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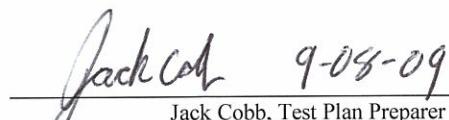www.wylelabs.com

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Certification Test Plan No. T56849-01
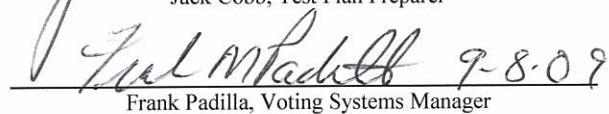September 08. 2009

CERTIFICATION TEST PLAN

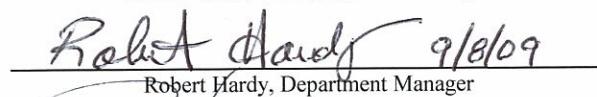## EAC Application Number MVT0901

Prepared for:

Manufacturer Name	MicroVote General Corporation
Manufacturer System	Election Management System (EMS) v4.0
EAC Application No.	MVT0901
Manufacturer Address	MicroVote General Corporation 6366 Guilford Ave. Indianapolis, In 46220

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NVLAP LAB CODE 200771-0

U.S. Election Assistance Commission
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EAC Lab Code 0704

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APPENDICES

1.0   INTRODUCTION

The purpose of this Test Plan is to document the procedures required to validate the modifications made to the MicroVote General Corporation Election Management System (EMS), identified as version 4.0. The MicroVote EMS v. 4.0 has been previously fully tested to EAC 2005 VVSG. As a result of this testing, the MicroVote EMS v. 4.0 was granted certification under EAC Certification No. MVTEMS4. Since that time, MicroVote General Corporation has developed performance enhancements, repaired defects, and added features to the system, resulting in the need for regression testing.

The full system details for the previous test campaign, including system, performance, security, telecommunication, usability, system verification, and TDP deliverables can be reviewed in the EAC test report "MicroVote General Corporation Election Management System (EMS) Voting System v.4.0 VSTL Certification Test Report Version 5" (listed on www.eac.gov).

1.1   References

The list below includes all documents cited in the Test Plan and used in the development of the Test Plan. The documents listed were utilized to perform certification testing.

- Election Assistance Commission 2005 Voluntary Voting System Guidelines, Volume I, Version 1.0, "Voting System Performance Guidelines", and Volume II, Version 1.0, "National Certification Testing Guidelines", dated December 2005

- Election Assistance Commission Testing and Certification Program Manual, Version 1.0, effective date January 1, 2007

- Election Assistance Commission Voting System Test laboratory Program Manual, Version 1.0, effective date July 2008

- National Voluntary Laboratory Accreditation Program NIST Handbook 150, 2006 Edition, "NVLAP Procedures and General Requirements (NIST Handbook 150)", dated February 2006

- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2008 Edition, "Voting System Testing (NIST Handbook 150-22)", dated May 2008

- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002

- Wyle Laboratories' Test Guidelines Documents: EMI-001A, "Wyle Laboratories' Test Guidelines for Performing Electromagnetic Interference (EMI) Testing", and EMI-002A, "Test Procedure for Testing and Documentation of Radiated and Conducted Emissions Performed on Commercial Products"

- Wyle Laboratories' Quality Assurance Program Manual, Revision 3

- ANSI/NCSL Z540-1, "Calibration Laboratories and Measuring and Test Equipment, General Requirements"

- ISO 10012-1, "Quality Assurance Requirements for Measuring Equipment"

- EAC Requests for Interpretation (listed on www.eac.gov)

- EAC Notices of Clarification (listed on www.eac.gov)

- MicroVote General Corporation Election Management System (EMS) Voting System v.4.0 VSTL Certification Test Report Version 5 (listed on www.eac.gov)

1.1   References (continued)

- MicroVote General Corporation Election Management System (EMS) Voting System v.4.0 Technical Data Package

1.2   Terms and Abbreviations

Table 1-1 defines all terms and abbreviations applicable to the development of this Test Plan.

Table 1-1 Terms and Abbreviations

Term	Abbreviation	Definition
Americans with Disabilities Act of 1990	ADA	ADA is a wide-ranging civil rights law that prohibits, under certain circumstances, discrimination based on disability
Configuration Management	CM	---
Commercial Off the Shelf	COTS	---
Direct Record Electronic	DRE	---
United States Election Assistance Commission	EAC	Commission created per the Help America Vote Act of 2002, assigned the responsibility for setting voting system standards and providing for the voluntary testing and certification of voting systems.
Election Management System	EMS	
Equipment Under Test	EUT	---
Functional Configuration Audit	FCA	Exhaustive verification of every system function and combination of functions cited in the manufacturer's documentation.
Help America Vote Act	HAVA	Act created by United States Congress in 2002.
MicroVote EMS	EMS	MicroVote Election Management System
National Institute of Standards and Technology	NIST	Government organization created to promote U.S. innovation and industrial competitiveness by advancing measurement science, standards, and technology in ways that enhances economic security and improves our quality of life.
Printed Circuit Board	PCB	The circuit board used to mechanically support and electrically connect electronic components.
Physical Configuration Audit	PCA	Review by accredited test laboratory to compare voting system components submitted for certification testing to the manufacturer's technical documentation, and confirmation the documentation meets national certification requirements. A witnessed build of the executable system is performed to ensure the certified release is built from tested components.
Quality Assurance	QA	---
Specimen Under Test	SUT	---
Technical Data Package	TDP	Manufacturer documentation related to the voting system required to be submitted as a precondition of certification testing.
Uninterruptible Power Supply	UPS	---
Voter Verifiable Paper Audit Trail	VVPAT	---
Voluntary Voting System Guidelines	2005 VVSG	Published by the EAC, the third iteration of national level voting system standards.
Wyle Operating Procedure	WoP	Wyle Test Method or Test Procedure

1.3   Scope of Testing

The MicroVote EMS v. 4.0 was granted certification under EAC Certification No. MVTEMS4. Since that time, MicroVote General Corporation has developed performance enhancements, repaired defects, and added features to the system, resulting in the need for re-test/regression testing. These items are listed below.

1.3.1   <u>Enhancements</u>

E-01 – Timeout for posting large number of votes after serial vote extraction. A five minute timeout was removed and two stored procedures were improved to provide better performance for posting a large number of votes in precincts with a large number of advanced votes requiring possible retraction.

E-02 – Offices were wrapped if there was no room for the entire office in a column or on a page. A modification was made to move the entire office to the top of the next column if the entire contest would not fit in the previous column.

E-03 – A warning was added for the "Resorting of Candidate" function to prevent unintended results.

E-04 – Candidate name wrapping caused ballots to be longer then necessary. A calculation was updated to calculate the page width accounting for the fact that a two-column layout only needs space for a single gutter where the calculation previously allocated space for a gutter per column. The default border for the candidate box was removed and font size was modified to decrease the ballot size.

E-05 – "All" option on the Precinct summary report was modified to be more useable. Page breaks and numbering were added to enhance the readability of the report.

E-06 – A modification was made to add running mate to the "Report", "Tally", and "Phonetics" fields.

E-07 – Report and Tally Names did not allow the "/" or "&" characters. A modification was made to allow these characters.

E-08 – The arrow navigation keys required a double press to get to the next field. A modification was made to allow a single selection to navigate to the next field.

E-09 – Activation names did not allow the dash character. A modification was made to allow the dash character in the activation name.

E-10 – Text could not be added between the "Office Title" and "Candidate Names" in the ballot layout. A modification was made to allow additional text to be added between these fields.

E-11 – To allow the ballot designer to observe custom text formatting by the user, the auto left and right alignment was removed for this text except for the first line of text on absentee ballots.

1.3.2   <u>Defects</u>

D-01 – An office placed on a ballot without enough space for the entire contest was being split into two parts with a gap. This issue has been corrected.

D-02 – The "Sort By Name Within Party" function did not function properly. A modification was made to place non-party candidates (including write-ins and no candidate filed) at the end of the candidate list.

1.3   Scope of Testing (continued)

1.3.2   Defects (continued)

D-03 – The sorting preference of "None" placed the "No Candidate" after regular candidate names and before "Write-In" candidate name. A modification was made to preserve the order of entry for candidates.

D-04 – Ballot text ran across the center line on the Infinity panel. A modification was made to correct this issue.

1.3.3   Feature

F- 01 – "Merge" database option was added to the existing options to backup, restore, delete, and copy a current database. This feature shall merge a "backed up" election database into the current database.

1.3.4   Hardware

H-01 – The use of Mark Products, LTBSHH356JC graphic LCD Module with Hitachi SP24V001-A due to "end of life" for the LTBSHH356JC. The new display shall be an alternate display thus an Infinity panel can have either display.

2.0   MATERIALS REQUIRED FOR TESTING

The materials required for certification testing of the MicroVote EMS v. 4.0 include software, hardware, test materials, and deliverable materials to enable the test campaign to occur were shipped directly to Wyle by iBeta. The equipment used during this test is the same equipment used during the original certification campaign performed by iBeta. This process keeps the chain of custody intact.

2.1   Software

The software being evaluated comprises the source code for 4-0-23.

The Infinity version 4.00B Trusted Build Image, EMS Version 4-0-22 Trusted Build Image, Pre and Post build Images received from the EAC.

The EMS software version 4.0 shall be used for compatibility testing and building test election file systems.

Table 2-1 presents the software the manufacturer has submitted for testing.

Table 2-1 Software Submitted for Testing

Software Required For Testing	Software Version
MicroVote EMS	4.0.23
MicroVote EMS Autovote utility	4.0.23.1
Firmware for Infinity Panel	4.00B *(from EAC)*

2.2 Equipment

This subsection categorizes the equipment the manufacturer submitted for testing listed in Table 2-2. Each test element is included in the list of the equipment required for testing of that element, including system hardware, general purpose data processing and communications equipment, and any required test instrumentation.

Table 2-2 Test Equipment

Equipment	Description	Serial Numbers
Infinity Voting Panels	Model VP-1 Rev. C firmware version 4.00B	10403, 10234,22013
COTS Laptops	EMS laptop Build Laptop	CN-06G834-48643-65R-3140 (Dell) CN-0N8719-48643-613-4736 (Dell)
COTS Printer	Printer for EMS Reports	CN-0P0137-48734-5B0-119T (Dell)
Voting Booths	Infinity Panel regular and accessible voting booths/storage cases	NA
Double Talk LT	COTS text-to-speech portable voice device	NA
Seiko Printer	Model DPU-414	3002424
GEMPlus	COTS Smart Card Reader	R0434113302427
Headphones	COTS headphones for audio ballots	NA
Smart Cards	Smart cards for Start, Vote, Vote N, Admin, and Tally functions	NA
ELPAC Power Systems	Power Supply	Infinity COTS Power Supply

2.3 Test Tools/Material

This subsection enumerates any and all test materials needed to perform voter system testing. The scope of testing determines the quantity of a specific material required.

Test Material	Quantity
Software tools (i.e. ExamDiff Pro for source code analysis)	TBD
Election database (from MicroVote)	TBD
WoP's	as required
Paper for Reports	as required
Miscellaneous Office equipment and supplies	as required
Printer Thermal Paper Rolls	TBD

2.4   Deliverable Materials

At test conclusion, Wyle Laboratories shall deliver a final report to MicroVote General Corporation and the EAC that includes the following:

- A description of the functional testing and test results.
- The electrical hardware test configurations and results.
- TDP review report
- A source code review report.
- An anomaly list listing any anomalies on Wyle form WH1066, Notice of Anomaly.

All supplied equipment and software furnished to Wyle Laboratories for this program shall be returned to the customer at the conclusion of testing unless otherwise agreed in writing.

2.5   Proprietary Data

All proprietary data that is marked shall be distributed only to those persons that the manufacturer identifies as needing the information to conduct system testing. The manufacturer is required to mark all proprietary documents as such. All organizations and individuals receiving proprietary documents shall ensure those documents are not available to non-authorized persons.

3.0   TEST SPECIFICATIONS

3.1   Requirements

The strategy for evaluating the MicroVote EMS v4.0 was to review the change log, source changes, and the engineer changes submitted for the modified system. Wyle Laboratories has determined that the software changes do not directly affect any of the requirements in the 2005 VVSG. Wyle Laboratories has assessed that no additional functionality was added to the modified system that would add additional requirements that were not tested in the previous test campaign. These reviews also allowed Wyle Laboratories to assess that the enhancements and defect repairs did not materially change any of the requirements which the previous system met. Regression testing of the software and re-testing of specific hardware modification is required.

This test campaign includes the following tests:

- Source code review in accordance with 2005 EAC VVSG.

- Technical Data Package review to insure all modification is documented as applicable.

- End-to-end operational review (includes functionality testing for all system functions of a voting system).

- All functionality performed by new or modified subsystems/modules.

- Functionality that is accomplished using any interfaces to new modules, or that shares inputs or outputs from new modules.

- All functionality related to vote tabulation, election results reporting, and audit trail maintenance.

- The EMS functions from a personal computer (PC) provided by the vendor.

- Electrical testing that includes Electrostatic Disruption, Electromagnetic Radiation (FCC part 15) and Electromagnetic Susceptibility.

3.1   Requirements (continued)

Wyle Laboratories personnel shall maintain a test log of the procedure(s) employed. This log identifies the system and equipment by model and serial number.

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

The designated Wyle Operating Procedures (WoP's) for this program are listed below together with the identification and a brief description of the hardware and software to be tested and any special considerations that affect the test design and procedure.

The specific Wyle WoP's to be used during testing include the following:

- WoP 2 Receipt Inspection
- WoP 3 Technical Data Package Review
- WoP 4 Test Plan Preparation– MicroVote EMS v. 4.0 *(This document)*
- WoP 5a Source Code Compliance Review
- WoP 5b Source Code Functional Review
- WoP 7 Trusted Build
- WoP 9 Electromagnetic Radiation (FCC Part 15)
- WoP 10 Electrostatic Disruption
- WoP 11 Electromagnetic Susceptibility
- WoP 25 Physical Configuration Audit
- WoP 26 Functional Requirements
- WoP 30 System Integration Test
- WoP 30a Logic and Accuracy Test
- WoP 34 Test Report

The MicroVote EMS v. 4.0 shall be configured as follows for Functional Configuration Audit, System Integration Test and Logic and Accuracy Test:

EMS – A COTS laptop documented in Section 2 shall be loaded with Version 4.0.23 build of the EMS. The GemPlus card reader and COTS printer shall be attached as peripherals.

The Infinity Panel shall be configured as follows for Hardware Tests, Functional Configuration Audit, System Integration Test and Logic and Accuracy Test:

DRE - An Infinity Voting Panel configured with firmware version 4.00B, Double Talk LT, Headphones, and a voting booth.

3.2   Hardware Configuration and Design

MicroVote General Corporation submitted an Engineering Change Notice (ECN) for adding the Mark Products, LTBSHH356JC graphic LCD Module with Hitachi SP24V001-A, display of the Infinity Panel Model VP-1 Rev: C, as an alternative display. Wyle performed an engineering analysis of this submission and a visual inspection of the printed circuit boards (PCB), and determined the change to be a "Minor Modification" with some testing required due to the two displays having different electrical characteristics; therefore , different electronic signatures.

3.2   Hardware Configuration and Design (continued)

Wyle Laboratories has conducted a review of the system performance characteristics in accordance with Volume II, Appendix A, Section 4.3.1 of the 2005 VVSG to determine the following: Overall system capabilities, pre-voting functions, voting functions, and post-voting functions. The minimum tests to be performed for this test campaign are as follows:

- Electromagnetic Radiation, FCC Class B (ANSI C63.4)
- Electrostatic Disruption, IEC 61000-4-2
- Electromagnetic Susceptibility IEC 61000-4-3
- Functional testing of monitor per 2005 VVSG requirements

Wyle Laboratories views these tests as the minimum hardware tests that need to be performed. Based on the data collected in these tests further testing maybe required. Wyle Laboratories shall analyze the data collected to determine if further testing is required. If further test is required this test plan shall be updated as needed.

The intended use of the hardware is for voting systems that use election data created on version 4.0 of the EMS.

3.3   Software System Functions

The submitted changes for this test campaign are documented in Section 1.3. The modifications shall be tested using "Re-testing" and "Regression testing". Re-testing shall be used to verify the success of the corrective action. Regression testing shall be used to insure the modification did not introduce any defects in unchanged areas. Wyle Laboratories plans to use both partial and full regression testing. Partial regression testing shall be used to test the directly interacting elements at both the Component and Integration Levels of testing. Full regression testing shall be used to test indirectly interacting elements at the System and Acceptance Level of testing.

The strategy for evaluating the depth of regression testing shall be to review the source code modifications during the source code review. Minor enhancements to variables, input fields, and restrictions shall be tested by inputting both valid and invalid data to the documented modification. Enhancements and defect repairs that directly interacted with modified logic shall be tested by visually comparing Version 4.0.22 build to Version 4.0.23 build. Once the physical modification has been observed the interacting functions shall be fully regression tested to insure the enhancement performs as expected and the defects have been corrected with introducing new problems. After all modifications have been tested on a component level a full system level test shall be performed to insure all interacting components function as a system without issues.

4.0   TEST DATA

4.1   Data Recording

All equipment utilized for test data recording shall be identified in the test data package. For hardware environmental and operational testing, the equipment shall be listed on the Instrumentation Equipment Sheet for each test. The output test data shall be recorded in an appropriate manner as to allow for data analysis. For source code and TDP reviews, results shall be compiled in output reports and submitted to MicroVote General Corporation for resolution. Additionally, all test results, including functional test data, shall be recorded on the relevant WoP's and Test Cases. Results shall also be recorded real-time in engineering log books.

4.2 Test Data Acceptance Criteria

Wyle Laboratories shall evaluate all test results against the MicroVote General Corporation provided technical documentation for the MicroVote EMS v4.0 and the requirements set forth in the 2005 VVSG. The MicroVote EMS v4.0 shall be evaluated for its performance against the 2005 VVSG. The acceptable range for system performance and the expected results for each test case shall be derived from the MicroVote EMS v4.0 documentation. Per the 2005 VVSG, these parameters shall encompass the test tolerances, the minimum number of combinations or alternatives of input and output conditions that can be exercised to constitute an acceptable test of the parameters involved, and the maximum number of interrupts, halts or other system breaks that may occur due to non-test conditions (excluding events from which recovery occurs automatically or where a relevant status message is displayed).

5.0 TEST PROCEDURE AND CONDITIONS

This section describes Wyle Laboratories proposed test procedures and the conditions under which those tests shall be conducted.

The following subsections describe test procedures and a statement of the criteria by which readiness and successful completion shall be indicated and measured.

5.1 Test Facilities

All testing shall be conducted at the Wyle Huntsville, AL facility unless otherwise annotated. Hardware operating testing shall be conducted at the appropriate test site with the required support equipment. All instrumentation, measuring, and test equipment used in the performance of this test campaign shall be listed on the Instrumentation equipment Sheet for each test and shall be calibrated in accordance with Wyle Laboratories' Quality Assurance Program, which complies with the requirements of ANSI/NCSL Z540-1 and ISO 10012-1. Standards used in performing all calibrations are traceable to the National Institute of Standards and Technology (NIST) by report number and date. When no national standards exist, the standards are traceable to international standards or the basis for calibration is otherwise documented.

Unless otherwise specified herein, all remaining tests, including system level functional testing, shall be performed at standard ambient conditions:

- Temperature: $25°C \pm 10°C$ ($77°F \pm 18°F$)
- Relative Humidity: 20 to 90%
- Atmospheric Pressure: Local Site Pressure

Unless otherwise specified herein, the following tolerances shall be used:

- Time $\pm 5\%$
- Temperature $\pm 3.6°F$ ($2°C$)
- Vibration Amplitude $\pm 10\%$
- Vibration Frequency $\pm 2\%$
- Random Vibration Acceleration
  20 to 500 Hertz ± 1.5 dB
  500 to 2000 Hertz ± 3.0 dB
- Random Overall grms ± 1.5 dB
- Acoustic Overall Sound Pressure Level   +4/-2 dB

5.1   Test Facilities (continued)

Deviations to the tolerances on Page No. 2 of 11 shall be submitted by the test responsible agency with sufficient engineering information to substantiate the deviation request, but only when best effort technique and system limitations indicate the need for a deviation.

5.2   Test Set-Up

All voting machine equipment (hardware and software), shall be received and documented utilizing Wyle Receiving Ticket (WL-218, Nov'85) and proper QA procedures. When voting system hardware is received, Wyle Laboratories Shipping and Receiving personnel shall notify Wyle Laboratories QA personnel. With Wyle Laboratories QA personnel present, each test article shall be unpacked and inspected for obvious signs of degradation and/or damage that may have occurred during transit. Noticeable degradation and/or damage, if present, shall be recorded, photographs shall be taken, and the MicroVote General Corporation representative shall be notified.

Wyle Laboratories QA personnel shall record the serial numbers and part numbers. Comparison shall be made between those numbers recorded and those listed on the shipper's manifest. Any discrepancies noted shall be brought to the attention of the MicroVote General Corporation representative for resolution.

TDP items, including all manuals, and all source code modules received shall be inventoried and maintained by the Wyle Laboratories Project Engineer assigned to testing.

For hardware test setup, the system shall be configured as it would be for normal field use. This includes connecting all supporting equipment and peripherals. Wyle personnel shall properly configure and initialize the system, and verify that it is ready to be tested, by following the procedures detailed in the MicroVote EMS v4.0 technical documentation. Wyle shall develop an operational status test to be performed prior to and immediately following each hardware test. Wyle shall develop the system performance levels to be measured during operational tests.

5.3   Test Sequence

There is no specific sequencing enforced for the execution of the required tests.

The components of the MicroVote EMS v4.0 shall only undergo the hardware tests described in the Table 5-1. Table 5-1 includes a list of tests and a brief description of each hardware test and a planned sequence along with the location of each test:

Table 5-1 MicroVote EMS v4.0 Hardware Test Sequence

Test	Procedure/Description	Location	Specimen
Electromagnetic Radiation	FCC Part 15 Class B for both radiated and conducted emissions	EMI Lab	Serial Number 10403
Electrostatic Disruption	IEC 61000-4-2 (1995-01) 15kV air discharge and 8kV contact discharge	EMI Lab	Serial Number 10403
Electromagnetic Susceptibility	IEC 61000-4-3 electromagnetic field of 10V/m modulated by a 1kHZ, 80% AM modulation at 80MHz to 1000MHz frequency	EMI Lab	Serial Number 10403

5.3 Test Sequence (continued)

Table 5-2 MicroVote EMS v4.0 Software and System Testing Sequence

Test	Description	Procedure	Test Level	Specimen	Election Data
Technical Data Package (TDP) Review *(Pre-testing Activity)*	Documentation review for compliance, correctness, and completeness	WHVS07.1 WOP 3	Document	TDP package	
Compliance Source Code Review *(Pre-testing Activity)*	Source code review for compliance	WHVS07.2 WOP 5a	Component	EMS Source Code package	
Compliance Build	Use the build documents and source code to construct the application	WHVS07.3 WOP 25	Component & System	EMS Source Code package	
Physical Configuration Audit	Audit hardware and software models and versions	WHVS07.3 WOP 25	Component & System		
Functional Configuration Audit	Functional testing to the system documentation and 2005 VVSG requirements	WHVS07.4 WOP 26 WOP30a	Component & Integration		Gen-01
Logic and Accuracy (Temp Power)	Test of accuracy to ~1.6 million ballot positions	WHVS07.9 WOP 30	System		L & A Election
System Integration Test	Test of all system hardware, software and peripherals.	WOP 30	System		Gen-01
Trusted Build	Creation and installation of the final system software	WHVS07.6 WOP 7 WOP 7a	Component	EMS Source Code package	

5.4 Test Operation Procedures

Wyle Laboratories shall provide the step-by-step procedures for each test case to be conducted. Each step is assigned a test step number and this number, along with critical test data and test procedures information, shall be tabulated onto a Test Control Record for control and the recording of test results.

Any test failures shall be recorded on WH1066, Notice of Anomaly form. These Anomalies shall be reported to the manufacturer and the EAC.

APPENDIX A

FUNCTIONALITY REQUIREMENTS MATRIX

Item	Description	Test	Comments
E-01	Timeout for posting large number of votes after serial vote extraction. A five minute timeout was removed and two stored procedures were improved to provide better performance for posting large number of votes in precincts with large numbers of advanced votes requiring possible retraction.	FCA, System Integration	Wyle shall use an election database provided by MicroVote containing a large amount of election data.
E-02	Offices were wrapped if there was no room for the entire office in a column or on a page. A modification was made to move the entire office to the top of the next column if the entire contest would not fit in the previous column.	FCA, System Integration	
E-03	A warning was added for the "Resorting of Candidate" function to prevent unintended results	FCA	
E-04	Candidate name wrapping caused ballots to be longer then necessary. A calculation was updated to calculate the page width accounting for the fact that a two column layout only needs space for a single gutter where the calculation previously allocated space for a gutter per column. The default border for the candidate box was removed and font size was modified to decrease the ballot size.	FCA, System Integration	
E-05	"All" option on the Precinct summary report was modified to be more useable. Page breaks and numbering were added to enhance the readability of the report.	System Integration	
E-06	A modification was made to add running mate to the "Report", "Tally", and "Phonetics" fields.	System Integration	
E-07	Report and Tally Names did not allow the "/" or "&" characters. A modification was made to allow these characters.	FCA	
E-08	The arrow navigation keys required a double press to get to the next field. A modification was made to allow a single selection to navigate to the next field.	FCA	
E-09	Activation names did not allow the dash character. A modification was made to allow the dash character in the activation name.	FCA	
E-10	Text could not be added between the "Office Title" and "Candidate Names" in the ballot layout. A modification was made to allow additional text to be added between these fields.	FCA	
E-11	To allow the ballot designer to observe custom text formatting by the user the auto left and right alignment was removed for this text except for the first line of text on absentee ballots.	FCA, System Integration	

D-01	An office placed on a ballot that without enough space was being split into two parts with a gap. This issue has been corrected.	FCA, System Integration	
D-02	The "Sort By Name Within Party" function did not function properly. A modification was made to place non-party candidates (including write-ins and no candidate filed) at the end of the candidate list.	FCA	
D-03	The sorting preference of "None" placed the "No Candidate" after regular candidate names and before "Write-In" candidate name. A modification was made to preserve the order of entry for candidates.	FCA, System Integration	
D-04	Ballot text ran across the center line on the Infinity panel. A modification was made to correct this issue.	FCA, System Integration	
F-01	"Merge" database option was added to the existing options to backup, restore, delete, and copy a current database. This feature shall merge a "backed up" election database into the current database.	FCA, System Integration	

APPENDIX B

TEST PROCEDURE DESCRIPTION

Test Procedure	Test Procedure Description
WoP 2 Receipt Inspection	Documenting the receiving inspection of equipment.
WoP 3 Technical Data Package Review	Track all enhancements, new features, and hardware changes through the technical data package.
WoP 4 Test Plan Preparation – MicroVote EMS v. 4.0 (*This Document*)	Approval of this document shall fulfill the requirements of this procedure.
WoP 5a Source Code Compliance Review	Compare the source code to the vendor's software design documentation to ascertain how completely the software conforms to the vendor's specifications. Source code inspection shall also assess the extent to which the code adheres to the requirements in the 2005 VVSG, Volume I, Section 5.
WoP 5b Source Code Functional Review	Review every source code module for compliance with stated coding standard. The tools used are a file comparison program or text editor. As required, compare each modified file to its previous version to confirm that the actual changes in the file are as identified in the change log and in compliance with stated functionality.
WoP 7 Trusted Build	To ensure that the system version tested is the correct version, Wyle Laboratories personnel shall witness the build of the executable version of the system immediately prior to or as part of, the physical configuration audit. (Additionally, should components of the system be modified or replaced during the testing process, Wyle Laboratories shall require MicroVote General Corporation to conduct a new "build" of the system to ensure that the certified executable release of the system is built from tested components).
WoP 9 Electromagnetic Radiation (FCC Part 15)	Verifies that radiated and conducted emissions from the voting system hardware do not exceed the allowable limits of CFR Part 15, Class B. The test for electromagnetic radiation shall be conducted in compliance with the FCC Part 15 Class B requirements by testing per ANSI C63.4 (Volume II, Section 4.8.b)
WoP 10 Electrostatic Disruption	Demonstrates the voting system's hardware to withstand electrostatic discharges during normal operation. This test is equivalent to the procedure of IEC 61000-4-2. The test for electrostatic disruption shall be conducted in compliance with the test specified in IEC 61000-4-2 (Volume II, 4.8.c)
WoP 11 Electromagnetic Susceptibility	Demonstrates the voting system's hardware to withstand radiated electromagnetic fields during normal operation. This test is equivalent to the procedure of IEC 61000-4-3. The test for electromagnetic susceptibility shall be conducted in compliance with the test specified in IEC 61000-4-3 (Volume II, 4.8.d)
WoP 25 Physical Configuration Audit	Establish a configuration baseline of software and hardware to be tested; confirm whether manufacturer's documentation is sufficient for the user to install, validate, operate, and maintain the voting system. Verify software conforms to the manufacturer's specifications; inspect all records of manufacturer's release control system; if changes have been made to the baseline

Test Procedure	Test Procedure Description
	version, verify manufacturer's engineering and test data are for the software version submitted for certification.
	Review drawings, specifications, technical data, and test data associated with system hardware, if non-COTS, to establish system hardware baseline associated with software baseline.
	Review manufacturer's documents of user acceptance test procedures and data against system's functional specifications; resolve any discrepancy or inadequacy in manufacturer's plan or data prior to beginning system integration functional and performance tests.
	Subsequent changes to baseline software configuration made during testing, as well as system hardware changes that may produce a change in software operation are subject to re-examination.
WoP 26 Functional Requirements	The functional configuration audit encompasses an examination of manufacturer's tests, and the conduct of additional tests, to verify that the system hardware and software perform all the functions described in the manufacturer's documentation submitted for the TDP. In addition to functioning according to the manufacturer's documentation tests shall be conducted to insure all applicable 2005 VVSG requirements are met.
WoP 30 System Integration Test	System Level certification test address the integrated operation of both hardware and software, along with any telecommunication capabilities. Compatibility of the voting system software components or subsystems with one another, and with other components of the voting system environment, shall be determined through functional tests integrating the voting system software with the remainder of the system.
WoP 30a Test case - GEN-01	This test exercises options that can be specified when building the ballots for a general Election.
	These options shall be used to generate inputs for Direct Recording Electronic (DRE) Devices. All relevant values of each option must be exercised. Additional test cases may be generated as necessary.
	This test should follow the procedures exactly as described in the Election Management System (EMS) Operators manual.
WoP 30a Test case - LA-01	Use ballot that provides the maximum number of votable positions. Use multiple races with multiple candidates. Simulation may be used to generate sufficient voted ballots to exercise at least 1,549,703 positions.
WoP 34 Test Report	National Certification Test Report