



U. S. ELECTION ASSISTANCE COMMISSION
VOTING SYSTEM TESTING AND CERTIFICATION PROGRAM
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Notice of Clarification

NOC 09-004: Development and Submission of Test Reports.

Issued by Program Director, November 9, 2009:

Objective of this NOC:

The objective of this document is to clarify the intent, content and use of test reports as currently outlined in the 2005 Voluntary Voting System Guidelines (VVSG), the EAC Voting System Testing and Certification Program Manual, and the EAC Voting System Test Laboratory Program Manual.

This NOC is intended to:

- 1) Reduce the review time and the number of Technical Reviewer comments;
- 2) Increase the likelihood of initial review acceptance, which may translate to lower costs and faster test campaign completion; and
- 3) Improve communication of the thoroughness and results of testing for the EAC and for election officials, but particularly for members of the general public unfamiliar with the certification process.

This clarification has been drafted to align with requirements in the 2005 VVSG Volumes I and II and to be consistent with both EAC manuals. Information pertaining to the test reports contained in the reference documents noted above has been included at the end of this document.

It has been the experience of the EAC that, in many instances, test reports have been developed and submitted for EAC review and approval that do not fully meet the intent and objective of test reports as defined in the 2005 VVSG and the EAC Manuals.

This NOC defines with more clarity items already contained in the EAC program documentation. The overall objective of the test report is to make the review process more efficient and to help ensure that the testing conducted is clearly communicated to the EAC, state and local election officials and the general public.

Clarification Statement:

The goal of this NOC is to guide the production of test reports that are clearer and more comprehensive by documenting:

- All the components, and necessary information that comprise the version and configuration of hardware, software and COTS needed for the evaluation of the voting system;
- The completeness and comprehensiveness of the testing performed;

- The adequacy of the testing performed; and
- The results of all the testing performed.

All such information needs to be provided with clarity, completeness and without ambiguity, so that a wide range of readers and users of the document will be able to understand the evaluation that supports a system's certification.

System Description:

Although included in all the program documents, the Laboratory Manual has the most complete description of what is required for the system description, as enumerated within the "System Identification and Overview" Section.

Test reports need to describe each and every element in the system with sufficient specificity and clarity so that election officials can distinguish between the certified version and a modification of the certified version. This is necessary to establish and maintain the consistency of a system's performance and its functional integrity and physical attributes with its requirements, design, and operational information throughout the useful life of the system. The description needs to include product names, manufactures, model numbers, options, version identifiers, and substitution alternatives. It shall include:

- Hardware
- Software
- Firmware
- COTS products
 - Hardware
 - Software
 - Operating Systems
 - Applications (for example virus scan application)
- All engineering changes to software and hardware that are not included in the base version definition.

This information is critical to establishing an unequivocal baseline of the system being validated to the VVSG.

It is particularly important that COTS products be identified with sufficient specificity so that the certificate of conformance can accurately identify the COTS products that are used with the certified system. This NOC is not direction to VSTLs to analyze or test all possible COTS variations that may potentially be used with a voting system, but rather to thoroughly document all COTS characteristics and features including variations that the VSTL/manufacturer may have agreed on for the test campaign. As a note, for PC's, adding RAM memory or increasing the disk size shall be acceptable variations for use with a certified system. However, adding I/O ports or new functionality shall not be acceptable without evaluation. For operating systems and other software, only the version of software tested is approved for use with the certified system. New versions of operating systems and other software require evaluations by the VSTL before they may be accepted as modifications to the certified system.

Test Description:

Appendix B6 in the VVSG Volume II provides the most thorough guidance for inclusion of test information in the report. Based on past report submissions, the content of the test data included often has not provided the "understanding" called for in Appendix B6. Appendix B6 says:

“This appendix provides additional detail about the test results to enable the understanding of test results and recommendation”. The test report is intended to archive the results and to communicate the results of the test effort to a wide range of readers, over the life of the voting system. In reports examined to date, much of the entry data and output data or conditions for the test campaign have been interspersed with test procedures, test cases, and test sequences that are deemed proprietary and thus not available to jurisdictions or many readers and users of the report. In addition, the test data and conditions have not been linked or referenced in the report and have therefore been difficult to find in the hundreds of test records and documents. Therefore the report needs to be understandable, logical and provide a rationale as to how the requirement was satisfied without relying on proprietary material. This rationale should be able to be understood by election officials and the public, not just by a voting system manufacturer, or by the VSTL that conducted the test.

The current program does not have a provision for Waivers or Deviations and therefore all mandatory (shall) requirements in the standard need to be tested. The voting system needs to demonstrate that it meets all of the requirements (unless a requirement is deemed to be not applicable) by passing all of the tests in order for it to be certified. It is important to ensure that the report appropriately documents the rationale for the recommendation to certify (or not certify) the system.

References:

VVSG Volume II

Appendix B: National Certification Test Report

B.1 Scope

This Appendix contains a recommended outline for the National Certification Test Report to be prepared by the accredited test lab. The test report shall be organized so as to facilitate the presentation of conclusions and recommendations regarding system acceptability, a summary of the test operations, a summary of the test results, the test data records, and the analyses that support the conclusions and recommendations. The content of the report may vary based on the scope of review conducted.

B.1.1 New Certification Test Report

A full report is prepared for the initial certification testing of a voting system. This document consists of five main sections: Introduction, Certification Test Background, System Identification, System Overview, and Certification Test Results. Detailed information about the test operations and findings, and test data, are included as appendices to the report. Sections B.2 through B.7 describe the contents of the individual sections of this report.

B.1.2 Changes to Previously Certified Test Report

This report addresses a wide range of scenarios. After a preliminary review of the submitted changes, the accredited test lab may determine that:

- A review of all change documentation against the baseline materials is sufficient for recommendation for certification
- All changes must be retested against the previously certified baseline

- The scope of the changes is substantial enough that a complete retest of the software is required

The format of this report will vary, based on the type of review that is performed. If only a review of change documentation against the baseline materials is performed the report is quite simple. It consists of an Introduction, a Version Description, the Testing Approach, and a Results Summary. A more extensive report is prepared, for changes that have extensive impact on the system design and/or operations.

B.2 Certification Test Background

This section contains the following information:

General information about the certification test process

A list and definition of all terms and nomenclature peculiar to the hardware, the software, or the test report

B.3 System Identification

This section gives information about the tested software and supporting hardware, including:

- System name and major subsystems (or equivalent) System version
- Test support hardware
- Specific documentation provided in the vendor's TDP used to support testing

B.4 System Overview

This section describes the voting system in terms of its overall design structure, technologies used, processing capacity claimed by the vendor for system components (such as ballot counters, voting machines, vote consolidation equipment), and mode of operation. It may also identify other products that interface with the voting system.

B.5 Certification Test Results and Recommendation

This section provides a summary of the results of the testing process, and indicates any special considerations that affect the conclusions derived from the test results. This summary includes: The acceptability of the system design and construction based on the performance of the system hardware, software and communications, and on the source code inspection The degree to which the hardware and software meet the vendor's specifications and the guidelines, and the acceptability of the vendor's technical and user documentation General findings on the maintainability of the system including, where applicable, notation of specific maintenance activities that are determined to be difficult to perform

Identification and description of any deficiencies that remain uncorrected after completion of the certification test and that have caused or are judged to be capable of causing, the loss or corruption of voting data, providing sufficient detail to support a recommendation to reject the system being tested. Similarly, any deficiency in compliance with the security, accuracy, data retention, and audit requirements are fully described

A specific recommendation to the EAC for approval or rejection Of note, any uncorrected deficiency that does not involve the loss or corruption of voting data shall not necessarily be cause for rejection. Deficiencies of this type may include failure to fully achieve the levels of performance specified in Volume I or failure to fully implement formal programs for quality assurance and configuration management described in Volume I, Sections 8 and 9. The nature of the deficiency is described in detail sufficient to support the recommendation either to accept or

to reject the system. The recommendation is based on consideration of the probable effect the deficiency will have on safe and efficient system operation during all phases of election use.

B.6 Appendix – Test Operations and Findings

This appendix provides additional detail about the test results to enable the understanding of test results and recommendation. This information is organized in a manner that reflects the Certification Test Plan. Summaries of the results of hardware examinations, operating and non-operating hardware tests, software module tests, software function tests, and system level tests (including security and telecommunications tests, and the results of the Physical and Functional Configuration Audits) are provided.

B.7 Appendix - Test Data Analysis

This appendix provides summary records of the test data and the details of the analysis. The analysis includes a comparison of the vendor's hardware and software specifications to the test data, together with any mathematical or statistical procedure used for data reduction and processing.

Testing and Certification Program Manual

4.6. Test Report. Manufacturers shall enable their identified VSTL to submit test reports directly to the EAC. The VSTL shall submit test reports only if the voting system has been tested and all tests identified in the test plan have been successfully performed.

4.6.1. Submission. The test reports shall be submitted to the Program Director. The Program Director shall review the submission for completeness. Any reports showing incomplete or unsuccessful testing will be returned to the test laboratory for action and resubmission. Notice of this action will be provided to the Manufacturer. Test reports shall be submitted in Adobe PDF, Microsoft Word, or other electronic formats as prescribed by the Program Director. Information on how to submit reports will be posted on the EAC Web site: www.eac.gov.

4.6.2. Format. Manufacturers shall ensure that test labs submit reports consistent with the requirements in the VVSG and this Manual.

4.6.3. Technical Review. A technical review of the test report, technical documents, and test plan will be conducted by EAC technical experts. The EAC may require the submission of additional information from the VSTL or Manufacturer if deemed necessary to complete the review. These experts will submit a report outlining their findings to the Program Director. The report will provide an assessment of the completeness, appropriateness, and adequacy of the VSTL's testing as documented in the test report.

4.6.4. Program Director's Recommendation. The Program Director shall review the report and take one of the following actions:

4.6.4.1. Recommend certification of the candidate system consistent with the reviewed test report and forward it to the Decision Authority for action (Initial Decision); or

4.6.4.2. Refer the matter back to the technical reviewers for additional specified action and resubmission.

4.7. Initial Decision on Certification. Upon receipt of the report and recommendation forwarded by the Program Director, the Decision Authority shall issue an Initial Decision on Certification. The decision shall be forwarded to the Manufacturer consistent with the requirements of this Manual.

4.7.1. An Initial Decision granting certification shall be processed consistent with Chapter 5 of this Manual.

4.7.2. An Initial Decision denying certification shall be processed consistent with Chapter 6 of this Manual.

Laboratory Manual

Test Report Format

Test Reports produced by VSTLs shall follow the format outlined below:

1. System Identification and Overview
2. Certification Test Background
 - 2.1 Revision History
 - 2.2 Implementation Statement
3. Test Findings and Recommendation
 - 3.1 Summary Finding and Recommendation
 - 3.2 Reasons for Recommendation to Reject
 - 3.3 Anomalies
 - 3.4 Correction of Deficiencies

Appendix A. Additional Findings

Appendix B. Warrant of Accepting Change Control Responsibility

Appendix C. Witness Build

Appendix D. Test Plan

Appendix E. State Test Reports

System Identification and Overview

The VSTL shall provide basic information about the voting system software and supporting hardware including the system name and major subsystems or their equivalent and their version numbers. In addition, this section shall describe the design and structure of the voting system, technologies used, processing capacity claimed by the Manufacturer for system components such as ballot counters, and vote consolidation equipment. The description of the voting system, both software and hardware shall have enough detail and specificity to allow the identification of a voting system in the field as being either identical to that tested or a modified version of the system. This section may also identify other products that interface with the voting system.

Certification Test Background

For modifications to previously tested voting systems, the VSTL shall include references to the test reports that are precedential to the current testing engagement. The VSTL shall also include the implementation statement submitted by the Manufacturer, amended to reflect any changes that were necessitated during the course of the testing engagement.

Test Findings and Recommendation

This section provides a summary of the results of the testing engagement and indicates any special considerations that affect the conclusions derived from the test results.

The VSTL shall present a summary finding of whether or not the voting system, as tested, satisfied all applicable mandatory (“shall”) requirements of the VVSG. The VSTL shall also provide a specific recommendation to the EAC for approval or rejection of the candidate system. If the VSTL finds that the voting system under test does not satisfy all applicable mandatory requirements of the VVSG, the VSTL shall identify each of the specific requirements that were not satisfied, and include a description of the inspections or tests that detected the nonconformities and include any applicable evidence (e.g., vote data report, citation of logic error in source code, etc.) The VSTL shall also summarize all failures, errors, nonconformities and anomalies that were observed during the testing engagement. Finally, the VSTL shall identify any deficiencies corrected during the course of the test engagement and identify inspections or tests that confirm that the deficiencies were corrected.

Appendix A. Additional Findings

The VSTL shall include as Appendix A of the Test Report identification of each applicable non-mandatory test (“shoulds”) for which conformity was demonstrated during the testing engagement. Appendix A shall also include identification of all tests that were identified as non-applicable to the voting system under test and therefore waived during the test engagement. Appendix A shall also include the laboratory response to any additional information, report or review provided by the EAC regarding the voting system under testing, and whether or not the items noted in the materials presented have any relevance to the system under test.

Appendix B. Warrant of Accepting Change Control Responsibility

If the Manufacturer must make changes to the voting system to successfully complete the conformance testing, the VSTL shall include as Appendix B of the Test Report a signed warrant from the Manufacturer that those changes will be included in the product that is delivered to customers.

Appendix C. Witness Build

The VSTL shall include as Appendix C of the Test Report a copy of the record of the final witness build and sufficient description of the build process to enable reproduction of the build.

Appendix D. Test Plan

The VSTL shall include a copy of the voting system Test Plan, amended to reflect any deviations from the original, EAC approved, test Plan during the course of testing.

Appendix E. State Test Reports

The VSTL shall include the results or reports from any testing engagement requested by a State to the EAC candidate system conducted concurrent to the EAC testing engagement. The results of State test reports shall not impact the EAC certification of the voting system if the system successfully meets all requirements of the EAC VVSG and Testing and Certification Program.