

Derived Test Requirements for the Updated Voter Verifiable Paper Audit Trail (VVPAT) Requirements in the VVSG Version 1.1

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Preliminary Draft

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1 Introduction

1.1 Background

By authorization of the 2002 Help America Vote Act (HAVA), the Election Assistance Commission (EAC) was given the responsibility for implementing and maintaining the Voluntary Voting System Guidelines (VVSG). As part of the maintenance process for the VVSG, the EAC is updating the VVSG 2005 by modifying and adding some requirements to the guidelines resulting in the VVSG version 1.1. The new and modified requirements are based on the requirements found in the next VVSG developed by the EAC's Technical Guidelines Development Committee (TGDC). However, not all of the requirements found in the next VVSG were included as part of the VVSG version 1.1. The EAC plans to issue the VVSG version 1.1 after receiving and reviewing public comments.

As part of the VVSG update, the EAC asked NIST to develop a set of uniform public test suites for the modified and new requirements, which will be used as part of the EAC's Testing and Certification Program. Test Labs will be able to use these freely available test suites to help determine that modified and new requirements of the VVSG version 1.1 are met by voting systems. Use of the public test suites will produce consistent results and promote transparency of the testing process. The test suites can also assist manufacturers in the development of conforming products by providing precise test specifications. Also, they will help reduce the cost of testing since each test lab would no longer need to develop its own test suites. Finally, a uniform set of public test suites can increase election officials' and voters' confidence that voting systems conform to VVSG version 1.1 requirements covered by the test suites.

1.2 Purpose

The purpose of this document is to develop detailed test procedures for the updated and new security requirements found in the VVSG version 1.1. In this document, detailed test procedures derived from a requirement found in the VVSG version 1.1 are contained in structure known as a derived test requirement (DTR). (See Section 1.5.1 Derived Test Requirement Structure for details). This document contains the set of derived test requirements (DTRs) for the requirements found in the VVSG version 1.1, Volume 1, Section 7.9 Voter Verifiable Paper Audit Trail Requirements. By providing detailed derived test requirements, the following objectives are achieved:

1. In-depth guidance to test laboratories to ensure high quality testing
2. Repeatability from tester to tester as well as test laboratory to test laboratory
3. Predictability of the effort involved for a testing campaign
4. Cost savings by not having to analyze and develop tests for different implementations of a voting system

1.3 Scope

The scope of this document is limited to functional testing of the updated and new security requirements found in the VVSG version 1.1. Testing requirements in VVSG version 1.1 other than updated and new security requirements are outside the scope of this document. Specifically, the derived test requirements (DTRs) found in this document only cover the requirements found in the VVSG version 1.1, Volume 1, Section 7.9 Voter Verifiable Paper Audit Trail Requirements. Since the VVSG does not require voting systems to have the VVPAT capability, the DTRs described in this document need to be executed if and only if the System Under Test (SUT) contains VVPAT functionality.

1.4 Approach

In developing the set of derived test requirements (DTRs) the following approach was taken:

1. If at all possible, the test laboratory shall test compliance with a VVSG requirement by stimulus → response testing¹ on the voting system. The exceptions to this shall be rare and shall be justified only on the basis of extremely prohibitive cost.
2. The stimulus → response testing shall include nominal, boundary and outlier values as implied by the VVSG requirement and the voting system's interface(s) that implement and enforce the requirement.
3. When stimulus → response testing is not possible given the design of the voting system, the test laboratory shall examine the applicable source code.
4. When performing review of the manufacturer provided documentation, the test laboratory shall focus on gaining an understanding of the voting system and how it implements security. Priority shall be given to identification of potential security concerns based on the review and analysis of manufacturer documents with next priority to substantive inconsistencies. In addition, the test laboratory shall ensure that there is sufficient clarity to the documentation so that the security controls can be appropriately configured.

1.5 Derived Test Requirement Structure

A derived test requirement (DTR) is a structured used to contain detailed test procedures associated with a specific requirement. This section describes the components, nomenclature, and notation used in this document to describe the structure of a derived test requirement (DTR).

A derived test requirement consists of the following components:

1. A requirement is labeled with the literal "RE," followed by a number based on the section of the VVSG version 1.1 containing the requirement and a title for the requirement to provide traceability back to the VVSG version 1.1. When a requirement is tested by another derived test requirement (DTR), that requirement's derived test requirement (DTR) will contain a reference to the appropriate derived test requirement (DTR).
2. A requirement may have one or more tester activities associated with it. Test activities are the detailed test procedures used to test the voting system for conformance to the VVSG version 1.1 security requirements. When no tester activity is found in a derived test requirement (DTR), it means the requirement was tested under the test procedures of another (DTR) that is specifically referenced in "Analysis" text. The tester activities are labeled with the literal "TE", followed by the requirement label without "RE", followed by period ("."), followed by sequential numbers starting with 1. For example, test activities for requirement RE 7.9.1-A are numbered RE 7.9.1-A.1, RE 7.9.1-A.2, and so on. Each tester activity title is refined based on the associated VVSG version 1.1 requirement title.

The label "Analysis:" precedes text that is used to provide additional information related to requirements and tester activities. In general, analysis text follows the associated requirement and tester activities being discussed. For example, analysis text following a requirement may cross-reference the test activities of another requirement that verifies the requirement or provide context of the test activities of the requirement.

1.6 Electronic File Features for Word Versions of the Document

An electronic version of this document was prepared using Microsoft Word and the Word Style feature. The Word Style feature provides the ability to separate text based on the Style associated with the text. The following Styles were used in this document to allow material to be subsetting in or out:

1. "reheader" Style is used to list the requirement title.

¹ Stimulus → response testing refers to a testing method where an IT system is stimulated by providing some input and the IT system's response/output is observed and analyzed. (See Definitions section)

2. "teheader" Style is used to list the test procedure title.
3. "Test Procedure" Style is used to list the test procedures test laboratories must carry out in order to test the voting system for compliance with VVSG Version 1.1 requirements.
4. "Normal" Style is used for the requirement text and text associated with analysis and rationale. "

1.7 General Testing Assumptions

The tester shall use each DTR to test the voting system under test and when appropriate develop more detailed test procedures and test cases based on implementation dependant characteristics such as specific configuration requirements, specific user account names, specific file names, etc.

The tester shall document test procedures and test cases.

After conducting the tests, the tester shall document the test results with sufficient detail to demonstrate that the test succeeded or failed. In the case of failure, the documentation shall be detailed enough to provide the nature of failure.

The tester may execute the DTRs in any order as long as the precedence requirements specified in individual DTR are met.

The tester shall note the start and end time in date, hours, and minutes when each DTR is executed to help in several ways including but not limited to: reconciling the event log, reconstructing DTR execution sequence, and determining the state of the voting system under test at any given time.

1.8 Testing with Sample Ballots

Some tests in this document require a sample ballot to be used. When the term "Simple Test Ballot" is used, it refers to the sample ballot described in Section 4. When the term "Complex Test Ballot" is used, it refers to the sample ballot described in Section 5.

The following notation is used in describing ballots. A ballot choice on a specific ballot or ballot total is listed under n.m, n is the contest number and m is the voter choice under the selected ballot configuration. Thus, for the Simple Test Ballot configuration, 2.2 means a vote for Bruce Reeder and 3.4 means a vote for Amanda Marracini.

1.9 Asterisk Notation (****)

A series of red asterisks (****) next to test activities (i.e. all or part of a TE) indicates that the activity is conditional and may not need to be executed based on the implementation under test. In general, the test activities have a condition statement similar to: "If the voting device is an EMS..." or "If the voting system provides role-based authentication...."

2 Definitions

Stimulus → Response Testing: A test method where the IT system is stimulated by providing some input and the IT system's response (output) is observed and analyzed. Also see test method for other form of testing.

Test Case: A fully defined set of input and expected results for a test. A test case is the most detailed and lowest level of test documentation material.

Test Method: Description of one or more tests, procedures by which tests are derived, or a combination of these.

Test Pre-Requisite: System configuration prior to executing a test case or set of test cases. For example, prior to testing that identification and authentication succeeds and fails under appropriate conditions, user accounts with specific user ID and passwords will need to be set up.

Test Procedures: Procedures used to execute a collection of test cases. For example, test procedures typically will consist of executing a set of steps to set test pre-requisite and then steps for each test case as identified with the test case,

Test Results: Set of results for each of the test cases.

3 VVPAT Derived Test Requirements

RE 7.9.1-A (2005) VVPAT, review a paper record:

VVPAT voting systems shall provide capabilities for the voter to review a paper record of ballot selections and a summary of the voter's electronic ballot selections prior to casting a ballot

TE 7.9.1-A.1 (2005) VVPAT, review a paper record:

The tester shall configure the SUT for the Simple Test Ballot using the manufacturer defined procedures.

The tester shall configure the SUT to provide paper record.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to cast a sample ballot using the following choices: 1.2; 2.2; 3.1 and 3.2.

The tester shall verify that casting a sample ballot using the SUT causes the device to produce a paper record.

The tester shall verify that the paper record matches the tester's selected choices for the ballot.

The tester shall indicate their acceptance of the vote to the SUT.

The tester shall terminate the authenticated session.

The tester shall also verify the paper records produced by the following test procedures (i.e., TEs).

- TE 7.9.1-C.1 (2005) VVPAT, unambiguous interpretation of cast vote: Ballot Image
- TE 7.9.2-C.1 (2005) VVPAT, vote rejection process requirements
- TE 7.9.3-A.1 (2005) Collection of ballot images record

RE 7.9.1-B (2005) VVPAT, support for hand auditing:

VVPAT voting systems shall create a paper record that election officials can use to reconstruct the full set of totals from the election.

Analysis:

This requirement is tested by TE 7.9.1-A (2005) VVPAT, review a paper record.

RE 7.9.1-C (2005) VVPAT, unambiguous interpretation of cast vote:

Each paper record shall contain a human-readable summary of the electronic ballot image record. In addition, all paper records shall contain audit-related information including:

- a. Polling place;
- b. Reporting context, such as precinct or election district;
- c. Ballot configuration;
- d. Date of election; and
- e. Complete summary of voter's choices.

TE 7.9.1-C.1 (2005) VVPAT, unambiguous interpretation of cast vote: Ballot Image

The tester shall configure the SUT for the following:

1. Print paper record
2. Print electronic ballot image/paper record correspondence (i.e., random number) on the paper record.
3. Accept Simple Test Ballots.

The tester shall cast seven (7) sample ballots as follows:

Voter#1 – 1.1; 2.1; 3.1 and 3.2 (accepted)
Voter#2 – 1.2; 2.2; 3.1 and 3.2 (accepted)
Voter#3 – 1.1; 2.2; 3.1 and 3.2 (accepted)
Voter#4 – 1.2; 2.1; 3.1 and 3.2 (accepted)
Voter#5 – 1.2; 2.2; 3.1 and 3.2 (accepted)
Voter#6 – 1.1; 2.1; 3.1 and 3.2 (accepted)
Voter#7 – 1.1; 2.1; 3.1 and 3.2 (accepted)

The tester shall compare the paper record produced by the SUT with the electronic ballot image. TE 7.9.1-C.1 (2005) VVPAT, unambiguous interpretation of cast vote: Ballot is successful if all of the following are satisfied:

1. The tester can read and understand human-readable part of the paper records without any additional information that is already not on the VVPAT.
2. All paper records contain votes for 3.1 through 3.5 for county commissioners.
3. Three paper records contain votes for 1.1 and 2.1;
4. Two paper records contain votes for 1.2 and 2.2;
5. One paper record contains votes for 1.1 and 2.2;
6. One paper record contains votes for 1.2 and 2.1;
7. All electronic ballot images contain votes for 3.1 and 3.2 for county commissioners.
8. Three electronic ballot images contain votes for 1.1 and 2.1;
9. Two electronic ballot images contain votes for 1.2 and 2.2;
10. One electronic ballot image contains votes for 1.1 and 2.2;
11. One electronic ballot image contains votes for 1.2 and 2.1;
12. The SUT shows that seven (7) total ballots were cast; and
13. For each of the seven electronic ballot images:
 - a) The random identifier on electronic ballot image matches the random identifier on a corresponding paper record with the vote selections on the electronic ballot image and paper record also matching.
 - b) Make a copy of the paper record and verify that the random identifier does not appear on the copy or is illegible.

TE 7.9.1-C.2 (2005) VVPAT, unambiguous interpretation of cast vote: Audit

TE 7.9.1-C.2 (2005) VVPAT, unambiguous interpretation of cast vote: Audit shall be conducted after the TE 7.9.1-C.1 (2005) VVPAT, unambiguous interpretation of cast vote: Ballot Image

The tester shall verify that the paper record contains the following data:

Required VVPAT Data	Required to be human-readable
Polling place	No
Reporting context	No
Ballot configuration	No
Date of election	No
Complete summary of voter's choices	Yes (already tested under TE 7.9.1-C.1 (2005) VVPAT, unambiguous interpretation of cast vote: Ballot Image)

If any of the data above is not human-readable, the tester shall use the appropriate equipment to read the ballot information. The tester shall visually or from machine reading verify the information as follows:

VVPAT Data
Polling place
Reporting context
Ballot configuration
Date of election

Value
Precinct1
District1
Simple Test Ballot
Date TE 7.9.1-C.1 (2005) VVPAT, unambiguous interpretation of cast vote: Ballot Image was conducted

RE 7.9.2-A (2005) VVPAT, ease of record comparison:

The VVPAT voting system format and presentation of the paper record and electronic summaries of ballot selections shall be designed to facilitate the voter's comparison between the electronic ballot selections and the paper record

TE 7.9.2-A.1 (2005) VVPAT, ease of record comparison:

TE 7.9.2-A.1 (2005) VVPAT, ease of record comparison shall be conducted after the TE 7.9.1-C.1 (2005) VVPAT, unambiguous interpretation of cast vote: Ballot Image

The tester shall compare the voter choice information printed on the paper record against the electronic summary displayed by the SUT during ballot approval. The tester shall verify that the information is printed in the same order left to right and top to bottom.

Note: If this requirement is tested under usability test suite, TE 7.9.2-A.1 (2005) VVPAT, ease of record comparison need not be conducted.

RE 7.9.2-B (2005) VVPAT, vote acceptance process requirements:

When a voter indicates that the paper record is to be accepted, the VVPAT voting system shall:

- a. Immediately print an indication that the vote has been accepted, in view of the voter;
- b. Electronically store the electronic ballot image record as a cast vote; and
- c. Deposit the paper record into a secure receptacle

Analysis:

The following are tested under TE 7.9.2-C.1 (2005) VVPAT, vote rejection process requirements:

1. Printing an indication of vote acceptance in view of the voter
 2. Verifying that the electronic ballot image record is stored by the SUT
 3. Depositing the paper record in a receptacle.
 4. Secure receptacle
-

RE 7.9.2-C (2005) VVPAT, vote rejection process requirements:

When a voter indicates that the paper record is to be rejected, the VVPAT voting system shall:

- a. Immediately print an unambiguous indication that the vote has been rejected, in view of the voter;
- b. Electronically store a record that the paper record was rejected; and
- c. Deposit the rejected paper record into the secure receptacle.

TE 7.9.2-C.1 (2005) VVPAT, vote rejection process requirements:

The tester shall configure the SUT for the following:

1. Print paper record
2. Print electronic ballot image/paper record correspondence (i.e., random number) on the paper record.
3. Accept Simple Test Ballots.

The tester shall cast five (5) sample ballots as follows, each time authenticating as a voter and terminating the authenticated session after casting the ballot.

Each time when the ballot is cast, the voter shall verify that the paper record is not visible after the voter accepts the cast ballot and the ballot is printed.

Voter#1 – 1.2, 2.1, 3.1, 3.2 (accepted)
Voter#2 – 1.1, 2.2, 3.3, 3.5 (rejected)
Voter#3 – 1.1, 2.1, 3.4, 3.5 (rejected)
Voter#4 – 1.2, 2.2, 3.1, 3.5 (accepted)
Voter#5 – 1.1, 2.1, 3.3, 3.4 (accepted)

The tester shall compare the paper records produced by the SUT with the electronic ballot images. TE 7.9.2-C.1 (2005) VVPAT, vote rejection process requirements is successful if all of the following are satisfied:

1. The tester can read and understand human-readable part of the paper records without any additional information that is already not on the paper records.
2. There are three accepted paper records and they are as follows:
 - a) 1.2, 2.1, 3.1, 3.2
 - b) 1.2, 2.2, 3.1, 3.5
 - c) 1.1, 2.1, 3.3, 3.4
3. There are two rejected paper records and they are as follows:
 - a) 1.1, 2.2, 3.3, 3.5
 - b) 1.1, 2.1, 3.4, 3.5
4. There are three accepted electronic ballot images and they contain the following voter choices:
 - a) 1.2, 2.1, 3.1, 3.2
 - b) 1.2, 2.2, 3.1, 3.5
 - c) 1.1, 2.1, 3.3, 3.4
5. There are two rejected electronic ballot images and they contain the following voter choices:
 - a) 1.1, 2.2, 3.3, 3.5
 - b) 1.1, 2.1, 3.4, 3.5
6. For each of the five electronic ballot images, if the electronic ballot image contains a random identifier, the random identifier matches the random identifier on a corresponding paper record with the vote selections on the electronic ballot image and paper record matching.

The tester shall examine the physical security of the secure receptacles used to store printed ballots: accepted ballot and rejected ballots using the DTR for RE 7.9.4-B (2005) VVPAT, printer physical security to ensure that secure locks and/or tamper evident seals are used to secure the receptacles.

RE 7.9.2-D (2005) VVPAT, rejected vote configurable limits per voter:

The VVPAT voting system shall have the capacity to be configured to limit the number of times a single voter may reject a paper record without election official intervention. The VVPAT voting system shall be configurable for limits of zero (any rejected paper record requires election official intervention) to five times, and may support an unlimited number of rejections without election official intervention.

Note: An unlimited number of rejections without election official intervention does not require anything testable.

TE 7.9.2-D.1 (2005) VVPAT, rejected vote configurable limits per voter:

The tester shall configure the SUT for Simple Test Ballot.

The tester shall repeat the following steps for each of $N = 1, 2, 3, 4, 5,$ and 6 :

1. The tester shall configure the SUT to have a paper record rejection limit per voter of N-1 so that it will require election official intervention when N rejected VVPAT(s) are generated by a voter.
2. The tester shall configure the SUT for total rejection limit of 50. (Note: This steps is carried out so that total machine rejection threshold does not require election official intervention.)
3. The tester shall configure the SUT to accept ballots.
4. The tester shall authenticate to the SUT as a Voter.
5. The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.1 and 3.2.
6. The tester shall reject the paper record N times. Each time, the voter shall verify that the rejected paper record (including the Nth one) is put in the SUT vote receptacle and the rejected paper record is not visible after being put in the receptacle.
7. The tester shall verify that the SUT screen does not display any voter choices.
8. The tester shall verify that the SUT screen displays a message that the vote has been rejected.
9. The tester shall verify that the SUT screen also displays a message indicating the need for an election official to intervene.
10. The tester shall intervene as election official and use the manufacturer defined procedures to allow voting to proceed.

RE 7.9.2-E (2005) VVPAT, rejected vote limits per machine:

The VVPAT voting system shall have the capacity to limit the total number of paper records that a machine may reject before election official intervention is required. The VVPAT voting system shall permit the setting of no limit, so that no number of total rejected paper records requires immediate election official intervention.

TE 7.9.2-E.1 (2005) VVPAT, rejected vote limits per machine:

The tester shall configure the SUT for the following:

1. Simple Test Ballot.
2. Per Voter rejection limit of 5
3. Per machine rejection limit of 18.
4. Accept ballots.

The tester shall repeat the following steps three times.

1. The tester shall authenticate to the SUT as a Voter.
2. The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.1 and 3.2.
3. The tester shall reject the completed ballot five (5) times. Each time, the voter shall verify that the rejected ballot (including the 5th one) is put in the SUT vote receptacle.
4. The tester shall then accept the completed ballot.
5. The tester shall verify that the accepted/cast ballot is put in the SUT vote receptacle.
6. The tester shall verify that the printed ballot is not visible after being put in the ballot receptacle.
7. The tester shall terminate the authenticated session.

The tester shall carry out the following steps:

1. The tester shall authenticate to the SUT as a Voter.
2. The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.1 and 3.2.
3. The tester shall reject the completed ballot four (4) times. Each time, the voter shall verify that the rejected ballot (including the 4th one) is put in the SUT vote receptacle.
4. The tester shall verify that the SUT screen does not display any voter choices.
5. The tester shall verify that the SUT screen displays a message that the vote has been rejected.

6. The tester shall verify that the SUT screen also displays a message indicating the need for an election official to intervene.
7. The tester shall intervene as election official and use the manufacturer defined procedures to allow voting to proceed.

TE 7.9.2-E.2 (2005) VVPAT, rejected vote limits per machine – No Limit:

The tester shall set the machine paper record rejection limit.

The tester shall verify that one of the options available is to set no limit, i.e., make the number of permitted rejections limitless or infinite.

RE 7.9.2-F (2005) VVPAT, rejected vote election official intervention:

When a VVPAT voting system reaches a configured limit of rejected paper records per voter or per machine, it shall do the following:

- a. Remove any indication of the voter's choices from the screen;
- b. Place the paper record that has been rejected into the ballot box or other receptacle;
- c. Clearly display that a paper record has been rejected and indicate the need for election official intervention; and
- d. Suspend normal operations until re-enabled by an authorized election official.

Analysis:

RE 7.9.2-F (2005) VVPAT, rejected vote election official intervention is tested by the following:

- Per voter limit requirement is tested by TE 7.9.2-D.1 (2005) VVPAT, rejected vote configurable limits per voter.
- Per machine limit requirement is tested by TE 7.9.2-E.1 (2005) VVPAT, rejected vote limits per machine.

RE 7.9.3-A (2005) Collection of ballot images record:

Electronic ballot images shall be recorded in a randomized order by the voting system for the election. For each voted ballot, this includes:

- a. Ballot configuration and counting context;
- b. For each contest:
 1. The choice recorded, including undervotes and write-ins; and
 2. Any information collected by the vote-capture device electronically about each write-in;
- c. Information specifying whether the ballot is provisional, early voting or election day voting.
- d. Information linking the electronic ballot image to a paper record, if such functionality is enabled in the voting system.

Analysis: Item d above is tested under TE 7.9.2-C.1 (2005) VVPAT, vote rejection process requirements.

TE 7.9.3-A.1 (2005) Collection of ballot images record:

Note: It is assumed that a DRE can cover multiple precincts. If that is not true, then this TE can be revised by the testing lab to cover only one precinct.

Note: For this TE, counting context is the precinct.

The tester shall configure the SUT to accept Simple Test Ballot.

The tester shall cast the following ballots on the SUT in the listed order:

TABLE X-1: VOTES FOR SUMMARY COUNT REPORT

Precinct	Reject	All Votes								
		WI	2.1	2.2	WI	3.1	3.2	3.3	3.4	3.5
A (6)	N		X			X		X		
	N			X		X	X	X		
	N		X	X						
	N	X							X	
	Y (P) ²			X					X	X
	N		X				X		X	
A Total³	1	1	3	2	0	2	2	2	2	0
B (4)	N	X				X			X	
	N			X			X	X		
	N			X				X	X	
	N		X			X				X
B Total	0	1	1	2	0	2	1	2	2	1
C (5)	N		X			X	X			X
	Y (C) ⁴		X					X	X	
	N			X	X			X		
	N		X			X		X		
	N			X					X	X
C Total	1	0	2	2	1	2	1	2	1	2
Grand Total (15)	2	2	6	6	1	6	4	6	5	3

The tester shall obtain the record of ballot images.

The tester shall verify that the ballot images contain fifteen ballots as listed in Table X-1: Votes for Summary Count Report.

The tester shall verify that for each ballot images there is exactly one match in the voting pattern from Table X-1, including the precinct.

The tester shall verify that the ballot images are not in the same order as listed in Table X-1.

The tester shall verify that the ballot images are not in the reverse order as cast per Table X-1.

The tester shall verify that the ballot images are not in the same cycle as cast per Table X-1. (e.g., vote 2, vote 3, ... vote 15, vote 1).

The tester shall verify that the ballot images are not in the reverse cycle as cast per Table X-1. (e.g., vote 13, vote 12, ... vote 1, vote 15, vote 14).

The tester shall verify that two ballots are rejected and that the choices made on those two ballots are the same as those in Table X-1 for the two rejected ballots. The tester shall verify the appropriate ballot image has provisional and challenged next to it as listed for the ballot in Table X-1. The tester shall also verify that each of the two ballots has a provisional category such as "regular provisional," "extended hours provisional," "regular extended hours", etc.

The tester shall verify that each ballot image points to the same ballot configuration.

² Provisional

³ All totals in this table exclude provisional and challenged ballot.

⁴ Challenged

RE 7.9.3-B (2005) All records capable of being exported in publicly documented format:

The voting system shall provide the capability to export the collection of electronic ballot images in a publicly documented format, such as XML, or include a utility to export the records into a publicly documented format for offline viewing.

TE 7.9.3-B.1 (2005) All records capable of being exported in publicly documented format:

TE 7.9.3-B.1 (2005) All records capable of being exported in publicly documented format shall be conducted immediately after TE 7.9.3-A.1 (2005) Collection of ballot images record.

The tester shall export the electronic ballot images to a file to a removable media. The tester shall take the removable media to a workstation that has the software to parse the format specified by the manufacturer. Examples of formats are text files, PDF files, Election Markup Language (EML), or IEEE Voting EDI format. The tester shall verify that the electronic ballot images match votes cast in TE 7.9.3-A.1 (2005) Collection of ballot images record.

RE 7.9.3-C (2005) Cryptographic protection of records from voting devices:

Electronic ballot images shall be digitally signed by the voting system. The digital signature shall be generated using a NIST-approved digital signature algorithm with a security strength of at least 112-bits implemented within a FIPS 140-2 validated cryptographic module operating in FIPS mode.

TE 7.9.3-C.1 (2005) Cryptographic protection of records from voting devices:

TE 7.9.3-C.1 (2005) Cryptographic protection of records from voting devices shall be conducted after TE 7.9.1-C.1 (2005) VVPAT, unambiguous interpretation of cast vote: Ballot Image.

The tester shall perform the following activities for 5 electronic ballot images. Since electronic ballot images must be individually signed, the following steps shall be carried out five times.

1. The tester shall obtain an electronic ballot image.
2. The tester shall use the digital signature key to verify that the digital signature on the electronic ballot image verifies.

The tester shall execute the following cryptographic tests for the digital signature cryptographic module used to sign the electronic ballot images:

TE Crypto Module.1 Cryptographic module validation information verification -- Modules
TE Crypto Module.2 Cryptographic module validation environment verification
TE Crypto Module.3 Cryptographic module validation description verification
TE Crypto Module.4 Cryptographic module validation configuration verification
TE Crypto Module.5 Cryptographic module validation algorithm verification
TE Key Size.1 Cryptographic strength – Key Size
TE MAC Size.1 Cryptographic strength – MAC

RE 7.9.3-D (2005) VVPAT, machine readability of VVPAT paper record:

The human-readable contents of the paper record should be created in a manner that is machine-readable by optical character recognition.

TE 7.9.3-D.1 (2005) VVPAT, machine readability of VVPAT paper record:

TE 7.9.3-D.1 (2005) VVPAT, machine readability of VVPAT paper record shall be conducted after the TE 7.9.1-A.1 (2005) VVPAT, review a paper record.

The tester shall verify that the paper record is printed in a manner that will make it easy to scan and read using OCR software. The tester shall verify that the paper record is printed:

1. Using only characters from the Latin alphabet (i.e. no accented or foreign characters such as ß, ü, ñ, or ú);
2. Using black characters on white paper (i.e. high contrast);
3. Does not make use of font formatting such as bold, italic, or underline;
4. Such that no watermark, overlaid image, or shading overlaps with the text; and
5. With individual letters laid out from left to right and appropriately spaced so that they are not overlapping.

RE 7.9.3-E (2005) VVPAT, paper-roll, required human-readable content per roll:

Paper-roll VVPAT voting systems shall mark paper rolls with the following:

- a. Polling place;
- b. Reporting context, such as precinct or election district;
- c. Date of election;
- d. If multiple paper rolls were produced during this election on this device, the number of the paper roll (e.g., Roll #2); and
- e. A final summary line specifying how many total paper records appear on the roll, and how many accepted paper records appear on the roll.

******TE 7.9.3-E.1 (2005) VVPAT, paper-roll, required human-readable content per roll:**

TE 7.9.3-E.1 (2005) VVPAT, paper-roll, required human-readable content per roll is not applicable if the VVPAT vote-capture device does not include a printer that uses a paper-roll.

The tester shall configure the SUT with the following:

1. Load a roll with only seven (7) pages length remaining.
2. Set the polling location as "TEST"
3. Accept Complex Test Ballot

The tester shall create tester maintained manual counters for total ballots and for accepted ballots.

The tester shall set the tester's counter of accepted ballots to zero (0).

The tester shall set the tester's counter of total ballots to zero (0).

The tester shall conduct the following steps until the roll is finished. Given the roll has seven pages, this should occur on the fourth ballot:

1. The tester shall authenticate to the SUT as a Voter.
2. The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.1; 4.4 and 4.5; and Yes on referendum #1.
3. The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record. After the third ballot, the SUT may not produce a paper record or may produce a paper record that is partial and then generate an "out of paper" error.
4. The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.
5. The tester shall indicate their acceptance of the complete ballot to the SUT. Some of the times, the tester may reject the completed ballot. If the ballot is accepted, increment the tester's counter for accepted ballots by one.
6. The tester shall verify that the printed choices are no longer visible.
7. The tester shall increment the tester's counter for total ballots by one.
8. The tester shall terminate the authenticated session.

The tester shall note the roll number from the roll on the SUT (say this is n).

The tester shall verify that the roll indicates the polling place as "TEST"

The tester shall verify that the roll indicates the reporting context as District1, Precinct1.

The tester shall verify that the roll indicates the date of election as the date TE 7.9.3-E.1 (2005) VVPAT, paper-roll, required human-readable content per roll is conducted.

The tester shall verify that the total number of ballots indicated on the roll matches the counter kept by the tester.

The tester shall verify that the number of accepted ballots indicated on the roll matches the counter kept by the tester.

The tester shall verify that last ballot is either fully printed or if partially printed, it was rejected by the SUT.

The tester shall insert a new roll in the printer.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.1; and Yes for referendum 1. (Note: The county commissioners contest is undervoted).

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record.

The tester shall verify that the paper record matches the tester's selected choices for the ballot.

The tester shall indicate their acceptance of the completed ballot to the SUT.

The tester shall terminate the authenticated session

As a voter casting a provisional ballot, the tester shall authenticate to the SUT.

The tester shall use the SUT to complete a provisional ballot using the following choices: 1.1; 2.1; 3.2; Tom and Harry; and Yes to referendum 1.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record.

The tester shall verify that the paper record matches the tester's selected choices for the ballot.

The tester shall indicate their rejection of the provisional ballot to the SUT.

The tester shall use the SUT to complete a ballot using the following choices: 1.1; 2.2; 3.2; 4.2 and 4.3; and No to referendum 1.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record.

The tester shall verify that the paper record matches the tester's selected choices for the ballot.

The tester shall indicate their acceptance of the vote to the SUT.

The tester shall terminate the authenticated session.

The tester shall retrieve the roll from the printer.

The tester shall verify that the roll number printed on the roll is n+1.

The tester shall verify that the roll indicates the polling place as "TEST"

The tester shall verify that the roll indicates the reporting context as District1, Precinct1

The tester shall verify that the roll indicates the date of election as the date TE 7.9.3-E.1 (2005) VVPAT, paper-roll, required human-readable content per roll is conducted.

The tester shall verify that the total number of ballots indicated on the roll is three (3).

The tester shall verify that the number of accepted ballots indicated on the roll is two (2).

RE 7.9.3-F (2005) VVPAT, paper-roll, information per paper record:

Paper-roll VVPAT voting systems shall include the following on each paper record:

- a. Ballot configuration;
- b. Type of voting (e.g., provisional, early, etc.);
- c. Complete summary of voter's choices;
- d. For each ballot contest:
 1. Contest name (e.g., "Governor");
 2. Any additional information needed for unambiguous interpretation of the paper record;
 3. An indication, if the contest was undervoted; and
 4. An indication, if the choice is a write-in vote.
- e. An indication of whether the ballot has been accepted or rejected by the voter.

*******TE 7.9.3-F.1 (2005) VVPAT, paper-roll, information per paper record:**

TE 7.9.3-F.1 (2005) VVPAT, paper-roll, information per paper record is not applicable if the VVPAT vote-capture device does not include a printer that uses a paper-roll.

TE 7.9.3-F.1 (2005) VVPAT, paper-roll, information per paper record shall be conducted after the TE 7.9.3-E.1 (2005) VVPAT, paper-roll, required human-readable content per roll.

The tester shall examine last roll with three ballots on it.

The tester shall verify the following for the first ballot:

1. Ballot#1 is printed as the ballot configuration.
2. The ballot is marked as "regular" or there is no marking such as provisional, contested, or early.
3. The ballot indicates the following choices:
 - a) 1.2 for President/VP
 - b) 2.2 for Senator
 - c) 3.1 for House of Representatives
 - d) County Commissioners: None
 - e) Yes for referendum 1
 - f) None of the five contests are not marked "Write-In"
 - g) Only the representative contest is marked undervote.
 - h) None of the five contests are marked overvote.
4. The vote indicated accepted.

The tester shall verify the following for the second ballot:

1. Ballot#1 is printed as the ballot configuration.
2. The ballot is marked as "provisional".
3. The ballot indicates the following choices:
 - a) 1.1 for President/VP
 - b) 2.1 for Senator
 - c) 3.2 for House of Representatives
 - d) County Commissioners: Tom and Harry
 - e) The county commissioners contest is clearly marked "Write-In"
 - f) None of the other contests are marked "Write-In"
 - g) None of the five contests is marked overvote or undervote
4. The vote indicated rejected.

The tester shall verify the following for the third ballot:

1. Ballot#1 is printed as the ballot configuration.
2. The ballot is marked as "provisional".
3. The ballot indicates the following choices:
 - a) 1.1 for President/VP
 - b) 2.2 for Senator
 - c) 3.2 for House of Representatives
 - d) 4.2 and 4.3 for County Commissioners
 - e) None of the contests is marked "Write-In"
 - f) None of the contests is marked overvote or undervote
4. The vote indicated accepted.

RE 7.9.3-G (2005) VVPAT, paper-roll, paper records on a single roll:

Paper-roll VVPAT voting systems shall not split paper records across rolls; each paper record must be contained in its entirety by the paper roll.

Analysis:

RE 7.9.3-G (2005) VVPAT, paper-roll, paper records on a single roll is tested under the test procedure TE 7.9.3-E.1 (2005) VVPAT, paper-roll, required human-readable content per roll.

RE 7.9.3-H (2005) VVPAT, cut-sheet, content requirements per electronic ballot image:

Cut-sheet VVPAT voting systems shall include the following on each paper record:

- a. Polling place;
- b. Reporting context, such as precinct or election district;
- c. Date of election;
- d. Ballot configuration
- e. Type of voting (e.g., provisional, early, etc.);
- f. Complete summary of voter's choices;
- g. For each ballot contest:
 1. Contest name (e.g., "Governor");
 2. Any additional information needed for unambiguous interpretation of the paper record;
 3. An indication, if the contest was undervoted; and
 4. An indication, if the choice is a write-in vote.
- h. An indication of whether each sheet has been accepted or rejected by the voter.

*******TE 7.9.3-H.1 (2005) VVPAT, cut-sheet, content requirements per electronic ballot image:**

TE 7.9.3-H.1 (2005) VVPAT, cut-sheet, content requirements per electronic ballot image is not applicable if the SUT is not a vote-capture device that uses cut sheet paper record.

The tester shall configure the SUT for the following:

1. Accept Complex Test Ballot
2. Print the electronic ballot image correspondence information on the paper record.
3. Per voter rejection limit of 5.
4. Machine rejection limit of 50.
5. Polling location as "HOME".

The tester shall authenticate to the SUT as a Voter who is completing a provisional ballot.

The tester shall use the SUT to complete a provisional ballot using the following choices: 1.2; 2.2; 3.1, 4.1 and 4.2, and Yes. The tester shall verify that the voter is asked to accept or reject the choices on each of the screens individually.

The tester shall verify that completing the ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their acceptance of the completed ballot to the SUT.

The tester shall verify that the printed ballot is no longer visible.

The tester shall terminate the authenticated session.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.1, 3.1, 4.1 and 4.2. (Note: The undervote on senate race and referendum is intentional). The tester shall verify that he is asked to accept or reject the choices on each of the screens individually.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their acceptance of the completed ballot to the SUT.

The tester shall verify that the printed ballot is no longer visible.

The tester shall terminate the authenticated session.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.1; 3.1; 4.2, 4.3; No. The tester shall verify that he is asked to accept or reject the choices on each of the screens individually.

The tester shall verify that casting a sample ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their rejection of the completed ballot to the SUT.

The tester shall verify that the printed ballot is no longer visible.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.2; 4.4, 4.5; Yes. The tester shall verify that he is asked to accept or reject the choices on each of the screens individually.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their acceptance of the completed ballot to the SUT.

The tester shall verify that the printed ballot is no longer visible.

The tester shall terminate the authenticated session.

The tester shall authenticate to the SUT as a voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; Tom Hanks; 3.2; 4.3 and 4.4; No. The tester shall verify that he is asked to accept or reject the choices on each of the screens individually.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their acceptance of the completed ballot to the SUT.

The tester shall verify that the printed ballot is no longer visible.

The tester shall terminate the authenticated session.

The tester shall retrieve the five cast ballots from the printer.

The tester shall verify the following for each of the five ballots:

1. The first sheet of each ballot has polling place as "HOME".
2. Each sheet of each ballot has District1, Precinct1 as the reporting context.
3. The first sheet of each ballot has the date of election as the date TE 7.9.3-H.1 (2005) VVPAT, cut-sheet, content requirements per electronic ballot image is conducted.
4. Each sheet of each ballot has Complex Test Ballot as the ballot configuration.
5. The first sheet of each ballot contains whether the ballot is provisional or not. Thus, only one ballot should indicate provisional. The remaining four ballots should be marked regular or not marked at all.
6. Only one ballot has undervote and those are for Senatorial Race and Referendum 1. These are indicated on sheet 2 and sheet 4 of that ballot.
7. Only one ballot indicates write-in and that is one on sheet 2 for Senatorial Race.

8. One ballot has the following choices: provisional; 1.2; 2.2; 3.1, 4.1 and 4.2, and Yes; accepted, no write-ins and no overvote or undervote. No contest is split across sheets.
 9. One ballot has the following choices: 1.1, 3.1; 4.1 and 4.2; accepted, no write-ins and no overvote and the following undervotes: senate race and referendum. No contest is split across sheets.
 10. One ballot has the following choices: 1.2; 2.1; 3.1, 4.2, 4.3, No; rejected, no write-ins and no overvote or undervote. No contest is split across sheets.
 11. One ballot has the following choices: 1.2; 2.2; 3.2; 4.4, 4.5; Yes; accepted, no write-ins and no overvote or undervote. No contest is split across sheets.
 12. One ballot has the following choices: 1.2; Tom Hanks; 3.2; 4.3 and 4.4; No; accepted, one write-in (Senate contest); and no overvote or undervote. No contest is split across sheets.
 13. Each sheet of each ballot has proper accepted or rejected marking. Only sheets for one ballot indicate rejected.
 14. Each ballot is two (2) sheets long.
 15. Each sheet of the ballot states page n of 2 (where n = 1 or 2).
 16. Each sheet of each ballot contains the correspondence information for electronic ballot image.
 17. When each sheet is copied, correspondence information for electronic ballot image is not copied or is illegible on the copy.
-

RE 7.9.3-I (2005) VVPAT, cut-sheet, paper record split across sheets:

If a cut-sheet VVPAT voting system splits paper records across multiple sheets of paper, each sheet shall include:

- a. Page number of this sheet and total number of sheets (e.g., page 1 of 4);
- b. Ballot configuration
- c. Reporting context, such as precinct or election district
- d. An indication that the sheet's contents have been accepted or rejected by the voter; and
- e. Any correspondence information included to link the paper record to its corresponding electronic ballot image record.

Analysis:

RE 7.9.3-I (2005) VVPAT, cut-sheet, paper record split across sheets is tested under the TE 7.9.3-H.1 (2005) VVPAT, cut-sheet, content requirements per electronic ballot image.

RE 7.9.3-J (2005) VVPAT, cut-sheet, ballot contests not split across sheets:

If a cut-sheet VVPAT voting system splits paper record across multiple sheets of paper, it shall not split ballot contests across sheets.

Analysis:

RE 7.9.3-J (2005) VVPAT, cut-sheet, ballot contests not split across sheets is tested under the TE 7.9.3-H.1 (2005) VVPAT, cut-sheet, content requirements per electronic ballot image.

RE 7.9.3-K (2005) VVPAT, cut-sheet, paper record sheets verified individually:

If a cut-sheet VVPAT voting system splits paper records across multiple sheets of paper, the ballot choices on each sheet shall be submitted to the voter for verification separately according to the following:

- a. The voter shall be presented a verification screen for the contents of each sheet separately at the same time as the voter is able to verify the contents of the part of the paper record on the sheet;

- b. When a voter accepts or rejects the contents of a sheet, the votes contained on that sheet and verification screen shall be committed to memory, regardless of the verification of any other sheet by the same voter;
- c. Configurable limits on rejected paper records per voter shall count each rejected sheet as a rejected paper record;
- d. Configurable limits on rejected paper records per machine shall not count more than one rejected paper record per voter; and
- e. When a rejected paper record requires election official intervention, the VVPAT voting system shall indicate which sheets have been accepted and which rejected.

Analysis:

Part a of RE 7.9.3-K (2005) VVPAT, cut-sheet, paper record sheets verified individually is also tested under the TE 7.9.3-H.1 (2005) VVPAT, cut-sheet, content requirements per electronic ballot image.

*******TE 7.9.3-K.1 (2005) VVPAT, cut-sheet, paper record sheets verified individually:**

TE 7.9.3-K.1 (2005) VVPAT, cut-sheet, paper record sheets verified individually is not applicable if the SUT is not a vote-capture device that uses cut sheet paper record.

The tester shall configure the SUT for the following:

1. Accept Complex Test Ballot.
2. Not print the electronic ballot image correspondence information on the paper record.
3. Polling location as "HOME"
4. Per voter rejection limit of 3.
5. Machine rejection limit of 2.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.1; 4.1, 4.2; No. The tester shall verify that he is asked to accept or reject the choices on each of the screens individually.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their acceptance of the completed ballot to the SUT.

The tester shall terminate the authenticated session

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.1; 3.1; 4.2, 4.3; No. The tester shall verify that he is asked to accept or reject the choices on each of the screens individually.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their rejection of each screen of the screens on the SUT.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.2; 4.4, 4.5; Yes. The tester shall verify that he is asked to accept or reject the choices on each screen individually.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their rejection of the first two screens.

The tester shall verify that the SUT screen does not display any voter choices.

The tester shall verify that the SUT screen displays a message that the ballot has been rejected.

The tester shall verify that the SUT screen also displays a message indicating the need for an election official to intervene.

The tester shall intervene as election official and use the manufacturer defined procedures to allow voting to proceed.

The tester shall authenticate to the SUT as a voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.1; 2.1; 3.2; 4.3, 4.4; Yes. The tester shall verify that he is asked to accept or reject the choices on each of the screens individually.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their acceptance of the completed ballot to the SUT.

The tester shall terminate the authenticated session.

The tester shall authenticate to the SUT as a voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.1; 4.3, 4.5; Yes. The tester shall verify that he is asked to accept or reject the choices on each of the screens individually.

The tester shall verify that completing a ballot using the SUT causes the device to produce a paper record of the completed ballot.

The tester shall verify that the printed paper record matches the tester's selected choices for the ballot.

The tester shall indicate their rejection of the first screen.

The tester shall verify that the SUT screen does not display any voter choices.

The tester shall verify that the SUT screen displays a message that the ballot has been rejected.

The tester shall verify that the SUT screen also displays a message indicating the need for an election official to intervene.

The tester shall intervene as election official and use the manufacturer defined procedures to allow voting to proceed.

The tester shall retrieve the five cast ballots from the printer.

The tester shall verify the following for each of the five ballots:

1. The first sheet of each ballot has polling place as "HOME".
2. Each sheet of each ballot has District1, Precinct1 as the reporting context.
3. The first sheet of each ballot has the date of election as the date TE 7.9.3-K.1 (2005) VVPAT, cut-sheet, paper record sheets verified individually is conducted.
4. Each sheet of each ballot has the Complex Test Ballot as the ballot configuration.
5. The first sheet of each ballot contains where is the ballot is provisional or not. Thus, all ballots should be marked regular or not marked at all.
6. No ballot has overvote.
7. No ballot indicates write-in.
8. One ballot is two sheets and has the following choices: 1.2; 2.2; 3.1; 4.1, 4.2; No; accepted.
9. One ballot is two sheets and has the following choices: 1.2; 2.1; 3.1; 4.2, 4.3; No; rejected.
10. One ballot is two sheets and has the following choices: 1.2; 2.2; 3.2; rejected; undervote for county commissioners and Referendum 1.
11. One ballot is two sheets and has the following choices: 1.1; 2.1; 3.2; 4.3, 4.4; Yes; accepted.
12. One ballot is one sheet and has the following choices:1.2; rejected; under vote for senate; representative, county commissioners, and referendum.
13. Each sheet of the ballot states page n of 2 (where n = 1 or 2).
14. No sheet of each ballot contains the correspondence information for electronic ballot image, i.e., a random identifier that matches the random numbers in the electronic ballot images listed below.

The tester shall examine the electronic ballot images and verify the following:

1. One electronic ballot image has the following choices: 1.2; 2.2; 3.1; 4.1, 4.2; No; accepted. Its random correspondence number is not printed on the corresponding paper record.
2. One electronic ballot image has the following choices: 1.2; 2.1; 3.1; 4.2, 4.3; No; rejected. Its random correspondence number is not printed on the corresponding paper record.
3. One electronic ballot image has the following choices: 1.2; 2.2; 3.2; rejected. It has no votes for county commissioners and Referendum 1. Its random correspondence number is not printed on the corresponding paper record.
4. One electronic ballot image has the following choices: 1.1; 2.1; 3.2; 4.3, 4.4; Yes; accepted. Its random correspondence number is not printed on the corresponding paper record.
5. One electronic ballot image has the following choices: 1.2; rejected; It has no votes for senate; representative, county commissioners, and referendum. Its random correspondence number is not printed on the corresponding paper record.

RE 7.9.3-L (2005) VVPAT, identification of electronic ballot image correspondence:

The VVPAT voting system shall provide a capability to print information on each paper record sufficient for auditors to identify from an electronic ballot image record its corresponding paper record and from a paper records its corresponding electronic ballot image. This capability shall be possible for election officials to enable or disable.

Analysis:

The matching of electronic ballot image correspondence information is verified in several tests including the TE 7.9.2-C.1 (2005) VVPAT, vote rejection process requirements.

The ability to disable printing electronic ballot image correspondence information is verified in the TE 7.9.3-K.1 (2005) VVPAT, cut-sheet, paper record sheets verified individually.

RE 7.9.3-M (2005) VVPAT, electronic ballot image correspondence identification hidden from voter:

Any information on the paper record that identifies the corresponding electronic ballot image should not be practical for the voter to read or copy by hand.

Analysis:

RE 7.9.3-M (2005) VVPAT, electronic ballot image correspondence identification hidden from voter is tested under the TE 7.9.3-H.1 (2005) VVPAT, cut-sheet, content requirements per electronic ballot image.

RE 7.9.3-N (2005) VVPAT, electronic ballot image correspondence identification viewable to auditors:

The VVPAT voting system manufacturer shall include a capability for auditors to verify the correspondence between the electronic ballot image and paper record pairs, if the correspondence information is printed on the paper record.

Analysis:

RE 7.9.3-N (2005) VVPAT, electronic ballot image correspondence identification viewable to auditors is tested under RE 7.9.3-L (2005) VVPAT, identification of electronic ballot image correspondence.

RE 7.9.4-A (2005) VVPAT, printer connection to voting system – verifying cables:

The VVPAT printer shall be physically connected via a standard, publicly documented printer port using a standard communications protocol.

TE 7.9.4-A.1 (2005) VVPAT, printer connection to voting system – verifying cables:

The tester shall review the printer documentation to determine the ports and protocol used by the printer.

The tester shall verify standards compliance. Verification shall include:

1. Checking the cable, and
2. Checking the connectors at each end of the cable.

To check the cable, the tester shall answer each of the following questions:

1. Does the printer documentation make a claim of standards compliance for this connection (e.g. USB, IEEE 1394)?
2. Are each of the applicable standards publicly documented?
3. Will the connection support printers from more than one manufacturer?
4. Does the cable match the physical specifications specified in the standard(s) (e.g. minimum length, maximum length, insulation)?

To check the connectors at each end of the cable the tester should answer each of the following questions:

1. Do the connectors match the physical specifications specified in the standard(s) (e.g. size, shape, and [pinout](#))?
-

RE 7.9.4-B (2005) VVPAT, printer physical security:

Tamper-evident seals or physical security measures shall protect the connection between the printer and the voting machine.

TE 7.9.4-B.1 (2005) VVPAT, printer physical security:

The tester shall prepare the SUT with the physical security controls as specified by the manufacturer.

The tester shall visually examine the SUT to identify access points for the connection between the printer and the voting machines.

Note: Examples of access points are doors, covers, panels, ports, locations that expose the internal hardware, access points to replenish the printer supplies (such as ink, toner cartridge, paper, etc.) when printer is used to print the official ballot, and ballot box. An access point can be opened using a key, SUT manufacturer provided tools or general hardware tools such as pliers, wrenches or screw drivers.

The tester shall use routine tools available from retail hardware store. Such tools include screw drivers, wrenches, Exacto knife, dissolving chemical, pliers, scissors, glue, adhesive, etc.

The tester shall attempt to use these tools to breach each of the access points such as doors, vents, covers, and panels identified earlier in this DTR. The tester's goal is to breach or open the access to the printer connection at the access point without any evidence (such as scratch marks, screw slot damage, etc.) of breach/tamper. The tester shall spend at least 30 minutes per access point in an attempt to breach it. The 30 minutes shall not include analysis, preparation and other efforts; 30 minutes shall be devoted to actual physical tampering.

TE 7.9.4-B.1 (2005) VVPAT, printer physical security fails if the tester is able to breach the physical security of an access point without leaving tamper evidence within the 30 minutes time allotted for that access point. In other words, TE 7.9.4-B.1 (2005) VVPAT, printer physical security passes under any one or more of the following:

1. The tester is unable to breach an access point.
2. The tester is able to breach an access point, but it leaves physical tamper evidence such as a scratch, old tamper evidence seal remains, screw damage, etc.
3. The tester is able to breach an access point without leaving tamper evidence, but determines that such attack will take more than 30 minutes by a skilled or trained attacker.

Note: Voter tampering threat may be further limited on the order fifteen minutes for the attack, but thirty minutes are used to mitigate the insider threat.

The tester shall verify that any locks used to protect printer connection have been tested for UL 437 compliance. If the lock is not UL 437 compliant, the tester shall test the security of the lock using the following procedures:

1. The tester shall examine the manufacturer's documentation or verify from the manufacturer that the lock is designed so that at least 1,000 different locks can be produced each requiring a different key to unlock.
2. The tester shall use routine tools available from retail hardware store. Such tools include screw drivers, wrenches, Exacto knife, dissolving chemical, pliers, scissors, manual saw, glue, adhesive, etc.
3. Using these routine tools, the tester shall attempt to open, break or otherwise breach the lock.

4. The tester shall verify that the lock can not be compromised in ten minutes.

RE 7.9.4-C (2005) VVPAT, printer connection break:

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 system event log.

TE 7.9.4-C.1 (2005) VVPAT, printer connection break:

The tester shall perform the following activities:

1. The tester shall disconnect the printer cable.
2. The tester shall examine the event log and verify that an entry for break in printer connection exists with the following characteristics:
 1. The date and time of the event is the same as TE 7.9.4-C.1 (2005) VVPAT, printer connection break is conducted.

RE 7.9.4-D (2005) VVPAT, printer able to detect errors:

The VVPAT voting system shall detect printer errors that may prevent paper records from being correctly displayed, printed or stored, such as lack of consumables such as paper, ink, or toner, paper jams/misfeeds, and memory errors.

Analysis: The term “displaying” is intended to convey viewing by the voter. The term “displaying” is included as distinct from “printing” since paper jam can occur during printing or when printed paper is rolled

Analysis: The term “storage” is intended to mean storing the paper record cut-sheet in a box or paper in the paper roll.

TE 7.9.4-D.1 (2005) VVPAT, printer able to detect errors – out of paper:

TE 7.9.4-D.1 (2005) VVPAT, printer able to detect errors – out of paper shall be conducted after the TE 7.9.1-A.1 (2005) VVPAT, review a paper record.

The tester shall remove all paper supply from the printer.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.1 and 3.2.

The tester shall attempt to print the paper record.

The tester shall verify that the SUT detects the printer error condition and displays an error message to the voter.

The tester shall verify that he/she can not see any previously printed ballots.

The tester shall verify that the SUT displays an unambiguous indication of whether the current vote has been cast, discarded, or is waiting to be completed.

The tester shall terminate the authenticated session.

The tester shall use the manufacturer defined procedures to attempt to cancel the current vote.

The tester shall verify that the voter choices are not displayed.

The tester shall verify that the vote is cancelled by the SUT if and only if the cast ballot indication was that the vote is cast.

The tester shall replenish the paper supply (e.g., paper-roll or cut sheets, etc.)

The tester shall verify that previously printed ballots are not visible.

******TE 7.9.4-D.2 (2005) VVPAT, printer able to detect errors – out of ink or toner:**

TE 7.9.4-D.2 (2005) VVPAT, printer able to detect errors – out of ink or toner is not applicable if the SUT does not use a printer that consumes ink or toner.

TE 7.9.4-D.2 (2005) VVPAT, printer able to detect errors – out of ink or toner shall be conducted immediately after the TE 7.9.4-D.1 (2005) VVPAT, printer able to detect errors – out of paper.

The tester shall remove all ink/toner supply from the printer.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.1; 3.1 and 3.2.

The tester shall attempt to print the paper record.

The tester shall verify that the SUT detects the printer error condition and displays an error message to the voter.

The tester shall verify that the SUT displays an unambiguous indication of whether the current vote has been cast, discarded, or is waiting to be completed.

The tester shall verify that previously printed ballots are not visible.

The tester shall terminate the authenticated session.

The tester shall use the SUT manufacturer defined procedures to attempt to cancel the current vote.

The tester shall verify that the voter choices are not displayed.

The tester shall verify that the vote is cancelled by the SUT if and only if the cast ballot indication was that the vote is cast.

The tester shall replenish the printer with ink/toner.

The tester shall verify that previously printed ballots are not visible.

******TE 7.9.4-D.3 (2005) VVPAT, printer able to detect errors – power failure:**

TE 7.9.4-D.3 (2005) VVPAT, printer able to detect errors – power failure is not applicable if the printer cannot be powered off separately from the SUT.

TE 7.9.4-D.3 (2005) VVPAT, printer able to detect errors – power failure shall be conducted immediately after the TE 7.9.4-D.2 (2005) VVPAT, printer able to detect errors – out of ink or toner.

The tester shall power-off the printer.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.1; 2.1; 3.3 and 3.4.

The tester shall attempt to print the paper record.

The tester shall verify that the SUT detects the printer error condition and displays an error message to the voter.

The tester shall verify that the SUT displays an unambiguous indication of whether the current voter's vote has been cast, discarded, or is waiting to be completed.

The tester shall verify that previously printed ballots are not visible.

The tester shall terminate the authenticated session.

The tester shall use the SUT manufacturer defined procedures to attempt to cancel the just cast vote.

The tester shall verify that the voter choices are not displayed.

The tester shall verify that the vote is cancelled by the SUT if and only if the cast ballot indication was that the vote is cast.

The tester shall apply power to the printer.

The tester shall verify that previously printed ballots are not visible.

TE 7.9.4-D.4 (2005) VVPAT, printer able to detect errors – paper jam/misfeed:

TE 7.9.4-D.4 (2005) VVPAT, printer able to detect errors – paper jam/misfeed shall be conducted immediately after the TE 7.9.4-D.3 (2005)VVPAT, printer able to detect errors – power failure.

The tester shall open the printer and create a paper jam. Alternatively, the tester may load very thick paper in the printer that prints the ballots.

During this operation, the tester shall verify that previously printed ballots are not visible.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.2; 3.2 and 3.5.

The tester shall attempt to print the paper record.

The tester shall verify that the SUT detects the printer error condition and displays an error message to the voter.

The tester shall verify that the SUT displays an unambiguous indication of whether the current vote has been cast, discarded, or is waiting to be completed.

The tester shall verify that previously printed ballots are not visible.

The tester shall terminate the authenticated session.

The tester shall use the SUT manufacturer defined procedures to attempt to cancel the current vote.

The tester shall verify that the voter choices are not displayed.

The tester shall verify that the vote is cancelled by the SUT if and only if the cast ballot indication was that the vote is cast.

The tester shall remove the jammed paper.

The tester shall verify that previously printed ballots are not visible.

TE 7.9.4-D.5 (2005) VVPAT, printer able to detect errors – paper jam/misfeed after printing:

TE 7.9.4-D.5 (2005) VVPAT, printer able to detect errors – paper jam/misfeed after printing shall be conducted immediately after the TE 7.9.4-D.4 (2005) VVPAT, printer able to detect errors – paper jam/misfeed.

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.1; 2.2; 3.3 and 3.4.

The tester shall attempt to print the paper record.

The tester shall attempt to jam the printer after the ballot is printed.

The tester shall verify that the SUT detects the printer error condition and displays an error message to the voter.

The tester shall verify that the SUT displays an unambiguous indication of whether the current vote has been cast, discarded, or is waiting to be completed.

The tester shall verify that previously printed ballots are not visible.

The tester shall terminate the authenticated session.

The tester shall use the SUT manufacturer defined procedures to attempt to cancel the current vote.

The tester shall verify that the voter choices are not displayed.

The tester shall verify that the vote is cancelled by the SUT if and only if the cast ballot indication was that the vote is cast.

The tester shall remove the jammed paper.

The tester shall verify that previously printed ballots are not visible.

TE 7.9.4-D.6 (2005) VVPAT, printer able to detect errors – storage:

TE 7.9.4-D.6 (2005)VVPAT, printer able to detect errors – storage shall be conducted immediately after the TE 7.9.4-D.5 (2005)VVPAT, printer able to detect errors – paper jam/misfeed after printing.

The tester shall make sure that the storage for paper record is full (e.g., no more room for cut sheets or for rolls).

The tester shall authenticate to the SUT as a Voter.

The tester shall use the SUT to complete a ballot using the following choices: 1.2; 2.1; 3.1 and 3.5.

The tester shall attempt to print the paper record.

The tester shall verify that the SUT displays an unambiguous indication of whether the current vote has been cast, discarded, or is waiting to be completed.

The tester shall verify that previously printed ballots are not visible.

The tester shall terminate the authenticated session.

The tester shall use the SUT manufacturer defined procedures to attempt to cancel the current vote.

The tester shall verify that the voter choices are not displayed.

The tester shall verify that the vote is cancelled by the SUT if and only if the cast ballot indication was that the vote is cast.

The tester shall verify that previously printed ballots are not visible.

Note: The purpose of the following steps is to verify that the six printer errors in the six TEs did not result in a valid electronic ballot image.

The tester shall obtain the electronic ballot images.

The tester shall verify the following:

1. There is no electronic ballot image for or a rejected electronic ballot image for 1.2; 2.2; 3.1 and 3.2.
2. There is no electronic ballot image for or a rejected electronic ballot image for 1.2; 2.1; 3.1 and 3.2.
3. There is no electronic ballot image for or a rejected electronic ballot image for 1.1; 2.1; 3.3 and 3.4.
4. There is no electronic ballot image for or a rejected electronic ballot image for 1.2; 2.2; 3.2 and 3.5.
5. There is no electronic ballot image for or a rejected electronic ballot image for 1.1; 2.2; 3.3 and 3.4.
6. There is no electronic ballot image for or a rejected electronic ballot image for 1.2; 2.1; 3.1 and 3.5.

RE 7.9.4-E (2005) VVPAT, error handling specific requirements:

If a printer error or malfunction is detected, the VVPAT voting system shall:

- a. Present a clear indication to the voter and election officials of the malfunction. This must indicate clearly whether the current voter's vote has been cast, discarded, or is waiting to be completed;
- b. Suspend voting operations until the problem is resolved;
- c. Allow canceling of the current voter's electronic ballot image by election officials in the case of an unrecoverable error; and
- d. Protect the privacy of the voter while the error is being resolved.

Analysis:

RE 7.9.4-E (2005) VVPAT, error handling specific requirements is tested under RE 7.9.4-D (2005) VVPAT, printer able to detect errors.

RE 7.9.4-F (2005) VVPAT, paper-roll, privacy during printer errors:

Procedures for recovery from printer errors on paper-roll VVPAT voting systems shall not expose the contents of previously cast paper records.

Analysis:

RE 7.9.4-F (2005) VVPAT, paper-roll, privacy during printer errors is tested by the tests under RE 7.9.4-D (2005) VVPAT, printer able to detect errors.

RE 7.9.4-G (2005) VVPAT, paper-roll, support tamper-seals and locks:

Paper-roll VVPAT voting systems shall be designed so that when the rolls are removed from the voting device according to the following:

- a. All paper records are contained inside the secure container;
- b. The container supports being tamper-sealed and locked; and
- c. The container supports being labeled with the device serial number, precinct, and other identifying information to support audits and recounts.

Analysis:

The description under RE 7.9.4-G (2005) VVPAT, paper-roll, support tamper-seals and locks implies that container to transfer the paper-roll should be secured.

*******TE 7.9.4-G.1 (2005) VVPAT, paper-roll, support tamper-seals and locks:**

TE 4.4.2.6-C-1.1 VVPAT, paper-roll, support tamper-seals and locks is not applicable if the SUT does not use paper-roll.

The tester shall examine the container to hold the paper roll when removed from the SUT.

The tester shall verify that the paper-roll container is secured using a security lock. The tester shall verify that the security lock is tested for UL 437 compliance. If the lock is not UL 437 compliant, the tester shall test the security of the lock using the following procedures:

1. The tester shall examine the manufacturer's documentation or verify from the manufacturer that the lock is designed so that at least 1,000 different locks can be produced each requiring a different key to unlock.
2. The tester shall use routine tools available from retail hardware store. Such tools include screw drivers, wrenches, Exacto knife, dissolving chemical, pliers, scissors, manual saw, glue, adhesive, etc.
3. Using these routine tools, the tester shall attempt to open, break or otherwise breach the lock.
4. The tester shall verify that the lock can not be compromised in ten minutes.

The tester shall verify that the paper-roll container is secured using tamper-evident seals per RE 7.9.4-B (2005) VVPAT, printer physical security by executing the DTR for tamper-evident seals in RE 7.9.4-B (2005) VVPAT, printer physical security.

The tester shall label the container with device serial number, precinct, and container number, and roll number ranges (e.g., roll number n to roll number m).

RE 7.9.4-H (2005) VVPAT, paper-roll, mechanism to view spooled records:

If a continuous paper spool is used to store paper records, the manufacturer shall provide a mechanism for an auditor to unspool the paper, view each paper record in its entirety, and then respool the paper, without modifying the paper in any way.

******TE 7.9.4-H.1 (2005) VVPAT, paper-roll, mechanism to view spooled records:**

TE 7.9.4-H.1 (2005) VVPAT, paper-roll, mechanism to view spooled records is not applicable if the SUT does not use a paper-roll to print ballots.

TE 7.9.4-H.1 (2005) VVPAT, paper-roll, mechanism to view spooled records is not applicable if the SUT separates each paper record from the paper-roll after printing.

TE 7.9.4-H.1 (2005) VVPAT, paper-roll, mechanism to view spooled records shall be conducted after the TE 7.9.3-E.1 (2005) VVPAT, paper-roll, required human-readable content per roll.

The tester shall use the two printed rolls from the TE 7.9.3-E.1 (2005) VVPAT, paper-roll, required human-readable content per roll.

The tester shall unroll and re-roll each of the two paper-roll using the manufacturer procedures to view spooled records to verify the following:

1. The manufacturer procedures work.
2. No part of the paper-roll was visibly changed or obscured by the test.

RE 7.9.4-I (2005) VVPAT, printer no communications capability:

The printer shall not be permitted to communicate with any system or machine other than the voting machine to which it is connected.

TE 7.9.4-I.1 (2005) VVPAT, printer no communications capability:

The tester shall power up the SUT and use the manufacturer defined procedures to make the SUT operational for casting ballots.

The tester shall physically examine the printer.

The tester shall verify that the printer has only one set of interface cables.

The tester shall verify that the interface cables are connected to only one voting machine.

The tester shall verify that:

1. There are no switches or light indicators for wireless or infrared communications.
2. If there are any switches or lights, the tester shall verify that these are turned off.

The tester shall perform the following activities:

1. Obtain the printer documentation from the Internet.
2. If the printer documentation is not available on the Internet, the tester shall obtain the printer documentation from the manufacturer.
3. The tester shall verify that the documentation does not describe any wireless or infrared communication capability.
4. If the documentation does describe wireless or infrared communication capability, the tester shall verify that:
 - a) The printer documentation describes the procedures to turn off the wireless or infrared communication capability.
 - b) The procedures to turn off the wireless or infrared communication capability were used in the earlier step in this TE to start the SUT up.
 - c) Additionally, the printer documentation may also describe the procedures to determine if the wireless or infrared communication capability is turned off.
 - d) If documentation describes the procedures to determine the status of the wireless or infrared communication capability, the tester shall use those procedures to verify that the wireless or infrared communication capability are turned off.

RE 7.9.4-J (2005) VVPAT, printer no other functional capability:

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.

TE 7.9.4-J.1 (2005) VVPAT, printer no other functional capability:

The tester shall physically examine the printer and shall verify the following:

1. The printer does not contain any buttons or software interfaces to make copies.
2. The printer does not contain any buttons or software interfaces to send fax.
3. The printer does not contain any buttons or software interfaces to scan documents.
4. The printer does not contain any buttons or software interfaces to e-mail from printer.

Network capability aspects were tested under TE 7.9.4-I.1 (2005) VVPAT, printer no communications capability.

RE 7.9.4-K (2005) VVPAT, protective covering maintenance:

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.

TE 7.9.4-K.1 (2005) VVPAT, protective covering maintenance:

The tester shall use the manufacturer defined cleaning procedures to clear the SUT transparent covers (e.g., those for the voter to read the paper record).

The tester shall verify that the procedures are:

1. Complete
2. Executable
3. Result in cleaning the protective transparent covers.

The tester shall use the manufacturer defined procedures to replace the SUT transparent covers (e.g., those for the voter to read the paper record).

The tester shall verify that the procedures are:

1. Complete
 2. Executable
 3. Result in replacement of the protective transparent covers
 4. Provide the same view as when the previous covers were installed
 5. Do not cause additional exposure
 6. Do not result in physical security breach of the SUT.
-

RE 7.9.4-L (2005) VVPAT, paper record durability:

The paper record shall be of sufficient durability to remain unchanged for minimally 22 months to be used for verifications, reconciliations, and recounts conducted manually or by automated processing.

TE 7.9.4-L.1 (2005) VVPAT, paper record durability:

The tester shall research the paper record media durability using manufacturer information and open sources.

The tester shall verify that the manufacturer specified paper record media will last 22 months or longer.

4 Audit Test Ballot Specification – Simple

This section contains the specification for Simple Test Ballot used in TEs in Section 3.

Information applicable to whole ballot

Date and Time	2004-nov-02, 7:00 AM to 8:00 PM
State	Maryland
County	Madison
Party Line Voting Method	Enabled for partisan contests

Information applicable to every contest

Full-term or partial-term election	Full-term
Voting Method	Simple vote for N candidate(s) - (i.e. no ranked voting)

- **Contest #1:**

Title of Office	President and Vice-President of the United States
District of Office	United States
Partisanship	Partisan
Minimum Votes Allowed	0
Maximum Votes Allowed	1
Maximum Write-in Votes Allowed	0

- **Candidate #1.1:** Joseph Barchi and Joseph Hallaren / Blue
- **Candidate #1.2:** Adam Cramer and Greg Vuocolo / Yellow

- **Contest #2:**

Title of Office	US Representative
District of Office	6th Congressional District
Partisanship	Partisan
Minimum Votes Allowed	0
Maximum Votes Allowed	1

Maximum Write-in Votes Allowed	1
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- **Candidate #2.1:** Brad Plunkard / Blue
- **Candidate #2.2:** Bruce Reeder / Yellow

- **Contest #3:**

Title of Office	County Commissioners
District of Office	Countywide
Partisanship	Partisan
Minimum Votes Allowed	0
Maximum Votes Allowed	2
Maximum Write-in Votes Allowed	2

- **Candidate #3.1:** Camille Argent / Blue
- **Candidate #3.2:** Chloe Witherspoon / Blue
- **Candidate #3.3:** Clayton Bainbridge / Blue
- **Candidate #3.4:** Amanda Marracini / Yellow
- **Candidate #3.5:** Charlene Hennessey / Yellow

Preliminary Draft

5 Audit Test Ballot Specification – Complex

This section contains the specification for Complex Test Ballot used in TEs in Section 3.

The ballot shall be designed such that each paper record is exactly two pages. This may require adding referendum text and/or adding page breaks.

Information applicable to whole ballot

Date and Time	2004-nov-02, 7:00 AM to 8:00 PM
State	Maryland
County	Madison
Party Line Voting Method	Enabled for partisan contests

Information applicable to every contest

Full-term or partial-term election	Full-term
Voting Method	Simple vote for N candidate(s) - (i.e. no ranked voting)

- **Contest #1:**

Title of Office	President and Vice-President of the United States
District of Office	United States
Partisanship	Partisan
Minimum Votes Allowed	0
Maximum Votes Allowed	1
Maximum Write-in Votes Allowed	0

- **Candidate #1.1:** Joseph Barchi and Joseph Hallaren / Blue

- **Candidate #1.2:** Adam Cramer and Greg Vuocolo / Yellow

- **Contest #2:**

Title of Office	Senator
District of Office	Maryland
Partisanship	Partisan
Minimum Votes Allowed	0

Maximum Votes Allowed	1
Maximum Write-in Votes Allowed	1

- **Candidate #2.1:** Brad Plunkard / Blue
- **Candidate #2.2:** Bruce Reeder / Yellow

• **Contest #3:**

Title of Office	US Representative
District of Office	6th Congressional District
Partisanship	Partisan
Minimum Votes Allowed	0
Maximum Votes Allowed	1
Maximum Write-in Votes Allowed	1

- **Candidate #3.1:** Brad Plunkard / Blue
- **Candidate #3.2:** Bruce Reeder / Yellow

• **Contest #4:**

Title of Office	County Commissioners
District of Office	Countywide
Partisanship	Partisan
Minimum Votes Allowed	0
Maximum Votes Allowed	2
Maximum Write-in Votes Allowed	2

- **Candidate #4.1:** Camille Argent / Blue
- **Candidate #4.2:** Chloe Witherspoon / Blue
- **Candidate #4.3:** Clayton Bainbridge / Blue
- **Candidate #4.4:** Amanda Marracini / Yellow
- **Candidate #4.5:** Charlene Hennessey / Yellow

• **Referendum #1:**

Title of proposition	PROPOSED CONSTITUTIONAL AMENDMENT C
Wording of proposition	<p>Shall there be amendments to the State constitution intended to have the collective effect of ensuring the separation of governmental power among the three branches of state government: the legislative branch, the executive branch and the judicial branch?</p> <p>a. Article III, Section 6 of the Constitution shall be amended to read as follows:</p> <p>Section 6. Holding of offices under other governments. - Senators and representatives not to hold other appointed offices under state government. --No person holding any office under the government of the United States, or of any other state or country, shall act as a general officer or as a member of the general assembly, unless at the time of taking such engagement that person shall have resigned the office under such government; and if any general officer, senator, representative, or judge shall, after election and engagement, accept any appointment under any other government, the office under this shall be immediately vacated; but this restriction shall not apply to any person appointed to take deposition or acknowledgement of deeds, or other legal instruments, by the authority of any other state or country.</p> <p>No senator or representative shall, during the time for which he or she was elected, be appointed to any state office, board, commission or other state or quasi-public entity exercising executive power under the laws of this state, and no person holding any executive office or serving as a member of any board, commission or other state or quasi-public entity exercising executive power under the laws of this state shall be a member of the senate or the house of representatives during his or her continuance in such office.</p> <p>b. Article V of the Constitution shall be amended to read as follows: The powers of the government shall be distributed into three (3) separate and distinct departments: the legislative, the executive and the judicial.</p> <p>c. Article VI, Section 10 of the Constitution shall be deleted in its entirety.</p> <p>d. Article IX, Section 5 of the Constitution shall be amended to read as follows:</p> <p>Section 5. Powers of appointment.- The governor shall, by and with the advice and consent of the senate, appoint all officers of the state whose appointment is not herein otherwise provided for and all members of any board, commission or other state or quasi-public entity which exercises executive power under the laws of this state; but the general assembly may by law vest the appointment of such inferior officers, as they deem proper, in the governor, or within their respective departments in the other general officers, the judiciary or in the heads of departments.</p>