance personnel and travel time for such personnel to arrive at the appropriate site. Corrective maintenance may consist of substitution of the complete device or one of its components, as in the case of precinct count and some central count systems, or it may consist of on-site repair. The voting system shall achieve at least ninety nine percent availability during normal operation for the functions indicated above. This standard encompasses for each function the combination of all devices and components that support the function, including their MTTR and MTBF attribute. The voting system shall meet the availability standard for each of the following voting functions:**			
311	a.	**For all paper-based systems:**			
312	a. i.	Recording voter selections (such as by ballot marking or punch).	**VSTL-TP-410**	**Yes**	
313	a. ii.	Scanning the punches or marks on paper ballots and converting them into digital data.	**VSTL-TP-410**	**Yes**	
314	b.	For all DRE systems, recording and storing the voter's ballot selections.	**VSTL-TP-410**	**No**	
315	c.	For precinct-count systems (paper-based and DRE), consolidation of vote selection data from multiple precinct-based systems to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data.	**VSTL-TP-410**	**No**	
316	d.	For central-count systems (paper-based and DRE), consolidation of vote selection data from multiple counting devices to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data.	**VSTL-TP-410**	**Yes**	
317		The voting system achieved at least a 99% inherent availability (Ai) during normal operation for the functions indicated above,	**VSTL-TP-410**	**Yes**	
318		**Vendors will specify a typical system configuration used to assess availability and any assumptions that impact the MTTR. These factors will include:**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
319	e.	The recommended number and locations of spare devices/components inventory for repair during periods of system operation.	**Inspection , VSTL-TP-410, VSTL-TP-100**	**Yes**	
320	f.	The recommended number and locations of available qualified maintenance personnel to support repair calls during system operation.	**Inspection , VSTL-TP-410, VSTL-TP-100**	**Yes**	
321	g.	The organizational affiliation (i.e., jurisdiction, vendor) of qualified maintenance personnel.	**Inspection , VSTL-TP-410, VSTL-TP-100**	**Yes**	
322	**4.3.6**	**Product Marking**			
323		All voting systems shall:			
324	a.	Identify all devices by means of a permanently affixed nameplate or label containing the name of the manufacturer or vendor, the name of the device, its part or model number, its revision letter, its serial number, and if applicable, its power requirement	**Inspection , VSTL-TP-430**	**Yes**	
325		1) The name of the manufacturer or vendor	**Inspection , VSTL-TP-430**	**Yes**	
326		2) The name of the device	**Inspection , VSTL-TP-430**	**Yes**	
327		3) Its part or model number	**Inspection , VSTL-TP-430**	**Yes**	
328		4) Its revision letter	**Inspection , VSTL-TP-430**	**Yes**	
329		5) Its serial number	**Inspection , VSTL-TP-430**	**Yes**	
330		6) if applicable, its power requirements	**Inspection , VSTL-TP-430**	**Yes**	
331	b.	Display on each device a separate data plate containing a schedule for and list of operations required to service or to perform preventive maintenance c.	**Inspection , VSTL-TP-430**	**Yes**	
332	c.	Display advisory caution and warning instructions to ensure safe operation of the equipment and to avoid exposure to hazardous electrical voltages and moving parts at all locations where operation or exposure may occur.	**Inspection , VSTL-TP-430**	**Yes**	
333	**4.3.7**	**Workmanship**			
334		**To help ensure proper workmanship, all manufacturers of voting systems shall:**			
335	a.	Adopt and adhere to practices and procedures to ensure that their products are free from damage or defect that could make them unsatisfactory for their intended purpose;	**Inspection , VSTL-TP-430**	**Yes**	
336	b.	Ensure that components provided by external suppliers are free from damage or defect that could make them unsatisfactory for their intended purpose.	**Inspection , VSTL-TP-430**	**Yes**	
337	**4.3.8**	**Safety**			
338		**All voting systems shall meet the following requirements for safety:**			
339	a.	All voting systems and their components shall be designed so as to eliminate hazards to personnel, or to the equipment itself;	**Inspection , VSTL-TP-430**	**Yes**	
340	b.	Defects in design and construction that can result in personal injury or equipment damage must be detected and corrected before voting systems and components are placed into service;	**Inspection , VSTL-TP-430**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
341	c.	Equipment design for personnel safety shall be equal to or better than the appropriate requirements of the Occupational Safety and Health Act (OSHA), as identified in Title 29, part 1910, of the Code of Federal Regulations.	**Inspection , VSTL-TP-430**	**Yes**	
342		**Human Engineering – Controls and Displays**			
343		**All voting systems and components shall be designed and constructed so as to simplify and facilitate the functions required, and to eliminate the likelihood of erroneous stimuli and responses on the part of the voter or operator. Other specific requirements for controls and displays are described below. In addition, specific functional requirements for system use by voters with disabilities are described in Section 2.2.7 of the Standards. Appendix C provides additional advisory guidance on the application of human engineering principles to the interface between the voter and the voting system.** **All voting systems shall meet the following requirements for controls and displays:**			
344		In all systems, controls used by the voter or equipment operator shall be conveniently located, shall use designs that are consistent with their functions, and shall be clearly labeled. Instruction plates shall be provided, if they are necessary to avoid ambiguity or incorrect actuation;	**Inspection, VSTL-TP-800, VSTL-TP-700**	**Yes**	
345		Information or data displays shall be large enough to be readable by voters and operators with no disabilities and by voters with disabilities consistent with the requirements defined is Section 2.2.7 of the Standards;	**Inspection, VSTL-TP-900, VSTL-TP-100**	**Yes**	
346		Status displays shall meet the same requirements as data displays, and they shall also follow conventional industrial practice with respect to color:	**Inspection, VSTL-TP-100, VSTL-TP-800**	**Yes**	
347		Green, blue, or white displays shall be used for indications of normal status;	**Inspection, VSTL-TP-100, VSTL-TP-800**	**Yes**	
348		Amber indicators shall be used to indicate warnings or marginal status;	**Inspection, VSTL-TP-100, VSTL-TP-800**	**Yes**	
349		Red indicators shall be used to indicate error conditions or equipment states that may result in damage, or in hazards to personnel; and unless the equipment is designed to halt under conditions of incipient damage or hazard, an audible alarm shall also be provided.	**Inspection, VSTL-TP-100, VSTL-TP-800**	**Yes**	
350		Color coding shall be selected so as to assure correct perception by voters and operators with color blindness; and shall not be used as the only means of conveying information, indicating an action, prompting a response, or distinguishing a visual element (see Appendix B for suggested references);	**Inspection, VSTL-TP-100, VSTL-TP-800**	**Yes**	
351		The system's display shall not use flashing or blinking text objects, or other elements having a flash or blink frequency, greater than 2 Hz and lower than 55 Hz.	**Inspection, VSTL-TP-100, VSTL-TP-800**	**Yes**	

Cell: D6

Comment: V.2:4.2.1

ITAs shall design and perform procedures that test the voting system hardware requirements identified in Volume I, Section 3. Test procedures shall be designed and performed by the ITA for both operating and non-operating environmental tests:

• Operating environmental tests apply to the entire system, including hardware components that are used as part of the voting system telecommunications capability; and

• Non-operating tests apply to those elements of the system that are intended for use at poll site voting locations, such as voting machines and precinct counters. These tests address environmental conditions that may be encountered by the voting system hardware at the voting location itself, or while in storage or transit to or from the poll site.

Additionally, compatibility of this equipment with the voting system environment shall be determined through functional tests integrating the standard product with the remainder of the system.

All hardware components custom-designed for election use shall be tested in accordance with the applicable procedures contained in this section. Unmodified COTS hardware will not be subject to all tests. Generally such equipment has been designed to rigorous industrial standards and has been in wide use, permitting an evaluation of its performance history. To enable reduced testing of such equipment, vendors shall provide the manufacturers specifications and evidence that the equipment has been tested to the equivalent of the Standards.
The specific testing procedures to be used shall be identified in the Qualification Test Plan prepared by the ITA. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for hardware testing performed by the ITA.

V.2:4.2.2
The hardware submitted for qualification testing shall be equivalent, in form and function, to the actual production versions of the hardware units. Engineering or developmental prototypes are not acceptable unless the vendor can show that the equipment to be tested is equivalent to standard production units in both performance and construction.

V.2:4.3
Qualification tests may be performed in any facility capable of supporting the test environment. Preparation for testing, arrangement of equipment, verification of equipment status, and the execution of procedures shall be witnessed by at least one independent, qualified observer who shall certify that all test and data acquisition requirements have been satisfied.

When a test is to be performed at "standard" or "ambient" conditions, this requirement shall refer to a nominal laboratory environment at prevailing atmospheric pressure and relative humidity.

Otherwise, all tests shall be performed at the required temperature and electrical supply voltage, regulated within the following tolerances:
a. Temperature of +/- 4 degrees F; and
b. Electrical supply voltage +/- 2 VAC.

V.2:4.4
The ITA shall maintain a test log of the procedure employed. This log shall identify the system and equipment by model and serial number. Test environment conditions shall be noted.

In the event that the ITA deems it necessary to deviate from requirements pertaining to the test environment, the equipment arrangement and method of operation, the specified test procedure, or the provision of test instrumentation and facilities, the deviation shall be recorded in the test log. A discussion of the reasons for the deviation and the effect of the deviation on the validity of the test procedure shall also be provided.

V.2:4.5
The use of test fixtures or ancillary devices to facilitate hardware qualification testing is encouraged. These fixtures and devices may include arrangements for automating the operation of voting devices and the acquisition of test data.

The use of a fixture to ensure correctness in casting ballots by hand is recommended. Such a fixture may consist of a template, with apertures in the desired location, so that selections may be made rapidly.

Such a template will eliminate or greatly minimize errors in activating test ballot patterns, while reducing the amount of time required to cast a test ballot.

For systems that use a light source as a means of detecting voter selections, the generation of a suitable optical signal by an external device is acceptable. For systems that rely on the physical activation of a switch, a mechanical fixture with suitable motion generators is acceptable.

To speed up the process of testing and to eliminate human error in casting test ballots the tests may use a simulation device with appropriate software. Such simulation is recommended if it covers all voting data detection and control paths that are used in casting an actual ballot. In the event that only partial simulation is achieved, then an independent method and test procedure must be used to validate the proper operation of those portions of the system not tested by the simulator.

If the vendor provides a means of simulating the casting of ballots, the simulation device is subject to the same performance, reliability, and quality requirements that apply to the voting device itself so as not to contribute errors to the test processes.

Cell: E6
Comment: V.2:4.2.1
The accredited test lab shall design and perform procedures that test the voting system hardware requirements identified in Volume I, Section 4. Test procedures shall be designed and performed for both operating and non-operating environmental tests:

• Operating environmental tests apply to the entire system, including hardware components that are used as part of the voting system telecommunications capability; and

• Non-operating tests apply to those elements of the system that are intended for use at poll site voting locations, such as voting machines and precinct counters. These tests address environmental conditions that may be encountered by the voting system hardware at the voting location itself, or while in storage or transit to or from the poll site.

Additionally, compatibility of this equipment with the voting system environment shall be determined through functional tests integrating the standard product with the remainder of the system.

All hardware components that are custom-designed for election use shall be tested in accordance with the applicable procedures contained in this section. Unmodified COTS hardware will not be subject to all tests. Generally such equipment has been designed to rigorous industrial standards and has been in wide use, permitting an evaluation of its performance history. To enable reduced testing of such equipment, vendors shall provide the manufacturer specifications and evidence that the equipment has been tested to the equivalent.
of these Guidelines.

V.2:4.2.2
The hardware submitted for qualification testing shall be equivalent, in form and function, to the actual production versions of the hardware units. Engineering or developmental prototypes are not acceptable unless the vendor can show that the equipment to be tested is equivalent to standard production units in both performance and construction.

V.2:4.3
Certification tests may be performed in any facility capable of supporting the test environment. Preparation for testing, arrangement of equipment, verification of equipment status, and the execution of procedures shall be witnessed by at least one independent, qualified observer who shall certify that all test and data acquisition requirements have been satisfied.

When a test is to be performed at “standard” or “ambient” conditions, this requirement shall refer to a nominal laboratory environment at prevailing atmospheric pressure and relative humidity.

Otherwise, all tests shall be performed at the required temperature and electrical supply voltage, regulated within the following tolerances:
a. Temperature of +/- 4 degrees F; and
b. Electrical supply voltage +/- 2 voltage alternating current

V.2:4.4
The accredited test lab shall maintain a test log of the procedure employed. This log shall identify the system and equipment by model and serial number. Test environment conditions shall be noted.

In the event that the accredited test lab deems it necessary to deviate from requirements pertaining to the test environment, the equipment arrangement and method of operation, the specified test procedure, or the provision of test instrumentation and facilities, the deviation shall be recorded in the test log. A discussion of the reasons for the deviation and the effect of the deviation on the validity of the test procedure shall also be provided.

V.2:4.5
The use of test fixtures or ancillary devices to facilitate hardware qualification testing is encouraged. These fixtures and devices may include arrangements for automating the operation of voting devices and the acquisition of test data.

The use of a fixture to ensure correctness in casting ballots by hand is recommended. Such a fixture may consist of a template, with apertures in the desired location, so that selections may be made rapidly. Such a template will eliminate or greatly minimize errors in activating test ballot patterns, while reducing the amount of time required to cast a test ballot.

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To speed up the process of testing and to eliminate human error in casting test ballots the tests may use a simulation device with appropriate software. Such simulation is recommended if it covers all voting data detection and control paths that are used in casting an actual ballot. In the event that only partial simulation is achieved, then an independent method and test procedure must be used to validate the proper operation of those portions of the system not tested by the simulator.

If the vendor provides a means of simulating the casting of ballots, the simulation device is subject to the same performance, reliability, and quality requirements that apply to the voting device itself so as not to contribute errors to the test processes.

Cell: D9
Comment: non-operating environmental tests:

Prior to each test, the equipment shall be shown to be operational by means of the procedure contained in Subsection 4.6.1.5. The equipment may then be prepared as if for actual transportation or storage, and subjected to appropriate test procedures outlined. After each procedure has been completed, the equipment status will again be verified as in Subsection 4.6.1.5.

Cell: E9
Comment: non-operating environmental tests:

Prior to each test, the equipment shall be shown to be operational by means of the procedure contained in Subsection 4.6.1.5. The equipment may then be prepared as if for actual transportation or storage, and subjected to appropriate test procedures outlined. After each procedure has been completed, the equipment status will again be verified as in Subsection 4.6.1.5.

Cell: D10
Comment: Data Accuracy

As indicated in Volume I, Section 3, data accuracy is defined in terms of ballot position error rate. This rate applies to the voting functions and supporting equipment that capture, record, store, consolidate and report the specific selections, and absence of selections, made by the voter for each ballot position. Volume I, Section 3.2.1 identifies the specific functions to be tested.

For each processing function, the system shall achieve a target error rate of no more than one in 10,000,000 ballot positions, with a maximum acceptable error rate in the test process of one in 500,000 ballot

positions. This error rate includes errors from any source while testing a specific processing function and it related equipment.

This error rate is used to determine the vote position processing volume used to test system accuracy for each function:

• If the system makes one error before counting 26,997 consecutive ballot positions correctly, it will be rejected. The vendor is then required to improve the system.

• If the system reads at least 1,549,703 consecutive ballot positions correctly, it will be accepted.

• If the system correctly reads more than 26,997 ballot positions but less than 1,549,703 when the first error occurs, the testing will have to be continued until another 1,576,701 consecutive ballot positions are counted without error (a total of 3,126,404 with one error).

Volume II, Appendix C, Section C.5 provides further details of the calculation for this testing volume.

Cell: E10
Comment: Data Accuracy

As indicated in Volume I, Section 4, data accuracy is defined in terms of ballot position error rate. This rate applies to the voting functions and supporting equipment that capture, record, store, consolidate and report the specific selections, and absence of selections, made by the voter for each ballot position. Volume I, Section 3.2.1 identifies the specific functions to be tested.

For each processing function, the system shall achieve a target error rate of no more than one in 10,000,000 ballot positions, with a maximum acceptable error rate in the test process of one in 500,000 ballot positions. This error rate includes errors from any source while testing a specific processing function and it related equipment.

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Volume II, Appendix C, provides further details of the calculation for this testing volume.

Cell: D23
Comment: To enable reduced testing of such equipment, vendors shall provide the manufacturers specifications and evidence that the equipment has been tested to the equivalent of the Standards.

Cell: E23
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Cell: D41
Comment: The test for power disturbance disruption shall be conducted in compliance with the test specified in in IEC 61000-4-11 (1994-06).

Cell: E41
Comment: The test for power disturbance disruption shall be conducted in compliance with the test specified in in IEC 61000-4-11 (1994-06).

Cell: D48
Comment: The test for electrical fast transient shall be conducted in compliance with the test specified in in IEC 61000-4-4 (1995-01).

Cell: E48
Comment: The test for electrical fast transient shall be conducted in compliance with the test specified in in IEC 61000-4-4 (1995-01).

Cell: F48
Comment: NOTE 1: The most important data this might be lost is cast vote records. Therefore the system must be processing, storing or retrieving cast vote records while the disruptions are applied.

Cell: D53
Comment: The test for lightning surge protection shall be conducted in compliance with the test specified in IEC 61000-4-5 (1995-02).

Cell: E53
Comment: The test for lightning surge protection shall be conducted in compliance with the test specified in IEC 61000-4-5 (1995-02).

Cell: F53
Comment: NOTE 1: The most important data this might be lost is cast vote records. Therefore the system must be processing, storing or retrieving cast vote records while the disruptions are applied.

Cell: D60
Comment: The test for electrostatic disruption shall be conducted in compliance with the test specified in IEC 61000-4-2 (1995-01).

Cell: E60
Comment: The test for electrostatic disruption shall be conducted in compliance with the test specified in IEC 61000-4-2 (1995-01).

Cell: D63
Comment: The test for electromagnetic radiation shall be conducted in compliance with the FCC Part 15 Class B requirements by testing per ANSI C63.4.

Cell: E63
Comment: The test for electromagnetic radiation shall be conducted in compliance with the FCC Part 15 Class B requirements by testing per ANSI C63.4.

Cell: D66
Comment: The test for electromagnetic susceptibility shall be conducted in compliance with the test specified in IEC 61000-4-3 (1996).

Cell: E66
Comment: The test for electromagnetic susceptibility shall be conducted in compliance with the test specified in IEC 61000-4-3 (1996).

Cell: F66
Comment: NOTE 1: The most important data this might be lost is cast vote records. Therefore the system must be processing, storing or retrieving cast vote records while the disruptions are applied.

Cell: D69
Comment: The test for conducted RF immunity shall be conducted in compliance with the test specified in IEC 61000-4-6 (1996-04).

Cell: E69
Comment: The test for conducted RF immunity shall be conducted in compliance with the test specified in IEC 61000-4-6 (1996-04).

Cell: F69
Comment: NOTE 1: The most important data this might be lost is cast vote records. Therefore the system must be processing, storing or retrieving cast vote records while the disruptions are applied.

Cell: D72
Comment: The test for AC magnetic fields RF immunity shall be conducted in compliance with the test specified in IEC 61000-4-8 (1993-06).

Cell: E72
Comment: The test for AC magnetic fields RF immunity shall be conducted in compliance with the test specified in IEC 61000-4-8 (1993-06).

Cell: D74
Comment: 4.7.1 Temperature and Power Variation Tests

This test is similar to the low temperature and high temperature tests of MIL-STD810D, Method 502.2 and Method 501.2, with test conditions that correspond to the requirements of the performance standards. This procedure tests system operation under various environmental conditions for at least 163 hours. During 48 hours of this operating time, the device shall be in a test chamber. For the remaining hours, the equipment shall be operated at room temperature. The system shall be powered for the entire period of this test; the power may be disconnected only if necessary for removal of the system from the test chamber.

Operation shall consist of ballot-counting cycles, which vary with system type. An output report need not be generated after each counting cycle; the interval between reports, however, should be no more than 4 hours to keep to a practical minimum the time between the occurrence of a failure or data error and its detection.

Test Ballots per Counting Cycle
Precinct count systems: 100 ballots/hour
Central count systems: 300 ballots/hour

The recommended pattern of votes is one chosen to facilitate visual recognition of the reported totals; this pattern shall exercise all possible voting locations. System features such as data quality tests, error logging, and audit reports shall be enabled during the test.

Each operating cycle shall consist of processing the number of ballots indicated in the preceding chart.

Step 1: Arrange the equipment in the test chamber. Connect as required and provide for power, control and data service through enclosure wall.

Step 2: Set the supply voltage at 117 vac.

Step 3: Power the equipment, and perform an operational status check as in Section 4.6.1.5.

Step 4: Set the chamber temperature to 50 degrees F observing precautions against thermal shock and condensation.

Step 5: Begin 24 hour cycle.

Step 6: At T=4 hrs, lower the supply voltage to 105 vac.

Step 7: At T=8 hrs, raise the supply voltage to 129 vac.

Step 8: At T=11:30 hrs, return the supply voltage to 117 vac and return the chamber temperature to lab ambient, observing precautions against thermal shock and condensation.

Step 9: At T=12:00 hrs, raise the chamber temperature to 95 degrees Fahrenheit.

Step 10: Repeat Steps 5 through 8, with temperature at 95 degrees Fahrenheit, complete at T=24 hrs.

Step 11: Set the chamber temperature at 50 degrees Fahrenheit as in Step 4.

Step 12: Repeat the 24 hour cycle as in Steps 5-10, complete at T=48 hrs.

Step 13: After completing the second 24 hour cycle, disconnect power from the system and remove it from the chamber if needed.

Step 14: Reconnect the system as in Step 2, and continue testing for the remaining period of operating time required until the ACCEPT/REJECT criteria of Subsection 4.7.11 have been met.

Cell: E74
Comment: 4.7.1 Temperature and Power Variation Tests

This test is similar to the low temperature and high temperature tests of MIL-STD810D, Method 502.2 and Method 501.2, with test conditions that correspond to the requirements of the performance standards. This procedure tests system operation under various environmental conditions for at least 163 hours. During 48 hours of this operating time, the device shall be in a test chamber. For the remaining hours, the equipment shall be operated at room temperature. The system shall be powered for the entire period of this test; the power may be disconnected only if necessary for removal of the system from the test chamber.

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Precinct count systems: 100 ballots/hour
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The recommended pattern of votes is one chosen to facilitate visual recognition of the reported totals; this pattern shall exercise all possible voting locations. System features such as data quality tests, error logging, and audit reports shall be enabled during the test.

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Step 2: Set the supply voltage at 117 vac.

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Cell: D75

Comment: Environmental tests of non-operating equipment are intended to simulate exposure to physical shock and vibration associated with handling and transportation of voting equipment and precinct counters between a jurisdiction's storage facility and precinct polling site. These tests additionally simulate the temperature and humidity conditions that may be encountered during storage in an uncontrolled warehouse environment or precinct environment. The procedures and conditions of these tests correspond generally to those of MIL-STD-810D, "Environmental Test Methods and Engineering Guidelines," 19 July 1983. In most cases, the severity of the test conditions has been reduced to reflect commercial, rather than military, practice.

Systems exclusively designed with system-level COTS hardware whose configuration has not been modified in any manner and are not subjected to this segment of hardware testing. Systems made up of individual COTS components such as hard drives, motherboards, and monitors that have been packaged to build a voting machine or other device will be required to undergo the hardware testing.

Prior to each test, the equipment shall be shown to be operational by means of the procedure contained in Subsection 4.6.1.5. The equipment may then be prepared as if for actual transportation or storage, and subjected to appropriate test procedures outlined. After each procedure has been completed, the equipment status will again be verified as in Subsection 4.6.1.5.

(4.6.1.1 Pretest Data)
The test technician shall verify that the equipment is capable of normal operation. Equipment identification, environmental conditions, equipment configuration, test instrumentation, operator tasks, time-of-day or test time, and test results shall be recorded.

(4.6.1.2 Preparation for Test)
The equipment shall be prepared as for the expected non-operating use, as noted below. When preparation for transport between the storage site and the polling place is required, the equipment shall be prepared with any protective enclosures or internal restraints that the vendor specifies for such transport. When preparation for storage is required, the equipment shall be prepared using any protective enclosures or internal restraints that the vendor specifies for storage.

(4.6.1.3 Mechanical Inspection and Repair)
After the test has been completed, the devices shall be removed from their containers, and any internal restraints shall be removed. The exterior and interior of the devices shall be inspected for evidence of mechanical damage, failure, or dislocation of internal components. Devices shall be adjusted or repaired, if necessary.

(4.6.1.4 Electrical Inspection and Adjustment)
After completion of the mechanical inspection and repair, routine electrical maintenance and adjustment may be performed, according to the manufacturer's standard procedure.

(4.6.1.5 Operational Status Check)
When all tests, inspections, repairs, and adjustments have been completed, normal operation shall be verified by conducting an operational status check.

During this process, all equipment shall be operated in a manner and environmental conditions that simulate election use to verify the functional status of the system. Prior to the conduct of each of the environmental hardware non-operating tests, a supplemental test shall be made to determine that the operational state of the equipment is within acceptable performance limits.

The following procedures shall be followed to verify the equipment status:
Step 1: Arrange the system for normal operation.

Step 2: Turn on power, and allow the system to reach recommended operating temperature.

Step 3: Perform any servicing, and make any adjustments necessary, to achieve operational status.

Step 4: Operate the equipment in all modes, demonstrating all functions and features that would be used during election operations.

Step 5: Verify that all system functions have been correctly executed.

(4.6.1.6 Failure Criteria)
Upon completion of each non-operating test, the system hardware shall be subject to functional testing to verify continued operability. If any portion of the voting machine or precinct counter hardware fails to remain fully functional, the testing will be suspended until the failure is identified and corrected by the vendor. The system will then be subject to a retest.

Cell: E75

Comment: Environmental tests of non-operating equipment are intended to simulate exposure to physical shock and vibration associated with handling and transportation of voting equipment and precinct counters between a jurisdiction's storage facility and precinct polling site. These tests additionally simulate the temperature and humidity conditions that may be encountered during storage in an uncontrolled warehouse environment or precinct environment. The procedures and conditions of these tests correspond generally to those of MIL-STD-810D, "Environmental Test Methods and Engineering Guidelines," 19 July 1983. In most cases, the severity of the test conditions has been reduced to reflect commercial, rather than military, practice.

Systems exclusively designed with system-level COTS hardware whose configuration has not been modified in any manner and are not subjected to this segment of hardware testing. Systems made up of individual COTS components such as hard drives, motherboards, and monitors that have been packaged to build a voting machine or other device will be required to undergo the hardware testing.

Prior to each test, the equipment shall be shown to be operational by means of the procedure contained in Subsection 4.6.1.5. The equipment may then be prepared as if for actual transportation or storage,

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(4.6.1.2 Preparation for Test)
The equipment shall be prepared as for the expected non-operating use, as noted below. When preparation for transport between the storage site and the polling place is required, the equipment shall be prepared with any protective enclosures or internal restraints that the vendor specifies for such transport. When preparation for storage is required, the equipment shall be prepared using any protective enclosures or internal restraints that the vendor specifies for storage.

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Step 5: Verify that all system functions have been correctly executed.

(4.6.1.6 Failure Criteria)
Upon completion of each non-operating test, the system hardware shall be subject to functional testing to verify continued operability. If any portion of the voting machine or precinct counter hardware fails to remain fully functional, the testing will be suspended until the failure is identified and corrected by the vendor. The system will then be subject to a retest.

Cell: D77
Comment: V.2:4.6.4
The low temperature test simulates stresses faced during storage of voting machines and ballot counters.

(4.6.4.1 Applicability)
All systems and components, regardless of type, shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 502.2, Procedure I-Storage. The minimum temperature shall be -4 degrees F.

(4.6.4.2 Procedure)
Step 1: Arrange the equipment as for storage. Install it in the test chamber.

Step 2: Lower the internal temperature of the chamber at any convenient rate, but not so rapidly as to cause condensation in the chamber, and in any case no more rapidly than 10 degrees F per minute, until an internal temperature of -4 degrees F has been reached.

Step 3: Allow the chamber temperature to stabilize. Maintain this temperature for a period of 4 hours after stabilization.

Step 4: Allow the internal temperature of the chamber to return to standard laboratory conditions, at a rate not exceeding 10 degrees F per minute

Step 5: Allow the internal temperature of the equipment to stabilize at laboratory conditions before removing it from the chamber.

Step 6: Remove the equipment from the chamber and from its containers, and inspect the equipment for evidence of damage.

Step 7: Verify continued operability of the equipment.

V.2:4.6.5
The high temperature test simulates stresses faced during storage of voting machines and ballot counters.

(4.6.5.1 Applicability)
All systems and components, regardless of type, shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 501.2, Procedure I-Storage. The maximum temperature shall be 140 degrees F.

(4.6.5.2 Procedure)
Step 1: Arrange the equipment as for storage. Install it in the test chamber.

Step 2: Raise the internal temperature of the chamber at any convenient rate, but in any case no more rapidly than 10 degrees F per minute, until an internal temperature of 140 degrees F has been reached.

Step 3: Allow the chamber temperature to stabilize. Maintain this temperature for a period of 4 hours after stabilization.

Step 4: Allow the internal temperature of the chamber to return to standard laboratory conditions, at a rate not exceeding 10 degrees F per minute.

Step 5: Allow the internal temperature of the equipment to stabilize at laboratory conditions before removing it from the chamber.

Step 6: Remove the equipment from the chamber and from its containers, and inspect the equipment for evidence of damage.

Step 7: Verify continued operability of the equipment.

Cell: E77
Comment: V.2:4.6.4
The low temperature test simulates stresses faced during storage of voting machines and ballot counters.

(4.6.4.1 Applicability)
All systems and components, regardless of type, shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 502.2, Procedure I-Storage. The minimum temperature shall be -4 degrees F.

(4.6.4.2 Procedure)
Step 1: Arrange the equipment as for storage. Install it in the test chamber.

Step 2: Lower the internal temperature of the chamber at any convenient rate, but not so rapidly as to cause condensation in the chamber, and in any case no more rapidly than 10 degrees F per minute, until an internal temperature of -4 degrees F has been reached.

Step 3: Allow the chamber temperature to stabilize. Maintain this temperature for a period of 4 hours after stabilization.

Step 4: Allow the internal temperature of the chamber to return to standard laboratory conditions, at a rate not exceeding 10 degrees F per minute

Step 5: Allow the internal temperature of the equipment to stabilize at laboratory conditions before removing it from the chamber.

Step 6: Remove the equipment from the chamber and from its containers, and inspect the equipment for evidence of damage.

Step 7: Verify continued operability of the equipment.

V.2:4.6.5
The high temperature test simulates stresses faced during storage of voting machines and ballot counters.

(4.6.5.1 Applicability)
All systems and components, regardless of type, shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 501.2, Procedure I-Storage. The maximum temperature shall be 140 degrees F.

(4.6.5.2 Procedure)
Step 1: Arrange the equipment as for storage. Install it in the test chamber.

Step 2: Raise the internal temperature of the chamber at any convenient rate, but in any case no more rapidly than 10 degrees F per minute, until an internal temperature of 140 degrees F has been reached.

Step 3: Allow the chamber temperature to stabilize. Maintain this temperature for a period of 4 hours after stabilization.

Step 4: Allow the internal temperature of the chamber to return to standard laboratory conditions, at a rate not exceeding 10 degrees F per minute.

Step 5: Allow the internal temperature of the equipment to stabilize at laboratory conditions before removing it from the chamber.

Step 6: Remove the equipment from the chamber and from its containers, and inspect the equipment for evidence of damage.

Step 7: Verify continued operability of the equipment.

Cell: D78
Comment: The bench handling test simulates stresses faced during maintenance and repair of voting machines and ballot counters.

(4.6.2.1 Applicability)
All systems and components, regardless of type, shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 516.3, Procedure VI.

(4.6.2.2 Procedure)
Step 1: Place each piece of equipment on a level floor or table, as for normal operation or servicing.

Step 2: Make provision, if necessary, to restrain lateral movement of the equipment or its supports at one edge of the device. Vertical rotation about that edge shall not be restrained.

Step 3: Using that edge as a pivot, raise the opposite edge to an angle of 45 degrees, to a height of four inches above the surface, or until the point of balance has been reached, whichever occurs first.

Step 4: Release the elevated edge so that it may drop to the test surface without restraint.

Step 5: Repeat steps 3 and 4 for a total of six events.

Step 6: Repeat steps 2, 3, and 4 for the other base edges, for a total of 24 drops for each device.

Cell: E78
Comment: The bench handling test simulates stresses faced during maintenance and repair of voting machines and ballot counters.

(4.6.2.1 Applicability)
All systems and components, regardless of type, shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 516.3, Procedure VI.

(4.6.2.2 Procedure)
Step 1: Place each piece of equipment on a level floor or table, as for normal operation or servicing.

Step 2: Make provision, if necessary, to restrain lateral movement of the equipment or its supports at one edge of the device. Vertical rotation about that edge shall not be restrained.

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Step 4: Release the elevated edge so that it may drop to the test surface without restraint.

Step 5: Repeat steps 3 and 4 for a total of six events.

Step 6: Repeat steps 2, 3, and 4 for the other base edges, for a total of 24 drops for each device.

Cell: D79
Comment: The vibration test simulates stresses faced during transport of voting machines and ballot counters between storage locations and polling places.

(4.6.3.1 Applicability)
All systems and components, regardless of type, shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 514.3, Category 1- Basic Transportation, Common Carrier.

(4.6.3.2 Procedure)
Step 1: Install the test item in its transit or combination case as prepared for transport.

Step 2: Attach instrumentation as required to measure the applied excitation.

Step 3: Mount the equipment on a vibration table with the axis of excitation along the vertical axis of the equipment.

Step 4: Apply excitation as shown in MIL-STD-810D, Method 514.3-1, “Basic transportation, common carrier, vertical axis”, with low frequency excitation cutoff at 10 Hz, for a period of 30 minutes.

Step 5: Repeat steps 2 and 3 for the transverse and longitudinal axes of the equipment with the excitation profiles shown in Figures 514.3-2 and 514.3-3, respectively. (Note: The total excitation period equals 90 minutes, with 30 minutes excitation along each axis.)
Step 6: Remove the test item from its transit or combination case and verify its continued operability.

Cell: E79
Comment: The vibration test simulates stresses faced during transport of voting machines and ballot counters between storage locations and polling places.

(4.6.3.1 Applicability)
All systems and components, regardless of type, shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 514.3, Category 1- Basic Transportation, Common Carrier.

(4.6.3.2 Procedure)
Step 1: Install the test item in its transit or combination case as prepared for transport.

Step 2: Attach instrumentation as required to measure the applied excitation.

Step 3: Mount the equipment on a vibration table with the axis of excitation along the vertical axis of the equipment.

Step 4: Apply excitation as shown in MIL-STD-810D, Method 514.3-1, “Basic transportation, common carrier, vertical axis”, with low frequency excitation cutoff at 10 Hz, for a period of 30 minutes.

Step 5: Repeat steps 2 and 3 for the transverse and longitudinal axes of the equipment with the excitation profiles shown in Figures 514.3-2 and 514.3-3, respectively. (Note: The total excitation period equals 90 minutes, with 30 minutes excitation along each axis.)
Step 6: Remove the test item from its transit or combination case and verify its continued operability.

Cell: D80
Comment: The humidity test simulates stresses faced during storage of voting machines and ballot counters.

(4.6.6.1 Applicability)
All systems and components regardless of type shall meet the requirements of this test. This test is similar to the procedure of MIL-STD-810D, Method 507.2, Procedure I-Natural Hot-Humid. It is intended to evaluate the ability of the equipment to survive exposure to an uncontrolled temperature and humidity environment during storage. This test lasts for ten days.

(4.6.6.2 Procedure)
Step 1: Arrange the equipment as for storage. Install it in the test chamber.

Step 2 Adjust the chamber conditions to those given in MIL-STD-810D Table 507.2-I, for the time 0000 of the HotHumid cycle (Cycle 1).

Step 3: Perform a 24-hour cycle with the time and temperature-humidity values specified in Figure 507.2-1, Cycle 1.

Step 4: Repeat Step 2 until 5, 24-hour cycles have been completed.

Step 5: Continue with the test commencing with the conditions specified for time = 0000 hours.

Step 6: At any convenient time in the interval between time = 120 hours and time = 124 hours, place the equipment in an operational configuration, and perform a complete operational status check as defined in Subsection 4.6.1.5

Step 7: If the equipment satisfactorily completes the status check, continue with the sixth 24-hour cycle.

Step 8: Perform 4 additional 24-hour cycles, terminating the test at time = 240 hours

Step 9: Remove the equipment from the test chamber and inspect it for any evidence of damage.

Step 10: Verify continued operability of the equipment.

Cell: E80
Comment: The humidity test simulates stresses faced during storage of voting machines and ballot counters.

(4.6.6.1 Applicability)
All systems and components regardless of type shall meet the requirements of this test. This test is similar to the procedure of MIL-STD-810D, Method 507.2, Procedure I-Natural Hot-Humid. It is intended to evaluate the ability of the equipment to survive exposure to an uncontrolled temperature and humidity environment during storage. This test lasts for ten days.

(4.6.6.2 Procedure)
Step 1: Arrange the equipment as for storage. Install it in the test chamber.

Step 2 Adjust the chamber conditions to those given in MIL-STD-810D Table 507.2-I, for the time 0000 of the HotHumid cycle (Cycle 1).

Step 3: Perform a 24-hour cycle with the time and temperature-humidity values specified in Figure 507.2-1, Cycle 1.

Step 4: Repeat Step 2 until 5, 24-hour cycles have been completed.

Step 5: Continue with the test commencing with the conditions specified for time = 0000 hours.

Step 6: At any convenient time in the interval between time = 120 hours and time = 124 hours, place the equipment in an operational configuration, and perform a complete operational status check as defined in Subsection 4.6.1.5

Step 7: If the equipment satisfactorily completes the status check, continue with the sixth 24-hour cycle.

Step 8: Perform 4 additional 24-hour cycles, terminating the test at time = 240 hours

Step 9: Remove the equipment from the test chamber and inspect it for any evidence of damage.

Step 10: Verify continued operability of the equipment.

Cell: D288
Comment: The ITA shall test for reliability based on the provisions of Volume I, Section 3 for the acceptable mean time between failure (MBTF). The MBTF shall be measured during the conduct of other system performance tests specified in this section, and shall be at least 163 hours. Volume II, Appendix C, Section C.4 provides further details of the calculation for this testing period.

Cell: E288
Comment: The accredited test lab shall test for reliability based on the provisions of Volume I, Section 3 for the acceptable mean time between failure (MBTF). The MBTF shall be measured during the conduct of other system performance tests specified in this section, and shall be at least 163 hours. Volume II, Appendix C, provides further details of the calculation for this testing period.

Cell: D292
Comment: The ITA shall test for maintainability based on the provisions of Volume I, Section 3 for maintainability, including both physical attributes and additional attributes regarding the ease of performing maintenance activities. These tests include:

a. Examine the physical attributes of the system to determine whether significant impediments exist for the performance of those maintenance activities that are to be performed by the jurisdiction. These activities shall be identified by the vendor in the system maintenance procedures (part of the TDP).

b. Performing activities designated as maintenance activities for the jurisdiction in the TDP, in accordance with the instructions provided by the vendor in the system maintenance procedures, noting any difficulties encountered.

Should significant impediments or difficulties be encountered that are not remedied by the vendor, the ITA shall include such findings in the qualification test results of the qualification test report.

Cell: E292
Comment: The accredited test lab shall test for maintainability based on the provisions of Volume I, Section 3 for maintainability, including both physical attributes and additional attributes regarding the ease of performing maintenance activities. These tests include:

a. Examine the physical attributes of the system to determine whether significant impediments exist for the performance of those maintenance activities that are to be performed by the jurisdiction. These activities shall be identified by the vendor in the system maintenance procedures (part of the TDP).

b. Performing activities designated as maintenance activities for the jurisdiction in the TDP, in accordance with the instructions provided by the vendor in the system maintenance procedures, noting any difficulties encountered.

Should significant impediments or difficulties be encountered that are not remedied by the vendor, the ITA shall include such findings in the qualification test results of the qualification test report.

Cell: D308
Comment: The ITA shall assess the adequacy of system availability based on the provisions of Volume I, Section 3. As described in this section, availability of voting system equipment is determined as a function of reliability, and the mean time to repair the system in the event of failure.

Availability cannot be tested directly before the voting system is deployed in jurisdictions, but can be modeled mathematically to predict availability for a defined system configuration. This model shall be prepared by the vendor, and shall be validated by the ITA.

The model shall reflect the equipment used for a typical system configuration to perform the following system functions:

a. For all paper-based systems:
1) Recording voter selections (such as by ballot marking or punch);
2) Scanning the punches or marks on paper ballots and converting them into digital data;

b. For all DRE systems:
1) Recording and storing the voter's ballot selections.

c. For precinct-count systems (paper-based and DRE):
1) Consolidation of vote selection data from multiple precinct-based systems to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data; and

d. For central-count systems (paper-based and DRE):
1) Consolidation of vote selection data from multiple counting devices to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data.

The model shall demonstrate the predicted availability of the equipment that supports each function. This demonstration shall reflect the equipment reliability, mean time to repair and assumptions concerning equipment availability and deployment of maintenance personnel stated by the vendor in the TDP.

Cell: E308
Comment: The accredited test lab shall assess the adequacy of system availability based on the provisions of Volume I, Section 4. As described in this section, availability of voting system equipment is determined as a function of reliability, and the mean time to repair the system in the event of failure.

Availability cannot be tested directly before the voting system is deployed in jurisdictions, but can be modeled mathematically to predict availability for a defined system configuration. This model shall be prepared by the vendor, and shall be validated by the accredited testing lab.

The model shall reflect the equipment used for a typical system configuration to perform the following system functions:

a. For all paper-based systems:
1) Recording voter selections (such as by ballot marking or punch);
2) Scanning the punches or marks on paper ballots and converting them into digital data;

b. For all DRE systems:

1) Recording and storing the voter's ballot selections.

c. For precinct-count systems (paper-based and DRE):
1) Consolidation of vote selection data from multiple precinct-based systems to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data; and

d. For central-count systems (paper-based and DRE):
1) Consolidation of vote selection data from multiple counting devices to generate jurisdiction-wide vote counts, including storage and reporting of the consolidated vote data.

The model shall demonstrate the predicted availability of the equipment that supports each function. This demonstration shall reflect the equipment reliability, mean time to repair and assumptions concerning equipment availability and deployment of maintenance personnel stated by the vendor in the TDP.

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
4	**V.2:1.7.1.2**	**General Applicability - Software**			
5		**Software certification is applicable to the following:** **a. Application programs that control and carry out ballot processing, commencing with the definition of a ballot, and including processing of the ballot image (either from physical ballots or electronically activated images), and ending with the system's access to memory for the generation of output reports** **b. Specialized compilers and specialized operating systems associated with ballot processing** **c. Standard compilers and operating systems that have been modified for use in the vote counting process** **Specialized software for ballot preparation, election programming, vote recording, vote tabulation, vote consolidation and reporting, and audit trail production shall be subjected to code inspection. Functional testing of all these programs during software evaluation and system-level testing shall exercise any specially tailored software off-line from the ballot counting process (e.g.**			
6	**5**	**Software Standards**	**V.2:5.2** **V.2:1.3.1.3**		
7		**Initial Review of Documentation: The documentation submitted by the vendor in the TDP is sufficient to enable:**			
8		a. Review of the source code	**V.2:5.3, VSTL-TP-100**	**Yes**	
9		b. Design and conducting of tests at every level of the software structure to verify that the software meets the vendor's design specifications and the requirements of the performance standards.	**V.2:5.3, VSTL-TP-100**	**Yes**	
10	**5.1**	**Scope**			
11		The standards in this section also support:	**High level requirements. Assure these requirements are meet as part of the Section 4, Software, evaluation.**		
12		system accuracy			
13		logical correctness, privacy, security and integrity.			
14		privacy			
15		security			
16		integrity.			
17	**5.1.1**	**Sources**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
18		**The requirements of this section apply generally to all software used in voting systems, including:** **• Software provided by the voting system vendor and its component suppliers.** **• Software furnished by an external provider (for example, providers of COTS operating systems and web browsers) where the software may be used in any way during voting system operation.** **• Software developed by the voting jurisdiction.**			
19		Compliance with the requirements of the software standards is assessed by several formal tests, including code examination. Unmodified software is not subject to code examination; however, source code generated by a package and embedded in software modules for compilation or interpretation *shall* be provided in human readable form to the [2002: ITA] [2005: accredited test lab]. The [2002: ITA] [2005: accredited test lab] may inspect source code units to determine testing requirements or to verify that the code is unmodified and that the default configuration options have not been changed.	**V.2:5.4, VSTL-TP-200**	**Yes**	
20		**Configuration of software, both operating systems and applications, is critical to proper system functioning. Correct test design and sufficient test execution must account for the intended and proper configuration of all system components.**			
21		Therefore, [2002: the vendors shall submit to the ITA, in the TDP, a record of all user selections made during software installation]. [2005: vendors shall submit a record of all user selections made during software installation as part of the Technical Data Package]	**VSTL-TP-100**	**Yes**	
22		The vendor shall also submit a record of all configuration changes made to the software following its installation.	**VSTL-TP-100**	**Yes**	
23		The [2002: ITA] [2005: accredited test lab] shall confirm the propriety and correctness of these user selections and configuration changes.	**VSTL-TP-100**	**Yes**	
24	**5.1.2**	**2002: Location and Control of Software and Hardware on Which It Operates** **2005: Management of Software and Hardware**			
25		In addition to the requirements of this section, all software used in any manner to support any voting-related activities shall meet the requirements for security described in [2002: section 6 of the Standard] [2005: Section 7].	**VSTL-TP-1100**	**Yes**	
26	**5.1.3**	**Exclusions**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
27		**Some voting systems use equipment, such as personal computers, that may be used for other purposes and have resident on the equipment general purpose software such as operating systems, programming language compilers, database management systems, and Web browsers. Such software is governed by the Standards unless:**			
28	a.	The software provides no support of voting system capabilities.	**VSTL-TP-100, VSTL-TP-300, VSTL-TP-200**	**Yes**	
29	b.	The software is removable, disconnectable, or switchable such that it cannot function while voting system functions are enabled.	**VSTL-TP-100, VSTL-TP-300, VSTL-TP-200**	**Yes**	
30	c.	Procedures are provided that confirm that the software has been removed, disconnected, or switched.	**VSTL-TP-100, VSTL-TP-300, VSTL-TP-200**	**Yes**	
31	**5.2**	**Software Design and Coding Standards**			
32	**5.2.1**	**Selection of Programming Languages**			
33		Software associated with the logical and numerical operations of vote data shall use a high-level programming language, such as: Pascal, Visual Basic, Java, C and C++. The requirement for the use of high-level language for logical operations does not preclude the use of assembly language for hardware-related segments, such as device controllers and handler programs. Also, operating system software may be designed in assembly language.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
34	**5.2.2**	**Software Integrity**			
35		Self-modifying, dynamically loaded, or interpreted code is prohibited, except under the security provisions outlined in [2002: section 6.4.e] [2005: Subsection 7.4]. This prohibition is to ensure that the software tested and approved during the qualification process remains unchanged and retains its integrity. External modification of code during execution shall be prohibited. Where the development environment (programming language and development tools) includes the following features, the software shall provide controls to prevent accidental or deliberate attempts to replace executable code:	**VSTL-TP-200**	**Yes**	
36	a.	Unbounded arrays or strings (including buffers used to move data).	**VSTL-TP-200**	**Yes**	
37	b.	Pointer variables.	**VSTL-TP-200**	**Yes**	
38	c.	Dynamic memory allocation and management.	**VSTL-TP-200**	**Yes**	
39	**5.2.3**	**Software Modularity and Programming**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
40		**Voting system application software, including commercial off-the-shelf (COTS) software, shall be designed in a modular fashion. However, COTS software is No to be inspected for compliance with this requirement. For the purpose of this requirement, "modules" may be compiled or interpreted independently. Modules may also be nested. The modularity rules described here apply to the component sub modules of a library. The principle concept is that the module contains all the elements to compile or interpret successfully and has limited access to data in other modules. The design concept is simple replacement with another module whose interfaces match the original module. A module is designed in accordance with the following rules:**			
41			**V.2:5.2**	**Yes**	
42	a.	Each module shall have a specific function that can be tested and verified independently of the remainder of the code. In practice, some additional modules (such as library modules) may be needed to compile the module under test, but the modular construction allows the supporting modules to be replaced by special test versions that support test objectives.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
43	b.	Each module shall be uniquely and mnemonically named, using names that differ by more than a single character. In addition to the unique name, the modules shall include a set of header comments identifying the module's purpose, design, conditions, and version history, followed by the operational code. Headers are optional for modules of fewer than ten executable lines where the subject module is embedded in a larger module that has a header containing the header information. Library modules shall also have a header comment describing the purpose of the library and version information.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
44	c.	All required resources, such as data accessed by the module, should either be contained within the module or explicitly identified as input or output to the module. Within the constraints of the programming language, such resources shall be placed at the lowest level where shared access is needed. If that shared access level is across multiple modules, the definitions should be defined in a single file (called header files in some languages, such as C) where any changes can be applied once and the change automatically applies to all modules upon compilation or activation.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
45	d.	A module is small enough to be easy to follow and understand. Program logic visible on a single page is easy to follow and correct. Volume II, Section 5 provides testing guidelines for the [2002: ITA] [2005: accredited test lab] to identify large modules subject to review under this requirement.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
46	e.	Each module shall have a single entry point, and a single exit point, for normal process flow. For library modules or languages such as the object-oriented languages, the entry point is to the individual contained module or method invoked. The single exit point is the point where control is returned. At that point, the data that is expected as output must be appropriately set. The exception for the exit point is where a problem is so severe that execution cannot be resumed. In this case, the design must explicitly protect all recorded votes and audit log information and must implement formal exception handlers provided by the language.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
47	f.	Process flow within the modules shall be restricted to combinations of the control structures defined in Volume II, Section 5. These structures support the modular concept, especially the single entry/exit rule above. They apply to any language feature where program control passes from one activity to the next, such as control scripts, object methods, or sets of executable statements, even though the language itself is not procedural.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
48	**5.2.4**	**Control Constructs**			
49		**Voting system software shall use the control constructs identified in Volume II, Section 5:**			
50	a.	Acceptable constructs are Sequence, If-Then-Else, Do-While, Do-Until, Case, and the General loop (including the special case for loop).	**V.2:5.4.1, VSTL-TP-100, VSTL-TP-200 V.2:5.4.1.d**	**Yes**	
51	a. i.	If the programming language used does not provide these control constructs, the vendor shall provide them (that is, comparable control structure logic). The constructs shall be used consistently throughout the code. No other constructs shall be used to control program logic and execution.	**V.2:5.4.1.a, VSTL-TP-100, VSTL-TP-200**	**Yes**	
52	a. ii.	While some programming languages do not create programs as linear processes, stepping from an initial condition, through changes, to a conclusion, the program components nonetheless contain procedures (such as “methods” in object-oriented languages). Even in these programming languages, the procedures must execute through these control constructs or their equivalents, as defined and provided by the vendor.	**V.2:5.4.1.b, VSTL-TP-100, VSTL-TP-200**	**Yes**	
53	a. iii.	Operator intervention or logic that evaluates received or stored data shall not re-direct program control within a program routine. Program control may be re-directed within a routine by calling subroutines, procedures, and functions, and by interrupt service routines and exception handlers (due to abnormal error conditions). Do-While (False) constructs and intentional exceptions (used as GoTos) are prohibited.	**V.2:5.4.1.c, VSTL-TP-100, VSTL-TP-200**	**Yes**	
54	**5.2.5**	**Naming Conventions**			
55		**Voting system software shall use the following naming conventions:**			
56	a.	Object, function, procedure, and variable names shall be chosen so as to enhance the readability and intelligibility of the program.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
57	a.	Insofar as possible, names shall be selected so that their parts of speech represent their use, such as nouns to represent objects, verbs to represent functions.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
58	b.	Names used in the code and in documentation shall be consistent.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
59	c.	Names shall be unique within an application.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
60		Names shall differ by more than a single character. All single-character names are forbidden except those for variables used as loop indexes. In large systems where subsystems tend to be developed independently, duplicate names may be used where the scope of the name is unique within the application. Names should always be unique where modules are shared.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
61	d.	Language keywords shall not be used as names of objects, functions, procedures, variables, or in any manner not consistent with the design of the language.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
62	**5.2.6**	**Coding Conventions**			
63		**Voting system software shall adhere to basic coding conventions. The coding conventions used shall meet one of the following conditions:**			
64	a.	The vendors shall identify the published, reviewed, and industry-accepted coding conventions used and the [2002: ITAs] [2005: accredited test lab] shall test for compliance.	**V.2:5.4.2, VSTL-TP-100, VSTL-TP-200**	**Yes**	
65	b.	The ITAs shall evaluate the code using the coding convention requirements specified in Volume II, Section 5.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
66		**These standards reference conventions that protect the integrity and security of the code, which may be language-specific, and language-independent conventions that significantly contribute to readability and maintainability. Specific style conventions that support economical testing are not binding unless adopted by the vendor.**			
67	**5.2.7**	**Comment Conventions**			
68		**Voting system software shall use the following comment conventions:**			
69	a.	All modules shall contain headers. For small modules of 10 lines or less, the header may be limited to identification of unit and revision information. Other header information should be included in the small unit headers if not clear from the actual lines of code. Header comments shall provide the following information:	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
70	a. i.	Purpose of the unit and how it works.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
71	a. ii.	Other units called and the calling sequence.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
72	a. iii.	A description of input parameters and outputs.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
73	a. iv.	File references by name and method of access (read, wrote, modify, append, etc.).	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
74	a. v.	Global variables used.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
75	a. vi.	Date of creation and a revision record.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
76	b.	Descriptive comments shall be provided to identify objects and data types. All variables shall have comments at the point of declaration clearly explaining their use. Where multiple variables that share the same meaning are required, the variables may share the same comment.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
77	c.	In-line comments shall be provided to facilitate interpretation of functional operations, tests, and branching.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
78	d.	Assembly code shall contain descriptive and informative comments such that its executable lines can be clearly understood.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
79	e.	All comments shall be formatted in a uniform manner that makes it easy to distinguish them from executable code.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
80	**5.3**	**Data and Document Retention**			
81		**All systems shall:**			
82	a.	Maintain the integrity of voting and audit data during an election, and for at least 22 months thereafter, a time sufficient in which to resolve most contested elections and support other activities related to the reconstruction and investigation of a contested election.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
83	b.	Protect against the failure of any data input or storage device at a location controlled by the jurisdiction or its contractors, and against any attempt at improper data entry or retrieval.	**VSTL-TP-100, VSTL-TP-200**	**Yes**	
84	**5.4**	**Audit Record Data**			
85		Audit trails are essential to ensure the integrity of a voting system. Operational requirements for audit trails are described in [2002: Section 2.2.5.2 of the Standards] [2005: Subsection 2.5.1.1]. Audit record data are generated by these procedures. The audit record data in the following subsections are essential to the complete recording of election operations and reporting of the vote tally. This list of audit records may not reflect the design constructs of some systems. Therefore, **vendors shall** supplement it with information relevant to the operation of their specific systems.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
86	**5.4.1**	**Pre-election Audit Records**			
87		During election definition and ballot preparation, the system shall audit the preparation of the baseline ballot formats and modifications to them, a description of these modifications, and corresponding dates.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
88		**The log shall include:**	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**		
89	a.	The allowable number of selections for an office or issue.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
90	b.	The combinations of voting patterns permitted or required by the jurisdiction.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
91	c.	The inclusion or exclusion of offices or issues as the result of multiple districting within the polling place.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
92	d.	Any other characteristics that may be peculiar to the jurisdiction, the election, or the polling place's location.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
93	e.	Manual data maintained by election personnel.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
94	f.	Samples of all final ballot formats.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
95	g.	Ballot preparation edit listings.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
96	**5.4.2**	**System Readiness Audit Records**			
97		**The following minimum requirements apply to system readiness audit records:**			
98	a.	Prior to the start of ballot counting, a system process shall verify hardware and software status and generate a readiness audit record. This record shall include the identification of the software release, the identification of the election to be processed, and the results of software and hardware diagnostic tests.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
99	b.	In the case of systems used at the polling place, the record shall include the polling place's identification.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
100	c.	The ballot interpretation logic shall test and record the correct installation of ballot formats on voting devices.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
101	d.	The software shall check and record the status of all data paths and memory locations to be used in vote recording to protect against contamination of voting data.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
102	e.	Upon the conclusion of the tests, the software shall provide evidence in the audit record that the test data have been expunged.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
103	f.	If required and provided, the ballot reader and arithmetic-logic unit shall be evaluated for accuracy, and the system shall record the results, allowing the processing, or simulated processing, of sufficient test ballots to provide a statistical estimate of processing accuracy.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
104	g.	For systems that use a public network, provide a report of test ballots that includes:	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
105	g. i.	Number of ballots sent.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
106	g. ii.	When each ballot was sent.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	

	B	C	E	V	W
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2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
107	g. iii.	Machine from which each ballot was sent.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
108	g. iv.	Specific votes or selections contained in the ballot.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
109	**5.4.3**	**In-Process Audit Records**			
110		**In-process audit records document system operations during diagnostic routines and the casting and tallying of ballots. At a minimum, the in-process audit records shall contain:**			
111	a.	Machine generated error and exception messages to demonstrate successful recovery. Examples include, but are not necessarily limited to:	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
112	a. i.	The source and disposition of system interrupts resulting in entry into exception handling routines.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
113	a. ii.	All messages generated by exception handlers.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
114	a. iii.	The identification code and number of occurrences for each hardware and software error or failure.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
115	a. iv.	Notification of system login or access errors, file access errors, and physical violations of security as they occur, and a summary record of these events after processing.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
116	a. v.	Other exception events such as power failures, failure of critical hardware components, data transmission errors, or other type of operating anomalies.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
117	b.	Critical system status messages other than informational messages displayed by the system during the course of normal operations. These items include, but are not limited to:	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
118	b. i.	Diagnostic and status messages upon startup.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
119	b. ii.	The “zero totals” check conducted before opening the polling place or counting a precinct centrally.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
120	b. iii.	For paper-based systems, the initiation or termination of card reader and communications equipment operation.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
121	b. iv.	For DRE machines at controlled voting locations, the event (and time, if available) of activating and casting each ballot (i.e., each voter's transaction as an event). This data can be compared with the public counter for reconciliation purposes.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
122	c.	Non-critical status messages that are generated by the machine's data quality monitor or by software and hardware condition monitors.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
123	d.	System generated log of all normal process activity and system events that require operator intervention, so that each operator access can be monitored and access sequence can be constructed.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
124	**5.4.4**	**Vote Tally Data**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
125		**Voting systems shall meet these reporting requirements by providing software capable of obtaining data concerning various aspects of vote counting and producing reports of them on a printer. At a minimum, vote tally data shall include:**			
126	a.	Number of ballots cast, using each ballot configuration, by tabulator, by precinct, and by political subdivision.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
127	b.	Candidate and measure vote totals for each contest, by tabulator.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
128	c.	The number of ballots read within each precinct and for additional jurisdictional levels, by configuration, including separate totals for each party in primary elections.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
129	d.	Separate accumulation of overvotes and undervotes for each contest, by tabulator, precinct and for additional jurisdictional levels (no overvotes would be indicated for DRE voting devices).	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
130	e.	For paper-based systems only, the total number of ballots both able to be processed and unable to be processed; and if there are multiple card ballots, the total number of cards read.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
131		For systems that produce an electronic file containing vote tally data, the contents of the file shall include the same minimum data cited in a-e for printed vote tally reports.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**Yes**	
132	**5.5**	**Voter Secrecy (DRE Systems)**			
133		**All DRE systems shall ensure vote secrecy by:**			
134	a.	Immediately after the voter chooses to cast his or her ballot, record the voter's selections in the memory to be used for vote counting and audit data (including ballot images), and erase the selections from the display, memory, and all other storage, including all forms of temporary storage.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**No**	
135	b.	Immediately after the voter chooses to cancel his or her ballot, erase the selections from the display and all other storage, including buffers and other temporary storage.	**VSTL-TP-100, VSTL-TP-200, VSTL-TP-700, VSTL-TP-1200**	**No**	

Cell: D6

Comment: ITAs shall design and perform procedures that test the voting system software requirements identified in Volume I. All software components designed or modified for election use shall be tested in accordance with the applicable procedures contained in this section.

Unmodified, general purpose COTS non-voting software (e.g., operating systems, programming language compilers, data base management systems, and Web browsers) is not subject to the detailed examinations specified in this section. However, the ITA shall examine such software to confirm the specific version of software being used against the design specification to confirm that the software has not been modified. Portions of COTS software that have been modified by the vendor in any manner are subject to review.

Unmodified COTS software is not subject to code examination. However, source code generated by a COTS package and embedded in software modules for compilation or interpretation shall be provided in human readable form to the ITA. The ITA may inspect COTS source code units to determine testing requirements or to verify the code is unmodified.
The ITA may inspect the COTS generated software source code in preparation of test plans and to provide some minimal scanning or sampling to check for embedded code or unauthorized changes. Otherwise, the COTS source code is not subject to the full code review and testing. For purposes of code analysis, the COTS units shall be treated as unexpanded macros.

Compatibility of the voting system software components or subsystems with one another, and with other components of the voting system environment, shall be determined through functional tests integrating the voting system software with the remainder of the system.
The specific procedures to be used shall be identified in the Qualification Test Plan prepared by the ITA. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for software testing performed by the ITA.

Recognizing variations in system design and the technologies employed by different vendors, the ITAs shall design test procedures that account for these variations.

Cell: E6

Comment: V.2:5.2

The accredited test lab shall design and perform procedures that test the voting system software requirements identified in Volume I, Section 5. All software components designed or modified for election use shall be tested in accordance with the applicable procedures contained in this section.

Unmodified, general purpose COTS non-voting software (e.g., operating systems, programming language compilers, data base management systems, and Web browsers) is not subject to the detailed examinations specified in this section. However, the accredited test lab shall examine such software to confirm the specific version of software being used against the design specification to confirm that the software has not been modified. Portions of COTS software that have been modified by the vendor in any manner are subject to review.

Unmodified COTS software is not subject to code examination. However, source code generated by a COTS package and embedded in software modules for compilation or interpretation shall be provided in human readable form to the accredited test lab. The accredited test lab may inspect COTS source code units to determine testing requirements or to verify the code is unmodified.
The accredited test lab may inspect the COTS generated software source code in preparation of test plans and to provide some minimal scanning or sampling to check for embedded code or unauthorized changes. Otherwise, the COTS source code is not subject to the full code review and testing. For purposes of code analysis, the COTS units shall be treated as unexpanded macros.

Compatibility of the voting system software components or subsystems with one another, and with other components of the voting system environment, shall be determined through functional tests integrating the voting system software with the remainder of the system.

The specific procedures to be used shall be identified in the National Certification Test Plan prepared by the accredited test lab. These procedures may replicate testing performed by the vendor and documented in the vendor's TDP, but shall not rely on vendor testing as a substitute for software testing performed by the accredited test lab.

Recognizing variations in system design and the technologies employed by different vendors, the accredited test labs shall design test procedures that account for these variations.

V.2:1.3.1.3

The software tests encompass a number of interrelated examinations, involving assessment of application source code for its compliance with the requirements spelled out in Volume I, Section 5. Essentially, the accredited test lab will look at programming completeness, consistency, correctness, modifiability, structure, and traceability, along with its modularity and construction. The code inspection will be followed by a series of functional tests to verify the proper performance of all system functions controlled by the software.

The accredited test lab may inspect COTS generated software source code in the preparation of test plans and conduct some minimal scanning or sampling to check for embedded code or unauthorized changes. Otherwise, the COTS source code is not subject to the full code review and testing. For purposes of code analysis, the COTS units shall be treated as unexpanded macros.

Cell: D8
Comment: 5.3 Initial Review of Documentation

Prior to initiating the software review, the ITA shall verify that the documentation submitted by the vendor in the TDP is sufficient to enable:

a. Review of the source code; and

b. Design and conducting of tests at every level of the software structure to verify that the software meets the vendor's design specifications and the requirements of the performance standards.

Cell: E8
Comment: 5.3 Initial Review of Documentation

Prior to initiating the software review, the accredited test lab shall verify that the documentation submitted by the vendor in the TDP is sufficient to enable:

a. Review of the source code; and

b. Design and conducting of tests at every level of the software structure to verify that the software meets the vendor's design specifications and the requirements of the performance guidlines.

Cell: E9
Comment: 5.3 Initial Review of Documentation

Prior to initiating the software review, the accredited test lab shall verify that the documentation submitted by the vendor in the TDP is sufficient to enable:

a. Review of the source code; and

b. Design and conducting of tests at every level of the software structure to verify that the software meets the vendor's design specifications and the requirements of the performance guidlines.

Cell: D19
Comment: The ITA shall compare the source code to the vendor's software design documentation to ascertain how completely the software conforms to the vendor's specifications. Source code inspection shall also assess the extent to which the code adheres to the requirements in Volume I, Section 4.

Cell: E19
Comment: The accredited test lab shall compare the source code to the vendor's software design documentation to ascertain how completely the software conforms to the vendor's specifications. Source code inspection

shall also assess the extent to which the code adheres to the requirements in Volume I, Section 5.

Cell: D41
Comment: However, the ITA shall examine such software to confirm the specific version of software being used against the design specification to confirm that the software has not been modified. Portions of COTS software that have been modified by the vendor in any manner are subject to review.

Unmodified COTS software is not subject to code examination. However, source code generated by a COTS package and embedded in software modules for compilation or interpretation shall be provided in human readable form to the ITA. The ITA may inspect COTS source code units to determine testing requirements or to verify the code is unmodified.

The ITA may inspect the COTS generated software source code in preparation of test plans and to provide some minimal scanning or sampling to check for embedded code or unauthorized changes. Otherwise, the COTS source code is not subject to the full code review and testing. For purposes of code analysis, the COTS units shall be treated as unexpanded macros.

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Comment: However, the accredited lab shall examine such software to confirm the specific version of software being used against the design specification to confirm that the software has not been modified. Portions of COTS software that have been modified by the vendor in any manner are subject to review.

Unmodified COTS software is not subject to code examination. However, source code generated by a COTS package and embedded in software modules for compilation or interpretation shall be provided in human readable form to the the accredited lab. The the accredited lab may inspect COTS source code units to determine testing requirements or to verify the code is unmodified.

The the accredited lab may inspect the COTS generated software source code in preparation of test plans and to provide some minimal scanning or sampling to check for embedded code or unauthorized changes. Otherwise, the COTS source code is not subject to the full code review and testing. For purposes of code analysis, the COTS units shall be treated as unexpanded macros.

Cell: D50
Comment: Illustrations of control construct techniques are provided in v2:5.4.1.2:

- Fig. 4-1 Sequence
- Fig. 4-2 If -Then -Else
- Fig. 4-3 Do -While
- Fig. 4-4 Do -Until
- Fig. 4-5 Case
- Fig. 4-6 General loop, including the special case FOR loop.

v2:5.4.1.1: In the constructs shown, any ‘process’ may be replaced by a simple statement, a subroutine or function call, or any of the control constructs. In Fig 4-1 for example, “Process A” may be a simple statement and “Process B” another Sequence construct.

Cell: E50
Comment: V.2:5.4.1

Illustrations of control construct techniques are provided in v2:5.4.1.1:

- Fig. 4-1 Sequence

- Fig. 4-2 If -Then -Else
- Fig. 4-3 Do -While
- Fig. 4-4 Do -Until
- Fig. 4-5 Case
- Fig. 4-6 General loop, including the special case FOR loop.

In the constructs shown, any 'process' may be replaced by a simple statement, a subroutine or function call, or any of the control constructs. In Fig 4-1 for example, "Process A" may be a simple statement and "Process B" another Sequence construct.

V.2:5.4.1.d

Conventional constructs that are inherent to the development language are permitted but must be documented in the code, adjacent to their use.

Cell: D51
Comment: If the programming language used does not provide these control constructs, the vendor shall provide them (that is, comparable control structure logic). The constructs shall be used consistently throughout the code. No other constructs shall be used to control program logic and execution.

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Cell: D52
Comment: While some programming languages do not create programs as linear processes, stepping from an initial condition, through changes, to a conclusion, the program components nonetheless contain procedures (such as "methods" in object-oriented languages). Even in these programming languages, the procedures must execute through these control constructs (or their equivalents, as defined and provided by the vendor).

Cell: E52
Comment: While some programming languages do not create programs as linear processes, stepping from an initial condition, through changes, to a conclusion, the program components nonetheless contain procedures (such as "methods" in object-oriented languages). Even in these programming languages, the procedures must execute through these control constructs (or their equivalents, as defined and provided by the vendor).

Cell: D53
Comment: Operator intervention or logic that evaluates received or stored data shall not re-direct program control within a program routine. Program control may be re-directed within a routine by calling subroutines, procedures, and functions, and by interrupt service routines and exception handlers (due to abnormal error conditions). Do-While (False) constructs and intentional exceptions (used as GoTos) are prohibited.

Cell: E53
Comment: Operator intervention or logic that evaluates received or stored data shall not re-direct program control within a program routine. Program control may be re-directed within a routine by calling subroutines, procedures, and functions, and by interrupt service routines and exception handlers (due to abnormal error conditions). Do-While (False) constructs and intentional exceptions (used as GoTos) are prohibited.

Cell: D64
Comment: The ITA shall test for compliance with the coding conventions specified by the vendor. If the vendor does not identify an appropriate set of coding conventions in accordance with the provisions of Volume I, section 4.2.6.a, the ITA shall review the code to ensure that it:

(a. - w.)

Cell: E64

Comment: The accredited test lab shall test for compliance with the coding conventions specified by the vendor. If the vendor does not identify an appropriate set of coding conventions in accordance with the provisions of Volume I, Subsection 5.2.6, the accredited test lab shall review the code to ensure that it:

(a. - w.)

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
4	**2.1.9**	**Telecommunications**	**V.2:6.4.2**		
5		For all voting systems that use telecommunications for the transmission of data during pre-voting, voting or post-voting activities, capabilities shall include capabilities to ensure data are transmitted with no alternation or unauthorized disclosure during transmission.	**VSTL-TP-1000**	**Yes**	
6		Such transmissions shall not violate the privacy, secrecy, and integrity demands of the *Guidelines* . Section [2002: 5] [2005: 6] describes telecommunications standards that apply to, at a minimum, the following types of data transmissions:	**VSTL-TP-1000**	**Yes**	
7		• Voter Authentication	**VSTL-TP-1000**	**Yes**	
8		• Ballot Definition	**VSTL-TP-1000**	**Yes**	
9		• Vote Transmission to Central Site	**VSTL-TP-1000**	**Yes**	
10		• Vote Count	**VSTL-TP-1000**	**Yes**	
11		• List of Voters	**VSTL-TP-1000**	**Yes**	
12	**4.1.2.15**	**Data Network Requirements**			
13		Voting systems may use a local or remote data network. If such a network is used, then all components of the network shall comply with the telecommunications requirements described in Section 5 of the Standards and the Security requirements described in Section 6.	**If a data network is used, include it in evaluation to telecommuncation requirements.**		
14	**6**	**Telecommunications Requirements**			
15					
16	**6.2**	**Design, Construction, and Maintenance Requirements**			
17	**6.2.1**	**Accuracy**			
18		Telecommunications components meet the accuracy requirements of section 3.2.1 (4.1.1).	**VSTL-TP-1000, VSTL-TP-1220**	**Yes**	
19	**6.2.2**	**Durability**			
20		Telecommunications components meet the durability requirements of section 3.4.2 (4.3.2).	**VSTL-TP-1000, VSTL-TP-400, VSTL-TP-500, VSTL-TP-600**	**Yes**	
21	**6.2.3**	**Reliability**			
22		Telecommunications components meet the reliability requirements of section 3.4.3 (4.3.3).	**VSTL-TP-1000, VSTL-TP-420**	**Yes**	
23	**6.2.4**	**Maintainability**			
24		Telecommunications components meet the maintainability requirements of section 3.4.4 (4.3.4).	**VSTL-TP-1000, VSTL-TP-440**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
25	**6.2.5**	**Availability**			
26		Telecommunications components meet the availability requirements of section 3.4.5 (4.3.5).	**VSTL-TP-1000, VSTL-TP-410**	**Yes**	
27	**6.2.6**	**Integrity**			
28	a.	WANs using public telecommunications, boundary definition and implementation shall not give direct access or control of inside the boundary resources to any outside entity.	**VSTL-TP-1000**	**Yes**	
29	b.	Voting system administrators shall not require any control of resources outside the boundary.	**VSTL-TP-1000**	**Yes**	
30	c.	The system design and configuration is not vulnerable to a single point of failure in the connection to the public network causing loss of voting capabilities at any polling place.	**VSTL-TP-1000**	**Yes**	
31	**6.2.7**	**Confirmation**			
32		Confirmation of successful or unsuccessful completion of data transmission,	**VSTL-TP-1000**	**Yes**	
33		Unsuccessful completion notifies the user of the action to be taken.	**VSTL-TP-1000**	**Yes**	

Cell: D4

Comment: For systems that use telecommunications to transmit official voting data, the ITA shall review, and conduct tests of, the data interception and prevention safeguards specified by the vendor in its TDP. The ITA shall evaluate safeguards provided by the vendor to ensure their proper operation, including the proper response to the detection of efforts to monitor data or otherwise compromise the system.
For systems that use public communications networks the ITA shall also review the vendor's documented procedures for maintaining protection against newly discovered external threats to the telecommunications network. This review shall assess the adequacy of such procedures in terms of:

a. Identification of new threats and their impact;
b. Development or acquisition of effective countermeasures;
c. System testing to ensure the effectiveness of the countermeasures;
d. Notification of client jurisdictions that use the system of the threat and the actions that should be taken;
e. Distribution of new system releases or updates to current system users; and
f. Confirmation of proper installation of new system releases.

Cell: E4

Comment: For systems that use telecommunications to transmit official voting data, the accredited test lab shall review, and conduct tests of, the data interception and prevention safeguards specified by the vendor in its TDP. The accredited test lab shall evaluate safeguards provided
by the vendor to ensure their proper operation, including the proper response to the detection of efforts to monitor data or otherwise compromise the system.

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a. Identification of new threats and their impact.
b. Development or acquisition of effective countermeasures.
c. System testing to ensure the effectiveness of the countermeasures.
d. Notification of client jurisdictions that use the system of the threat and the actions that should be taken
e. Distribution of new system releases or updates to current system users.
f. Confirmation of proper installation of new system releases.

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
4	**2.1**	**Overall System Capabilities**			
5	**2.1.1**	**Security**			
6	a.	Provide security access controls that limit or detect access to critical system components.		**Yes**	
7	b.	Provide system functions that are executable only in the intended manner and order, and only under the intended conditions.		**Yes**	
8	c.	Use the system's control logic to prevent a system function from executing, if any preconditions to the function have not been met.		**Yes**	
9	d.	Provide safeguards that protects against tampering during system repair, or interventions in system operations, in response to system failure.		**Yes**	
10	e.	Provide security provisions that are compatible with the procedures and administrative tasks involved in equipment preparation, testing, and operation.		**Yes**	
11	f.	Incorporate a means of implementing a capability if access to a system function is to be restricted or controlled		**Yes**	
12	g.	Provide documentation of mandatory administrative procedures for effective system security.		**Yes**	
13	**1.3.1.4**	**System Integration Testing**			
14		**The security tests focus on the ability of the system to detect, prevent, log, and recover from a broad range of security risks as identified in Volume 1, Section 7. The range of risks tested is determined by the design of the system and potential exposure to risk. Regardless of system design and risk profile, all systems are tested for effective access control and physical data security. For systems that use public telecommunications networks, to transmit election management data or official election results (such as ballots or tabulated results), security tests are conducted to ensure that the system provides the necessary identity-proofing, confidentiality, and integrity of transmitted data. The tests determine if the system is capable of detecting, logging, preventing, and recovering from types of attacks known at the time the system is submitted for qualification. The accredited test lab may meet these testing requirements by confirming the proper implementation of proven commercial security software.**			
15		**Evolution of Testing**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
16		Taking advantage of the experience gained in examining other voting systems, ITAs will design tests specifically for the system design, configuration, and documentation provided by the vendor. Additionally, new threats may be identified that are not directly addressed by the Standards or the system. As new threats to a voting system are discovered, either during the system's operation or during the operation of other computer-based systems that use technologies comparable to those of another voting system, ITAs shall expand the tests used for system security to address the threats that are applicable to a particular design of voting system.	**VSTL-TP-1100**	**Yes**	
17	**V2 6.4**	**Security Testing**			
18		**The accredited test lab shall design and perform test procedures that test the security capabilities of the voting system against the requirements defined in Volume I, Section 7. These procedures shall focus on the ability of the system to detect, prevent, log, and recover from the broad range of security risks identified. These procedures shall also examine system capabilities and safeguards claimed by the vendor in the TDP to go beyond these risks. The range of risks tested is determined by the design of the system and potential exposure to risk. Regardless of system design and risk profile, all systems shall be tested for effective access control and physical data security.** **For systems that use public telecommunications networks, including the Internet, to transmit election management data or official election results (such as ballots or tabulated results), the accredited test lab shall conduct tests to ensure that the system provides the necessary identity-proofing, confidentiality, and integrity of transmitted data. These tests shall be designed to confirm that the system is capable of detecting, logging, preventing, and recovering from types of attacks known at the time the system is submitted for certification.** **The accredited test lab may meet these testing requirements by confirming proper implementation of proven commercial security software. In this case, the vendor must provide the published standards and methods used by the U.S. Government to test and accept this software, or it may provide references to free, publicly available publications of these standards and methods, such as government web sites.** **At its discretion, the accredited test lab may conduct or simulate attacks on the system to confirm the effectiveness of the system's security capabilities, employing test procedures approved by the EAC.**			
19	**4.1.2.15**	**Data Network Requirements**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
20		Voting systems may use a local or remote data network. If such a network is used, then all components of the network shall comply with the telecommunications requirements described in Section 5 of the Standards and the Security requirements described in Section 6.	**If a data network is used include it in evaluation to security requirements.**	**Yes**	
21	**7**	**Security Standards**			
22		Security testing	**V.2:6.4, VSTL-TP-1100**	**Yes**	
23	**7.2**	**Access Controls**	**V.2:6.4.1 V.2:A.4.3.5**		
24		**Access Control Policies**			
25	**7.2.1**	**General Access Control Policy**			
26		**Vendor provides a description of recommended policies for:**			
27	a.	Software access controls.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
28	b.	Hardware access controls.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
29	c.	Communications.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
30	d.	Effective password management.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
31	e.	Protection abilities of a particular operating system.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
32	f.	General characteristics of supervisory access privileges.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
33	g.	Segregation of duties.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
34	h.	Any additional relevant characteristics.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
35	**7.2.1.1**	**Individual Access Privileges**			
36		**Vendor shall:**			
37	a.	Identify each person to whom access is granted, and the specific functions and data to which each person holds authorized access.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
38	b.	Specify whether an individual's authorization is limited to a specific time, time interval, or phase of the voting or counting operations.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
39	c.	Permit the voter to cast a ballot expeditiously, but preclude voter access to all aspects of the vote-counting processes.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
40	**7.2.1.2**	**Access Control Measures**			
41		**Vendors shall provide a detailed description of all system access control measures designed to permit authorized access to the system and prevent unauthorized access. Examples of such measures include:**			
42	a.	Use of data and user authorization.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
43	b.	Program unit ownership and other regional boundaries.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
44	c.	One-end or two-end port protection devices.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
45	d.	Security kernels.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
46	e.	Computer-generated password keys.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
47	f.	Special protocols.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
48	g.	Message encryption.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
49	h.	Controlled access security.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
50		Vendors also shall define and provide a detailed description of the methods used to prevent unauthorized access to the access control capabilities of the system itself.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
51	**7.3**	**Physical Security Measures**			
52	**7.3.1**	**Polling Place Security**			
53		**Vendors shall develop and provide detailed documentation of measures to anticipate and counteract vandalism, civil disobedience, and similar occurrences. The measures shall:**			
54		**Vendors shall develop and provide detailed documentation of measures to enable poll workers to physically protect and perform orderly shutdown of voting equipment to counteract vandalism, civil disobedience, and similar occurrences. The measures shall:**			
55		Allow the immediate detection of tampering with vote casting devices and precinct ballot counters.	**VSTL-TP-1100, VSTL-TP-100**	**No**	
56		Control physical access to a telecommunications link if such a link is used.	**VSTL-TP-1100, VSTL-TP-100**	**No**	
57	**7.3.2**	**Central Count Location Security**			
58		**Vendor develops and documents in detail the measures to be taken in a central counting environment. These measures shall include physical and procedural controls related to the:**			
59		Handling of ballot boxes.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
60		Preparing of ballots for counting.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
61		Counting operations.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
62		Reporting data.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
63		**Software Security**			
64	**7.4.1**	**Software and Firmware Installation**			
65		**The system shall meet the following requirements for installation of software, including hardware with embedded firmware:**			
66	a.	If software is resident in the system as firmware, the vendor shall require and state in the system documentation that every device is to be retested to validate each ROM prior to the start of elections operations.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	

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67	b.	No software shall be permanently installed or resident in the system unless the system documentation states that the jurisdiction must provide a secure physical and procedural environment for the storage, handling, preparation, and transportation of the system hardware.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
68	c.	The system bootstrap, monitor, and device-controller software may be resident permanently as firmware, provided that this firmware has been shown to be inaccessible to activation or control by any means other than by the authorized initiation and execution of the vote-counting program, and its associated exception handlers.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
69	d.	The election-specific programming may be installed and resident as firmware, provided that such firmware is installed on a component (such as computer chip) other than the component on which the operating system resides.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
70	e.	After initiation of election day testing, no source code or compilers or assemblers shall be resident or accessible.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
71	**7.4.2**	**Protection Against Malicious Software**			
72		Voting systems shall deploy protection against the many forms of threats to which they may be exposed such as file and macro viruses, worms, Trojan horses, and logic bombs. Vendors shall develop and document the procedures to be followed to ensure that such protection is maintained in a current status.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
73	**7.4.3**	**Software Distribution and Setup Validation**			
74	**7.4.4**	**Software Distribution**			
75	a.	The vendor shall document all software including voting system software, third party software (such as operating systems and drivers) to be installed on the certified voting system, and installation programs.	**Inspection, VSTL-TP-1100, VSTL-TP-100**	**Yes**	
76	a. i.	The documentation shall have a unique identifier (such as a serial number or part number) for the following set of information: documentation, software vendor name, product name, version, the certification application number of the voting system, file names and paths or other location information (such as storage addresses) of the software.	**Inspection, VSTL-TP-1100, VSTL-TP-100**	**Yes**	
77	a. ii.	The documentation shall designate all software files as static, semi-static or dynamic.	**Inspection, VSTL-TP-1100, VSTL-TP-100**	**Yes**	
78	b.	The EAC accredited testing lab shall witness the final build of the executable version of the certified voting system software performed by the vendor.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
79	b. i.	The testing lab shall create a complete record of the build that includes: a unique identifier (such as a serial number) for the complete record; a list of unique identifiers of unalterable storage media associated with the record; the time, date, location, names and signatures of all people present; the source code and resulting executable file names; the version of voting system software; the certification application number of the voting system; the name and versions of all (including third party) libraries; and the name, version, and configuration files of the development environment used for the build.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
80	b. ii.	The record of the source code and executable files shall be made on unalterable storage media. Each piece of media shall have a unique identifier.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
81	b. iii.	The testing lab shall retain this record until notified by the EAC that it can be archived.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
82	c.	After EAC certification has been granted, the testing lab shall create a subset of the complete record of the build that includes a unique identifier (such as a serial number) of the subset, the unique identifier of the complete record, a list of unique identifiers of unalterable storage media associated with the subset, the vendor and product name, the version of voting system software, the certification number of the voting system, and all the files that resulted from the build and binary images of all installation programs.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
83	c. i.	The record of the software shall be made on unalterable storage media. Each piece of media shall have a unique identifier.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
84	c. ii.	The testing lab shall retain a copy, send a copy to the vendor, and send a copy to the NIST National Software Reference Library (NSRL) and/or to any repository designated by a State.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
85	c. iii.	The NSRL shall retain this software until notified by the EAC that it can be archived.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
86	d.	The vendor shall provide the NSRL and any repository designated by a state with a copy of the software installation disk, which the vendor will distribute to purchasers--including the executable binary images of all third party software.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
87	d. i.	All voting system software, installation programs and third party software (such as operating systems and drivers) used to install or to be installed on voting system equipment shall be distributed using unalterable storage media.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
88	d. ii.	The vendor shall document that the process used to verify the software distributed on unalterable storage media is the certified software by using the reference information provided by the NSRL or other designated repository before installing the software.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
89	e.	The voting system equipment shall be designed to allow the voting system administrator to verify that the software is the certified software by comparing it to reference information produced by the NSRL or other designated repository.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
90	f.	The vendors and testing labs shall document to whom they provide voting system software.	**VSTL-TP-1100, VSTL-TP-100**	**Yes**	
91	**7.4.5**	**Software Reference Information**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
92		**The NSRL or other repository designated by a state election office shall generate reference information using binary images of the (a) certified voting system software received on unalterable storage media from testing labs and (b) election-specific software received on unalterable storage media from jurisdictions. The NSRL or other designated repository shall:**			
93	a.	Generate reference information in at least one of the following forms: (a) complete binary images, (b) cryptographic hash values, or (c) digital signatures of the software.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
94	b.	Create a record of the creation of the reference information that includes: • a unique identifier (such as a serial number) for the record; • the file names of software and associated unique identifier(s) of the unalterable storage media from which reference information is generated; • the time, date and name of people who generated reference information; • the type of reference information created; • the certification number of the voting system; • the voting system software version; • the product name; • the vendor name	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
95	c.	The NSRL or other designated repository shall retain the unalterable storage media used to generate the reference information until notified by the EAC that it can be archived.		**Yes**	
96	**7.4.5.1**	**Hashes and Digital Signatures**			
97	a.	The NSRL or other designated repository that generates hash value and/or digital signature reference information shall use FIPS-approved algorithms for hashing and signing.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
98	a.i.	The NSRL or other designated repository that generates hash values, digital signatures reference information or cryptographic keys shall use a FIPS 140-2 level 1 or higher validated cryptographic module.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
99	a.ii.	The NSRL or other designated repository that generates hash values and digital signatures for reference information shall include a hash value or digital signature covering the set of reference information.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
100	b.	**If the NSRL or other designated repository uses public key technology, the following requirements shall be met:**			
101	b.i.	Public and private key pairs used by the repository to generate digital signatures shall be 2048-bits or greater in length.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
102	b.ii.	The repository's private keys used to generate digital signature reference information shall be used for no more than three years.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
103	b.iii.	Public keys used to verify digital signature reference information shall be placed on unalterable storage media if not contained in a signed non-proprietary format for distribution.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
104	b.iv.	All copies of public key unalterable storage media made by the repository shall be labeled so that they are uniquely identifiable, including as a minimum: • a unique identifier (such as a serial number) for the unalterable storage media; • the time, date, location and name(s) of the repository owning the associated private keys; • documentation about its creation; • an indication that the contents are public keys	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
105	b.v.	The NSRL or other designated repository shall document to whom they provide unalterable storage media containing their public keys used to verify digital signature reference information including at a minimum: • the uniquely identified public keys, • the time and date provided, • the name of the organization, • the name and contact information (phone, address, email address) of the recipient	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
106	b.vi.	When a private key used to generate digital signature reference information becomes compromised, the NSRL or other designated repository shall provide notification to recipients of the associated public key that the private key has been compromised and the date on which it was compromised.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
107	c.	The NSRL or other designated repository shall make both the reference information available on unalterable storage media and its associated documentation that is labeled by the repository that created it uniquely identifiable by including at a minimum: • a unique identifier (such as a serial number) for the storage media; • the time, date, location, and name of the creating repository; • an indication that the contents are reference information	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
108	**7.4.6**	**Software Setup Validation**			
109	a.	Setup validation methods shall verify that no unauthorized software is present on the voting equipment.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
110	b.	The vendor shall have a process to verify that: • the correct software is loaded, • there is no unauthorized software, • voting system software on voting equipment has not been modified, using the reference information from the NSRL or from a State designated repository	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
111	b.i.	The process used to verify software should be possible to perform without using software installed on the voting system.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
112	b.ii.	The vendor shall document the process used to verify software on voting equipment.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
113	b.iii.	The process shall not modify the voting system software on the voting system during the verification process.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
114	c.	The vendor shall provide a method to comprehensively list all software files that are installed on voting systems.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
115	d.	The verification process should be able to be performed using COTS software and hardware available from sources other than the voting system vendor.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
116	d.i.	If the process uses hashes or digital signatures, then the verification software shall use a FIPS 140-2 level 1 or higher validated cryptographic module.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
117	d.ii.	The verification process shall either: (a) use reference information on unalterable storage media received from a repository, or (b) verify the digital signature of the reference information on any other media.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
118	e.	Voting system equipment shall provide a means to ensure that the system software can be verified through a trusted external interface, such as a read-only external interface, or by other means.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
119	e.i.	The external interface system shall be protected using tamper evident techniques.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
120	e.ii.	The external interface shall have a physical indicator showing when the interface is enabled and disabled.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
121	e.iii.	The external interface shall be disabled during voting.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
122	e.iv.	The external interface should provide a direct read-only access to the location of the voting system software without the use of installed software.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
123	f.	Setup validation methods shall verify that the registers and variables of the voting system equipment contain the proper static and initial values.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
124	f.i	The vendor should provide a method to query the voting system to determine the values of all static and dynamic registers and variables including the values that jurisdictions are required to modify to conduct a specific election.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
125	f.ii.	The vendor shall document the values of all static registers and variable, and the initial starting values of all dynamic registers and variables listed for voting system software, except for the values set to conduct a specific election.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200**	**Yes**	
126	**7.5**	**Telecommunications and Data Transmission**	**V.2:6.4.2**		
127	**7.5.1**	**Access Controls**			
128		Voting systems that use telecommunications to communicate between system components and locations are subject to the same security requirements governing access to any other system hardware, software, and data function.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
129	**7.5.1.a**	**Data Integrity**			
130		Voting systems that use electrical or optical transmission of data shall ensure the receipt of valid vote records is verified at the receiving station. This should include standard transmission error detection and correction methods such as checksums or message digest hashes.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
131		Verification of correct transmission shall occur at the voting system application level and ensure that the correct data is recorded on all relevant components consolidated within the polling place prior to the voter completing casting of his or her ballot.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
132	**7.5.1.b**	**Data Interception Prevention**			
133		**Voting systems using telecommunications to communicate between system components and locations before the polling place is officially closed shall:**			
134	i.	Implement an encryption standard currently documented and validated for use by an agency of the U.S. Federal Government.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
135	ii.	Provide a means to detect the presence of an intrusive process, such as an Intrusion Detection System.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
136	**7.5.2**	**Protection Against External Threats**			
137	a.	Voting systems that use public telecommunications networks shall implement protections against external threats to which commercial products used in the system may be susceptible.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
138	**7.5.2**	**Identification of COTS Products**			
139	b.	**Voting systems that use public telecommunications networks shall provide system documentation that clearly identifies all COTS hardware and software products and communications services used in the development and/or operation of the voting system, including:**			
140	b.	Operating systems.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
141		Communications routers.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
142		Modem drivers.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
143		Dial-up networking software.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
144	b.i.	Such documentation shall identify the name, vendor, and version used for each such component.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
145	**7.5.2**	**Use of Protective Software.**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
146	c.	**Voting systems that use public telecommunications networks shall use protective software at the receiving-end of all communications paths to:**			
147	c.i.	Detect the presence of a threat in a transmission.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
148	c.ii.	Remove the threat from infected files/data.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
149	c.iii.	Prevent against storage of the threat anywhere on the receiving device.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
150	c.iv.	Provide the capability to confirm that no threats are stored in system memory and in connected storage media.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
151	c.v	Provide data to the system audit log indicating the detection of a threat and the processing performed.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
152	d.	Vendors shall use multiple forms of protective software as needed to provide capabilities for the full range of products used by the voting system.	**VSTL-TP-1100, VSTL-TP-100, VSTL-TP-200, VSTL-TP-1000**	**Yes**	
153	**7.5.3**	**Monitor and Responding to External Threats**			
154		**The vendor of a voting system that uses public telecommunications shall document how they plan to monitor and respond to known threats to which their voting systems are vulnerable. This documentation shall provide a detailed description, including scheduling information, of the procedures the vendor will use to:**			
155		**Monitor threats.**			
156	a.	Monitor threats, such as through the review of assessments, advisories, and alerts for COTS components issued by the Computer Emergency Response Team (CERT), for which a current listing can be found at http://www.cert.org, the National Infrastructure Protection Center (NIPC), and the Federal Computer Incident Response Capability (FedCIRC), for which additional information can be found at www.us-cert.gov.	**Inspection, VSTL-TP-100, VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
157	b.	Evaluate threats and, if any, proposed responses.	**Inspection, VSTL-TP-100, VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
158	c.	Develop responsive updates to the system and/or corrective procedures.	**Inspection, VSTL-TP-100, VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
159	d.	Submit the proposed response to the ITAs and appropriate states for approval, identifying the exact changes and whether or not they are temporary or permanent.	**Inspection, VSTL-TP-100, VSTL-TP-1100, VSTL-TP-1000**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
160	e.	After implementation of the proposed response is approved by the state, assist clients, either directly or through detailed written procedures, how to update their systems and/or to implement the corrective procedures [2002: no later than one month before an election] [2005: within the timeframe established by the state]	**Inspection, VSTL-TP-100, VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
161	f.	Address threats emerging too late to correct the system [2002: at least one month before the election, including] [2005: by]:	**Inspection, VSTL-TP-100, VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
162	f.i.	Providing prompt, emergency notification to the ITAs and the affected states and user jurisdictions.	**Inspection, VSTL-TP-100, VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
163	f.ii.	Assisting client jurisdictions directly, or advising them through detailed written procedures, to disable the public telecommunications mode of the system.	**Inspection, VSTL-TP-100, VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
164	f.iii.	After the election, modifying the system to address the threat, submitting the modified system to an ITA and appropriate state certification authority for approval, and assisting client jurisdictions directly, or advising them through detailed procedures, to update their systems and/or to implement the corrective procedures after approval.	**Inspection, VSTL-TP-100, VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
165	**7.5.4**	**Shared Operating Environment**			
166		**If ballot recording and vote counting operations are performed in an environment that is shared with other data processing functions, both hardware and software features shall be present to protect the integrity of vote counting and of vote data. Systems that use a shared operating environment shall:**			
167	a.	Use security procedures and logging records to control access to system functions.	**VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
168	b.	Partition or compartmentalize voting system functions from other concurrent functions at least logically, and preferably physically as well.	**VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
169	c.	Control system access by means of passwords, and restriction of account access to necessary functions only.	**VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
170	d.	Have capabilities in place to control the flow of information, precluding data leakage through shared system resources.	**VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
171	**7.5.5**	**Access to Incomplete Election Returns and Interactive Queries**			
172		**If the voting system provides access to incomplete election returns and interactive inquiries before the completion of the official count, the system shall:**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
173	a.	For equipment that operates in a central counting environment, be designed to provide external access to incomplete election returns only if that access for these purposes is authorized by the statutes and regulations of the using agency. This requirement applies as well to polling place equipment that contains a removable memory module, or that may be removed in its entirety to a central place for the consolidation of polling place returns.	**VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
174	b.	Design voting system software and its security environment designed such that data accessible to interactive queries resides in an external file or database created and maintained by the elections software under the restrictions applying to any other output report, namely, that:	**VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
175	b.i.	The output file or database has no provision for write-access back to the system.	**VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
176	b.ii.	Persons whose only authorized access is to the file or database are denied write-access, both to the file or database, and to the system.	**VSTL-TP-1100, VSTL-TP-1000**	**Yes**	
177	**7.6**	**Security for Transmission of Official Data Over Public Communications Networks**			
178	**7.6.1**	**General Security Requirements for Systems Transmitting Data Over Public**			
179		**All systems that transmit data over public telecommunications networks shall:**			
180	a.	Preserve the secrecy of a voter's ballot choices, and prevent anyone from violating ballot privacy.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
181	b.	Employ digital signature for all communications between the vote server and other devices that communicate with the server over the network.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
182	c.	Require that at least two authorized election officials activate any critical operation regarding the processing of ballots transmitted over a public communications network takes place, i.e. the passwords or cryptographic keys of at least two employees are required to perform processing of votes.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
183	**7.6.2**	**Voting Process Security for Casting Individual Ballots over a Public**			
184	**7.6.2.1**	**Documentation of Mandatory Security Activities**			
185		**Vendors of systems that cast individual ballots over a public telecommunications network shall provide detailed descriptions of:**			
186	a.	All activities mandatory to ensuring effective system security to be performed in setting up the system for operation, including testing of security before an election.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
187	b.	All activities that should be prohibited during system setup and during the time frame for voting operations, including both the hours when polls are open and when polls are closed.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
188	**7.6.2.2**	**Capabilities to Operate During Interruption of Telecommunications Capabilities**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
189		**These systems shall provide the following capabilities to provide resistance to interruptions of telecommunications service that prevent voting devices at the polling place from communicating with external components via telecommunications:**			
190	a.	Detect the occurrence of a telecommunications interruption at the polling place and switch to an alternative mode of operation that is not dependent on the connection between polling place voting devices and external system components.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
191	b.	Provide an alternate mode of operation that includes the functionality of a conventional electronic machine without losing any single vote.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
192	c.	Create and preserve an audit trail of every vote cast during the period of interrupted communication and system operation in conventional electronic voting system mode.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
193	d.	Upon reestablishment of communications, transmit and process votes accumulated while operating in conventional electronic voting system mode with all security safeguards in effect.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
194	e.	Ensure that all safeguards related to voter identification and authentication are not affected by the procedures employed by the system to counteract potential interruptions of telecommunications capabilities.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
195	**7.7**	**Wireless Communications**			
196	**7.7.1**	**Controlling Usage**			
197		**If wireless communications are used in a voting system, then**			
198	a.	the vendor shall supply documentation describing how to use all aspects of wireless communications in a secure manner.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
199		**This documentation shall include:**			
200	i.	A complete description of the uses of wireless in the voting system including descriptions of the data elements and signals that are to be carried by the wireless mechanism	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
201	ii.	A complete description of the vulnerabilities associated with this proposed use of wireless, including vulnerabilities deriving from the insertion, deletion, modification, capture or suppression of wireless messages	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
202	iii.	A complete description of the techniques used to mitigate the risks associated with the described vulnerabilities including techniques used by the vendor to ensure that wireless cannot send or receive messages other than those situations specified in the documentation. Cryptographic techniques shall be carefully and fully described, including a description of cryptographic key generation, management, use, certification, and destruction	**VSTL-TP-1100, VSTL-TP-1000**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
203	iv.	A rationale for the inclusion of wireless in the proposed voting system, based on a careful and complete description of the perceived advantages and disadvantages of using wireless for the documented uses compared to using non-wireless approaches	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
204	b.	The details of all cryptographic protocols used for wireless communications, including the specific features and data, shall be documented.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
205	c.	The wireless documentation shall be closely reviewed for accuracy, completeness, and correctness.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
206	d.	There shall be no undocumented use of the wireless capability, nor any use of the wireless capability that is not entirely controlled by an election official.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
207	e.	If a voting system includes wireless capabilities, then the voting system shall be able to accomplish the same function if wireless capabilities are not available due to an error or no service.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
208	i.	The vendor shall provide documentation how to accomplish these functions when wireless is not available.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
209	f.	The system shall be designed and configured so it is not vulnerable to a single point of failure using wireless communications that causes a total loss of any voting capabilities.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
210	g.	If a voting system includes wireless capabilities, then the system shall have the ability to turn on the wireless capability when it is to be used and to turn off the wireless capability when the wireless capability is not in use.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
211	h.	If a voting system includes wireless capabilities, then the system shall not activate the wireless capabilities without confirmation from an elections official.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
212	**7.7.2**	**Identifying Usage**			
213		**Since there are a wide variety of wireless technologies (both standard and proprietary) and differing physical properties of wireless signals, it is important to identify some of the characteristics of the wireless technologies used in the voting system.**			
214	a.	If a voting system provides wireless communications capabilities, then there shall be a method for determining the existence of the wireless communications capabilities.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
215	b.	If a voting system provides wireless communications capabilities, then there shall be an indication that allows one to determine when the wireless communications (such as radio frequencies) capability is active.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
216	c.	The indication shall be visual.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
217	d.	If a voting system provides wireless communications capabilities, then the type of wireless communications used (such as radio frequencies) shall be identified either via a label or via the voting system documentation.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
218	**7.7.3**	**Protecting Transmitted Data**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
219	a.	All information transmitted via wireless communications shall be encrypted and authenticated--with the exception of wireless T-coil coupling--to protect against eavesdropping and data manipulation including modification, insertion, and deletion.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
220	i.	The encryption shall be as defined in Federal Information Processing Standards (FIPS) 197, "Advanced Encryption Standard (AES)."	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
221	ii.	The cryptographic modules used shall comply with FIPS 140-2, Security Requirements for Cryptographic Modules.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
222	b.	The capability to transmit non-encrypted and non-authenticated information via wireless communications shall not exist.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
223	c.	If audible wireless communication is used, and the receiver of the wireless transmission is the human ear, then the information shall not be encrypted.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
224	**7.7.4**	**Protecting the Wireless Path**			
225		**If wireless communications are used, then the following capabilities shall exist in order to mitigate the effects of a denial of service (DoS) attack:**			
226	a.	The voting system shall be able to function properly throughout a DoS attack, since the DoS attack may continue throughout the voting period.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
227	b.	The voting system shall function properly as if the wireless capability were never available for use.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
228	c.	Alternative procedures or capabilities shall exist to accomplish the same functions that the wireless communications capability would have done.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
229	d.	If infrared is being used, the shielding shall be strong enough to prevent escape of the voting system signal, as well as strong enough to prevent infrared saturation jamming.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
230	**7.7.5**	**Protecting the Voting System**			
231	a.	The security requirements in Subsection 2.1.1 shall be applicable to systems with wireless communications.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
232	b.	The accuracy requirements in Subsection 2.1.2 shall be applicable to systems with wireless communications.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
233	c.	The use of wireless communications that may cause impact to the system accuracy through electromagnetic stresses is prohibited.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
234	d.	The error recovery requirements in Subsection 2.1.3 shall be applicable to systems with wireless communications.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
235	e.	All wireless communications actions shall be logged.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
236	i.	The log shall contain at least the following entries: times when the wireless is activated and deactivated, services accessed, identification of device to which data was transmitted to or received from, identification of authorized user, and successful and unsuccessful attempts to access wireless communications or service.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
237	f.	Device authentication shall occur before any access to, or services from, the voting system are granted through wireless communications.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
238	i.	User authentication shall be at least level 2 as per NIST Special Publication 800-63 Version 1.0.1, Electronic Authentication Guideline.	**VSTL-TP-1100, VSTL-TP-1000**	**No**	
239	**7.8**	**Independent Verification Systems**			
240	**7.8.1**	**Overview**			
241		**Independent verification (IV) systems are electronic voting systems that produce multiple independent cast vote records of voter ballot selections, which can be audited to a high level of precision. For this to happen, the cast vote records must be handled according to the following protocol:**			
242		At least two cast vote records of the voter's selections are produced and one of the records is then stored in a manner that it cannot be modified by the voting system. For example, the voting system creates a record of the voter's selections and then copies it to unalterable storage media.	**VSTL-TP-1100**	**No**	
243		The voter must be able to verify that both cast vote records are correct and match before leaving the polling place, e.g., verify his or her selections on the voting machine summary screen and also verify the second record on the unalterable storage media.	**VSTL-TP-1100**	**No**	
244		The verification processes for the two cast vote records must be independent of each other, and at least one of the records must be verified directly by the voter.	**VSTL-TP-1100**	**No**	
245		The contents of the two cast vote records also can be checked later for consistency through the use of unique identifiers that allow the records to be linked.	**VSTL-TP-1100**	**No**	
246		The cast vote records would be formatted so that at least one set is usable in an efficient counting process by the electronic voting system and the other set is usable in an efficient process of auditing or verifying the agreement between the two sets.	**VSTL-TP-1100**	**No**	
247		Given these conditions, the multiple cast vote records are considered to be distinct and independently verifiable, that is, both records are not under the control of the same system processes. As a result of this independence, the audit records can be used to check the accuracy of the counted records. Because the records are separately stored, an attacker who can compromise one will also have to compromise the other.		**No**	
248	**7.8.2**	**Basic Characteristics of IV Systems**			
249		**This section describes a preliminary set of basic characteristics that apply to all types of IV systems.**			
250		An independent verification system produces at least two independent cast vote records of ballot selections via interactions with the voter, such that one record can be compared against the other to check their equality of content.	**VSTL-TP-1100**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
251		The voter verifies the content of each cast vote record and either (a) verifies at least one of the records directly or (b) verifies both records indirectly if the records are each under the control of independent processes.	**VSTL-TP-1100**	**No**	
252		The creation, storage and handling of the cast vote records are sufficiently separate that the failure or compromise of one record does not cause the failure or compromise of another.	**VSTL-TP-1100**	**No**	
253		Both cast vote records are highly resistant to damage or alteration and capable of long-term storage.	**VSTL-TP-1100**	**No**	
254		The processes of verification for the cast vote records do not all depend on the same device, software module, or system for their integrity, and are sufficiently separate that each record provides evidence of the voter's selections independently of its corresponding record.	**VSTL-TP-1100**	**No**	
255		The multiple cast vote records are linked to their corresponding audit records by including a unique identifier within each record.	**VSTL-TP-1100**	**No**	
256		Each cast vote record includes information identifying the following:		**No**	
257		An identification of the polling place and precinct	**VSTL-TP-1100**	**No**	
258		Whether the balloting is provisional, early, or on election day	**VSTL-TP-1100**	**No**	
259		Ballot style	**VSTL-TP-1100**	**No**	
260		A timestamp generated when the voting machine is enabled to begin a voting session that can be used to correctly group the cast vote records	**VSTL-TP-1100**	**No**	
261		A unique identifier associated with the voting machine	**VSTL-TP-1100**	**No**	
262		The cryptographic software used in IV systems is approved by the U.S. Government's Cryptographic Module Validation Program, as applicable.	**VSTL-TP-1100**	**No**	
263	**7.9**	**Voter Verifiable Paper Audit Trail Requirements**			
264		**these requirements will be applied for certification testing of DRE systems that are intended for use in states that require DREs to provide this capability.**			
265		The vendor's certification testing application to the EAC must indicate whether the system being presented for testing includes this capability, as provided under Subsection 1.6.2.5 extensions.	**VSTL-TP-100**	**No**	
266	**7.9.1**	**Display and Print a Paper Record**			
267	a.	The voting system shall print and display a paper record of the voter ballot selections prior to the voter making his or her selections final by casting the ballot.	**VSTL-TP-700**	**No**	
268	b.	The paper record shall constitute a complete record of ballot selections that can be used to assess the accuracy of the voting machine's electronic record, to verify the election results, and, if required by state law, in full recounts.	**VSTL-TP-700**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
269	c.	The vendor's certification testing application to the EAC must indicate whether the system being presented for testing includes this capability, as provided under Subsection 1.6.2.5 extensions.	**VSTL-TP-700**	**No**	
270	**7.9.2**	**Approve or Void the Paper Record**			
271	a.	The voting equipment shall allow the voter to approve or void the paper record.	**VSTL-TP-700**	**No**	
272	b.	The voting equipment shall, in the presence of the voter, mark the paper record as being approved by the voter if the ballot selections are accepted; or voided or if the voter decides to change one or more selections.	**VSTL-TP-700**	**No**	
273	c.	If the records do not match, the voting equipment shall mark and preserve the paper record and shall provide a means to preserve the corresponding electronic record so the source of error or malfunction can be analyzed.	**VSTL-TP-700**	**No**	
274	d.	The voting machine shall not record the electronic record until the paper record has been approved by the voter.	**VSTL-TP-700**	**No**	
275	e.	Vendor documentation shall include procedures to enable the election official to return a voting machine to correct operation after a voter has used it incompletely or incorrectly. This procedure shall not cause discrepancies between the tallies of the electronic and paper records.	**VSTL-TP-700**	**No**	
276	**7.9.3**	**Electronic and Paper Record Structure**			
277	a.	All cryptographic software in the voting system shall be approved by the U.S. Government's Cryptographic Module Validation Program, as applicable.	**VSTL-TP-200, VSTL-TP-100**	**No**	
278	b.	The electronic ballot image and paper records shall include information about the election.	**VSTL-TP-700**	**No**	
279	i.	The voting equipment shall be able to include an identification of the particular election, the voting site and precinct, and the voting machine.	**VSTL-TP-700**	**No**	
280	ii.	The records shall include information identifying whether the balloting is provisional, early, or on election day, and information that identifies the ballot style in use.	**VSTL-TP-700**	**No**	
281	iii.	The records shall include a voting session identifier that is generated when the voting equipment is placed in voting mode, and that can be used to identify the records as being created during that voting session.	**VSTL-TP-700**	**No**	
282	c.	The electronic ballot image and paper records shall be linked by including a unique identifier within each record that can be used to identify each record uniquely and each record's corresponding record.	**VSTL-TP-700**	**No**	
283	d.	The voting machine should generate and store a digital signature for each electronic record. e. The electronic ballot image records shall be able to be exported for auditing or analysis on standards-based and /or COTS information technology computing platforms.	**VSTL-TP-700**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
284	e.	The electronic ballot image records shall be able to be exported for auditing or analysis on standards-based and /or COTS information technology computing platforms.	**VSTL-TP-700**	**No**	
285	i.	The exported electronic ballot image records shall be in a publicly available, non-proprietary format.	**VSTL-TP-700**	**No**	
286	ii.	The records should be exported with a digital signature, which shall be calculated on the entire set of electronic records and their associated digital signatures.	**VSTL-TP-700**	**No**	
287	iii.	The voting system vendor shall provide documentation as to the structure of the exported ballot image records and how they shall be read and processed by software.	**VSTL-TP-700**	**No**	
288	iv.	The voting system vendor shall provide a software program that will display the exported ballot image records and that may include other capabilities such as providing vote tallies and indications of undervotes.	**VSTL-TP-700**	**No**	
289	v.	The voting system vendor shall provide full documentation of procedures for exporting electronic ballot image records and reconciling those records with the paper audit records.	**VSTL-TP-700**	**No**	
290	f.	The paper record should be created in a format that may be made available across different manufacturers of electronic voting systems.	**VSTL-TP-700**	**No**	
291	g.	The paper record shall be created such that its contents are machine readable.	**VSTL-TP-700**	**No**	
292	i.	The paper record shall contain error correcting codes for the purpose of detecting read errors and for preventing other markings on the paper record from being misinterpreted when machine reading the paper record.	**VSTL-TP-700**	**No**	
293	h.	If barcode is used, the voting equipment shall be able to print a barcode with each paper record that contains the human-readable contents of the paper record.	**VSTL-TP-700**	**No**	
294	i.	The barcode shall use an industry standard format and shall be able to be read using readily available commercial technology. Discussion: Examples of such codes are Maxi Code or PDF417.	**VSTL-TP-700, VSTL-TP-100**	**No**	
295	ii.	If the corresponding electronic record contains a digital signature, the digital signature shall be included in the barcode on the paper record.	**VSTL-TP-700**	**No**	
296	iii.	The barcode shall not contain any information other than the paper record's human-readable content, error correcting codes, and digital signature information.	**VSTL-TP-700**	**No**	
297	**7.9.4**	**Equipment Security and Reliability**			
298	a.	The voting machine shall provide a standard, publicly documented printer port (or the equivalent) using a standard communication protocol.	**VSTL-TP-300, VSTL-TP-700, VSTL-TP-100**	**No**	
299	b.	Tamper-evident seals or physical security measures shall protect the connection between the printer and the voting machine.prevent paper records from being correctly displayed, printed or stored.	**VSTL-TP-300, VSTL-TP-700, VSTL-TP-100**	**No**	
300	c.	If the connection between the voting machine and the printer has been broken, the voting machine shall detect this event and record it in the DRE internal audit log.	**VSTL-TP-700, VSTL-TP-1100**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
301	d.	The paper path between the printing, viewing and storage of the paper record shall be protected and sealed from access except by authorized election officials.	**VSTL-TP-700, VSTL-TP-1100**	**No**	
302	e.	The printer shall not be permitted to communicate with any system or machine other than the voting machine to which it is connected.	**VSTL-TP-700, VSTL-TP-1100**	**No**	
303	f.	The printer shall only be able to function as a printer; it shall not contain any other services (e.g., provide copier or fax functions) or network capability.	**VSTL-TP-700, VSTL-TP-1100**	**No**	
304	g.	The voting machine shall detect errors and malfunctions such as paper jams or low supplies of consumables such as paper and ink that may prevent paper records from being correctly displayed, printed or stored.	**VSTL-TP-700, VSTL-TP-1100**	**No**	
305	h.	If an error or malfunction occurs, the voting machine shall suspend voting operations and should present a clear indication to the voter and election officials of the malfunction.	**VSTL-TP-700, VSTL-TP-1100**	**No**	
306	i.	The voting machine shall not record votes if an error or malfunction occurs.	**VSTL-TP-700, VSTL-TP-1100**	**No**	
307	j.	Printing devices should contain sufficient supplies of paper and ink to avoid reloading or opening equipment covers or enclosures and thus potential circumvention of security features; or be able to reload paper and ink with minimal disruption to voting and without circumvention of security features such as seals.	**VSTL-TP-700, VSTL-TP-1100**	**No**	
308	k.	Vendor documentation shall include procedures for investigating and resolving printer malfunctions including, but not limited to; printer operations, misreporting of votes, unreadable paper records, and power failures.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
309	l.	Vendor documentation shall include printer reliability specifications including Mean Time Between Failure estimates, and shall include recommendations for appropriate quantities of backup printers and supplies.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
310	m.	Protective coverings intended to be transparent on voting equipment shall be maintainable via a predefined cleaning process. If the coverings become damaged such that they obscure the paper record, they shall be replaceable.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
311	n.	The paper record shall be sturdy, clean, and of sufficient durability to be used for verifications, reconciliations, and recounts conducted manually or by automated processing.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
312	**7.9.5**	**Preserving Voter Privacy**			

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
313		**VVPAT records can be printed and stored by two different methods:** **• Printed and stored on a continuous spool-to-spool paper roll where the voter views the paper record in a window** **• Printed on separate pieces of paper, which are deposited in a secure receptacle.** **If a requirement applies to only one method, that will be specified. Otherwise, the requirement applies to both**			
314	a.	Voter privacy shall be preserved during the process of recording, verifying and auditing his or her ballot selections.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
315	b.	When a VVPAT with a spool-to-spool continuous paper record is used, a means shall be provided to preserve the secrecy of the paper record of voter selections.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
316	c.	When a VVPAT with a spool-to-spool continuous paper record is used, no record shall be maintained of which voters used which voting machine or the order in which they voted.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
317	d.	The electronic and paper records shall be created and stored in ways that preserve the privacy of the voter.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
318	e.	The privacy of voters whose paper records contain an alternative language shall be maintained.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
319	f.	Unique identifiers shall not be displayed in a way that is easily memorable by the voter.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
320	g.	Both paper rolls and paper record secure receptacles shall be controlled, protected, and preserved with the same security as a ballot box.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100**	**No**	
321	**7.9.6**	**VVPAT Usability**			
322	a.	All usability requirements from Subsection 3.1 shall apply to voting machines with VVPAT.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-800**	**No**	
323	b.	The voting equipment shall be capable of showing the information on the paper in a font size of at least 3.0 mm and should be capable of showing the information in at least two font ranges; 3.0-4.0 mm, and 6.3-9.0 mm, under control of the voter or poll worker.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-800**	**No**	
324	c.	The voting equipment shall display, print and store the paper record in any of the written alternative languages chosen for the ballot.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-800**	**No**	
325	i.	To assist with manual auditing, candidate names on the paper record shall be presented in the same language as used on the DRE summary screen.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-800**	**No**	
326	ii.	Information on the paper record not needed by the voter to perform verification shall be in English.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-800**	**No**	
327	d.	The paper and electronic records shall be presented to allow the voter to read and compare the records without the voter having to shift his or her position.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-800**	**No**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
328	e.	If the paper record cannot be displayed in its entirety on a single page, a means shall be provided to allow the voter to view the entire record.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-800**	**No**	
329	f.	If the paper record cannot be displayed in its entirety on a single page, each page of the record shall be numbered and shall include the total count of pages for the record.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-800**	**No**	
330	g.	The instructions for performing the verification process shall be made available to the voter in a location on the voting machine.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-800**	**No**	
331	**7.9.7**	**VVPAT Accessibility**			
332	a.	All accessibility requirements from Subsection 3.2 shall apply to voting machines with VVPAT..	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-900**	**No**	
333	b.	If the normal voting procedure includes VVPAT, the accessible voting equipment should provide features that enable voters who are visually impaired and voters with an unwritten language to perform this verification. If state statute designates the paper record produced by the VVPAT to be the official ballot or the determinative record on a recount, the accessible voting equipment shall provide features that enable visually impaired voters and voters with an unwritten language to review the paper record.	**VSTL-TP-700, VSTL-TP-1100, VSTL-TP-100, VSTL-TP-900**	**No**	

Cell: D15
Comment: ITAs shall design and perform procedures that test the voting system software requirements identified in Volume I. All software components designed or modified for election use shall be tested in accordance with the applicable procedures contained in this section.

Cell: D16
Comment: Prior to initiating the software review, the ITA shall verify that the documentation submitted by the vendor in the TDP is sufficient to enable:

a. Review of the source code; and

b. Design and conducting of tests at every level of the software structure to verify that the software meets the vendor's design specifications and the requirements of the performance standards.

Cell: D22
Comment: The ITA shall design and perform test procedures that test the security capabilities of the voting system against the requirements defined in Volume I, Section 6. These procedures shall focus on the ability of the system to detect, prevent, log, and recover from a broad range of security risks as identified in Section 6 and system capabilities and safeguards, claimed by the vendor in its TDP that go beyond the risks and threats identified in Volume I, Section 6.
The range of risks tested is determined by the design of the system and potential exposure to risk. Regardless of system design and risk profile, all systems are tested for effective access control and physical data security.

For systems that use public telecommunications networks, including the Internet, to transmit election management data or official election results (such as ballots or tabulated results), the ITAs shall conduct tests to ensure that the system provides the necessary identity-proofing, confidentiality, and integrity of transmitted data. These tests shall be designed to confirm that the system is capable of detecting, logging, preventing, and recovering from types of attacks known at the time the system is submitted for qualification.

The ITA may meet these testing requirements by confirming proper implementation of proven commercial security software. In this case, the vendor must provide the published standards and methods used by the US Government to test and accept this software, or it may provide references to free, publicly available publications of these standards and methods, such as government web sites.

At its discretion, the ITA may conduct or simulate attacks on the system to confirm the effectiveness of the system's security capabilities, employing test procedures approved by the NASED Voting Systems Board.

Cell: E22
Comment: The accredited test lab shall design and perform test procedures that test the security capabilities of the voting system against the requirements defined in Volume I, Section 7. These procedures shall focus on the ability of the system to detect, prevent, log, and recover from the broad range of security risks identified. These procedures shall also examine system capabilities and safeguards claimed by the vendor in the TDP to go beyond these risks. The range of risks tested is determined by the design of the system and potential exposure to risk. Regardless of system design and risk profile, all systems shall be tested for effective access control and physical data security.

For systems that use public telecommunications networks, including the Internet, to transmit election management data or official election results (such as ballots or tabulated results), the accredited test lab shall conduct tests to ensure that the system provides the necessary identity-proofing, confidentiality, and integrity of transmitted data. These tests shall be
designed to confirm that the system is capable of detecting, logging, preventing, and recovering from types of attacks known at the time the system is submitted for certification.

The accredited test lab may meet these testing requirements by confirming proper implementation of proven commercial security software. In this case, the vendor must provide the published standards and methods used by the U.S. Government to test and accept this software, or it may provide references to free, publicly available publications of these standards and methods, such as government web sites.

At its discretion, the accredited test lab may conduct or simulate attacks on the system to confirm the effectiveness of the system's security capabilities, employing test procedures approved by the EAC.

Cell: D23

Comment: The ITA shall conduct tests of system capabilities and review the access control policies and procedures and submitted by the vendor to identify and verify the access control features implemented as a function of the system. For those access control features built in as components of the voting system, the ITA shall design tests to confirm that these security elements work as specified.

Specific activities to be conducted by the ITA shall include:

a. A review of the vendor's access control policies, procedures and system capabilities to confirm that all requirements of Volume I, Section 6.2 have been addressed completely; and
b. Specific tests designed by the ITA to verify the correct operation of all documented access control procedures and capabilities, including tests designed to circumvent controls provided by the vendor. These tests shall include:

1) Performing the activities that the jurisdiction will perform in specific accordance with the vendor's access control policy and procedures to create a secure system, including procedures for software (including firmware) installation (as described in Volume I, Section 6.4); and
2) Performing tests intended to bypass or otherwise defeat the resulting security environment. These tests shall include simulation of attempts to physically destroy components of the voting system in order to validate the correct operation of system redundancy and backup capabilities.

This review applies to the full scope of system functionality. It includes functionality for defining the ballot and other pre-voting functions, as well as functions for casting and storing votes, vote canvassing, vote reporting, and maintenance of the system's audit trail.

.....
A.4.4.5 System-level Test Case Design

Security tests: These tests are designed to defeat the security provisions of the system including modification or disruption of pre-voting, voting, and post voting processing; unauthorized access to, deletion, or modification of data, including audit trail data; and modification or elimination of security mechanisms;

Cell: E23

Comment: The accredited testing laboratory shall conduct tests of system capabilities and review the access control policies and procedures submitted by the vendor to identify and verify the access control features implemented as a function of the system. For those access control features built in as components of the voting system, the accredited test lab shall design tests to confirm that these security elements work as specified.

Specific activities to be conducted by the accredited test lab shall include:

a. A review of the vendor's access control policies, procedures and system capabilities to confirm that all requirements of Volume I, Subsection 7.2 have been addressed completely.

b. Specific tests designed by the accredited test lab to verify the correct operation of all documented access control procedures and capabilities, including tests designed to circumvent controls provided by the vendor. These tests shall include:

1) Performing the activities that the jurisdiction will perform in specific accordance with the vendor's access control policy and procedures to create a secure system, including procedures for software and firmware installation (as described in Volume I, Subsection 7.4).

2) Performing tests intended to bypass or otherwise defeat the resulting security environment. These tests shall include simulation of attempts to physically destroy components of the voting system in order to validate the correct operation of system redundancy and backup capabilities.

This review applies to the full scope of system functionality. It includes functionality for defining the ballot and other pre-voting functions, as well as functions for casting and storing votes, vote canvassing, vote reporting, and maintenance of the system's audit trail.

.....
A.4.3.5 System-level Test Case Design

Security tests: These tests are designed to defeat the security provisions of the system including modification or disruption of pre-voting, voting, and post voting processing; unauthorized access to, deletion, or modification of data, including audit trail data; and modification or elimination of security mechanisms;

Cell: D126
Comment: 6.4.2 Data Interception and Disruption

For systems that use telecommunications to transmit official voting data, the ITA shall review, and conduct tests of, the data interception and prevention safeguards specified by the vendor in its TDP. The ITA shall evaluate safeguards provided by the vendor to ensure their proper operation, including the proper response to the detection of efforts to monitor data or otherwise compromise the system.

For systems that use public communications networks the ITA shall also review the vendor's documented procedures for maintaining protection against newly discovered external threats to the telecommunications network. This review shall assess the adequacy of such procedures in terms of:

a. Identification of new threats and their impact;
b. Development or acquisition of effective countermeasures;
c. System testing to ensure the effectiveness of the countermeasures;
d. Notification of client jurisdictions that use the system of the threat and the actions that should be taken;
e. Distribution of new system releases or updates to current system users; and
f. Confirmation of proper installation of new system releases.

Cell: E126
Comment: 6.4.2 Data Interception and Disruption

For systems that use telecommunications to transmit official voting data, the accredited test lab shall review, and conduct tests of, the data interception and prevention safeguards specified by the vendor in its TDP. The accredited test lab shall evaluate safeguards provided by the vendor to ensure their proper operation, including the proper response to the detection of efforts to monitor data or otherwise compromise the system.

For systems that use public communications networks the accredited test lab shall also review the vendor's documented procedures for maintaining protection against newly discovered external threats to the telecommunications network. This review shall assess the adequacy of such procedures in terms of:

a. Identification of new threats and their impact;
b. Development or acquisition of effective countermeasures;

c. System testing to ensure the effectiveness of the countermeasures;
d. Notification of client jurisdictions that use the system of the threat and the actions that should be taken;
e. Distribution of new system releases or updates to current system users; and
f. Confirmation of proper installation of new system releases.

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
4	**8**	**Quality Assurance Requirements**	**V.2:7.2 V.2:7.3 V.2:7.3.1 V.2:7.5**		
5	**8.2**	**General Requirements**	**V.2:7.5.1**		
6		**The voting system vendor is responsible for designing and implementing a quality assurance program to ensure that the design, workmanship, and performance requirements of this standard are achieved in all delivered systems and components. At a minimum, this program shall:**			
7	a.	Include procedures for specifying, procuring, inspecting, accepting, and controlling parts and raw materials of the requisite quality.	**VSTL-TP-100**	**Yes**	
8	b.	Require the documentation of the hardware and software development process.	**VSTL-TP-100**	**Yes**	
9	c.	Identify and enforce all requirements for:	**VSTL-TP-100**	**Yes**	
10	c. i.	In-process inspection and testing that the manufacturer deems necessary to ensure proper fabrication and assembly of hardware.	**VSTL-TP-100**	**Yes**	
11	c. ii.	Installation and operation of software (including firmware).	**VSTL-TP-100**	**Yes**	
12	d.	Include the plans and procedures for post-production environmental screening and acceptance testing.	**VSTL-TP-100**	**Yes**	
13	e.	Include a procedure for maintaining all data and records required to document and verify the quality inspections and tests.	**VSTL-TP-100**	**Yes**	
14	**8.3**	**Components from Third Parties**			
15		A vendor who does not manufacture all the components of its voting system, but instead procures components as standard commercial items for assembly and integration into a voting system, shall verify that the supplier vendors follow documented quality assurance procedures that are at least as stringent as those used internally by the voting system vendor.	**VSTL-TP-100**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
16	**8.4**	**Responsibility for Tests**			
17		**The manufacturer or vendor shall be responsible for:**			
18		Performing all quality assurance tests.	**VSTL-TP-100**	**Yes**	
19		Acquiring and documenting test data.	**VSTL-TP-100**	**Yes**	
20		2002: Providing test reports for review by the ITA, and to the purchaser upon request. 2005: Providing test reports for examination by the test lab as part of the national certification process. These reports shall be provided to the purchaser upon request.	**VSTL-TP-100**	**Yes**	
21	**8.5**	**Parts and Materials Special Tests**	**V.2:7.5.2**		
22		**In order to ensure that voting system parts and materials function properly, vendors shall:**			
23	a.	Select parts and materials to be used in voting systems and components according to their suitability for the intended application. Suitability may be determined by similarity of this application to existing standard practice, or by means of special tests.	**VSTL-TP-100**	**Yes**	
24	b.	Design special tests, if needed, to evaluate the part or material under conditions accurately simulating the actual operating environment.	**VSTL-TP-100**	**Yes**	
25	c.	Maintain the resulting test data as part of the quality assurance program documentation.	**VSTL-TP-100**	**Yes**	
26	**8.6**	**Quality Conformance Inspections**	**V.2:7.5.3**		
27		**The vendor performs conformance inspections to ensure the overall quality of the voting system and components delivered to the ITA for testing and to the jurisdiction for implementation. To meet the conformance inspection requirements the vendor or manufacturer shall:**			
28	a.	Inspect and test each voting system or component to verify that it meets all inspection and test requirements for the system.	**VSTL-TP-100**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
29	b.	Deliver a record of tests or a certificate of satisfactory completion with each system or component.	**VSTL-TP-100**	**Yes**	
30	**8.7**	**Documentation**	**V.2:7.5.4**		
31		**Vendors are required to produce documentation to support the development and formal testing of voting systems. To meet documentation requirements, vendors shall provide complete product documentation with each voting systems or components, as described Volume II, Section 2 for the TDP. This documentation shall:**			
32		**Vendors are required to produce documentation to support the independent testing required for their products to be granted national certification. Volume II, Section 2, Description of the Technical Data Package, identifies the documentation required for the national certification testing process. This documentation shall:**			
33		Be sufficient to serve the needs of the ITA, voters, election officials, and maintenance technicians.	**VSTL-TP-100**	**Yes**	
34		Be prepared and published in accordance with standard industrial practice for information technology and electronic and mechanical equipment.	**VSTL-TP-100**	**Yes**	
35		Consist, at a minimum, of the following:	**VSTL-TP-100**	**Yes**	
36		System overview.	**VSTL-TP-100**	**Yes**	
37		System functionality description.	**VSTL-TP-100**	**Yes**	
38		System hardware specification.	**VSTL-TP-100**	**Yes**	
39		Software design and specifications.	**VSTL-TP-100**	**Yes**	
40		System security specification.	**VSTL-TP-100**	**Yes**	
41		System test and verification specification.	**VSTL-TP-100**	**Yes**	
42		System operations procedures.	**VSTL-TP-100**	**Yes**	
43		System maintenance procedures.	**VSTL-TP-100**	**Yes**	

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3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
44		Personnel deployment and training requirements.	**VSTL-TP-100**	**Yes**	
45		Configuration management plan.	**VSTL-TP-100**	**Yes**	
46		Quality assurance program.	**VSTL-TP-100**	**Yes**	
47		System Change Notes.	**VSTL-TP-100**	**Yes**	

Cell: D4
Comment: V.2:7.2
ITAs shall design and perform procedures that examine documented vendor practices for quality assurance and configuration management as addressed by Volume I, Sections 7 and 8, and complemented by Volume II, Section 2.
Examination procedures shall be designed and performed by the ITA that address:

a. Conformance with the requirements to provide information on vendor practices required by the Standards;

b. Conformance of system documentation and other information provided by the vendor with the documented practices for quality assurance and configuration management.

The Standards do not require on-site examination of the vendor's quality assurance and configuration management practices during the system development process. However, the ITAs conduct several activities while at the vendor site to witness the system build that enable assessment of the vendor's quality assurance and configuration management practices and conformance with them. These include surveys, interviews with individuals at all levels of the development team, and examination of selected internal work products such as system change requests and problem tracking logs.

It is recognized that examinations of vendor practices, and determinations of conformance, entail a significant degree of professional judgement. These standards for vendor practices identify specific areas of focus for the ITAs, while at the same time relying on their expertise and professional judgement, as evaluated in the certification of the ITAs.

The specific procedures used by the ITA shall be identified in the Qualification Test Plan. Recognizing variations in vendors' quality assurance and configuration management practices and procedures, the ITAs shall design examination procedures that account for these variations.

V.2:7.3
There is no required sequence for performing the examinations of quality assurance and configuration management practices. No other testing within the overall qualification testing process is dependent on the performance and results of these examinations.

V.2:7.3.1
While not required, ITAs are encouraged to initiate the examinations of quality assurance and configuration management practices early in the overall qualification testing sequence, and conduct them in parallel with other testing of the voting system. Conducting these examinations in parallel is recommended to minimize the overall duration of the qualification process.

V.2:7.5
The examination of quality assurance practices shall address the full scope of requirements described in Volume I, Section 7, and the documentation requirements described in Volume II, Section 2. The ITA shall confirm that all required information has been submitted, and assess whether the vendor's quality assurance program provides for:
a. Clearly measurable quality standards;
b. An effective testing program throughout the system development life cycle;
c. Application of the quality assurance program to external providers of system components and supplies;
d. Comprehensive monitoring of system performance in the field and diagnosis of system failures;
e. Effective record keeping of system failures to support analysis of failure patterns and potential causes; and
f. Effective processes for notifying customers of system failures and corrective measures that need to be taken, and for confirming that such measures are taken.

Cell: E4
Comment: V.2:7.2

The accredited test lab shall design and perform procedures that examine documented vendor practices for quality assurance and configuration management as addressed by Volume I, Sections 8 and 9 and Section 2.

Examination procedures shall be designed and performed to ensure:

a. Conformance with the requirements to provide information on vendor practices required by these Guidelines.

b. Conformance of system documentation and other information provided by the vendor with the documented practices for quality assurance and configuration management.

The Guidelines do not require on-site examination of the vendor's quality assurance and configuration management practices during the system development process. However, the accredited test lab can conduct several activities while at the vendor site to witness the system build that enable assessment of the vendor's quality assurance and configuration management practices. These include surveys, interviews with individuals at all levels of the development team, and examination of selected internal work products such as system change requests and problem tracking logs.

It is recognized that examinations of vendor practices, and determinations of conformance, entail a significant degree of professional judgment. These guidelines for vendor practices identify specific areas of focus but heavily rely on the expertise and professional judgment, of the accredited test lab.

The specific procedures used by the accredited test lab shall be identified in the Qualification Test Plan. Recognizing variations in vendors' quality assurance and configuration management practices and procedures, the accredited test lab shall design examination procedures that account for these variations.

V.2:7.3
There is no required sequence for performing the examinations of quality assurance and configuration management practices. No other testing is dependent on the performance and results of these examinations. However, examinations pertaining to configuration management, in particular those pertaining to configuration identification, will generally be useful in understanding the conventions used to define and document the components of the
system and will assist with other elements of the certification test process.

V.2:7.3.1
While not required, the accredited test lab is encouraged to initiate the examinations of quality assurance and configuration management practices early in the overall testing sequence, and to conduct them in parallel with other testing of the voting system. Conducting these examinations in parallel is recommended to minimize the overall duration of the testing process.

V.2:7.5
The examination of quality assurance practices shall address the full scope of requirements described in Volume I, Section 8, and the documentation requirements described in Volume II, Section 2. The accredited test lab shall confirm that all required information has been submitted, and assess whether the vendor's quality assurance program provides for:

a. Clearly measurable quality standards;
b. An effective testing program throughout the system development life cycle;
c. Application of the quality assurance program to external providers of system components and supplies;
d. Comprehensive monitoring of system performance in the field and diagnosis of system failures;
e. Effective record keeping of system failures to support analysis of failure patterns and potential causes; and
f. Effective processes for notifying customers of system failures and corrective measures that need to be taken, and for confirming that such measures are taken.

Cell: D5
Comment: The ITA shall examine the vendor's quality assurance policy to confirm that it:

a. Addresses the full scope of the voting system;

b. Clearly designates a senior level individual accountable for implementation and oversight of quality assurance activities;

c. Clearly designates the individuals, by position within the vendor's organization, who are to conduct each quality assurance activity; and

d. Provides procedures that determine compliance with, and correct deviations from, the quality assurance program at a minimum annually.

Cell: E5
Comment: The accredited test lab shall examine the vendor's quality assurance policy to confirm that it:

a. Addresses the full scope of the voting system.

b. Clearly designates a senior level individual accountable for implementation and oversight of quality assurance activities.

c. Clearly designates the individuals, by position within the vendor's organization, who are to conduct each quality assurance activity.

d. Provides procedures that determine compliance with, and correct deviations from, the quality assurance program at a minimum annually.

Cell: D21
Comment: The ITA shall examine the vendor's parts and materials special tests and examinations to confirm that they:

a. Identify appropriate criteria that are used to determine the specific system components for which special tests are required to confirm their suitability for use in a voting system;

b. Are designed in a manner appropriate to determine suitability; and

c. Have been conducted and documented for all applicable parts and materials.

Cell: E21
Comment: The accredited test lab shall examine the vendor's parts and materials special tests and examinations to confirm that they:

a. Identify appropriate criteria that are used to determine the specific system components for which special tests are required to confirm their suitability for use in a voting system;.

b. Are designed in a manner appropriate to determine suitability.

c. Have been conducted and documented for all applicable parts and materials.

Cell: D26
Comment: The ITAs shall examine the vendor's quality conformance plans, procedures and inspection results to confirm that:

a. All components have been tested according to the test requirements defined by the vendor;

b. All components have passed the requisite tests; and

c. For each test, the test documentation identifies:
1) Test location;
2) Test date;
3) Individual who conducted the test; and
4) Test outcome.

Cell: E26
Comment: The accredited test lab shall examine the vendor's quality conformance plans, procedures and, inspection results to confirm that:

a. All components have been tested according to the test requirements defined by the vendor.

b. All components have passed the requisite tests; an.

c. For each test, the test documentation identifies:
1) Test location
2) Test date
3) Individual who conducted the test
4) Test outcome

Cell: D30
Comment: The ITAs shall examine the vendor's voting system documentation to confirm that it meets the content requirements of Volume I, Section 7.5, and Volume I Section 2, and is written in a manner suitable for use by purchasing jurisdictions.

Cell: E30
Comment: The accredited test lab shall examine the vendor's voting system documentation to confirm that it meets the content requirements of Volume I, Subsection 8.7, and Section 2, and is written in a manner suitable for use by purchasing jurisdictions.

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	**components of the VSS/VVSG not appearing in this document were left out intentionally**			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
4	**9**	**Configuration Management**	**V.2:7.2 V.2:7.3 V.2:7.3.1**		
5	**9.1**	**Scope**			
6	**9.1.1**	**Configuration Management Requirements**	**V.2:7.4**		
7		**Configuration management addresses a broad set of record keeping, audit, and reporting activities that contribute to full knowledge and control of a system and its components. These activities include:**			
8		▪ Identifying discrete system components.	**VSTL-TP-100**	**Yes**	
9		▪ Creating records of a formal baseline and later versions of components.	**VSTL-TP-100**	**Yes**	
10		▪ Controlling changes made to the system and its components.	**VSTL-TP-100**	**Yes**	
11		▪ Releasing new versions of the system to ITAs.	**VSTL-TP-100**	**Yes**	
12		▪ Releasing new versions of the system to customers.	**VSTL-TP-100**	**Yes**	
13		▪ Auditing the system, including its documentation, against configuration management records.	**VSTL-TP-100**	**Yes**	
14		▪ Controlling interfaces to other systems.	**VSTL-TP-100**	**Yes**	
15		▪ Identifying tools used to build and maintain the system.	**VSTL-TP-100**	**Yes**	
16	**9.1.2**	**Organization of Configuration Management Standards**			
17	**9.1.3**	**Application of Configuration Management Standards**			
18		**Requirements for configuration management apply regardless of the specific technologies employed to all voting systems subject to the Standards. These system components include:**			
19		Software components.	**VSTL-TP-100**	**Yes**	
20		Hardware components.	**VSTL-TP-100**	**Yes**	
21		Communications components.	**VSTL-TP-100**	**Yes**	
22		Documentation.	**VSTL-TP-100**	**Yes**	
23		Identification and naming and conventions (including changes to these conventions) for software programs and data files.	**VSTL-TP-100**	**Yes**	
24		Development and testing artifacts such as test data and scripts.	**VSTL-TP-100**	**Yes**	
25		File archiving and data repositories.	**VSTL-TP-100**	**Yes**	
26	**9.2**	**Configuration Management Policy**	**V.2:7.4.1**		
27		**The vendor shall describe its policies for configuration management in the TDP. This description shall address the following elements:**			
28		Scope and nature configuration management program activities.	**VSTL-TP-100**	**Yes**	

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
29		Breadth of the application of the vendor's policies and practices to the voting system. (i.e. extent to which policies and practices apply to the total system and extent to which polices and practices of suppliers apply to particular components, subsystems, or other defined system elements.	**VSTL-TP-100**	**Yes**	
30	**9.3**	**Configuration Identification**	**V.2:7.4.2**		
31	**9.3.1**	**Structuring and Naming Configuration Items**			
32		**The vendor shall describe the procedures and conventions used to:**			
33		Classify configuration items into categories and subcategories.	**VSTL-TP-100**	**Yes**	
34		Uniquely number or otherwise identify configuration items.	**VSTL-TP-100**	**Yes**	
35		Name configuration items.	**VSTL-TP-100**	**Yes**	
36	**9.3.2**	**Version Conventions**			
37		**When a system component is used to identify higher-level system elements, a vendor shall describe the conventions used to:**			
38	a.	Identify the specific versions of individual configuration items and sets of items that are used by the vendor to identify higher level system elements such as subsystems.	**VSTL-TP-100**	**Yes**	
39	b.	Uniquely number or otherwise identify versions.	**VSTL-TP-100**	**Yes**	
40	c.	Name versions.	**VSTL-TP-100**	**Yes**	
41	**9.4**	**Baseline, Promotion and Demotion Procedures**	**V.2:7.4.3**		
42		**The vendor shall establish formal procedures and conventions for establishing and providing a complete description of the procedures and related conventions used to:**			
43	a.	Establish a particular instance of a component as the starting baseline.	**VSTL-TP-100**	**Yes**	
44	b.	Promote subsequent instances of a component to baseline status as development progresses through to completion of the initial completed version released to the ITAs for qualification testing.	**VSTL-TP-100**	**Yes**	
45	c.	Promote subsequent instances of a component to baseline status as the component is maintained throughout its life cycle until system retirement (i.e., the system is no longer sold or maintained by the vendor).	**VSTL-TP-100**	**Yes**	
46	**9.5**	**Configuration Control Procedures**	**V.2:7.4.4**		

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
47		**Configuration control is the process of approving and implementing changes to a configuration item to prevent unauthorized additions, changes, or deletions. The vendor shall establish such procedures and related conventions, providing a complete description of those procedures used to:**			
48	a.	Develop and maintain internally developed items.	**VSTL-TP-100**	**Yes**	
49	b.	Acquire and maintain third-party items.	**VSTL-TP-100**	**Yes**	
50	c.	Resolve internally identified defects for items regardless of their origin.	**VSTL-TP-100**	**Yes**	
51	d.	Resolve externally identified and reported defects (i.e., by customers and ITAs).	**VSTL-TP-100**	**Yes**	
52	**9.6**	**Release Process Procedures**	**V.2:7.4.5**		
53		**The release process is the means by which the vendor installs, transfers, or migrates the system to the ITAs and, eventually, to its customers. The vendor shall establish such procedures and related conventions, providing a complete description of those used to:**			
54	a.	Perform a first release of the system to: [2002: an ITA]. [2005: an accredited test lab].	**VSTL-TP-100**	**Yes**	
55	b.	Perform a subsequent maintenance or upgrade release of the system, or a particular components, to: [2002: an ITA]. [2005: an accredited test lab].	**VSTL-TP-100**	**Yes**	
56	c.	Perform the initial delivery and installation of the system to a customer, including confirmation that the installed version of the system matches exactly the certified system version.	**VSTL-TP-100**	**Yes**	
57	d.	Perform a subsequent maintenance or upgrade release of the system, or a particular component, to a customer, including confirmation that the installed version of the system matches exactly the qualified system version.	**VSTL-TP-100**	**Yes**	
58	**9.7**	**Configuration Audits**	**V.2:7.4.6**		
59	**9.7.1**	**Physical Configuration Audit**			
60		**The PCA is conducted by the ITA to compare the voting system components submitted for qualification to the vendor's technical documentation. For the PCA, a vendor shall provide:**			
61	a.	Identification of all items that are to be a part of the software release.	**VSTL-TP-100, VSTL-TP-300**	**Yes**	

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
62	b.	Specification of compiler (or choice of compilers) to be used to generate executable programs.	**VSTL-TP-100, VSTL-TP-300**	**Yes**	
63	c.	Identification of all hardware that interfaces with the software.	**VSTL-TP-100, VSTL-TP-300**	**Yes**	
64	d.	Configuration baseline data for all hardware that is unique to the system.	**VSTL-TP-100, VSTL-TP-300**	**Yes**	
65	e.	Copies of all software documentation intended for distribution to users, including program listings, specifications, operations manual, voter manual, and maintenance manual.	**VSTL-TP-100, VSTL-TP-300**	**Yes**	
66	f.	User acceptance test procedures and acceptance criteria.	**VSTL-TP-100, VSTL-TP-300**	**Yes**	
67	g.	Identification of any changes between the physical configuration of the system submitted for the PCA and that submitted for the FCA, with a certification that any differences do not degrade the functional characteristics.	**VSTL-TP-100, VSTL-TP-300**	**Yes**	
68	h.	Complete descriptions of its procedures and related conventions used to support this audit by:	**VSTL-TP-100, VSTL-TP-300**	**Yes**	
69	h. i.	Establishing a configuration baseline of the software and hardware to be tested.	**VSTL-TP-100, VSTL-TP-300**	**Yes**	
70	h. ii.	Confirming whether the system documentation matches the corresponding system components.	**VSTL-TP-100, VSTL-TP-300**	**Yes**	
71	**9.7.2**	**Functional Configuration Audit**	**V.2:7.3.2**		
72		**The Functional Configuration Audit is conducted by the [2002: ITA; 2005: accredited test lab] to verify that the system performs all the functions described in the system documentation. The vendor shall:**			
73	a.	Completely describe its procedures and related conventions used to support this audit for all system components.	**VSTL-TP-100, VSTL-TP-700**	**Yes**	
74	b.	Provide the following information to support this audit:	**VSTL-TP-100, VSTL-TP-700**	**Yes**	
75	b. i.	Copies of all procedures used for module or unit testing, integration testing, and system testing.	**VSTL-TP-100, VSTL-TP-700**	**Yes**	
76	b. ii.	Copies of all test cases generated for each module and integration test, and sample ballot formats or other test cases used for system tests.	**VSTL-TP-100, VSTL-TP-700**	**Yes**	
77	b. iii.	Records of all tests performed by the procedures listed above, including error corrections and retests.	**VSTL-TP-100, VSTL-TP-700**	**Yes**	
78		In addition to such audits performed by ITAs during the system qualification process, elements of this audit may also be performed by state election organizations during the system certification process, and individual jurisdictions during system acceptance testing.	**VSTL-TP-100, VSTL-TP-700**	**Yes**	

	B	C	E	V	W
1	**VSS/VVSG Requirement**		**General Test Procedure & Supporting Information**	**Oregon Evaluation Criteria**	
2	****components of the VSS/VVSG not appearing in this document were left out intentionally****			**Applicable to Oregon evaluation criteria? Yes/No**	**Requirement Addressed? Y - N - I**
3	**VVSG 2005**	**Requirement**	**VVSG 2005**		
79	**9.8**	**Configuration Management Resources**	**V.2:7.4.7**		
80		**Often, configuration management activities are performed with the aid of automated tools. Assuring that such tools are available throughout the system life cycle, including if the vendor is acquired by or merged with another organization, is critical to effective configuration management. Vendors may choose the specific tools they use to perform the record keeping, audit, and reporting activities of the configuration management standards. The resources documentation standard provided below focus on assuring that procedures are in place to record information about the tools to help ensure that they, and the data they contain, can be transferred effectively and promptly to a third party should the need arise. Within this context, a vendor is required to develop and provide a complete description of the procedures and related practices for maintaining information about:**			
81	a.	Specific tools used, current version, and operating environment specifications.	**VSTL-TP-100**	**Yes**	
82	b.	Physical location of the tools, including designation of computer directories and files.	**VSTL-TP-100**	**Yes**	
83	c.	Procedures and training materials for using the tools.	**VSTL-TP-100**	**Yes**	

Cell: D4
Comment: V.2:7.2
ITAs shall design and perform procedures that examine documented vendor practices for quality assurance and configuration management as addressed by Volume I, Sections 7 and 8, and complemented by Volume II, Section 2.
Examination procedures shall be designed and performed by the ITA that address:

a. Conformance with the requirements to provide information on vendor practices required by the Standards;

b. Conformance of system documentation and other information provided by the vendor with the documented practices for quality assurance and configuration management.

The Standards do not require on-site examination of the vendor's quality assurance and configuration management practices during the system development process. However, the ITAs conduct several activities while at the vendor site to witness the system build that enable assessment of the vendor's quality assurance and configuration management practices and conformance with them. These include surveys, interviews with individuals at all levels of the development team, and examination of selected internal work products such as system change requests and problem tracking logs.

It is recognized that examinations of vendor practices, and determinations of conformance, entail a significant degree of professional judgement. These standards for vendor practices identify specific areas of focus for the ITAs, while at the same time relying on their expertise and professional judgement, as evaluated in the certification of the ITAs.

The specific procedures used by the ITA shall be identified in the Qualification Test Plan. Recognizing variations in vendors' quality assurance and configuration management practices and procedures, the ITAs shall design examination procedures that account for these variations.

V.2:7.3
There is no required sequence for performing the examinations of quality assurance and configuration management practices. No other testing within the overall qualification testing process is dependent on the performance and results of these examinations.

However, examinations pertaining to configuration management, in particular those pertaining to configuration identification, will generally be useful in understanding the conventions used to define and document the components of the system and will assist other elements of the qualification test process.

V.2:7.3.1
While not required, ITAs are encouraged to initiate the examinations of quality assurance and configuration management practices early in the overall qualification testing sequence, and conduct them in parallel with other testing of the voting system. Conducting these examinations in parallel is recommended to minimize the overall duration of the qualification process.

Cell: E4
Comment: V.2:7.2
The accredited test lab shall design and perform procedures that examine documented vendor practices for quality assurance and configuration management as addressed by Volume I, Sections 8 and 9 and Section 2.

Examination procedures shall be designed and performed by the accredited test lab that address:

a. Conformance with the requirements to provide information on vendor practices required by the Guidelines;

b. Conformance of system documentation and other information provided by the vendor with the documented practices for quality assurance and configuration management.

The Guidelinesdo not require on-site examination of the vendor's quality assurance and configuration management practices during the system development process. However, the accredited test lab conducts several activities while at the vendor site to witness the system build that enable assessment of the vendor's quality assurance and configuration management practices and conformance with them. These

include surveys, interviews with individuals at all levels of the development team, and examination of selected internal work products such as system change requests and problem tracking logs.

It is recognized that examinations of vendor practices, and determinations of conformance, entail a significant degree of professional judgement. These standards for vendor practices identify specific areas of focus for the accredited test lab, while at the same time relying on their expertise and professional judgement, as evaluated in the certification of the the accredited test lab.

The specific procedures used by the the accredited test lab shall be identified in the Qualification Test Plan. Recognizing variations in vendors' quality assurance and configuration management practices and procedures, the ITAs shall design examination procedures that account for these variations.

V.2:7.3
There is no required sequence for performing the examinations of quality assurance and configuration management practices. No other testing is dependent on the performance and results of these examinations. However, examinations pertaining to configuration management, in particular those pertaining to configuration identification, will generally be useful in understanding the conventions used to define and document the components of the system and will assist with other elements of the certification test process.

V.2:7.3.1
While not required, the accredited test lab is encouraged to initiate the examinations of quality assurance and configuration management practices early in the overall testing sequence, and to conduct them in parallel with other testing of the voting system. Conducting these examinations in parallel is recommended to minimize the overall duration of the testing process.

Cell: D6
Comment: The examination of configuration management practices shall address the full scope of requirements described in Volume I, Section 8, and the documentation requirements described in Volume II, Section 2. In addition to confirming that all required information has been submitted, the ITAs shall determine the vendor's conformance with the documented configuration management practices.

Cell: E6
Comment: The examination of configuration management practices shall address the full scope of requirements described in Volume I, Section 9, and the documentation requirements described in Section 2. In addition to confirming that all required information has been submitted, the accredited test lab shall determine the vendor's conformance with the documented configuration management practices.

Cell: D26
Comment: The ITAs shall examine the vendor's documented configuration management policy to confirm that it:

a. Addresses the full scope of the system, including components provided by external suppliers; and

b. Addresses the full breadth of system documentation.

Cell: E26
Comment: The accredted test lab shall examine the vendor's documented configuration management policy to confirm that it:

a. Addresses the full scope of the system, including components provided by external suppliers; and

b. Addresses the full breadth of system documentation.

Cell: D30

Comment: The ITAs shall examine the vendor's documented configuration identification practices policy to confirm that they:

a. Describe clearly the basis for classifying configuration items into categories and subcategories, for numbering of configuration items; and for naming of configuration items; and

b. Describe clearly the conventions used to identify the version of the system as a whole and the versions of any lower level elements (e.g., subsystems, individual elements) if such lower level version designations are used.

Cell: E30
Comment: The accredited test lab shall examine the vendor's documented configuration identification practices policy to confirm that it:

a. Describes clearly the basis for classifying configuration items into categories and subcategories, for numbering of configuration items; and for naming of configuration items.

b. Describes clearly the conventions used to identify the version of the system as a whole and the versions of any lower level elements (e.g., subsystems, individual elements) if such lower level version designations are used.

Cell: D41
Comment: The ITA shall examine the vendor's documented baseline, promotion and demotion procedures to confirm that they:

a. Provide a clear, controlled process that promotes components to baseline status when specific criteria defined by the vendor are met; and

b. Provide a clear controlled process for demoting a component from baseline status when specific criteria defined by the vendor are met.

Cell: E41
Comment: The accredited test lab shall examine the vendor's documented baseline, promotion, and demotion procedures to confirm that they:

a. Provide a clear, controlled process that promotes components to baseline status when specific criteria defined by the vendor are met.

b. Provide a clear controlled process for demoting a component from baseline status when specific criteria defined by the vendor are met.

Cell: D46
Comment: The ITA shall examine the vendor's configuration control procedures to confirm that they:

a. Are capable of providing effective control of internally developed system components; and

b. Are capable of providing effective control of components developed or supplied by third parties.

Cell: E46
Comment: The accredited test lab shall examine the vendor's configuration control procedures to confirm that they:

a. Are capable of providing effective control of internally developed system components.

b. Are capable of providing effective control of components developed or supplied by third parties.

Cell: D52
Comment: The ITA shall examine the vendor's release process to confirm that it:

a. Provides clear accountability for moving forward with the release of the initial system version and subsequent releases;

b. Provides the means for clear identification of the system version being replaced;

c. Confirms that all required internal vendor tests and audits prior to release have been completed successfully;

d. Confirms that each system version released to customers has been qualified by a the appropriate ITA prior to release;

e. Confirms that each system release has been received by the customer; and

f. Confirms that each system release has been installed successfully by the customer.

Cell: E52
Comment: The accredited test lab shall examine the vendor's release process to confirm that it:

a. Provides clear accountability for moving forward with the release of the initial system version and subsequent releases.

b. Provides the means for clear identification of the system version being replaced

c. Confirms that all required internal vendor tests and audits prior to release have been completed successfully.

d. Confirms that each system version released to customers has been qualified by a the appropriate ITA prior to release.

e. Confirms that each system release has been received by the customer.

f. Confirms that each system release has been installed successfully by the customer.

Cell: D58
Comment: The ITA shall examine the vendor's configuration audit procedures to confirm that they:

a. Are sufficiently broad in scope to address the entire system, including system documentation;

b. Are conducted with appropriate timing to enable effective control of system versions; and

c. Are sufficiently rigorous to confirm that all system documentation prepared and maintained by the vendor indeed matches the actual system functionality, design, operation and maintenance requirements.

Cell: E58
Comment: The accredited test lab shall examine the vendor's configuration audit procedures to confirm that they:

a. Are sufficiently broad in scope to address the entire system, including system documentation.

b. Are conducted with appropriate timing to enable effective control of system versions.

c. Are sufficiently rigorous to confirm that all system documentation prepared and maintained by the vendor indeed matches the actual system functionality, design, operation and maintenance requirements.

Cell: D71
Comment: As described in Volume I, Section 8, the functional configuration audit verifies that the voting system performs all the functions described in the system documentation. To help ensure an efficient test process, this audit shall be conducted by ITAs as an element of integrated system testing that confirms the proper functioning of the system as a whole. Integrated system testing is described in more detail in Volume II, Section 6.

Cell: E71
Comment: As described in Volume I, Section 9, the functional configuration audit verifies that the voting system performs all the functions described in the system documentation. To help ensure an efficient test process, this audit shall be conducted by the accredited test lab as an
element of the system integration testing that confirms the proper functioning of the system as a whole.

Cell: D79
Comment: The ITA shall examine the configuration management resource information submitted by the vendor to determine whether sufficient information has been provided to enable another organization to clearly identify the resources used and acquire them for use. This examination is intended to ensure that in the event the vendor concludes business operations, sufficient information has been provided to enable an in-depth audit of the system should such an audit be required by election officials and/or a law enforcement organization.

Cell: E79
Comment: The accredited test lab shall examine the configuration management resource information submitted by the vendor to determine whether sufficient information has been provided to enable another organization to clearly identify the resources used and acquire them for use. This examination is intended to ensure that in the event the vendor concludes business operations, sufficient information has been provided to enable an in-depth audit of the system should such an audit be required by election officials and/or a law enforcement organization.

Oregon Voting System Certification

Request for Approval

SEL 675

rev 10/15
ORS 246.550

Application Information

Date	**Requesting expedited handling?** ☐ Yes ☐ No

Justification for expedited handling if necessary attach additional information

Type

☐ Entirely new system	☐ Amended application
☐ Blended combination of components from different voting systems	☐ Update of approved system may include new components
	Date of Current Approval

Applicant

Name	**Contact Phone**	**Email Address**

Principal Address physical location or mailing address

Type

☐ Manufacturer	☐ Distributor	☐ Jurisdiction
☐ Other please explain		

Standing to Present Application

Applicant

Name	**Contact Phone**	**Email Address**

Principal Address physical location or mailing address

Type

☐ Manufacturer	☐ Distributor	☐ Jurisdiction
☐ Other please explain		

Standing to Present Application

Vendor

Name

Mailing Address

Contact Phone	**Fax**	**Email Address**

Hardware			
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**

Software			
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**
Name Model No.	**Version**	☐ New ☐ Updated ☐ No Change	**Description**

COTS Components		
Name	**Model/Version**	**Manufacturer or Specs; Description**
Name	**Model/Version**	**Manufacturer or Specs; Description**
Name	**Model/Version**	**Manufacturer or Specs; Description**
Name	**Model/Version**	**Manufacturer or Specs; Description**
Name	**Model/Version**	**Manufacturer or Specs; Description**
Name	**Model/Version**	**Manufacturer or Specs; Description**
Name	**Model/Version**	**Manufacturer or Specs; Description**

Federal Qualification Number(s)	Date Qualified

Accessibility

Describe the modalities of physical disabilities that are supported by this system and detail the nature of that support.

Detail the alternative languages that are supported by this system.

Upgrade Plan for Existing Customers

Identify all current Oregon customers that will be affected if this system is approved and detail the plan for their upgrade.

Users' Group

Provide detail on the existing Users' Group *or* detail the plan for creating a Users' Group.

Compliance with Conditions of Approval

Has the applicant and, if applicable, any parent or subsidiary company, fully complied with all conditions set forth in the Secretary of State approval document for all versions of voting systems manufactured or sold by the applicant or parent or subsidiary company that is currently used by one or more Oregon customers? ☐ Yes ☐ No

If you answered NO, identify in the space provided below or an attachment every condition with which the applicant, parent or subsidiary company has not fully complied and explain the reason(s) for the lack of full compliance.

Compliance with Conditions of Certification

Has the applicant and, if applicable, any parent or subsidiary company, fully complied with all conditions set forth in the Secretary of State certification of the applicant, parent or subsidiary company as a manufacturer or finisher of ballots that are currently used by one or more Oregon customers? ☐ Yes ☐ No

If you answered NO, identify in the space provided below or an attachment every condition with which the applicant, parent or subsidiary company has not fully complied and explain the reason(s) for the lack of full compliance.

Attestation

→I hereby certify that the information submitted on this form, as well as all attachments and submitted documentation is true, accurate and complete. I certify that I am legally authorized to sign and submit this application on behalf of the applicant organization(s).

Signature	**Date Signed**
Printed Name	**Organization**

Signature	**Date Signed**
Printed Name	**Organization**