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TEST REPORT

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NATIONAL CERTIFICATION TEST REPORT FOR CERTIFICATION TESTING OF THE ELECTION SYSTEMS & SOFTWARE UNITY 3.2.1.0 VOTING SYSTEM

for

Election Systems & Software
11208 John Galt Boulevard
Omaha, NE 68137

(wo)

STATE OF ALABAMA
COUNTY OF MADISON }

Robert D. Hardy, Department Manager, being duly sworn, deposes and says: The information contained in this report is the result of complete and carefully conducted testing and is to the best of his knowledge true and correct in all respects.

Robert Hardy

SUBSCRIBED and sworn to before me this 11 day of Mar 20 11

Sandra A. Manuel

Notary Public in and for the State of Alabama at Large

My Commission expires June 5, 2011

Wyle shall have no liability for damages of any kind to person or property, including special or consequential damages, resulting from Wyle's providing the services covered by this report.

PREPARED BY: Jack Cobb 3-11-11
Jack Cobb, Senior Project Engineer Date

APPROVED BY: Frank Padilla 3-11-11
Frank Padilla , Voting Systems Manager Date

WYLE Q. A.: Brenda Mroz FOR 3/11/11
Raul Terceno, Q. A. Manager Date

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Revisions

REVISION A

REPORT NO. T58200.01-01, Rev. A

DATE March 10, 2011

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REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
---	2-28-11	Entire Document	Original Release
A	3-10-11	Section 1.1	Added background information on additional tests performed and reference to discrepancy descriptions in Section 3.2.1 of this report.
A	3-10-11	Section 1.1, second paragraph, last sentence	Added: "Wyle is only documenting the configuration used during testing conducted at Wyle."
A	3-10-11	Section 2.1	Reworded last sentence.
A	3-10-11	Section 2.2.1, Table 2-1	Reworded table information.
A	3-10-11	Section 2.2.2	Combined and reworded first two sentences.
A	3-10-11	Section 2.2.2, Table 2-2	Added clarification for DS200 software version
A	3-10-11	Section 3.2	Added background information on additional tests performed.
A	3-10-11	Section 3.2	Reworded second paragraph and added the following sentence: "However, to be prudent, the M100 was included in the Accuracy Test."
A	3-10-11	Section 3.2	Added reference to Section 3.2.1 of the report for discrepancy descriptions.
A	3-10-11	Section 3.2.1	Changed reference to iBeta test report.
A	3-10-11	Section 3.2.2	Reworded test description and added wording to clarify test being performed.

Revisions

REVISION A
REPORT NO. T58200.01-01, Rev. A
DATE March 10, 2011

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REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
A	3-10-11	Section 4.1.2	Added additional information on test and summary findings.
A	3-10-11	Section 4.1.7	Added additional information on test and summary findings.
A	3-10-11	Section 4.3	Deleted the following statement: "Due to the varying requirements of individual jurisdictions, it is recommended by the VVSG that local jurisdictions perform pre-election logic and accuracy tests on all systems prior to their use in an election within their jurisdiction."
A	3-10-11	Entire Document	Reformatted due to revisions (updated TOC, page numbering, etc.) and corrected minor typos.

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APPENDICES

1.0 INTRODUCTION

1.1 Scope

This report presents the test results for Certification Testing of the Election Systems & Software (ES&S) Unity 3.2.1.0 Voting System. Initial certification testing of the Unity 3.2.1.0 System was performed by iBeta Quality Assurance. iBeta Quality Assurance withdrew from the Election Assistance Commission's (EAC) Voting Systems Test Laboratory (VSTL) Program on December 13, 2010 as documented in the letter "iBeta's Intention to Withdraw from the EAC Program" dated November 29, 2010. At the conclusion of the iBeta test campaign, ES&S requested a transition of all remaining testing responsibilities to Wyle Laboratories in the letter "VSTL Change Decision" dated December 17, 2010. The EAC granted this transition on January 11, 2011.

The ES&S Unity 3.2.1.0 system testing performed by iBeta Quality Assurance resulted in nine open discrepancies (described in Section 3.2.1 of this report) at the time of iBeta's withdrawal from the EAC Testing & Certification Program. The primary objective of the tests conducted by Wyle was to resolve all open discrepancies that resulted from the iBeta test campaign. To accomplish this, Wyle designed and executed tests for these discrepancies and iBeta's Reliability Test. Additionally, as a result of issues encountered during testing, Wyle designed and executed the following tests: a Modem Test to insure the DS200 modem is inoperable, an Accuracy Test on the DS200 and M100, a Threshold Test, a DS200 Date/Time Change Event Test, a Printer Timeout Test and a Ballot Presentation Test. Wyle only regression tested the open discrepancies identified at the conclusion of the iBeta test campaign; therefore Wyle only documented the configuration used during testing conducted at Wyle. A

This report is valid only for the equipment identified in Section 2 of this report. Any changes, revisions, or corrections made to the system after this evaluation shall be submitted to the EAC to determine if the modified system requires a new application, or can be submitted as a modified system. The scope of testing required will be determined based upon the degree of modification.

1.2 Objective

ES&S Unity 3.2.1.0 system certification was tested to the United States Federal Election Commission (FEC) 2002 Voting System Standards (VSS) and all applicable EAC 2005 Voluntary Voting Systems Guidelines (VVSG). All testing performed by Wyle was to the FEC 2002 VSS and applicable EAC 2005 VVSG.

1.3. Test Report Overview

This test report consists of four main sections and appendices:

- 1.0 Introduction – Provides: the architecture of the National Certification Test Report (hereafter referred to as Test Report); a brief overview of the testing scope of the Test Report; a list of documentation, customer information, and references applicable to the voting system hardware, software, and this test report.
- 2.0 System Identification – Provides information about the equipment tested.
- 3.0 Certification Test Background – Contains information about the certification test process and a list of terms and nomenclature pertinent to the Test Report and system tested.
- 4.0 Test Findings and Recommendation – Provides a summary of the results of the testing process.
- Appendices– Information supporting reviews and testing of the voting system are included as appendices to this report.

1.0 INTRODUCTION (continued)

1.4 Customer

Election Systems & Software
11208 John Galt Boulevard
Omaha, NE 68137

1.5 References

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
- United States Federal Election Commission Voting System Standards Volume I, "Performance Standards" and Volume II, "Test Standards" dated April 2002
- 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)
- iBeta Quality Assurance ES&S Unity 3.2.1.0 VSTL Certification Test Plan Version 5.0
- iBeta Test Report No. (V)2010-13Dec-001(A), Version 1.0, "ES&S Unity 3.2.1.0 VSTL Certification Test Report for testing completed by iBeta as of November 29, 2010"
- EAC DS200 Freeze/Shutdown Failures and X Windows Correlation dated October 13, 2010
- EAC Letter Response to ES&S VSTL Change Request, dated January 11, 2011
- ES&S DS200 Ballot Drop Issue Analysis, Unity 3.2.1.0, Print Date January 18, 2011

2.0 SYSTEM IDENTIFICATION AND OVERVIEW

2.1 System Overview

The full ES&S Unity 3.2.1.0 system description can be found in Section 1.4 of iBeta Quality Assurance ES&S Unity 3.2.1.0 VSTL Certification Test Plan, Version 5.0. Wyle only regression tested the open discrepancies at the conclusion of the iBeta test campaign; therefore Wyle only documented the configuration used during testing conducted at Wyle. A

2.2 System Identification

The materials required for testing of the Unity 3.2.1.0 included software, hardware, test materials, and deliverable materials shipped directly to Wyle by iBeta. The equipment used during the test campaign was the same equipment used during the original certification campaign performed by iBeta. The materials documented in the following sections are the materials used during regression testing of the open discrepancies at the conclusion of the iBeta test campaign and the additional tests performed at Wyle and are not a complete list of materials used in the certification of Unity 3.2.1.0. A

2.2.1 Hardware

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 2-1 Unity 3.2.1.0 Test Equipment

Equipment	Description	Serial Numbers
DS200 (Version 1.2.1)	Precinct Count Optical Scanner	ES0107380927, ES0107370025, ES0107360007, DS02093900001, DS0110340837, DS0110390905
M100 (Version 1.3)	Precinct Count Optical Scanner	205071, 202975, 231531
Ballot Box (Versions 1..2 & 1.3)	Plastic Ballot Box	E076, E089, E099, 096, 57936-01, 57936-02
Ballot Box (Versions 1.0, 1.1 & 1.2)	Metal Box with Diverter	E015, E017 A
Dell Optiplex 760 (EMS PC)	Processor: Intel Duo Core E8400 Wolfdale Memory: 4x 1GB, 800 Mhz Ram Hard Drive Capacity: 80 GB	3x6FKK1
Report Printer	HP LaserJet 4050N	USQX074394
Dell Latitude E6400 (ERM Laptop)	Processor: Intel Duo Core P8600 2.4 Ghz Memory: 1x 2GB, 800 Mhz Ram Hard Drive Capacity: 80 GB	137FMJ1
Transport Media (USB Flash Drives)	SanDisk 2GB Cruzer Micro	Wyle-assigned: TM-XXX
Compact Flash	Delkin Devices 1 GB Compact Flash	Wyle-assigned: CF-XXX
PCMCIA Card	Vikant Corporation PCMCIA SRAM Card, P/N: VT-SRA-512, 5.16.2008	Wyle-assigned: PCMCIA-XXX

2.0 SYSTEM IDENTIFICATION AND OVERVIEW (continued)

2.2 System Identification (continued)

2.2.2 Software

The software evaluated was limited to the firmware builds for the DS200 and M100. Only the changes incorporated since the iBeta test campaign were evaluated by Wyle. The "Build" software environments were constructed by iBeta and shipped to Wyle. Wyle accepted the build environments for this test campaign. Wyle utilized an EMS setup configured by iBeta to load election information onto transport media and receive voted election data from the tabulators. Wyle did not test the EMS for any other functionality. Wyle used two election definitions built by iBeta (REG1S1EN and WIOPPRI) to test iBeta discrepancy numbers 188, 189, 190, and 192. Wyle developed election definitions for discrepancy 187 and the accuracy test. A

Table 2-2 Software Required for Testing

Software Required For Testing	Software Version
DS200 Firmware	1.4.3.11*
Scanner Board Firmware	2.21.0.0
Power Management Board (received from iBeta)	1.2.0.1
M100 Firmware	5.4.4.5

*The final version tested was 1.4.3.11, however, tests were performed on multiple previous versions. A

2.3 Test Support Materials

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

The following test materials were required to support the Unity 3.2.1.0 test campaign:

Table 2-3 Test Support Equipment

Test Material	Quantity
Paper Rolls	160 rolls total (145-DS200, 15-M100)
Pre Printed Ballots	2200 11" and 700 of each additional size (14", 17", 19")

2.4 Deliverable Materials

The materials delivered by ES&S as part of the Unity 3.2.1.0 system to the user are documented in Section 3.4, "Deliverable Materials", of iBeta Quality Assurance ES&S Unity 3.2.1.0 VSTL Certification Test Plan, Version 5.0.

3.0 CERTIFICATION TEST BACKGROUND

Wyle Laboratories is an independent testing laboratory for systems and components under harsh environments, including dynamic and climatic extremes as well as the testing of electronic voting systems. Wyle holds the following accreditations:

- ISO-9001:2000
- Nationally Recognized Testing Laboratory (NRTL)
- OSHA Accredited
- NVLAP Accredited ISO 17025:2005
- EAC Accredited VSTL, NIST 150,150-22
- A2LA Accredited (Certification No.'s 845.01, 845.02, and 845.03)
- FCC Approved Contractor Test Site (Part 15, 18, 68)

3.1 General Information about the Certification Test Process

All testing performed as part of the test effort was performed at the Wyle Labs Huntsville, AL facility. Qualification/Certification testing was limited to the ES&S Unity 3.2.1.0 Voting System components previously identified in this report.

All hardware used during testing for this test campaign was configured "As Used" for voting. Each tabulator was placed on a ballot box and loaded with the proper firmware. The Unity 3.2.1.0 EMS suite was loaded on a COTS desktop. All media used during testing was loaded from this EMS desktop. All hardware used to build the software was configured by and received from iBeta Quality Assurance.

3.2 Certification Testing Scope

As stated previously, the ES&S Unity 3.2.1.0 System testing performed by iBeta Quality Assurance resulted in nine open discrepancies at the time of iBeta's withdrawal from the EAC Testing & Certification Program. The primary objective of the tests conducted by Wyle was to resolve all open discrepancies that resulted from the iBeta test campaign. To accomplish this, Wyle designed and executed tests for these discrepancies and iBeta's reliability test. As a result of issues encountered during testing, Wyle also designed and executed the following tests: a Modem Test to insure the DS200 modem is inoperable in version 1.4.3.10 of the firmware, an Accuracy Test on the DS200 and M100, a Threshold Test, a Printer Timeout Test, a Ballot Presentation Test and a DS200 Date/Time Change Event Test. A

Prior to initiation of certification testing at Wyle, ES&S submitted three Engineering Change Orders (ECOs) for review: ECO 858, ECO 860 and ECO 865, all of which pertained to the M100. ECO 865 documented a change in part number for a contact image sensor and was deemed De Minimis with no testing required. ECO 860 detailed a change in the manufacturer of the semiconductor clock chip on the M100. Due to the differences in access time for the clock chips (100ns for the replacement chip versus 70 ns for the previous chip), Wyle performed a comparison emissions scan to determine if further testing was necessary (photographs of which are presented in Appendix A). Following analysis of the results of the scan, Wyle concluded that the variation (delta) between the two chips did not represent a significant risk to the equipment or the effect the equipment could have on its environment and recommended that no further testing be conducted. However, to be prudent, the M100 was included in the Accuracy Test. A

ECO 858 documented the RoHS compliance of the part tested for ECO 860 and was deemed De Minimis with no testing required.

3.0 CERTIFICATION TEST BACKGROUND (continued)

3.2 Certification Testing Scope (continued)

The strategy to evaluate the ES&S Unity 3.2.1.0 system was to research documentation provided by iBeta Quality Assurance, ES&S and the EAC for all documented open discrepancies from the iBeta certification test campaign, which are described in detail in Section 3.2.1 of this report. Wyle then determined that the open discrepancies related to the following requirements: A

Table 3-1 Test Requirements

Test Requirement	WoP	iBeta Discrepancy/ Additional Test
FEC 2002 VSS Vol. I: 2.2 This section defines required functional capabilities that are system-wide in nature and not unique to pre-voting, voting, and post-voting operations. All voting systems shall provide the following functional capabilities: ... Error recovery;	5a	189
FEC 2002 VSS Vol. I: 2.2.1 .b Provide system functions that are executable in the intended manner and order, and only under the intended conditions.	5a	187
FEC 2002 VSS Vol. I: 2.2.4.1 g. Record and report the date and time of normal and abnormal events;	5a	190
FEC 2002 VSS Vol. I: 2.2.5.1 Election audit trails provide the supporting documentation for verifying the correctness of reported election results. They present a concrete, indestructible archival record of all system activity related to the vote tally, and are essential for public confidence in the accuracy of the tally, for recounts, and for evidence in the event of criminal or civil litigation.	5a	190
FEC 2002 VSS Vol. II: 2.8.5.c. Provides procedures that clearly enable the operator to intervene the system operations to recover from an abnormal system state;	5a	189
EAC 2005 VVSG Vol. I: 2.2.1.e&f e. Provide security provisions that are compatible with the procedures and administrative tasks involved in equipment preparation, testing, and operation, f. Incorporate a means of implementing a capability if access to a system function is to be restricted or controlled	3	178
EAC 2005 VVSG Vol. I: 2.1.1 .b Provide system functions that are executable in the intended manner and order, and only under the intended conditions.	5a	192
EAC 2005 VVSG Vol. I: 2.1.2 .c Record each vote precisely as indicated by the voter and be able to produce an accurate report of all votes cast.	5a&b	187
EAC 2005 VVSG Vol. I: 2.1.4.g Record and report the date and time of normal and abnormal events.	5a	188
EAC 2005 VVSG Vol. I: 2.1.8. b Records the number of ballots cast during a particular test cycle or election.	5a	187

3.0 CERTIFICATION TEST BACKGROUND (continued)

3.2 Certification Testing Scope (continued)

Table 3-1 Test Requirements

Test Requirement	WoP	iBeta Discrepancy/ Additional Test
EAC 2005 VVSG Vol. II: 2.5.7.2.e If the software module or unit contains, receives, or outputs data, a description of its inputs, outputs, and other data elements as applicable.	3	181
EAC 2005 VVSG Vol. II: 2.2.1.d&f The system description shall include written descriptions, drawings and diagrams that present: d. Descriptions of the functional and physical interfaces between subsystems and components; f. Interfaces among internal components, and interfaces with external systems. For components that interface with other components for which multiple products may be used, the TDP shall provide an identification of: 1) File specifications, data objects, or other means used for information exchange; and 2) The public standard used for such file specifications, data objects, or other means;	3	182
EAC 2005 VVSG Vol. II: 2.5.6.2.a&b The vendor shall describe the software's capabilities or methods for detecting or handling: a. Exception conditions; b. System failures;	3	182
EAC 2005 VVSG Vol. II: 2.9 The system maintenance procedures shall provide information in sufficient detail to support election workers, systems personnel, or maintenance personnel in the adjustment or removal and replacement of components….	3	191
EAC 2005 VVSG Vol. II: Section 4.7.1.1 Data Accuracy	30,30a	Accuracy Test
EAC 2005 VVSG Vol. I: Section 4.3.3 Reliability	---	iBeta Reliability Test
Modem Test	26	Modem Test
Threshold Test	26	Threshold Test
Date/Time Change Event	26	Date/Time Change Event Test
Ballot Presentation Test	26	Ballot Presentation Test
Printer Timeout Test	26	Printer Timeout Test

Additionally, the following WoPs were used to support the test campaign but were not mapped to specific iBeta discrepancies or additional test requirements: WoP 2 (Receipt Inspection), WoP 4 (Test Plan Preparation), WoP 7 (Trusted Build), and WoP 34 (Test Report).

3.0 CERTIFICATION TEST BACKGROUND (continued)

3.2 Certification Testing Scope (continued)

3.2.1 Discrepancy Descriptions

Descriptions of the nine open discrepancies identified at the conclusion of the iBeta test campaign are summarized below. Detailed descriptions are presented inAppendix 7.5 of iBeta Test Report No. (V)2010-13Dec-001(A), Version 1.0, "ES&S Unity 3.2.1.0 VSTL Certification Test Report for testing completed by iBeta as of November 29, 2010". A

iBeta Number 178 – Although the disclaimer at the front of various TDP documents contains a statement disallowing the use of "remote transmission", no procedural or technical controls were found to prevent the installation of a modem in the DS200.

iBeta Number 181 – Some existing error codes are not listed in the TDP.

iBeta Number 182 - DS200 documentation of unrecoverable system errors and the scanner interface is insufficient.

iBeta Number 187 – A ballot was dropped into the ballot bin without incrementing the counter.

Note: Refer to the ES&S DS200 Ballot Drop Issue Analysis, Unity 3.2.1.0, Print Date January 18, 2011, for the ES&S analysis of this issue.

iBeta Number 188 – The M100 audit logs do not record the change of date.

iBeta Number 189 – The DS200 failed to shut down when the "COUNTER BLOCK FAILED CRC" error screen was displayed.

iBeta Number 190 – The DS 200 does not record a printer-time out event in the audit log.

iBeta Number 191 - Battery Charge Indicator functionality descriptions are inconsistent across the TDP.

iBeta Number 192 – The DS200 functions inconsistently when presenting the "NO MAIN POWER DETECTED" screen.

3.2.2 Reliability Test Description

Wyle executed the iBeta Reliability Test that was halted during testing. This test is documented in Section 5.3.4 of iBeta Test Report No. (V)2010-13Dec-001(A), Version 1.0, "ES&S Unity 3.2.1.0 VSTL Certification Test Report for testing completed by iBeta as of November 29, 2010". Since Steps 1 through 4 of the test performed by iBeta determined that three units displayed the error more frequently, Wyle used these identified units and began execution of this test at Step 5. A

3.2.3 Modem Test Description

Per the EAC correspondence to Wyle received on January 13, 2011, Wyle designed and executed a Modem Test to verify that the DS200 modem is inoperable in version 1.4.3.10 of the firmware. This test consisted of a source code review to verify that the modem code was removed and necessary functional testing required for verification that a modem cannot be used in the system.

3.0 CERTIFICATION TEST BACKGROUND (continued)

3.2 Certification Testing Scope (continued)

3.2.4 Accuracy Test Description

Per the VVSG, data accuracy is defined in terms of ballot position error rate. This rate applies to the voting functions and supporting equipment that capture, record, store, consolidate, and report the selections (or absence thereof) made by the voter for each ballot position. To meet the requirements of this test, the voting system must be subjected to the casting of a large number of ballots to verify vote recording accuracy, i.e., at least 1,549,703 ballot positions correctly read and recorded.

Wyle designed and executed an Accuracy Test to Volume II, Section 4.7.1.1 "Data Accuracy" of the EAC 2005 VVSG. The DS200 and M100 were subjected to recording the selection and non-selection of approximately 1.6 million ballot positions. Ballots were hand-marked for the execution of this test.

3.2.5 Threshold Test Description

Wyle designed and executed a Threshold Test to verify that the change in the default setting of the scanner threshold value (from 166 to 140) ensured that the DS200, loaded with firmware version 1.4.3.10, recorded selections and non-selections accurately and consistently.

3.2.6 Date/Time Change Event Test Description

Wyle designed and executed a DS200 Date/Time Change Event Test to verify that the DS200, loaded with firmware version 1.4.3.10, records the date/time change event in the Audit Log Report.

3.2.7 Ballot Presentation Test Description

Wyle designed and executed a Ballot Presentation Test to verify that the DS200 machine, loaded with firmware version 1.4.3.10, operates properly if an unexpected key press ID occurs.

3.2.8 Printer Timeout Test Description

Wyle designed and executed a Printer Timeout Test to verify that the DS200 machine, loaded with firmware version 1.4.3.11, does not change printer fonts or print "gibberish" during a printer timeout event. The fix for iBeta Discrepancy Number 190 caused the printer to print unrecognizable characters during the affidavit printing if a printer time out occurred. Also, the default font size could be altered.

3.3 Wyle Quality Assurance

All work performed on this program was in accordance with Wyle Laboratories' Quality Assurance Program and Wyle Laboratories' Quality Program Manual, which conforms to the applicable portions of International Standard Organization (ISO) Guide 17025.

The Wyle Laboratories, Huntsville Facility, Quality Management System is registered in compliance with the ISO-9001 International Quality Standard. Registration has been completed by Quality Management Institute (QMI), a Division of Canadian Standards Association (CSA).

3.0 CERTIFICATION TEST BACKGROUND (continued)

3.4 Test Equipment and Instrumentation

All instrumentation, measuring, and test equipment used in the performance of this test program was calibrated in accordance with Wyle Laboratories' Quality Assurance Program, which complies with the requirements of ANSI/NCSL 2540-1, ISO 10012-1, and ISO/IEC 17025. 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.

3.5 Terms and Abbreviations

This subsection defines all terms and abbreviations applicable to this Test Report.

Table 3-1 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	Commercial, readily available hardware or software
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	Verification of system functions and combination of functions cited in the manufacturer's documentation.
Help America Vote Act	HAVA	Act created by United States Congress in 2002.
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.
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	---
Technical Data Package	TDP	Manufacturer documentation related to the voting system required to be submitted as a precondition of certification testing.

3.0 CERTIFICATION TEST BACKGROUND (continued)

3.5 Terms and Abbreviations (continued)

Table 3-1 Terms and Abbreviations (continued)

Term	Abbreviation	Definition
Voting System Standards	VSS	Published by the FEC, second iteration of national level voting system standards.
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

4.0 TEST FINDINGS AND RECOMMENDATIONS

4.1 Summary Findings and Recommendation

The ES&S Unity 3.2.1.0 Voting System components, as listed in Section 2.0, were subjected to the tests described in Table 3-1 of this report. The results of those tests are summarized in the sections below. All hard copy data generated by the performance of these tests is retained by Wyle as raw data.

4.1.1 Discrepancy Testing Results

The strategy for ensuring the open discrepancies were closed included functional testing and documentation review. The documentation review was performed to ensure the open discrepancies of a specific document had been addressed in the TDP. This included iBeta Discrepancy Numbers 178, 181, 182, and 191. Individual test cases were not designed for the discrepancies pertaining to document review. Functional testing was utilized to verify the resolution of iBeta Discrepancy Numbers 188, 189, 190, and 192. Wyle researched and was able to recreate these discrepancies. Wyle used a DS200 and a M100 loaded with the same firmware version used by iBeta. Wyle reviewed the documented issues and designed specific test cases for each item.

iBeta Discrepancy Number 187, a ballot counter issue, was also regression tested. Wyle determined that the root cause of the issue was at the hardware communication level and could not be easily reproduced in a normal test environment. To verify this discrepancy had been resolved, Wyle performed a functional source code review to understand the problem, the repair, and the additional checks on the source code submitted by ES&S. The engineering analysis documenting the issue from a software engineering perspective is presented in Appendix C. Wyle also designed and executed a test case (TC-187: iBeta Number 187 Regression Test) to exercise the source code repairs to ensure the repairs fixed the problem and did not adversely affect other areas of the firmware.

In addition to these discrepancies, Wyle noted during test setup that the DS200 audit logs do not record the date and time event described in iBeta Discrepancy Number 188 for the M100. Wyle designed a test case (TC-DS200 Unity 3.2.1.0 Date/Time Change Event) for this specific event for the DS200. The results of this test are presented in Section 4.1.6 of this report.

The test cases utilized to test the iBeta discrepancies are summarized in Table 4-1 and presented in their entirety in Appendix D.

4.0 TEST FINDINGS AND RECOMMENDATIONS (continued)

4.1 Summary Findings and Recommendation (continued)

4.1.1 Discrepancy Testing Results (continued)

Table 4-1 Test Case Descriptions

Test Case	Description
TC-187: iBeta Number 187 Regression Test	Ensure that every ballot inserted into the DS200 is accounted for (either as Accepted or Rejected), and an entry for each ballot is recorded in the audit log.
TC-188: 188 Unity 3210 M100 Date Change Event	This test ensures that the M100 Audit Log records the system date and time change event.
TC-189: 189 CRC Loop After Modifying Election Definition	This test ensures that the DS200 shutdown button functions as expected after modifying the election definition thus changing the CRC for the election.
TC-190: 190 Printer Timeout Event	This test ensures that the DS200 Audit Log records Printer Timeout Events.
TC-192: 192-DS-200 Incorrect Status Message	This test ensures that consistent messages are displayed on the DS200 when unit is operating on battery power and has an election definition loaded.

Summary Findings:

The results encountered following the completion of each test case are summarized below:

TC-187: iBeta Number 187 Regression Test

This test was performed utilizing four DS200 units (serial numbers ES0107380927, ES0107370025, ES0107360007 and DS02093900001) loaded with firmware version 1.4.3.9. A total of 372 of each ballot size (11-, 14-, 17- and 19-inch) were hand-marked for the test per the election definition presented in Appendix E. The election definition "iBeta Number 187 Regression Test" was loaded onto each machine. The ballots were then scanned by the machines, the polls closed, and the machines shutdown by selection of the "shutdown" button. As required for acceptance, every ballot inserted into the DS200 was verified to be accounted for (either accepted or rejected) on the public count and in the audit logs and the vote totals were accurate according to the voted test pattern.

The EAC Technical Advisory (ESS2011-01) and the ES&S Technical Bulletin (PRBDS2000010) pertaining to this test are both included for reference in Appendix C of this report.

TC-188: 188 Unity 3210 M100 Date Change Event

This test was performed utilizing one M100 unit (serial number 202975) loaded with firmware version 5.4.4.5. To verify that the M100 successfully recorded the date and time change event, the unit was powered up and loaded with an election. Prior to opening of the polls, the systems setting were accessed, via the Diagnostic Test Menu, and the date and time were changed. The polls were then opened and the Audit Log Report printed. As required for acceptance, the expected results from all steps in the test case matched the actual results observed and the printed Audit Log contained an entry with the new date and the new system date.

4.0 TEST FINDINGS AND RECOMMENDATIONS (continued)

4.1 Summary Findings and Recommendation (continued)

4.1.1 Discrepancy Testing Results (continued)

TC-189: 189 CRC Loop After Modifying Election Definition

This test was performed utilizing one DS200 unit (serial number ES0107380927) loaded with firmware version 1.4.3.9. To verify that the DS200 shutdown button functioned as expected after modifying the election definition, thus changing the CRC for the election, the test case was exercised successfully. As required for acceptance, the expected results from all steps in the test case matched the actual results observed and the shutdown button functioned as expected.

TC-190: 190 Printer Timeout Event

This test was performed utilizing one DS200 unit (serial number ES0107370025) loaded with firmware version 1.4.3.9. To verify that the Audit Log Report recorded printer timeout events, the printer door was open and the paper was removed during the printing of the Open Polls and Close Polls reports, causing a printer timeout event in both cases. The Audit Log Report was then printed. As required for acceptance, the expected results from all steps in the test case matched the actual results observed and the printed Audit Log contained two entries for a "Printer Timeout" event with the corresponding date and time.

TC-192: 192-DS-200 Incorrect Status Message

This test was performed utilizing one DS200 unit (serial number ES0107360007) loaded with firmware version 1.4.3.9. To verify that consistent messages were displayed when the DS200 unit is operating on battery power and has an election definition loaded, the DS200 was subjected to the loading of an election while not connected to AC power. As required for acceptance, the expected results from all steps in the test case matched the actual results observed and onscreen messages were not dependent on an election being loaded in the system.

4.1.2 Reliability Test Results

The Reliability Test was executed during the iBeta certification test campaign. This test was halted due to the "Ballot Counter Issue" (see iBeta Discrepancy 187) and was not re-started prior to the conclusion of the iBeta test campaign. Wyle executed this test using the original equipment and election data as documented by iBeta. Since Steps 1 through 4 of the test performed by iBeta determined that three units displayed the error more frequently, Wyle used these identified units and began execution of this test at Step 5 (serial numbers ES0107380927, ES0107370025 and ES0107360007). Wyle used these identified units for execution of this test. A

Testing was performed by exercising a reliability test case developed by iBeta (TC- Reliability, presented in Appendix D). The election definition parameters are summarized in Table 4-2.

The EAC Technical Advisory (ESS2010-01) and the ES&S Technical Bulletin (PRBDS2000008) pertaining to this test are both included for reference in Appendix C of this report.

4.0 TEST FINDINGS AND RECOMMENDATIONS (continued)

4.1 Summary Findings and Recommendation (continued)

4.1.2 Reliability Test Results (continued)

Table 4-2 Reliability Election Definition Parameters

Ballot Positions	Precinct 1000: 21 positions, Precinct 2000: 21 positions, Precinct 3000 (split): 21and 34 positions
Ballot Styles	4
Election Parameters	Closed Primary: No Open Primary: Yes (with Party Preferences) Partisan offices: Yes Non-Partisan offices: Yes Write-in voting: Yes Primary presidential delegation nominations: No Ballot Rotation: No Straight Party voting: No Cross-party endorsement: No Split Precincts: No Vote for N of M: Yes Recall issues, with options: No Cumulative voting: No Ranked order voting: No Provisional or challenged ballots: No Early Voting: Yes
Districts	1
Precincts	3
Parties	2
Languages	English, Spanish
Voting Pattern	Three test decks were used comprised of all four ballot styles.
Total Ballots Cast	Total Ballots scanned throughout test performance 4,776

Summary Findings:

On the second day of test performance, an anomaly was encountered on iteration 23 when the DS200 machine that was continuously powered (designated as "Machine 3"), would not accept the ballot that was presented, creating a "ballot presentation" error. To troubleshoot the issue, ES&S installed debug firmware on machines at their facility. After one of the machines demonstrated the problem, the debug information was extracted. Analysis of the data by ES&S proved that the root of the problem was a function in the tabulator firmware that was not handling an unexpected key press ID correctly. Inspection of the source code and the debug output revealed an if-else statement near the end of a function in the source file "menu.c named election_count_ballots()" that did not contain a default or closing else. To resolve the issue, a source code revision was made that added the missing else statements. The updated source code (version 1.4.3.10) was then installed on the machines and the test was repeated with no anomalies.

The Notice of Anomaly (Notice of Anomaly No. 1) generated documenting the specific details of the failure is presented in its entirety in Appendix B of this report. Additionally, Wyle designed and executed a Ballot Presentation Test to verify that the DS200 machine, loaded with firmware version 1.4.3.10, will operate properly if an unexpected key press ID occurs. The results of this test are presented in Section 4.1.7 of this report.

4.0 TEST FINDINGS AND RECOMMENDATIONS (continued)

4.1 Summary Findings and Recommendation (continued)

4.1.3 Modem Test Results

This test consisted of a source code review, to verify that the modem code was removed, and necessary functional testing to verify that the modem was inoperable in the firmware version being tested. Wyle designed and executed a test case (TC-Modem Test, presented in Appendix D) to ensure that the DS200 functioned properly regardless of whether a modem is installed. For the test, two DS200's (serial numbers ES0107380927 and ES0107370025) were utilized (one with a modem and one without). For each unit, an election was added and a ballot voted. The polls were then closed and the Modem Results button was attempted to be accessed via the Administration menu.

Summary Findings:

As required for acceptance, the expected results from all steps in the test case matched the actual results observed and the voting results could not be transmitted via the modem.

4.1.4 Accuracy Test Results

The Accuracy Test was performed to test the DS200 and the M100 to Volume II, Section 4.7.1.1 "Data Accuracy" of the EAC 2005 VVSG. To perform the test three DS200 units (serial numbers DS02093900001, DS0110340837 and DS0110390905) and three M100 units (serial numbers 202975, 205071 and 231531) were subjected to recording the selection and non-selection of approximately 1.6 million ballot positions. Testing was performed by exercising an election definition developed specifically to test for logic and accuracy (Election Definition: Accuracy, contained in Appendix E). The ES&S Technical Bulletin (PRBDS2000006) pertaining to an issue with ballot skew is included for reference in Appendix C of this report. The election definition parameters are summarized in Table 4-3.

Table 4-3 Accuracy Election Definition Parameters

Ballot Positions	139 possible
Election Parameters	Closed Primary: No Open Primary: No Partisan offices: Yes Non-Partisan offices: Yes Write-in voting: Yes Primary presidential delegation nominations: No Ballot Rotation: No Straight Party voting: Yes Cross-party endorsement: No Split Precincts: No Vote for N of M: Yes Recall issues, with options: No Cumulative voting: No Ranked order voting: No Provisional or challenged ballots: No Early Voting: No
Precincts	1
Parties	8
Languages	English

4.0 TEST FINDINGS AND RECOMMENDATIONS (continued)

4.1 Summary Findings and Recommendation (continued)

4.1.4 Accuracy Test Results (continued)

Table 4-3 Accuracy Election Definition Parameters (continued)

Voting Pattern	The Test Deck consisted of 44 hand marked ballots for each precinct. The voting pattern consisted of a matrix pattern and three exception votes handled by the tabulators.
Total Ballots Cast	Total Ballots scanned by M100: 3,740 per machine = 11,220 Total Ballots scanned by DS200: 3,740 per machine = 11,220 Resulting in 1,559,580 positions marked and scanned accurately

Summary Findings:

At the conclusion of the Accuracy Test, the totals report for Machine ID DS0110340837 demonstrated an anomaly on the expected results of the contest "US Senator". Engineering analysis performed by ES&S revealed that a change to the default setting of the scanner threshold value (from 166 to 140) was needed to correct the problem. Per ES&S, the new setting will be employed on all DS200 units currently in test, in manufacture, and in deployment. ES&S' technical documentation will be modified to reflect this change and a Technical Bulletin will be prepared for distribution to all ES&S DS200 customers. The test was repeated with the threshold setting at 140 with no anomalies.

The Notice of Anomaly (Notice of Anomaly No. 2) generated documenting the specific details of the failure is presented in its entirety in Appendix B of this report. Additionally, as a result of this anomaly, Wyle designed and executed a test case to ensure that the DS200, loaded with source code version 1.4.3.10, accurately records selections and non-selections on a ballot. The results of this test are described in detail in Section 4.1.5 of this report.

4.1.5 Threshold Test Results

This test was performed to verify that the change in the default setting of the scanner threshold value (from 166 to 140) required during the performance of the Accuracy Test corrected the anomalous condition. To perform the test, two DS200 machines (serial numbers DS0110340837 and DS0110390905) were utilized, both loaded with firmware version 1.4.3.10, one of which was set with the previous threshold setting of 166 and the other set with the new value of 140. The questionable ballot from the original Accuracy Test and a new, purposefully smudged ballot were scanned into the units. In addition, a ballot was marked with a 0.7 mm pencil, thus creating a 0.4 mm – 0.6 mm thick line that that crossed the entirety of the voting target on its long axis and was centered on the voting target. The test cases utilized to perform the Threshold Test consisted of five subcases (TC-DS0110340905-166-New Ballot, TC-DS0110340905-166-Original Ballot, TC-DS0110340837-140-New Ballot, TC-DS0110340837-140-Original Ballot and TC-Minimum Mark) under one primary test case (TC-Threshold Test), all of which are presented in Appendix D. The ES&S Technical Bulletin (FYIDS2000019) pertaining to this test is included for reference in Appendix C of this report.

Summary Findings:

As required for acceptance, the expected results from all steps in the test case matched the actual results observed. With the threshold setting at 166, at least one vote was recorded for Gail Ross and at least one vote was recorded for Tetty Rogiers. With the threshold setting at 140, all expected votes were recorded for Gail Ross and none for Tetty Rogiers.

4.0 TEST FINDINGS AND RECOMMENDATIONS (continued)

4.1 Summary Findings and Recommendation (continued)

4.1.6 Date/Time Change Event Test Results

Wyle noted during test setup that the DS200 audit logs do not record the date and time event described in iBeta Discrepancy Number 188 for the M100. Wyle designed and executed a test case (TC-DS200 Unity 3.2.1.0 Date/Time Change Event) to verify that the DS200 (serial number DS02093900001), loaded with firmware version 1.4.3.10, records the date/time change event in the Audit Log Report. To perform the test, the unit was powered up and loaded with an election. Prior to opening of the polls, the systems setting were accessed, via the Administration Menu, and the date and time were changed. The polls were then opened and the Audit Log Report printed.

Summary Findings:

As required for acceptance, the expected results from all steps in the test case matched the actual results observed and the printed Audit Log contained an entry with the new date and the new system date.

4.1.7 Ballot Presentation Test Results

While performing the Reliability Test, the DS200 machine that was continuously powered would not accept the ballot that was presented, creating a "ballot presentation" error. Wyle then designed and executed a Ballot Presentation Test to verify that the DS200 machine, loaded with firmware version 1.4.3.10, will operate properly if an unexpected key press ID occurs. To perform the test, two DS200 machines were subjected to a test case (TC- Ballot Presentation, presented in Appendix D). One machine (serial number DS0110340830) was loaded with firmware version 1.4.3.8 and the other machine (serial number DS0110340905) was loaded with firmware version 1.4.3.10. For each machine, the ballot was presented and accepted with no errors. A

Summary Findings:

Wyle is accepting the issue as being resolved for the following reasons: 1) During the performance of the Ballot Presentation test, the issue could not be reproduced; and 2) The anomaly was not present during the second performance of the iBeta Reliability Test conducted by Wyle, where this issue was first noted. A

4.1.8 Printer Timeout Test Description

This test was performed to verify that the DS200 machine (serial number DS0110340837), loaded with firmware version 1.4.3.11, does not change printer fonts or print "gibberish" during a printer timeout event. The fix for iBeta Discrepancy Number 190 caused the printer to print unrecognizable characters during the affidavit printing if a printer timeout occurred. Also, the default font size could be altered. To perform the test, Wyle designed and executed a test case (TC- Printer Timeout Issue, presented in Appendix D).

Summary Findings:

ES&S updated the DS200 firmware to version 1.4.3.11. The code update initializes the printer after every print timeout event. The previous version (1.4.3.10) only initialized at boot-up. As required for acceptance, the expected results from all steps in the test case matched the actual results observed and the issue was not observed on firmware version 1.4.3.11.

4.0 TEST FINDINGS AND RECOMMENDATIONS (continued)

4.2 Anomalies and Resolutions

Two Notices of Anomaly were issued during the test campaign. A Notice of Anomaly (NOA) is generated upon occurrence of a verified failure, an unexpected test result, or any significant unsatisfactory condition. All anomalies encountered during certification testing were successfully resolved prior to test completion. The Notices of Anomaly generated during testing are presented in their entirety in Appendix B and are summarized below.

Notice of Anomaly No. 1: Reliability Test

On the second day of test performance, on iteration 23, the DS200 machine that was continuously powered (designated as "Machine 3"), would not accept the ballot that was presented, creating a "ballot presentation" error. The test performer selected the Admin menu, entered the password, and refreshed the screen. The machine then accepted the ballot and the test was halted pending ES&S resolution.

To troubleshoot the issue, ES&S installed debug firmware on machines at their facility. After one of the machines demonstrated the problem, the debug information was extracted. Analysis of the data by ES&S proved that the root of the problem was a function in the tabulator firmware that was not handling an unexpected key press ID correctly. Inspection of the source code and the debug output revealed an if-else statement near the end of a function in the source file "menu.c named election_count_ballots()" that did not contain a default or closing else. To resolve the issue, a source code revision was made that added the missing else statements.

The updated source code (version 1.4.3.10) was installed on the machines and the test was repeated with no anomalies.

Notice of Anomaly No. 2: Accuracy Test

At the conclusion of the Accuracy Test on the DS200 units, the totals report for Machine ID DS0110340837 demonstrated an anomaly on the expected results of the contest "US Senator". Four votes were missing from candidate Gail Ross and candidate Tetty Rogiers had an additional four votes.

Engineering analysis performed by ES&S revealed that at a scanner threshold value of 166 (original default value), the scanner could produce some images with a more pronounced number of dark/black pixels than actually existed on the originally printed ballots. Per ES&S, this would cause the image processing software to potentially analyze a target area and report a mark incorrectly, either as an indeterminate mark or as a voted position, and that a reduction of the threshold settings to 140 was needed to correct the problem. Therefore, the default threshold setting on the DS200 will be modified from 166 to 140. The new setting will be employed on all DS200 units currently in test, in manufacture, and in deployment. ES&S' technical documentation will be modified to reflect this change and a Technical Bulletin will be prepared for distribution to all ES&S DS200 customers.

Note: As a result of this anomaly, Wyle designed and executed a test case (TC-Threshold Test) to ensure that the DS200, loaded with source code version 1.4.3.10, accurately records selections and non-selections on a ballot.

4.0 TEST FINDINGS AND RECOMMENDATIONS (continued)

4.3 Recommendation for Certification

Wyle performed conformance and regression testing on the ES&S Unity 3.2.1.0 system to the open discrepancies noted in the iBeta test campaign, documented iBeta Test Report No. (V)2010-13Dec-001(A), Version 1.0, "ES&S Unity 3.2.1.0 VSTL Certification Test Report for testing completed by iBeta as of November 29, 2010", which covered all testing aspects of the system to the FEC VSS 2002 and the EAC 2005 VVSG, and recommended acceptance of all testing identified by iBeta as "Accept". Wyle only tested the DS200 and M100 for modifications and interfacing components listed in the approved Wyle Test Plan. In the scope of testing performed by Wyle, as is documented in the approved Wyle Test Plan, and the iBeta Test Report, the ES&S Unity 3.2.1.0 system met all applicable requirements of the FEC 2002 VSS and the manufacturer's technical documentation.

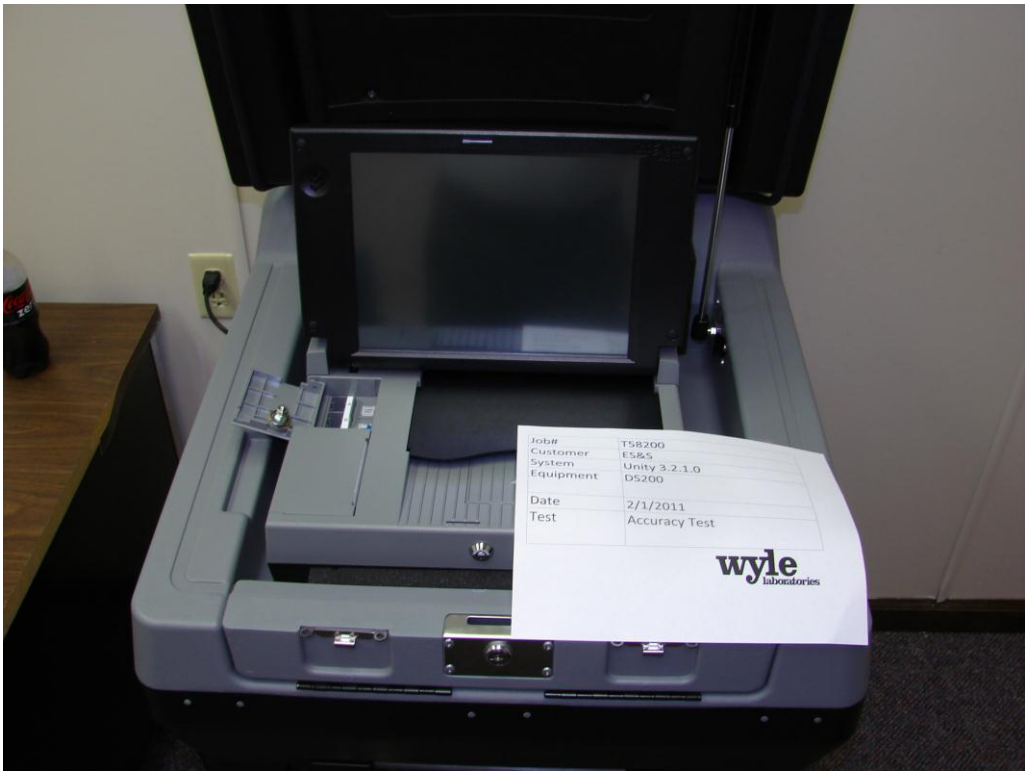
As such, Wyle recommends that the EAC grant the ES&S Unity 3.2.1.0 certification to the FEC 2002 VSS.

This report is valid only for the equipment identified in Section 2 of this report and the system documented in Section 1.4 of iBeta Quality Assurance ES&S Unity 3.2.1.0 VSTL Certification Test Plan, Version 5.0. Any changes, revisions, or corrections made to the system after this evaluation shall be submitted to the EAC for determination on the nature and scope of testing. The scope of testing required will be determined based upon the degree of modification.

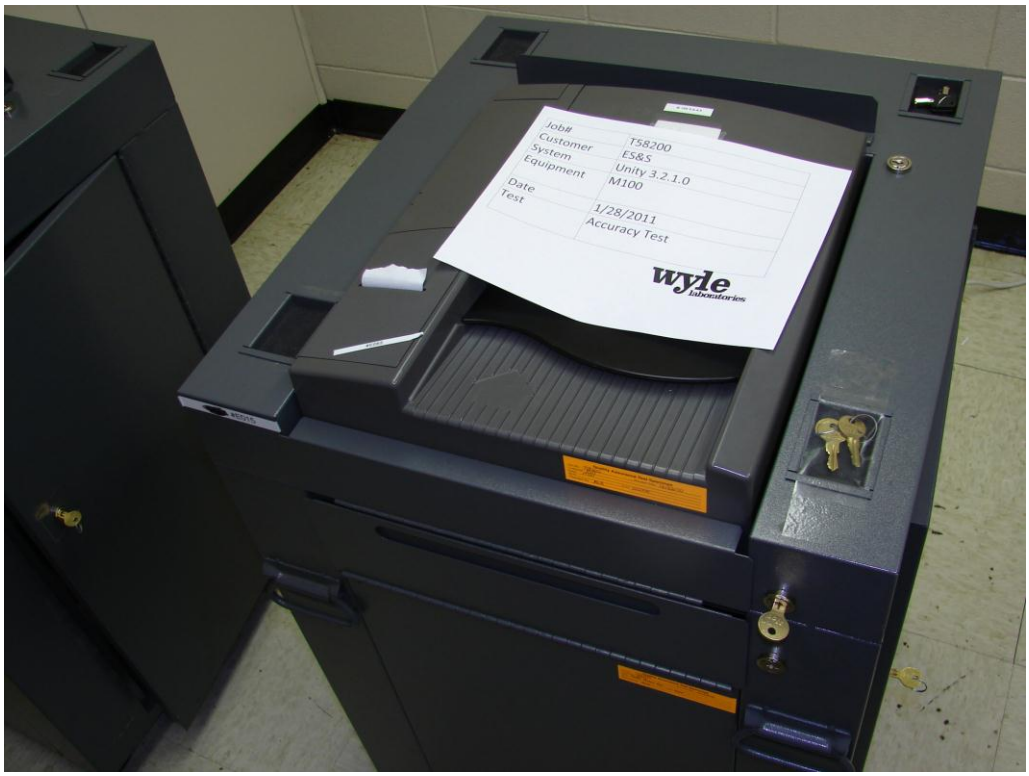
APPENDIX A

PHOTOGRAPHS

Photograph 1: ES&S Unity 3.2.1.0 Test Equipment Setup



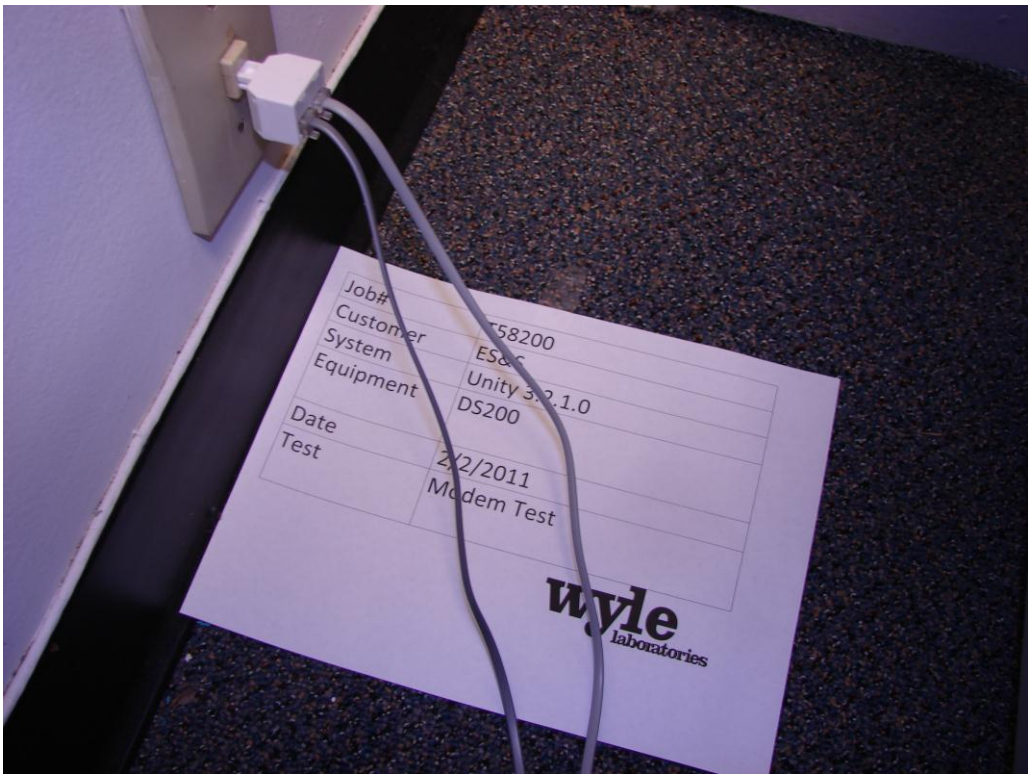
Photograph 2: ES&S Unity 3.2.1.0 Accuracy Test Setup



Photograph 3: ES&S Unity 3.2.1.0 Accuracy Test Setup

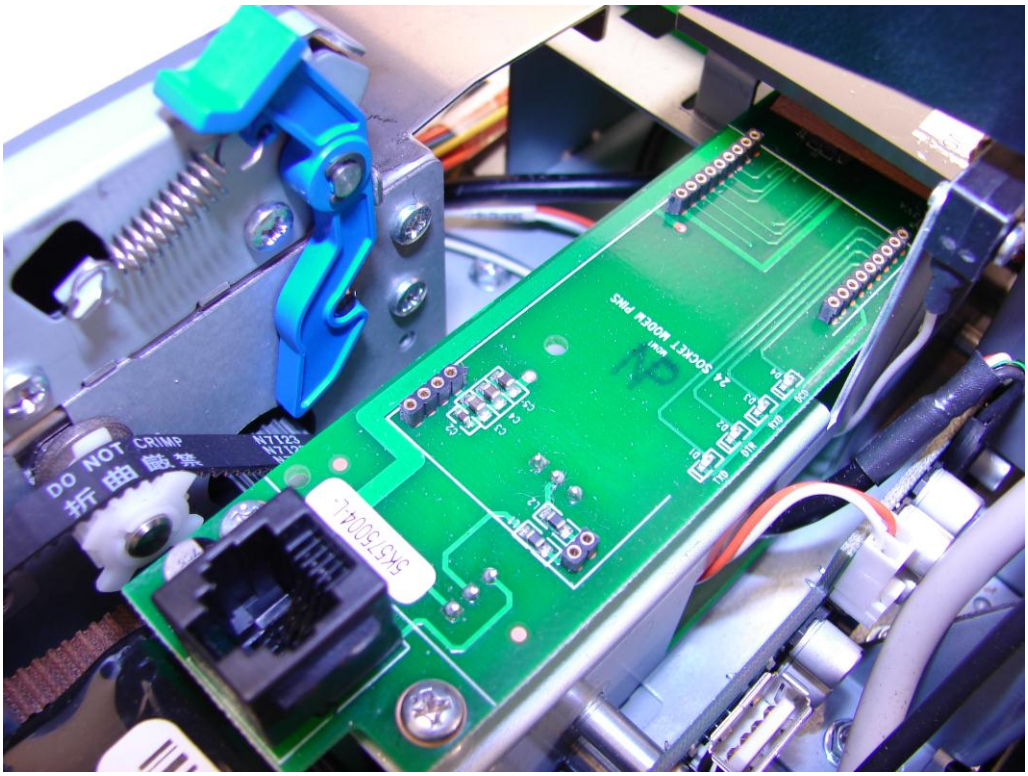
Photograph 4: ES&S Unity 3.2.1.0 Reliability Test Setup

Photograph 5: ES&S Unity 3.2.1.0 Modem Test Setup

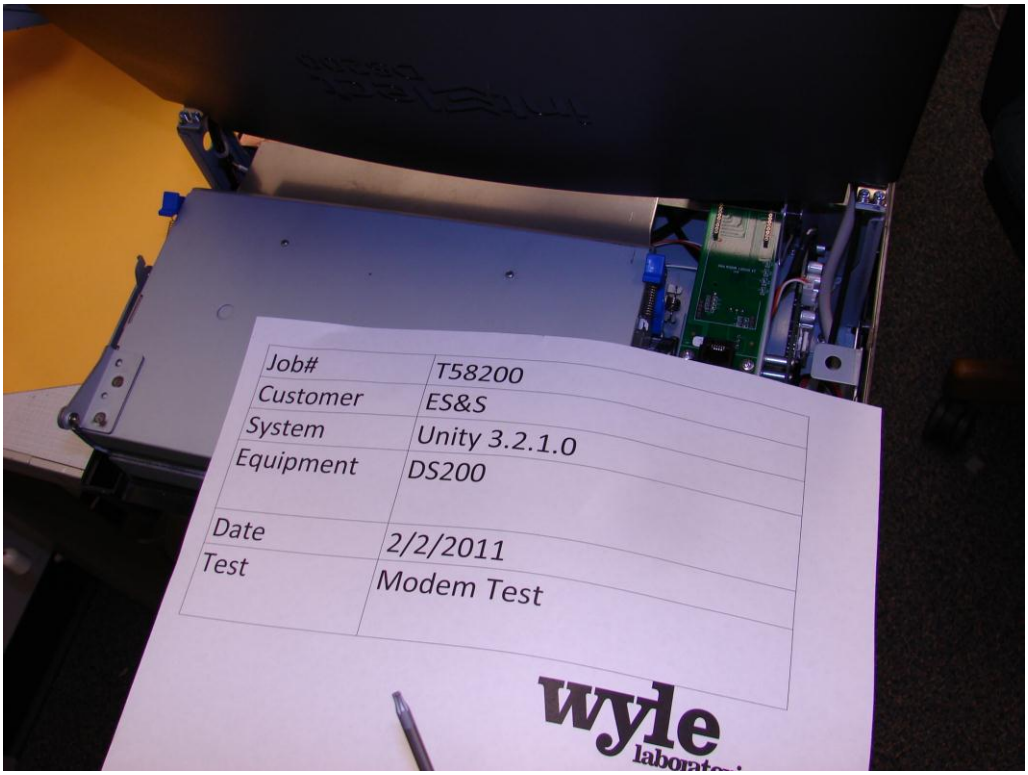


Photograph 6: ES&S Unity 3.2.1.0 Modem Test Setup

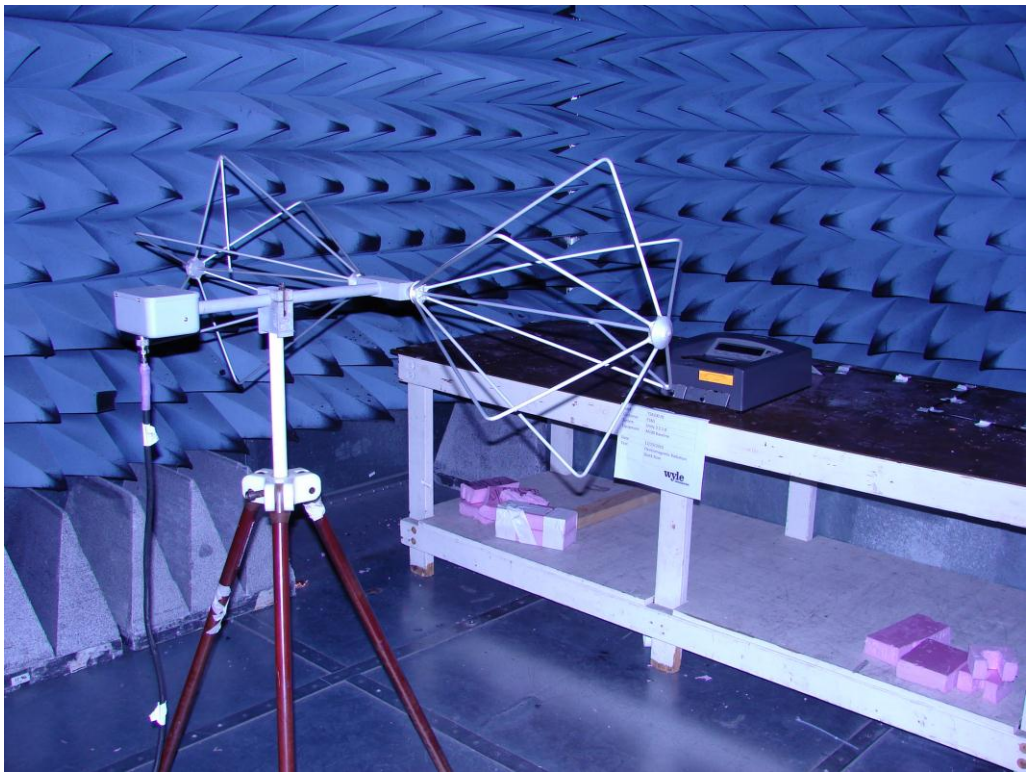
Photograph 7: ES&S Unity 3.2.1.0 Modem Test Setup



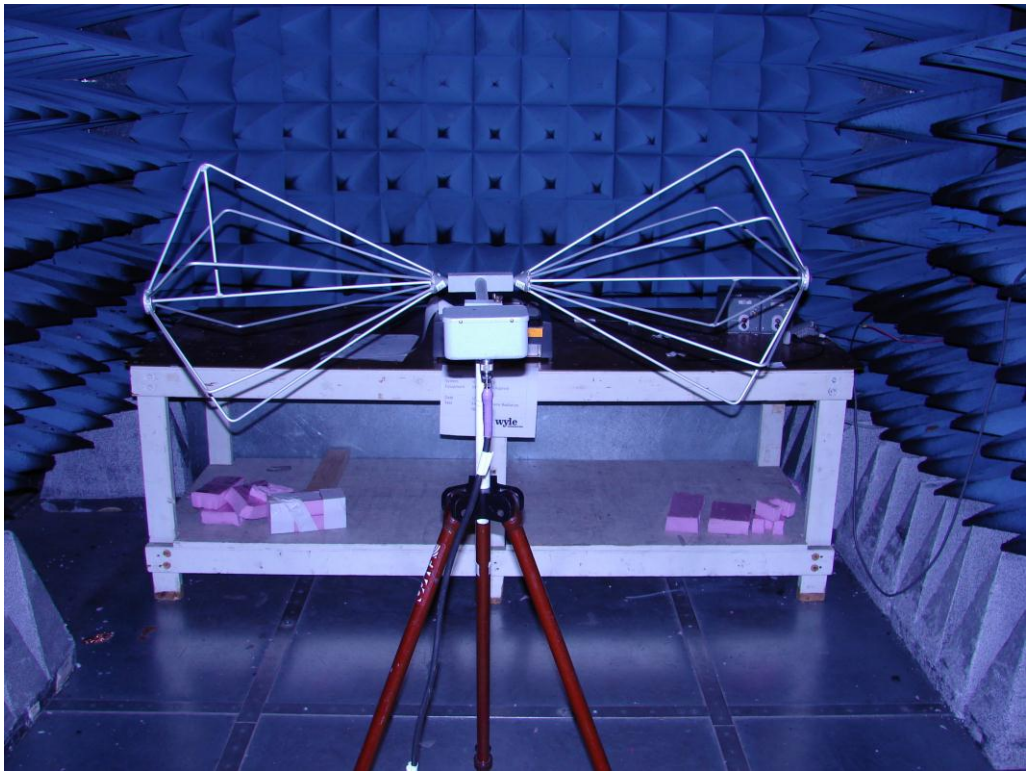
Photograph 8: ES&S Unity 3.2.1.0 Modem Test Setup



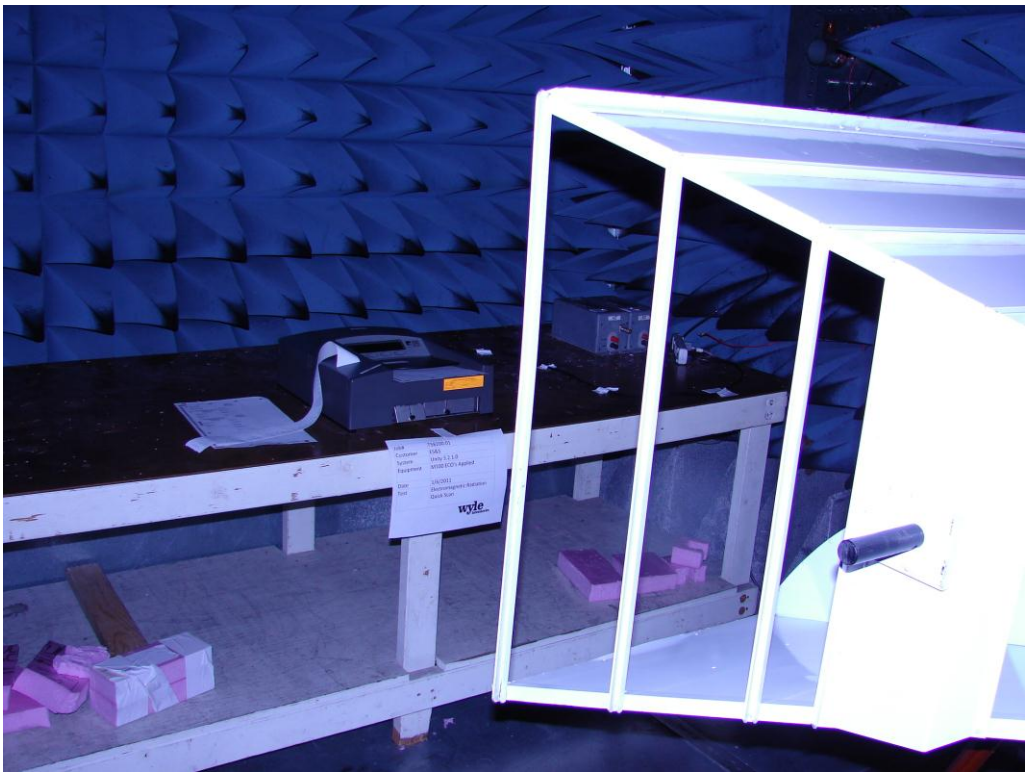
Photograph 9: ES&S Unity 3.2.1.0 Modem Test Setup



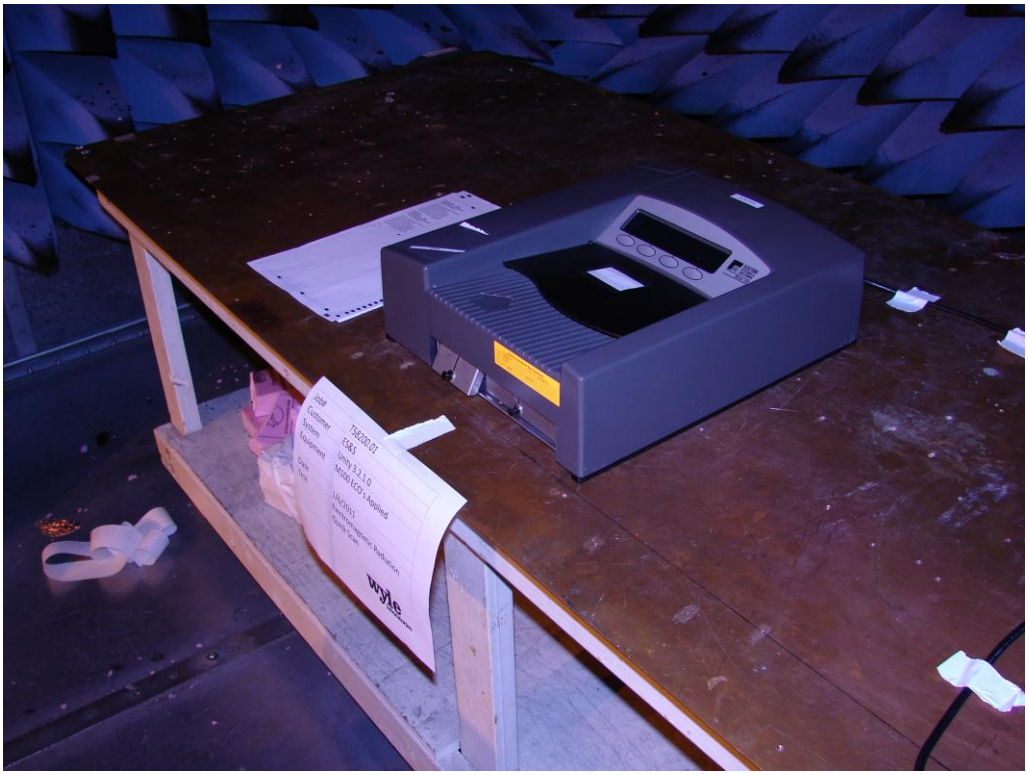
Photograph 10: ES&S Unity 3.2.1.0 Emissions Scan Test Setup



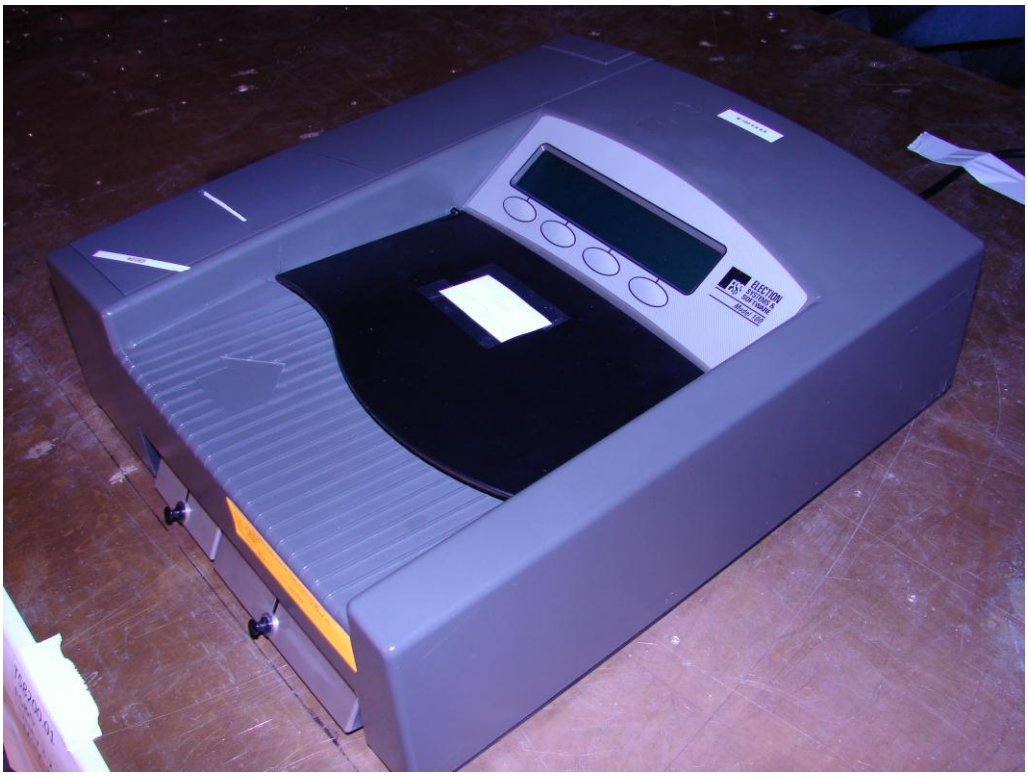
Photograph 11: ES&S Unity 3.2.1.0 Emissions Scan Test Setup



Photograph 12: ES&S Unity 3.2.1.0 Emissions Scan Test Setup



Photograph 13: ES&S Unity 3.2.1.0 Emissions Scan Test Setup



Photograph 14: ES&S Unity 3.2.1.0 Emissions Scan Test Setup

APPENDIX B

NOTICES OF ANOMALY

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ORIGINAL **NOTICE OF ANOMALY** DATE: 2/21/11

NOTICE NO: 1 P.O. NUMBER: ES&S-MSA-TA005 CONTRACT NO: N/A

CUSTOMER: Election Systems & Software (ES&S) WYLE JOB NO: T58200.01

NOTIFICATION MADE TO: Sue McKay NOTIFICATION DATE: 2/1/11

NOTIFICATION MADE BY: Michael Walker VIA: Verbal

CATEGORY: [X] SPECIMEN [ ] PROCEDURE [ ] TEST EQUIPMENT DATE OF ANOMALY: 2/1/11

PART NAME: Unity 3.2.1.0 Voting System PART NO. DS200

TEST: Reliability I.D. NO. ES0107360007

SPECIFICATION: Wyle Test Plan No. T58200.01-01, Rev. A PARA. NO. 3.3.2

REQUIREMENTS:

The ES&S Unity 3.2.1.0 System shall be subjected to the Wyle executed iBeta Reliability Test that was halted during testing. This test is documented in Section 5.3.4 of iBeta Test Report No. (V)2010-13Dec-001(A), Version 1.0, "ES&S Unity 3.2.1.0 VSTL Certification Test Report for testing completed by iBeta as of November 29, 2010". Wyle began execution of this test at Step 5. Three DS200 machines shall be used for test performance.

DESCRIPTION OF ANOMALY:

On the second day of test performance on iteration 23, the DS200 machine that was continuously powered (designated as "Machine 3"), would not accept the ballot that was presented, creating a "ballot presentation" error. The test performer selected the Admin menu, entered the password, and refreshed the screen. The machine then accepted the ballot and the test was halted pending ES&S resolution.

DISPOSITION • COMMENTS • RECOMMENDATIONS:

To troubleshoot the issue, ES&S installed debug firmware on machines at their facility. After one of the machines demonstrated the problem, the debug information was extracted. Analysis of the data by ES&S proved that the root of the problem was a function in the tabulator firmware that was not handling an unexpected key press ID correctly Inspection of the source code and the debug output revealed an if-else statement near the end of a function in the source file "menu.c named election_count_ballots()" that did not contain a default or closing else. To resolve the issue, a source code revision was made that added the missing else statements.

The updated source code (version 1.4.3.10) was installed on the machines and the test was reinitiated.

Safety Related ☐ YES ☒ NO Potential 10 CFR Part 21 ☐ YES ☐ NO ☒ N/A

RESPONSIBILITY TO ANALYZE ANOMALIES AND COMPLY WITH 10 CFR PART 21: ☐ CUSTOMER ☐ WYLE

CAR Required: ☐ YES ☒ NO CAR No.

VERIFICATION:

TEST WITNESS: ---

REPRESENTING: ---

QUALITY ASSURANCE: 2/21/11

PROJECT ENGINEER: 2-21-11

PROJECT MANAGER: 2-21-11

INTERDEPARTMENTAL COORDINATION:

WH-1066, Rev. MAR '09 Page 1 of 1

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ORIGINAL **NOTICE OF ANOMALY** DATE: 2/21/11

NOTICE NO: 2 P.O. NUMBER: ES&S-MSA-TA005 CONTRACT NO: N/A

CUSTOMER: Election Systems & Software (ES&S) WYLE JOB NO: T58200.01

NOTIFICATION MADE TO: Sue McKay NOTIFICATION DATE: 2/4/11

NOTIFICATION MADE BY: Michael Walker VIA: Verbal

CATEGORY: [X] SPECIMEN [ ] PROCEDURE [ ] TEST EQUIPMENT DATE OF ANOMALY: 2/4/11

PART NAME: Unity 3.2.1.0 Voting System PART NO. DS200

TEST: Data Accuracy I.D. NO. DS0110340837

SPECIFICATION: EAC 2005 VVSG PARA. NO. 4.7.1.1

REQUIREMENTS:

The ES&S Unity 3.2.1.0 System shall be subjected to the Accuracy Test as required by the EAC 2005 VVSG. The Accuracy Test will test the DS200 to Volume II, Section 4.7.1.1 "Data Accuracy" of the EAC 2005 VVSG. The DS200 will be subjected to recording the selection and non-selection of approximately 1.6 million ballot positions. Ballots will be hand-marked for the execution of this test. Three DS200 units shall be tested.

DESCRIPTION OF ANOMALY:

At the conclusion of the Accuracy Test, the totals report for Machine ID DS0110340837 demonstrated an anomaly on the expected results of the contest "US Senator". Four votes were missing from candidate Gail Ross and candidate Tetty Rogiers had an additional four votes.

DISPOSITION • COMMENTS • RECOMMENDATIONS:

Engineering analysis performed by ES&S revealed that at a scanner threshold value of 166 (original default value), the scanner could produce some images with a more pronounced number of dark/black pixels than actually existed on the originally printed ballots. Per ES&S, this would cause the image processing software to potentially analyze a target area and report a mark incorrectly, either as an indeterminate mark or as a voted position, and that a reduction of the threshold setting to 140 was needed to correct the problem. Therefore, the default threshold setting on the DS200 will be modified from 166 to 140. The new setting will be employed on all DS200 units currently in test, in manufacture, and in deployment. ES&S' technical documentation will be modified to reflect this change and a Technical Bulletin will be prepared for distribution to all ES&S DS200 customers.

The test was reinitiated with the firmware version 1.4.3.10 and the threshold setting at 140.

Safety Related ☐ YES ☒ NO Potential 10 CFR Part 21 ☐ YES ☐ NO ☒ N/A

RESPONSIBILITY TO ANALYZE ANOMALIES AND COMPLY WITH 10 CFR PART 21: ☐ CUSTOMER ☐ WYLE

CAR Required: ☐ YES ☒ NO CAR No.

VERIFICATION:

TEST WITNESS: ---

REPRESENTING: ---

QUALITY ASSURANCE: 2/21/11

PROJECT ENGINEER: 2-21-11

PROJECT MANAGER: 2-21-11

INTERDEPARTMENTAL COORDINATION:

WH-1066, Rev. MAR '09

Page 1 of 1

APPENDIX C

ENGINEERING ANALYSIS REPORTS AND TECHNICAL BULLETINS

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ENGINEERING ANALYSIS REPORT FOR ES&S UNITY 3.2.1.0 DS200 SCANNER BOARD FIRMWARE VERSION 2.21.0.0b

Prepared by:

Jack Cobb 2-03-11

Jack Cobb, Senior Project Engineer

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1.0 INTRODUCTION

This analysis presents the results for the functional source code review of ES&S Scanner Board Firmware version 2.21.0.0b submitted by ES&S as part of the Unity 3.2.1.0 EAC certification test campaign. The primary purpose of this engineering analysis was to determine the changes from Scanner Board Firmware version 2.20.0.0a to Scanner Board Firmware version 2.21.0.0b with regards to the submitted ES&S document "Voting System Reference – DS200 Ballot Drop Issue Analysis Unity 3.2.1.0" dated January 18, 2011.

2.0 SCOPE

An issue was discovered when a ballot was dropped into the ballot box without the public ballot counter incrementing. ES&S researched the issue and provided Wyle Laboratories with an initial assessment of their findings. The finding for this issue could not be easily recreated in the current test environment. ES&S requested Wyle travel to Omaha, Nebraska from December 28th through December 30th, 2010, to use the ES&S test simulators in order to better understand the issue. Wyle was able to direct ES&S engineers in performing specific functions, therefore giving Wyle a complete understanding of this issue. Following the trip, ES&S submitted their analysis and source code to Wyle for evaluation.

3.0 BACKGROUND

During the execution of the iBeta Reliability Test on November 11, 2010, a ballot was reported to have been returned to the voter and instead dropped into the ballot box without incrementing the public ballot counter. The ballot was inserted into the DS200 scanner. A message "You have cross voted" appeared on the screen. The tester selected the "Accept" button on the screen and the ballot dropped into the ballot box, but the public ballot counter did not increment. A screen message flashed indicating there was an issue with the ballot. A second message then flashed indicating the ballot was returned. Two ballots were in the ballot box and one ballot was recorded on the public ballot counter. The polls were closed and audit logs were printed. The audit log reported a "Ballot Removed During Scan (137)" message.

4.0 STRATEGY FOR EVALUATION

Wyle's strategy for evaluating the issue and the resolution was to research and understand what happened on a functional level and trace those observations back to the source code. To accomplish this, Wyle performed a functional source review on Scanner Board Firmware version 2.21.0.0b. This review focused on identifying the specific module that contained the defect. Once identified, Wyle traced different logic parameters through the source code module to identify the root cause. After the root caused was established, Wyle analyzed all modifications to the source code to understand what additional features had been added or modified to ensure the modification corrected the issue.

5.0 FUNCTIONAL SOURCE CODE REVIEW

Scanner Board Firmware version 2.21.0.0b is written in the C programing language. The source code is broken down into two separate directories; "include" and "src". The "include" directory contains all the header files and the "src" directory contains all the ".c" files for the project. Below is the list of files contained in these directories:

Include\EEProm.h
Include\errno.h
Include\Ess_ds_scanner_usb_cmds.h
Include\Scorpio.h
Include\timer.h
Include\util.h
Src\dscr.a51
Src\Ex_ISR.c
Src\Fw.c
Src\Periph.c
Src\Timer.c

The main() function is located in fw.c and was the starting point for the functional source code review.

The main() function begins with setting some variables to initial values and perform some basic tests. The primary test in this function is a while loop that continually polls the device checking to ensure the device is not in Idle Mode. The final call in the loop is to the Task Dispatcher to poll the device checking for hardware interrupts. Hardware interrupts are used to trigger execution and handling of the specific interrupt.

The TD_Poll function resides in the periph.c file. This function uses a case statement to test if there have been any hardware interrupts. If an interrupt occurs a call is made to the Intepret_Host_Cmd() function which resides in the same file. The Intepret_Host_Cmd function handles the decoding of the interrupt received and executes the scanner commands. The first section of code initalizes the variables used to store the interrupt buffer. The byte array EP1OUTBUF holds the interrupt received. This array is processed placing the values in the variables Cmd, Fpga_Addr, Fpga_Data, Fpga_DataOne, Fpga_DataTwo, and Fpga_DataThree. The variable Cmd is then tested for the command to be executed. A series of 35 commands are processed in this test.

To determine the cause of the defect, the functional source code review focused on two specific tests in Intepret_Host_Cmd:

- SCANNER_SET_CIS_PAPER_DETECT_COUNT_VALUE
- STEP_MOTOR_SET_DOCUMENT_LENGTH.

5.0 FUNCTIONAL SOURCE CODE REVIEW (continued)

The parameters of these tests are detailed in the table below.

Test Name	Test Parameters
SCANNER_SET_CIS_PAPER _DETECT_COUNT_VALUE	This test calls Set_Scanner_CIS_Detect_Count_Value passing the variables Fpga_DataThree, Fpga_DataTwo, Fpga_DataOne, and Fpga_Data. Set_Scanner_CIS_Detect_Count_Value() takes the parameters and performs a series of calculations to determine the delay in motor steps between the insertions of ballots. The global value for gS1_to_S2_Max_Steps is set to the calculated value for the delay.
STEP_MOTOR_SET_ DOCUMENT_LENGTH	This test calls Step_Motor_Set_Document_Length() passing the variables Fpga_DataThree, Fpga_DataTwo, Fpga_DataOne, and Fpga_Data. Step_Motor_Set_Document_Length takes the parameters and performs a series of calculations to determine the length in motor steps for the length of a ballot. The global value for gMaximum_Ballot_Length is set to the calculated value for the ballot length.

Wyle believed that the defect occurred when a call was made to Set_Scanner_CIS_Detect_Count_Value(). This test was executed and then fell through and called Step_Motor_Set_Document_Length(). The first call was executed as expected, but the fall through to Step_Motor_Set_Document_Length() passed the values for the delay between ballots. If this occurred, the length of a ballot in motor steps would be set to the time delay between ballot insertions in motor steps.

After Wyle presented their initial findings to ES&S for discussion, ES&S provided further information that the DS200 does not send the interrupt value for the command SCANNER_SET_CIS_PAPER_DETECT_COUNT_VALUE. With this information Wyle deems the defect to actually be the value for the global variable gS1_to_S2_Max_Steps was not changed for the default value of 5600 motor steps since the call to Set_Scanner_CIS_Detect_Count_Value() is not executed by the DS200 . The default value can be translated into a 28 inch ballot.

ES&S corrected this defect and added additional code to ensure this issue does not reoccur. The global value for gS1_to_S2_Max_Steps is now set in Step_Motor_Set_Document_Length. A flag was added to Set_Scanner_CIS_Detect_Count_Value() and set to true if the Set_Scanner_CIS_Detect_Count_Value() is executed. During execution of Step_Motor_Set_Document_Length() a test is performed to see if the flag is "True" or "False". This test will set the gS1_to_S2_Max_Steps variable if Set_Scanner_CIS_Detect_Count_Value() has not been executed. If Step_Motor_Set_Document_Length() sets gS1_to_S2_Max_Steps the value is the maximum ballot length minus one inch.

The following additional checks were also added:

- A "watchdog" to monitor the motor interrupts
- A safety length for the maximum ballot length

6.0 CONCLUSION

After completing evaluations of the source code, demonstration of the hardware components, and successful execution of test case TC-187: iBeta Number 187 Regression Test, Wyle concludes that the defect fix and additional checks developed by ES&S are sufficient to resolve the specific issue discussed in this document.

EAC TECHNICAL ADVISORY

ESS2010-01

U.S. Election Assistance Commission Voting System Testing and Certification Program

ESS# 2010-01

1201 New York Avenue, NW, Suite 300 Washington, DC. 20005

Publication Date: June 25, 2010

Voting System Technical Advisory
Intermittent Freeze/Shutdowns with EAC Certified ES&S Unity 3.2.0.0 System

System(s) Affected:	ES&S Unity 3.2.0.0 System
Component(s) Affected:	DS200
Version(s) Affected:	Firmware v. 1.3.10.0; Hardware v. 1.1, v.1.2; COTS Operating System v. 2.6.16.27
Notification Date:	May 21, 2010
Summary:	Intermittent freezes, lockups, and shutdowns

Advisory:
Counties and jurisdictions with this product should be aware of "power down" and "freeze" issue experienced during Logic & Accuracy (L&A) testing and Election Day.

Status:
EAC has launched an Informal Investigation and is working with ES&S to find a root cause to these issues.

Overview:
The DS200 precinct count optical scan voting device fielded in Cuyahoga County, Ohio is part of the EAC Certified Unity 3.2.0.0 voting system. During pre-election logic and accuracy (L&A) testing prior to the May 4, 2010 Primary Election the DS200 demonstrated intermittent screen freezes, system lockups and shutdowns. These issues were conveyed to the voting system manufacturer, Election Systems & Software (ES&S). ES&S provided the county with initial information on what they believe had occurred during L&A testing and during the subsequent election. EAC was notified of the anomaly and has contacted Cuyahoga County and other jurisdictions that use the same system, as well as ES&S to gather information. An Informal Investigation into these issues has been launched by the EAC.

Issue Descriptions:
Cuyahoga County enhanced and expanded the Logic & Accuracy (L&A) tests that were initially provided by ES&S. L&A testing was initiated 3 to 4 weeks prior to the May 4th election. Cuyahoga County has 1068 precincts with ≈1200 machines to fulfill

training and election needs. During the course of L&A testing a "power down" and "freezing" anomaly occurred on some DS200 machines. This anomaly appeared a total of 89 times during L&A testing without a distinguishable pattern in the timing or actions taken to cause the freeze/shutdown issue. In addition, another 8 of 108 new DS200's failed Cuyahoga County's acceptance and independent verification and validation testing which is conducted on newly received systems prior to acceptance. These systems were not deployed in the election.

During the May 4th Election, poll workers reported four DS200 shutdowns to the County. The poll workers tried to troubleshoot the DS200 machine failures and were able to restore the systems for use during the election period by rebooting the machines. Cuyahoga County officials asked poll workers who experiences this issue to reboot the DS200 and check for "hanging" or "stuck" ballots prior to allowing voters to use the machine. The county also completed a hand count in the precincts in which the shutdown occurred to make sure votes were not lost. Although the machine failures were encountered less frequently on Election Day than during L&A testing, the anomaly still presented itself in a number of machines.

Root Cause:

The EAC is working with ES&S in order to help determine a root cause.

ES&S Recommended Procedures for Election Day:

If the DS200 shuts down during opening/closing of the polls...

- Press and hold the "Power" button until it turns red.
- Once the red light goes off and the machine is completely shut down, press the "Power" button to restart the DS200.
- Continue with the opening/closing polls process according to the poll worker manual.

If the DS200 shuts down during voting...

- Determine if there is a ballot attached to the back of the DS200 by instructing the poll workers to do the following:
  -Go to the rear of the machine where the power cord is located.
  -Look through the clear plastic windows on the back of the ballot bin below the power supply.
  -If a ballot is still attached, they will see the white of the paper. If not, it will be dark inside the ballot box.

If no ballot is attached to the back of the DS200

- Press and hold the "Power" button until it turns red.
- Once the red light goes off and the machine is completely shut down, press the "Power" button to restart the DS200 and continue voting.
- If necessary, scan any ballots that may have been inserted into the emergency slot.
- Continue voting by having voters insert ballots directly into the DS200.

If there is a ballot attached to the back of the DS200

- Instruct the poll workers to begin using the emergency ballot box slot on the front of the ballot bin.
- Deploy a roving technician to the location with the backup memory stick for that precinct.
- Once onsite, have the tech remove the ballot attached to the back of the DS200 by doing the following:
  -Remove the seal and unlock the ballot bin front flap
  -Flip the ballot bin front flap down and slide the DS200 forward
  -Gently remove the ballot from the back of the DS200
  -Slide the DS200 back into place and lock and seal the ballot bin front flap.
  CAUTION: When sliding the DS200 back into place, make sure the power cord does not block the ballot path.
- Press and hold the "Power" button until it turns red. Wait until the red light goes off and the DS200 completely shuts down.
- Replace the Election Day memory stick with the backup memory stick.
- Press the "Power" button to restart the DS200.
- With a bi-partisan team, rescan **all** ballots in the precinct, including those in the ballot bin, any which may have been inserted into the emergency slot, and the ballot removed from the back of the DS200.
- Continue voting by having voters insert ballots directly into the DS200.

EAC TECHNICAL ADVISORY

ESS2011-01

U.S. ELECTION ASSISTANCE COMMISSION
Voting System Testing and Certification Program
1201 New York Avenue, NW, Suite 300
Washington, DC. 20005

ESS2011-01

EAC Certified System Technical Advisory

EAC System(s) Affected:	ES&S Unity 3.2.0.0, ES&S Unity 3.2.0.0 Rev. 1
Component(s) Affected:	DS200
Version(s) Affected:	All versions of the DS200 deployed in the field
Date:	February 28, 2011
Summary:	During Federal certification testing a DS200 Ballot Scanner accepted a ballot into the ballot bin without counting the ballot.

Advisory:

Counties and jurisdictions with this product should be aware that during Federal certification testing of the Election Systems & Software (ES&S) Unity 3.2.1.0 voting system, a DS200 accepted a voted ballot and deposited it in the ballot bin, but the ballot was not recorded in the public counter. ES&S determined this anomaly can occur in all deployed versions of the DS200. This anomaly has an extremely low rate of occurrence.

Overview:

During Reliability Testing on Unity 3.2.1.0, a DS200 accepted a ballot without incrementing the vote tally. ES&S informed the EAC that this anomaly exists in the EAC certified Unity 3.2.0.0 voting system and in the Unity 3.2.1.0 voting system currently undergoing Federal testing at Wyle Laboratories. All fielded versions of the DS200 have the capability of exhibiting this error. ES&S submitted a proposed solution to this anomaly which is currently being evaluated in the Unity 3.2.1.0 voting system.

Anomaly Description:

During the Reliability Test designed to determine if the previously reported Freeze/Shutdown anomaly was resolved in the DS200, one of the DS200 units accepted a ballot without incrementing the public counter. Two ballots were in the ballot bin and only one vote was counted by the DS200. When this anomaly originally presented itself the message stating, "You have cross voted," appeared on the DS200's screen. A second message was then displayed which stated, "Your ballot has been returned." Upon reviewing the audit log, the event was recorded by the following message: "Ballot Removed During Scan (137)." To the EAC's knowledge, instructions are not displayed on the DS200 screen to assist a pollworker in resolving this

uncounted ballot anomaly when this anomaly occurs. Please refer to the Recommended Procedures section of this Technical Advisory in case this anomaly is exhibited.

Root cause:

Wyle Laboratories and ES&S conducted extensive research in order to identify the root cause of this anomaly. Wyle traced the anomaly through the voting system's source code and found that when certain error conditions occur while processing a ballot, a function within the scanner can incorrectly make the DS200 believe the submitted ballot is twenty-eight (28) inches long. Therefore, when a typical ballot is fed into the scanner and this error condition occurs, the ballot is accepted into the ballot bin without incrementing the counter because the scanner is expecting a longer ballot. This error condition has an extremely low rate of occurrence. ES&S implemented improvements to the Unity 3.2.1.0 DS200 firmware in an attempt to resolve this anomaly. This updated firmware is part of the Unity 3.2.1.0 system currently under test.

Recommended Procedures:

Due to the fact that this anomaly exists in all versions of the DS200, local election officials using this system should take care to reconcile the voter list with the public count on all DS200 machines. EAC recommends that local election officials make pollworkers aware of this anomaly via pollworker training and Election Day instruction materials. If this anomaly is witnessed, follow jurisdiction procedures which should include contacting the lead local election official in order to correctly conduct the reconciliation process.

ES&S has stated the following:

"If you see any of the aforementioned error messages, poll workers should complete any necessary actions required by the error messages. In addition, the lead poll official should be notified that a potential ballot count issue has occurred and the public counter for the affected DS200 should be monitored for reoccurrence of the problem. You may also consider removing the unit from service if the situation were to re-occur."

ES&S TECHNICAL BULLETIN

NO. PRBDS2000006

DS200 Registers Unmarked Ovals as Marks on Skewed 17 and 19 Inch Ballots

Technical Bulletin	**PRBDS2000006**
Date	***February 28, 2011***
Product Name	***DS200***
Firmware Versions	***1.3.8.0 and 1.3.10.0***
Distribution	**Internal and External**

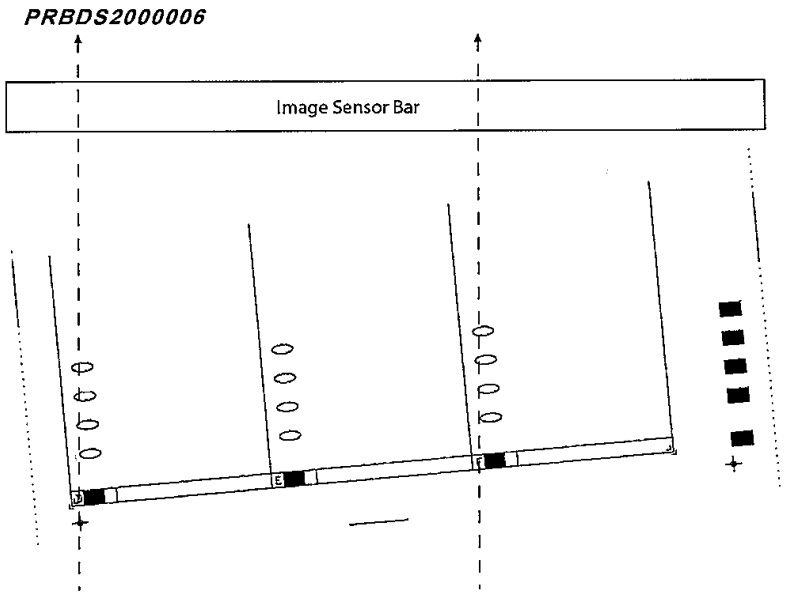
Problem:

Due to an issue in the skew correction routines in Versions 1.3.8.0 and 1.3.10.0 of the DS200 scanner firmware, users with this firmware must employ the specifications defined below when designing and printing 17" and 19" ballots. This issue does **NOT** apply to 11" or 14" ballots. If these specifications are not followed on Versions 1.3.8.0 and 1.3.10.0 with 17" and 19" ballots, it is possible that specific unmarked ovals on skewed ballots will register as marks. Following the ballot specifications will prevent this from occurring.

Note: The ballot specifications discussed in this bulletin supplement the ballot design specifications listed in the *ES&S Ballot Production Handbook, v. 1.0.0*.0, dated July 17, 2007.

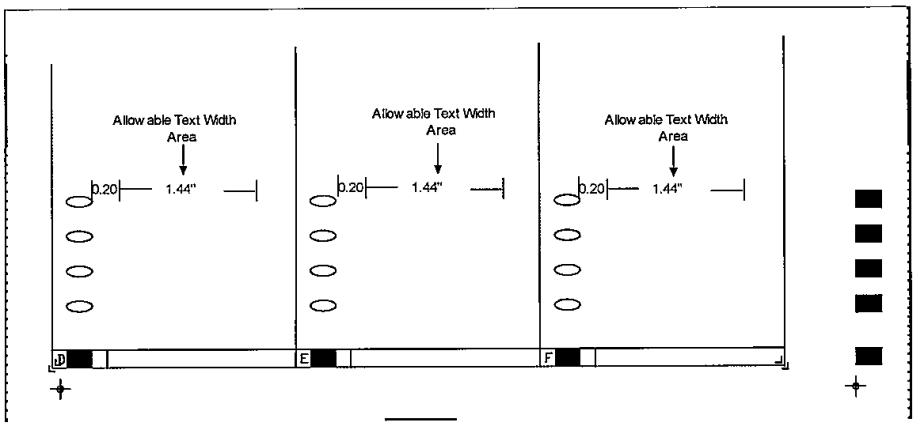
The following drawing is a slightly exaggerated illustration of skew. Skew can occur, when, for a variety of reasons, the ballot travels past the contact image sensor at an angle. This condition produces a data image with varying distances of the voter mark positions from the edges. Version 1.3.8.0 and 1.3.10.0 DS200 firmware compensates for the varying distances. However, on longer ballot stock (17" and 19") at the locations where the skew is most pronounced, it is possible for the firmware to mistake a small portion of the text next to an oval as part of the oval area itself. This can result in the firmware interpreting an unmarked oval as a mark.

2



Resolution:

To completely avoid the problem, it is critical that users do not place any text or graphics closer than 0.20 inches from the edge of the oval and not allow it to extend more the 1.44 inches from that "no print zone" as shown. Contest titles and referenda can still use the full column width.

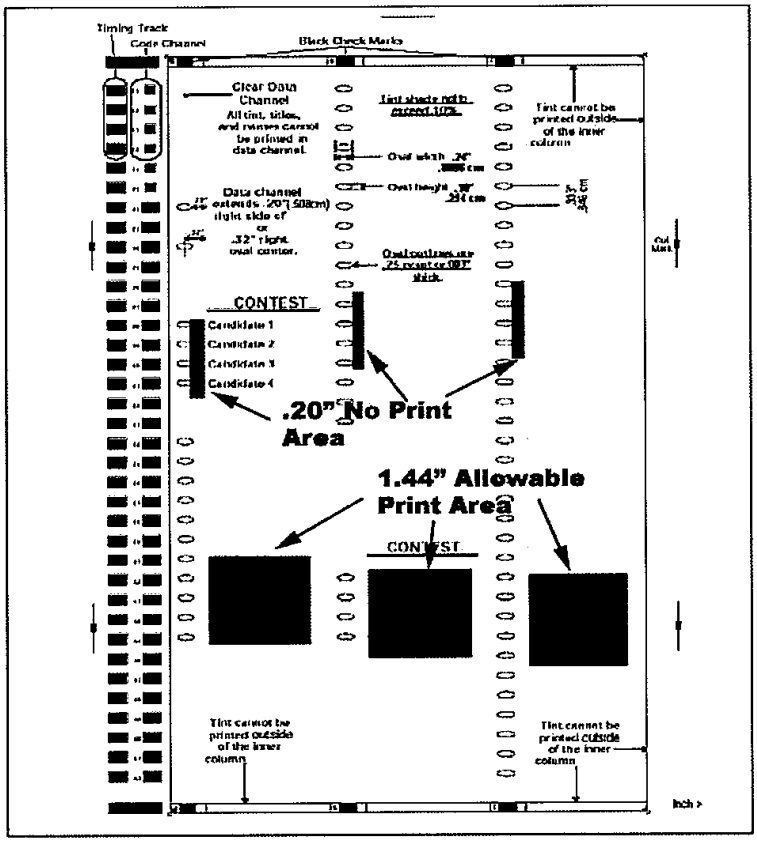


ES&S has modified the DS200's firmware to correct this issue in version 1.3.11.0 and will submit the updated firmware for EAC federal certification testing in October 2009.

Please refer to the drawing below for additional detail about the no print areas.

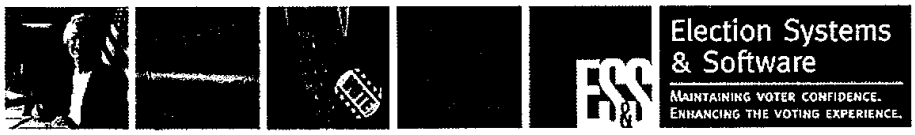
3

PRBDS2000006



ES&S TECHNICAL BULLETIN

NO. PRBDS2000008



Technical Bulletin	**PRBDS2000008**
Date	**July 7, 2010**
Product Name	**DS200(i)**
Version	**1.3.6.0 through 1.4.3.0**
Distribution	**All**

DS200(i) Intermittent Freeze and Shutdown (PRBDS2000008)

Problem:

The DS200(i) can freeze or shutdown during heavy usage of the touch screen, it can produce the following:

- The DS200(i) can freeze, which will require the user to force a shut down of the unit.
- The unit can also produce an error message that will require the user to shut down the system.

A variety of error messages can appear when the shutdown occurs, it will most often occur when there is heavy use of the touch screen (e.g. during Pre-election L&A system testing.) The problem can also occur during Election Day but this is not as common.

.

The problem does not affect the data or accuracy of the ballot scanning and tabulation.

PRBDS2000008 2

Resolution:

The root cause of the issue was found to involve a component of the COTS (Commercial, Off the Shelf) operating system called the X-windows system. The repeating of a specific set of steps that relied upon the X-window system resulted in a breakdown in the communication between the firmware and operating system components, which resulted in the lock up/shutdown of the DS200(i).

Improvements were made to the ES&S firmware to better handle this issue when it does occur. The final solution included updating the X-windows system. The updated firmware and operating system component will be part of Unity 3.2.1.0, which is currently pending Federal certification.

Workaround:

Users that have one of the affected firmware versions (1.3.6.0 through 1.4.3.0) and operating system can use the following procedures to manage a freeze/ shutdown should it occur.

If the DS200(i) freezes/shuts down during opening/closing of the polls.

1. Open the USB access door.
2. Press and hold the Power button until it turns red.
3. Wait until the red light is off and the machine completely shuts down, then press the Power button to restart the DS200(i).
4. Continue with the open/close polls process.

See **ES&S DS200(i) System Operations Procedures**

To open the polls, see Chapter 6: Election Day Tasks, Open the Polls.

To close the polls, see Chapter 6 Election Day Tasks, Close the Polls.

If DS200(i) freezes/shuts down during voting:

Determine if there is a ballot in the read area or the back of the DS200(i) by instructing the poll workers to do the following:

1. Go to the rear of the machine where the power cord is located.
2. Look through the clear plastic windows on the back of the ballot bin below the power supply.
3. If a ballot is not visible it will be dark inside the window, go to step 4. If you see the white ballot paper through the window, go to step 5. .

4. **If ballot is not visible through the clear plastic window**:
   a. If the machine is frozen, (it did not shut down on it's own), press and hold the Power button until it turns red.
   b. Once the machine is completely shut down, press the Power button to restart the DS200(i) and continue voting.
   c. If necessary, scan any ballots that may have been inserted into the emergency slot.
   d. Continue voting by having voters insert ballots directly into the DS200(i).
5. **If there is a ballot visible through the clear plastic window:**
   a. Instruct the poll workers to begin using the emergency ballot box slot on the front of the ballot bin.

A poll worker or technician authorized by the jurisdiction can remove the ballot attached to the back of the DS200(i) by doing the following:

   b. Remove the seal and unlock the ballot bin front flap.
   c. Flip the ballot bin front flap down and slide the DS200(i) forward.
   d. Gently remove the ballot from the back of the DS200(i).
   e. Slide the DS200(i) back into place and lock and seal the ballot bin front flap.

Warning: When sliding the DS200(i) back into place, make sure the power cord does not block the ballot path.

   f. If the machine is frozen, (it did not shut down on it's own), press and hold the "Power" button until it turns red.
   g. Wait until the red light goes off and the DS200(i) completely shuts down.
   h. Press the Power button to restart the DS200(i).
   i. Determine if the ballot was counted before the shutdown occurred. This can be done by a hand count of the ballots by authorized election workers and comparing that total with the public count on the DS200(i).
      - If the ballot was counted, place it in the ballot bin.
      - If the ballot was not counted it will need to be re-scanned.
   j. Continue voting by having voters insert ballots directly into the DS200(i).

ES&S TECHNICAL BULLETIN

NO. PRBDS2000010

Public Counter Does Not Increment When Ballot Is Dropped Into Ballot Box: PRBDS2000010

Technical Bulletin	**PRBDS2000010**
Date	**February 11, 2011**
Product Name	**DS200**
Version	**See Note***
Distribution	**All**

***NOTE:** This affects all current versions of the DS200. The updated firmware is part of the Unity 3.2.1.0 product suite currently pending Federal certification.

Problem:

During Federal certification testing by an independent test lab, an anomaly occurred where the DS200 allowed a ballot to fall into the ballot box without it being counted. After extensive follow-up testing, ES&S has determined that this issue occurs only rarely; approximately one instance per every nine thousand ballots cast.

When this situation manifests itself, you will likely see one of the following error messages:

- Ballot Removed During Scan (137)
- Unable to Read Timing Band (123)
- Missed Orientation Marks (100)

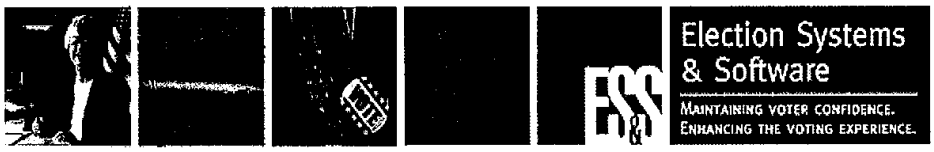
Resolution:

If you see any of the aforementioned error messages, poll workers should complete any necessary actions required by the error messages. Based on the receipt of these messages, the lead poll official should be notified that a potential ballot count issue has occurred and the public counter for the suspected DS200 should be monitored for reoccurrence of the problem.

Any suspected ballot count issue can be verified after poll closing by comparison of the voter check-in log against the total public count from the DS200 results tapes.

The root cause of this issue is due to a sensor misread in the ballot transport system. Improvements have been made to the DS200's firmware to fix this issue. The updated firmware is part of the Unity 3.2.1.0 product suite currently pending Federal certification.

ES&S TECHNICAL BULLETIN
NO. FYIDS2000019



DS200 Threshold Settings: FYIDS2000019

Technical Bulletin	**FYIDS2000019**
Date	**February 17, 2011**
Product Name	**DS200**
Version	**All**
Distribution	**All**

Issue:

The threshold setting for the DS200 top and bottom Contact Image Sensor (CIS) is set at the factory at 166. A small downward adjustment of the setting can further enhance the ability of the DS200 to create the digital representation of the ballot and voter marks.

Background:

The DS200 transports the ballot across a top and bottom Contact Image Sensor (CIS). The CIS is a device that contains a row of very small photo sensors and an LED light source. The photo sensors measure the amount of light reflecting from the ballot surface to determine if a given pixel is black or white.

The DS200 has an adjustable threshold configuration setting that establishes how much reflected light is required to establish a black versus white pixel. The DS200 scans the front and back of the ballot at the same time with separate configuration settings for the top and bottom CIS. The threshold value setting is adjustable from 0 to 255. Lowering the number produces a lighter image and raising the number produces a darker image.

Testing has revealed that a threshold value of 140 would improve the tolerance levels of the scanner and optimize the digital ballot images.

Resolution:

ES&S recommends that users reset the CIS threshold settings for the top and bottom sensors to 140. This is accomplished through the System Settings in the Administration Menu.

Refer to the **DS200 System Maintenance Manual** for detailed procedures.

APPENDIX D

TEST CASES

TC-187

IBETA NUMBER 187 REGRESSION TEST

Test Case: iBeta Number 187 Regression Test	
VVSG Requirements	2005 v.1: 2.1.1 .bTo ensure security all systems shall: provide system functions that are executable in the intended manner or order, and only under the intended conditions. v.1: 2.1.2 .c To ensure vote accuracy, all systems shall: record each vote precisely as indicated by the voter and be able to produce an accurate report of all votes cast. v.1: 2.1.8.b For all voting systems each piece of voting equipment that tabulates ballots shall provide a counter that: records the number of ballots cast during a … election.
Test Objective: Ensure that every ballot inserted into the DS-200 is accounted for (either as Accepted or Rejected), and an entry for each ballot is recorded in the audit log.	**Test Configuration:** 4 DS-200's with firmware version 1.4.3.9.
Devices & Tools Utilized:	1. (4) DS-200 units o ES0107380927 o ES0107370025 o ES0107360007 o DS02093900001 2. 372 per size printed hand-marked ballots, sizes 11, 14, 17, and 19 inches 3. Election Definition on USB thumb drive: "iBeta Number 187 Regression Test" 4. Election Definition document titled "iBeta Number 187 Regression Test.doc"
Assumptions	Tester knows the password to the election being used. Tester has knowledge of steps to load a USB for the DS-200 in ES&S HPM. DS-200 is connected to AC power. Hand marked test deck has been provided with 372 ballots.

Step	Procedure
0	Insert USB thumb drive into Slot B located in the top-left corner of the (4) DS-200's containing the election definition named "iBeta Number 187 Regression Test". *Expected:* *Actual:*
10000	Press the **[Power]** button located in the top-left corner of the DS-200 which is next to slot "B". *Expected: The DS-200 begins powering up. A message is displayed "Printing initial State report". Allow the report to print.* *Actual:*
10010	Touch the **[Open Polls]** button. *Expected: The polls are open and message stating "Open Polls Printing Report" the zero proof report prints.* *Actual:*
10020	Press **[Continue]** when message appears stating "Diverter Not found" *Expected: Diverter not found message displays and pressing continue will advance to next screen. Message appears stating "Insert ballot".* *Actual:*
10030	Begin inserting the hand-marked ballots into the DS-200's. Accepting all ballots and casting all ballots

	with errors. Do not reject or return any ballot during test. *Expected:* *Actual:*
10040	Press the [**Close Polls**] button located in the top-left corner of the DS200 which is next to slot "A" *Expected: Message stating "Print Close Polls Report" appears and the report prints. Upon completion of this the "Audit Log" will begin to print automatically.* *Actual:*
10050	Polls are now closed and a list of 9 options appear *Expected: After the polls are closed press the **[Shutdown]** button in the lower middle of the screen. After the unit has properly shutdown the USB drive may then be removed from the machine.* *Actual:*

Criteria for Evaluation of the Test Results
The results of this test will be accepted if every ballot inserted into the DS-200 is accounted for (either Accepted or Rejected) on the public count and in the audit logs and the vote totals are accurate according to the voted test pattern.

TC-188

188 UNITY 3210 M100 DATE CHANGE EVENT

Test Case: 188 Unity 3210 M100 Date Change Event		
VVSG Requirements	RFI 2009-04 & 2.1.4.g Record and report the date and time of normal and abnormal events.	
Test Objective:		**Test Configuration:**
This test ensures that the M-100 Audit Log records the system date and time change event.		M-100 with firmware version 5.4.4.5
Devices & Tools Utilized:	PCMCIA Memory Card loaded with election REG1S1EN.	
Special Requirements		
Assumptions	M-100 system date and time is set to the date of the test.	

Step	Procedure
0	Insert key into "Key Access Panel" and turn to "Open/Close Polls" to power up M-100. *Expected: Unit powers up.* *Actual:*
10000	When message appears on display "No election card", insert a PCMCIA election card containing election REG1S1EN. *Expected: The election is recognized.* *Actual:*
10010	Once the "Election Card Inserted Open Polls Now" is displayed, press and hold the first and third buttons on the "Menu Control Panel" to enter the Diagnostic Test Menu. Press the second button on the menu control panel for **[System Settings]**. *Expected: System Settings is displayed.* *Actual:*
10020	Touch the "Menu Control Panel" for the button corresponding to **[Date Time]** *Expected: New screen appears with Set Date menu.* *Actual:*
10030	Touch the "Menu Control Panel" for the button corresponding to **[Set Date]** *Expected: Buttons appear at bottom of screen to set the date.* *Actual:*
10040	Select the button corresponding to **[Select]** two times to by-pass month and day. Select the "Plus" button to advance the year. Select the button corresponding to **[Select]** one time to select the change. Select the button corresponding to **[Previous Menu]** three times to exit the "Test Menu". "Lock Out System Settings" is displayed select the button corresponding to **[No]**. Select the button corresponding to **[Previous Menu]**. *Expected: The Date Time has been altered.* *Actual:*
10050	Select the button corresponding to **[Yes]** on the "Open Polls" dialog screen. Turn the key in the "Key Access Panel" to "Vote". Turn the key in the "Key Access Panel" to "Open/Close" to close the polls. Select the button corresponding to **[Audit Log Report] .** *Expected: The Audit Log is printed with the new date and event description "System Date has been*

	updated" *Actual:*
Criteria for Evaluation of the Test Results The test results will be accepted if the expected results from all steps match the actual results observed and the printed Audit Log contains (1) an entry with the new date and (2) the new system date.	

TC-189

189 CRC LOOP AFTER MODIFYING ELECTION DEFINITION

Test Case: 189 CRC loop after modifying election definition		
VVSG Requirements	V1:2.2 This section defines required functional capabilities that are system-wide in nature and not unique to pre-voting, voting, and post-voting operations. All voting systems shall provide the following functional capabilities: ... Error recovery; V2:2.8.5.c. Provides procedures that clearly enable the operator to intervene the system operations to recover from an abnormal system state;	
Test Objective: This test ensures that the DS-200 shutdown button functions as expected after modifying the election definition thus changing the CRC for the election.	**Test Configuration:** DS-200 with firmware version 1.4.3.9.	
Devices & Tools Utilized:	USB thumb drive with election definition REG1S1EN. Default install of "HxD Hex Editor version 1.7.7.0" on a test PC.	
Special Requirements		
Assumptions	Tester knows the password to the election being used. Tester has knowledge of steps to load a USB for the DS-200 in ES&S HPM. DS-200 is connected to AC power.	

Step	Procedure
0	Launch ES&S HPM. *Expected: The application opens.* *Actual:*
10000	Insert a blank USB thumb drive into an available slot and take note of the associated drive letter. *Expected: The USB thumb drive is recognized.* *Actual:*
10010	In ES&S HPM, navigate to the menu **[Create Tabulator Data]** → **[Create Tabulator Parameters]** *Expected: A pop-up screen opens.* *Actual:*
10020	In the **[Tabulator]** field, select **[100/200]** from the dropdown. *Expected: The value is set to "100/200".* *Actual:*
10030	In the **[Range of Polls]** fields, type **[1]** in each field. *Expected: The values are set to "1".* *Actual:*
10040	Click **[OK]**. *Expected: Message appears stating "Tabulator parameters have been set".* *Actual:*
10050	In ES&S HPM, navigate to the menu **[Create Tabulator Data]** → **[Create Tabulator Parameters]** *Expected: A pop-up screen opens.* *Actual:*

10060	In the [**Tabulator**] field, select [**200**] from the dropdown. *Expected: The value is set to "200".* *Actual:*
10070	In the [**Range of Polls**] fields, type [**1**] in each field. *Expected: The values are set to "1".* *Actual:*
10080	Click [**OK**]. *Expected: Message appears stating "Tabulator data has been written to device".* *Actual:*
10090	Eject the USB thumb drive by navigating to My Computer, right-click on the drive associated with the thumb drive, and selecting Eject. Remove the USB thumb drive from the PC *Expected: Message appears stating the thumb drive has been ejected.* *Actual:*
10100	Insert the USB thumb drive into Slot B located in the top-left corner of the DS-200 *Expected: USB thumb drive is firmly seated in Slot B* *Actual:*
10110	Press the [**Power**] button located in the top-left corner of the DS-200 *Expected: The DS-200 begins powering up. A message is displayed "Printing initial State report". Allow the report to print.* *Actual:*
10120	Touch the [**Open Polls**] button *Expected: The polls are open and message appears stating "Insert ballot".* *Actual:*
10130	Remove the USB thumb drive from slot B. *Expected: Message appears stating "Election Not Found" and buttons appear for "Admin" and "Shutdown"* *Actual:*
10140	On a PC, launch the Hex Editor application *Expected: The application opens.* *Actual:*
10150	Insert the USB thumb drive containing election REG1S1EN. *Expected: USB thumb drive is recognized.*

	Actual:
10160	Open the election definition binary file *(e.g. pcb0001)* by navigating to File→Open. *Expected: The binary file opens. The first line contains column labels as follows:* *Offset 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F* *Actual:*
10170	In the original file (pcb0001), columns 04, 05, 06, 07, 08, 09, 0A, 0B, and 0C contain the CRC header information for the election definition. To right of these columns, an alpha-numeric value is displayed which identifies the translated binary information of the CRC header. Modify the CRC header information by changing any of the alpha-numeric values. *Expected: When one of the alpha-numeric values is changed, the value under the corresponding column (04, 05, 06, 07, 08, 09, 0A, 0B, and 0C) is also changed.* *Actual:*
10180	Save the election definition in the Hex Editor (File → Save) *Expected: The file is saved, and a backup of the file is created with a ".bak" extension* *Actual:*
10190	Eject the USB thumb drive by navigating to My Computer, right-click on the drive associated with the thumb drive, and selecting Eject. Remove the USB thumb drive from the PC *Expected: Thumb drive is ejected and removed* *Actual:*
10200	Insert the USB thumb drive into Slot B located in the top-left corner of the DS-200 *Expected: USB thumb drive is firmly seated in Slot B. An error message is displayed: "Media Header Section Failed CRC". A "Shutdown" button appears in the lower right corner of the display.* *Actual:*
10210	Touch the **[Shutdown]** button. *Expected: Message displays "Printing initial state report", then the DS-200 turns off.* *Actual:*
10220	Launch ES&S HPM. *Expected: The application opens.* *Actual:*
10230	Insert a blank USB thumb drive into an available slot and take note of the associated drive letter. *Expected: The USB thumb drive is recognized.* *Actual:*
10240	In ES&S HPM, navigate to the menu **[Create Tabulator Data]** → **[Create Tabulator Parameters]**

	Expected: A pop-up screen opens. *Actual:*
10250	In the [**Tabulator**] field, select [**100/200**] from the dropdown. *Expected: The value is set to "100/200".* *Actual:*
10260	In the [**Range of Polls**] fields, type [**1**] in each field. *Expected: The values are set to "1".* *Actual:*
10270	Click [**OK**]. *Expected: Message appears stating "Tabulator parameters have been set".* *Actual:*
10280	In ES&S HPM, navigate to the menu [**Create Tabulator Data**] → [**Create Tabulator Parameters**] *Expected: A pop-up screen opens.* *Actual:*
10290	In the [**Tabulator**] field, select [**200**] from the dropdown. *Expected: The value is set to "200".* *Actual:*
10300	In the [**Range of Polls**] fields, type [**1**] in each field. *Expected: The values are set to "1".* *Actual:*
10310	Click [**OK**]. *Expected: Message appears stating "Tabulator data has been written to device".* *Actual:*
10320	Eject the USB thumb drive by navigating to My Computer, right-click on the drive associated with the thumb drive, and selecting Eject. Remove the USB thumb drive from the PC *Expected: Message appears stating the thumb drive has been ejected.* *Actual:*
10330	On a PC, launch the Hex Editor application *Expected: The application opens.* *Actual:*
10340	Insert the USB thumb drive containing election REG1S1EN.

	Expected: USB thumb drive is recognized. *Actual:*
10350	Open the election definition binary file *(e.g. pcb0001)* by navigating to File→Open. *Expected: The binary file opens. The first line contains column labels as follows:* *Offset 00 01 02 03 04 05 06 07 08 09 0A 0B 0C 0D 0E 0F* *Actual:*
10360	In the original file (pcb0001), columns 04, 05, 06, 07, 08, 09, 0A, 0B, and 0C contain the CRC header information for the election definition. To right of these columns, an alpha-numeric value is displayed which identifies the translated binary information of the CRC header. Modify the CRC header information by changing any of the alpha-numeric values. *Expected: When one of the alpha-numeric values is changed, the value under the corresponding column (04, 05, 06, 07, 08, 09, 0A, 0B, and 0C) is also changed.* *Actual:*
10370	Save the election definition in the Hex Editor (File → Save) *Expected: The file is saved, and a backup of the file is created with a ".bak" extension* *Actual:*
10380	Eject the USB thumb drive by navigating to My Computer, right-click on the drive associated with the thumb drive, and selecting Eject. Remove the USB thumb drive from the PC *Expected: Thumb drive is ejected and removed* *Actual:*
10390	Insert the USB thumb drive into Slot B located in the top-left corner of the DS-200 *Expected: USB thumb drive is firmly seated in Slot B* *Actual:*
10400	Press the **[Power]** button located in the top-left corner of the DS-200 *Expected: The DS-200 begins powering up. A message is displayed "Printing initial State report". Allow the report to print. An error message is displayed: "Media Header Section Failed CRC". A "Shutdown" button appears in the lower right corner of the display.* *Actual:*
10410	Touch the **[Shutdown]** button *Expected: Message displays "Printing initial state report", then the DS-200 turns off.* *Actual:*
Criteria for Evaluation of the Test Results The test results will be accepted if the expected results from all steps match the actual results observed and the DS-200 shuts down when the on screen "Shutdown" button is pressed.	

TC-190

190 PRINTER TIMEOUT EVENT

Test Case: 190 Printer Timeout Event		
VVSG Requirements	V1:2.2.4.1... All Systems shall ... g. Record and report the date and time of normal and abnormal events; V1:2.2.5.1 [Audit trails] present a concrete, indestructible archival record of all system activity related to the vote tally, and are essential for public confidence in the accuracy of the tally, for recounts, and for evidence in the event of criminal or civil litigation. RFI 2009-04	
Test Objective:		**Test Configuration:**
This test ensures that the DS-200 Audit Log records Printer Timeout Events		DS-200 with firmware version 1.4.3.9
Devices & Tools Utilized:	USB thumb drive with election REG1S1EN	
Special Requirements	N/A	
Assumptions	Unit is connected to AC power.	

Step	Procedure
0	Insert a USB thumb drive loaded with election REG1S1EN into slot B of the DS-200. *Expected: n/a* *Actual:*
10000	Insert the key and unlock the "Access Door" covering the power button. Press **[Power]** button on DS200. *Expected: Unit powers up.* *Actual:*
10010	After the DS200 completes the power up cycle, an "Election Definition found" screen should display. Touch the on-screen button **[Open Polls].** *Expected: The Open Polls report begins printing.* *Actual:*
10020	While the report is printing, open the printer door and remove the printer paper. *Expected: The "Abort Printing?" screen appears.* *Actual:*
10030	Replace the paper and close the printer door, then touch the on-screen button **[No]** to continue printing. *Expected: The continue printing screen appears.* *Actual:*
10040	Locate the **[Close Polls]** button in the control above the **[Power]** button. *Expected: The Close Polls report begins printing.* *Actual:*
10050	While the report is printing, open the printer door and remove the printer paper. *Expected: The "Abort Printing?" screen appears.* *Actual:*

10060	Replace the paper and close the printer door, then touch the on-screen button **[No]** to continue printing. *Expected: The "ContinuePrinting" screen appears.* *Actual:*
10070	Touch the on-screen button **[Audit Log Report].** *Expected: The Audit Log report begins printing.* *Actual:*
10080	Examine the Audit Log Report print out for the "Printer Timeout" event. Ensure the log record date/time and a descriptive message about the events. *Expected: The Audit Log report both "Printer Timeout" events with the date and time.* *Actual:*
Criteria for Evaluation of the Test Results The test results will be accepted if the expected results from all steps match the actual results observed and the printed Audit Log contains two entries for a "Printer Timeout" event with the corresponding date and time.	

TC-192

192-DS-200 INCORRECT STATUS MESSAGE

Test Case: 192 – DS-200 Incorrect Status Message		
VVSG Requirements	V1:2.2.1.b. Provide system functions that are executable only in the intended manner and order, and only under the intended conditions.	
Test Objective:		**Test Configuration:**
This test ensures that consistent messages are displayed on the DS200 when unit is operating on battery power and has an election definition card inserted.		DS-200 with firmware version 1.4.3.9
Devices & Tools Utilized:	USB thumb drive loaded with election REG1S1EN	
Special Requirements	N/A	
Assumptions	Unit is **NOT** connected to AC power.	

Step	Procedure
0	Insert the key and unlock the "Access Door" covering the power button. Press **[Power]** button on DS200. NOTE: Unit is running on battery power without an election loaded. *Expected: n/a* *Actual:*
10000	Touch the on-screen button **[Continue on Battery Only]** *Expected: The unit continues powering up.* *Actual:*
10010	Confirm a screen appears stating "Election Definition not found", displaying buttons: **[Go to Admin]** and **[Shutdown]** *Expected: Correct screen appears.* *Actual:*
10020	Touch the on-screen button **[Shutdown]** *Expected: Unit continues shutdown operation.* *Actual:*
10030	After unit completes shutdown, insert a thumb drive with election REG1S1EN into slot B. *Expected: n/a* *Actual:*
10040	Press **[Power]** button on DS200. (Firmware version 1.4.3.8) *Expected: Unit powers up.* *Actual:*
10050	Touch the on-screen button **[Continue on Battery Only]** *Expected: The unit continues powering up.* *Actual:*
10060	Confirm a screen appears with message "Election Definition found", displaying buttons: **[Go to Admin]** and **[Shutdown]**

	Expected: Correct screen appears. *Actual:*
Criteria for Evaluation of the Test Results The test results will be accepted if the expected results from all steps match the actual results observed and onscreen messages are not dependent on an election being loaded in the system	

TC-MODEM TEST

Test Case: Modem Test		
VVSG Requirements	xxxx	
Test Objective:		**Test Configuration:**
This test ensures that the DS-200 functions properly regardless of whether a modem is installed		(2) DS-200's with firmware version 1.4.3.9
Devices & Tools Utilized:	1. USB thumb drive with election REG1S1EN 2. DS-200 modem 3. Standard phone jack and cord	
Special Requirements	N/A	
Assumptions	Unit is connected to AC power.	

Step	**Procedure**
0	Open the top cover of the **first DS-200** by removing the four screws on the side of the unit. *Expected: n/a* *Actual:*
10000	Install the modem into the appropriate slot of the **first DS-200.** *Expected: Modem is seated properly in the correct slot.* *Actual:*
10010	Replace the cover on the **first DS-200.** *Expected:* *Actual:*
10020	Insert a USB thumb drive containing election definition REG1S1EN into slot B of the **first DS-200.** *Expected:* *Actual:*
10030	Insert one end of the phone cord into the modem jack, and the other end into a nearby phone jack. *Expected:* *Actual:*
10040	Press the [Power] button on the **first DS-200** located in the upper right-hand corner of the unit. *Expected: The DS-200 begins powering up and the System Diagnostics report prints.* *Actual:*
10050	Confirm the System Diagnostics report contains an entry stating "Modem found" *Expected: System Diagnostics screen prints and contains entry "Modem found".* *Actual:*
10060	Press the **[Open Polls]** button. *Expected:*

	Actual:
10070	Feed a voted ballot into the **first DS-200** *Expected:* *Actual:*
10080	Press the **[Close Polls]** button located on the top left corner of the **first DS-200.** *Expected:* *Actual:*
10090	Navigate to the Admin menu by pressing the **[Admin]** button. *Expected:* *Actual:*
10100	Press the **[Modem Results]** button. *Expected: Screen appears "Change Modem Phone Number"* *Actual:*
10110	Select **[YES]** on the Change Modem Phone Number screen. *Expected:* *Actual:*
10120	Enter number **[256-838-4541]** then press **[Enter].** This concludes the test on the **first DS-200.** *Expected: Message appears stating "Modem Not Found"* *Actual:*
10130	Insert a USB thumb drive containing election definition REG181EN into slot B of the **second DS-200.** *Expected:* *Actual:*
10140	Press the power button on the **second DS-200.** *Expected: The DS-200 begins powering up and the Initial State report prints.* *Actual:*
10150	Confirm the Initial State report contains an entry stating "No Modem Found" *Expected:* *Actual:*
10160	Press the **[Open Polls]** button. *Expected:*

	Actual:
10170	Feed a voted ballot into the **second DS-200** *Expected:* *Actual:*
10180	Press the **[Close Polls]** button located on the top left corner of the **second DS-200**. *Expected:* *Actual:*
10190	Navigate to the Admin menu by pressing the **[Admin]** button. *Expected:* *Actual:*
10200	Press the **[Modem Results]** button. *Expected: Screen appears "Change Modem Phone Number"* *Actual:*
10210	Select **[YES]** on the Change Modem Phone Number screen. *Expected:* *Actual:*
10220	Enter number **[256-838-4541]** then press **[Enter].** This concludes the test on the **first DS-200**. *Expected: Message appears stating "Modem Not Found"* *Actual:*
Criteria for Evaluation of the Test Results The test results will be accepted if the voting results cannot be transmitted via the modem.	

TC-RELIABILITY TEST

Test Case: Reliability Test	
VVSG Requirements	2.1.1.b – Provide system functions that are executable only in the intended manner and order, and only under the intended conditions 2.1.3 – Error Recovery 2.1.4.g – Record and report the date and time of normal and abnormal event. 2.1.4.i – Detect and record every event, including the occurrence of an error condition that the system cannot overcome, and time-dependent or programmed events that occur without the intervention of the voter or a polling place operator 2.1.5.1 – Operational Requirements 4.3.3 – Reliability i. This test is to be run continuously for the 163 hours required. 4.3.5 – Availability i. The calculations will be provided for both before and after configurations.
Test Objective: This test ensures that the DS-200 does not freeze/shutdown as per EAC document titled "EAC_expectations_for_freeze_shut_testing.pdf"	**Test Configuration:** 3 DS-200's with firmware version 1.4.3.9.
Devices & Tools Utilized:	3 DS-200's identified by iBeta as being most prone to the freeze/shutdown error
Special Requirements	Serial #'s from the 3 DS-200's ES0107380927 – Power will be cycled after each 20-ballot iteration of the test ES0107370025 – Power will be cycled after each 8-hour period of testing ES0107360007 – Power will not be cycled throughout the duration of testing
Assumptions	Tester knows the password to the elections being used. Tester has knowledge of steps to load a USB for the DS-200 in ES&S HPM.

Step	Procedure
0	Insert a USB thumb drive containing the Logic and Accuracy test election definition into a DS-200 with firmware version 1.4.3.9. *Expected:* *Actual:*
10000	Press the [Power] button. *Expected: Message appears on screen "Election Definition Found"* *Actual:*
10010	Select the Arrow on the bottom right side of the touchscreen. *Expected:* *Actual:*
10020	Select the [Go To Admin] button. *Expected:* *Actual:*
10030	Enter the password. *Expected: Screen displays Administrative Mode.* *Actual:*

10040	Select [System Settings]. *Expected:* *Actual:*
10050	Select [Date & Time]. *Expected:* *Actual:*
10060	Scroll from the top of the Time Zones to the bottom of all available Time Zones. Return to EST time zone which was previously set. *Expected:* *Actual:*
10070	Select the [Exit] button to exit Date & Time. *Expected:* *Actual:*
10080	Select the [Previous] button 2 times to exit System Settings & Admin menu. *Expected:* *Actual:*
10090	Select the Arrow on the bottom right side of the touchscreen. *Expected:* *Actual:*
10100	Select the [Go To Admin] button. *Expected:* *Actual:*
10110	Enter the Password, then select [Enter]. *Expected: The screen displays "Administrative Mode"* *Actual:*
10120	Exit the Admin menu by selecting [Previous]. *Expected:* *Actual:*
10130	Repeat steps 10090 – 10120 to change the password **19X** on this DS-200. *Expected:* *Actual:*

10140	Feed 8 ballot Test Deck into each DS-200. *Expected:* *Actual:*
Criteria for Evaluation of the Test Results The test results will be accepted if none of the DS-200's experience the lockup issue as a result of these tests being performed.	

TC-DS200 UNITY 3.2.1.0 DATE/TIME CHANGE EVENT

Test Case: DS200 Unity 3.2.1.0 Date/Time Change Event		
VVSG Requirements	RFI 2009-04 & 2.1.4.g Record and report the date and time of normal and abnormal events.	
Test Objective:		**Test Configuration:**
This test ensures that the DS200 Audit Log records the system date and time change event.		DS200 with firmware version 1.4.3.10
Devices & Tools Utilized:	USB loaded with election REG1S1EN.	
Special Requirements		
Assumptions	DS200 system date and time is set to the date of the test.	

Step	Procedure
0	Insert key into "Key Access Panel" and press the **[Power]** button. *Expected: Unit powers up.* *Actual:*
10000	When message appears on display "Election Definition not found", insert a USB thumb drive containing election REG1S1EN. *Expected: The election is recognized, and the Initial State Report begins printing.* *Actual:*
10010	Touch the **[Cancel]** button to cancel printing, then touch **[Yes]** to confirm. *Expected: Printing is cancelled.* *Actual:*
10020	Touch the arrow button on the lower right-hand corner of the screen. *Expected: Three buttons appear on the screen for "Open Polls", "Shutdown", and "Go to Admin".* *Actual:*
10030	Touch the **[Go to Admin]** button. *Expected: User is prompted to enter the Admin password.* *Actual:*
10040	Enter the Admin password. *Expected: The Administration Menu appears.* *Actual:*
10050	Touch the **[System Settings]** button. *Expected: The System Settings screen appears.* *Actual:*
10060	Touch the **[Date & Time]** button. *Expected: The "Select Date And Time" screen appears.* *Actual:*
10070	Touch the dark blue box under the "Month" column, select a different month by touching it, then touch the

	Enter key (left facing arrow) to return to the previous screen. *Expected: The month is updated.* *Actual:*
10080	Touch the dark blue box under the "Time" column, touch the **[Clear]** button, enter a different time (4 digits; i.e. 0800) by using the keypad, then touch the **[Enter]** button. *Expected: The time is updated.* *Actual:*
10090	Touch the **[Previous]** button, then touch the **[ACCEPT NEW TIME]** button. *Expected: The System Settings screen appears, and the new date and time appear at the top of the screen.* *Actual:*
10100	Touch the **[Previous]** button. *Expected: The "Administration Menu" screen appears.* *Actual:*
10110	Touch the **[Diagnostic Reports]** button. *Expected: The Diagnostic Reports screen appears.* *Actual:*
10120	Touch the **[System Audit Log Report]** button. *Expected: The System Audit Log Report prints, contains entries stating the date and time were updated, and the date and time are correct.* *Actual:*
10130	Touch the **[Previous]** button to return to the Administration Menu. *Expected: The Administration Menu screen appears.* *Actual:*
10140	Restore the date and time to today by repeating steps **10050 – 10090**. *Expected: The date and time are changed to the current date and time.* *Actual:*
10150	Touch the **[Previous]** button. *Expected: The **[Open Polls]** and **[Shutdown]** buttons appear.* *Actual:*
10160	Touch the **[Shutdown]** button. *Expected: The DS-200 shuts down.*

	Actual:
Criteria for Evaluation of the Test Results The test results will be accepted if the expected results from all steps match the actual results observed and the printed Audit Log contains (1) an entry with the new date and (2) the new time.	

TC-THRESHOLD TEST

Test Case: Threshold Test	
VVSG Requirements	Volume II Section 4.7.1.1 Data Accuracy
Test Objective:	**Test Configuration:**
Ensure the DS200 version 1.4.3.10 records selections and non-selections consistently and accurately.	Two DS200 with firmware 1.4.3.10 set with different "Threshold" values of 166 and 140.
Devices & Tools Utilized:	See specific test case documents.
Special Requirements	See specific test case documents.
Assumptions	The DS200 unit is on AC power and powered on. The firmware is version 1.4.3.10. The gate on the DS200 is unlocked and ready to receive the USB drive.

Procedure

Step 1: Execute DS0110340905-166-New Ballot Test Case.

Totals :

Gail Ross ____

Tetty Rogiers ____

Step 2: Execute DS0110340905-166-Oringial Ballot Test Case

Totals :

Gail Ross ____

Tetty Rogiers ____

Step 3: Execute DS0110340837-140-New Ballot Test Case.

Totals :

Gail Ross ____

Tetty Rogiers ____

Step 4: Execute DS0110340837-140-Original Ballot Test Case.

Totals :

Gail Ross ____

Tetty Rogiers ____

Step 5: Examine all results comparing the actual results to the expected results.

Step 6: Execute Minimum Mark Test Case.

Criteria for Evaluation of the Test Results
The results of this test will be accepted if all four test cases are executed and the DS-200 does not count either ballot at the new "Threshold" value of 140 and the Minimum Mark Test achieves the expected results.

Signed _____ Approved _____

Test Case: DS0110340905-166-New Ballot		
VVSG Requirements	Volume II Section 4.7.1.1 Data Accuracy	
Test Objective:		**Test Configuration:**
Ensure the DS200 version 1.4.3.10 records selections and non-selections consistently and accurately.		Two DS200 with firmware 1.4.3.10 set with different "Threshold" values of 166 and 140.
Devices & Tools Utilized:	The ballot from the original Accuracy Test performed by Wyle on Feb. 4th 2011. A purposefully smudged ballot. Two USB thumb drives loaded with the Accuracy Test Election definition.	
Special Requirements	DS 200 serial number DS0110340905 with the threshold level set to 166 using the New Ballot.	
Assumptions	The DS200 unit is on AC power and powered on. The firmware is version 1.4.3.10. The gate on the DS200 is unlocked and ready to receive the USB drive.	

Step	Procedure
0	Insert USB thumb drive into slot B on the USB port array. Verify that the election definition is found. *Expected: Message election is found.* *Actual:*
10000	"Printing Intial State Report" screen select <CANCEL>. *Expected: "Cancel Report Printing?" screen is presented.* *Actual:*
10010	On the "Cancel Report Printing?" screen select <YES>. *Expected: Printing cancels* *Actual:*
10020	On the "Open Polls" screen select the <RIGHT ARROW> in the lower right hand corner. *Expected: The Admin screen is displayed.* *Actual:*
10030	Select <GO TO ADMIN> button. *Expected: Presented with password screen.* *Actual:*
10040	Input <87654321> and enter for the admin password. *Expected: Password is accepted.* *Actual:*
10050	On the "Admin Menu" screen select <ELECTION TEST> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10060	On the "Election Test Menu" screen select the <AUTO READ SETTINGS> button. *Expected: Presented with the "Auto Read Settings" screen.* *Actual:*

10070	On the "Auto Read Settings" screen select the <CLEAR> button and input <10> and select the <ENTER> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10080	On the "Election Test Menu" screen select <SCAN BALLOTS> button. *Expected: Presented with "Diverter not found" message.* *Actual:*
10090	On the "Diverter Not Found" screen select <CONTINUE> button. *Expected: Presented with the "Welcome"screen.* *Actual:*
10100	Present the New Ballot in orientation 1. *Expected: Scan cycle is started.* *Actual:*
10110	If error message occurs and the scanning is halted, then remove ballot and log the scan number. Re-present ballot and continue scanning. *Expected: Scanning continues.* *Actual:*
10120	At the conclusion of the scanning cycle, remove the ballot. *Expected: Scanning completed 10 cycles.* *Actual:*
10130	Select the <PREVIOUS> button at the center bottom of the "Welcome" screen. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10140	Select <PRECINCT REPORT SUMMARY> button. *Expected: Printing of total report is started.* *Actual:*
10150	Review the total report and note any anomalies. *Expected: The count will be noted and reported.* *Actual:*
10160	On the "Election Test Menu" select <ZERO TOTALS> button. On the "Zero Totals" screen select <YES> button and on the confirmation <OK> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*

10170	On the "Election Test Menu" screen <REPEAT STEP 10080 – 10160> *Expected: All expected results are repeated.* *Actual:*
10180	Continue 10170 until 5 complete cycles have occurred *Expected: There are 5 complete cycles.* *Actual:*
Criteria for Evaluation of the Test Results The DS200 with the "Threshold" set to 166 will possibly record at least one vote for Gail Ross and at least one less vote for Tetty Rogiers. All votes for Tetty Rogiers is also acceptable.	

Test Case: DS0110340905-166-Original Ballot	
VVSG Requirements	Volume II Section 4.7.1.1 Data Accuracy
Test Objective:	**Test Configuration:**
Ensure the DS200 version 1.4.3.10 records selections and non-selections consistently and accurately.	Two DS200 with firmware 1.4.3.10 set with different "Threshold" values of 166 and 140.
Devices & Tools Utilized:	The ballot from the original Accuracy Test performed by Wyle on Feb. 4th 2011. A purposefully smudged ballot. Two USB thumb drives loaded with the Accuracy Test Election definition.
Special Requirements	DS 200 serial number DS0110340905 with the threshold level set to 166 using the Original Ballot.
Assumptions	The DS200 unit is on AC power and powered on. The firmware is version 1.4.3.10. The gate on the DS200 is unlocked and ready to receive the USB drive.

Step	Procedure
0	Insert USB thumb drive into slot B on the USB port array. Verify that the election definition is found. *Expected: Message election is found.* *Actual:*
10000	"Printing Intial State Report" screen select <CANCEL>. *Expected:"Cancel Report Printing?" screen is presented.* *Actual:*
10010	On the "Cancel Report Printing?" screen select <YES>. *Expected: Printing cancels* *Actual:*
10020	On the "Open Polls" screen select the <RIGHT ARROW> in the lower right hand corner. *Expected: The Admin screen is displayed.* *Actual:*
10030	Select <GO TO ADMIN> button. *Expected: Presented with password screen.* *Actual:*
10040	Input <87654321> and enter for the admin password. *Expected: Password is accepted.* *Actual:*
10050	On the "Admin Menu" screen select <ELECTION TEST> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10060	On the "Election Test Menu" screen select the <AUTO READ SETTINGS> button. *Expected: Presented with the "Auto Read Settings" screen.* *Actual:*

10070	On the "Auto Read Settings" screen select the <CLEAR> button and input <10> and select the <ENTER> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10080	On the "Election Test Menu" screen select <SCAN BALLOTS> button. *Expected: Presented with "Diverter not found" message.* *Actual:*
10090	On the "Diverter Not Found" screen select <CONTINUE> button. *Expected: Presented with the "Welcome"screen.* *Actual:*
10100	Present the Original Ballot in orientation 1. *Expected: Scan cycle is started.* *Actual:*
10110	If error message occurs and the scanning is halted, then remove ballot and log the scan number. Re-present ballot and continue scanning. *Expected: Scanning continues.* *Actual:*
10120	At the conclusion of the scanning cycle, remove the ballot. *Expected: Scanning completed 10 cycles.* *Actual:*
10130	Select the <PREVIOUS> button at the center bottom of the "Welcome" screen. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10140	Select <PRECINCT REPORT SUMMARY> button. *Expected: Printing of total report is started.* *Actual:*
10150	Review the total report and note any anomalies. *Expected: The count will be noted and reported.* *Actual:*
10160	On the "Election Test Menu" select <ZERO TOTALS> button. On the "Zero Totals" screen select <YES> button and on the confirmation <OK> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*

10170	On the "Election Test Menu" screen <REPEAT STEP 10080 – 10160> *Expected: All expected results are repeated.* *Actual:*
10180	Continue 10170 until 5 complete cycles have occurred *Expected: There are 5 complete cycles.* *Actual:*
Criteria for Evaluation of the Test Results The DS200 with the "Threshold" set to 166 will record at least one vote for Gail Ross and at least one less vote for Tetty Rogiers.	

Test Case: DS0110340837-140-New Ballot	
VVSG Requirements	Volume II Section 4.7.1.1 Data Accuracy
Test Objective:	**Test Configuration:**
Ensure the DS200 version 1.4.3.10 records selections and non-selections consistently and accurately.	Two DS200 with firmware 1.4.3.10 set with different "Threshold" values of 166 and 140.
Devices & Tools Utilized:	The ballot from the original Accuracy Test performed by Wyle on Feb. 4th 2011. A purposefully smudged ballot. Two USB thumb drives loaded with the Accuracy Test Election definition.
Special Requirements	DS 200 serial number DS0110340837 with the threshold level set to 140 using the New Ballot.
Assumptions	The DS200 unit is on AC power and powered on. The firmware is version 1.4.3.10. The gate on the DS200 is unlocked and ready to receive the USB drive.

Step	Procedure
0	Insert USB thumb drive into slot B on the USB port array. Verify that the election definition is found. *Expected: Message election is found.* *Actual:*
10000	"Printing Intial State Report" screen select <CANCEL>. *Expected: "Cancel Report Printing?" screen is presented.* *Actual:*
10010	On the "Cancel Report Printing?" screen select <YES>. *Expected: Printing cancels* *Actual:*
10020	On the "Open Polls" screen select the <RIGHT ARROW> in the lower right hand corner. *Expected: The Admin screen is displayed.* *Actual:*
10030	Select <GO TO ADMIN> button. *Expected: Presented with password screen.* *Actual:*
10040	Input <87654321> and enter for the admin password. *Expected: Password is accepted.* *Actual:*
10050	On the "Admin Menu" screen select <ELECTION TEST> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10060	On the "Election Test Menu" screen select the <AUTO READ SETTINGS> button. *Expected: Presented with the "Auto Read Settings" screen.* *Actual:*

10070	On the "Auto Read Settings" screen select the <CLEAR> button and input <10> and select the <ENTER> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10080	On the "Election Test Menu" screen select <SCAN BALLOTS> button. *Expected: Presented with "Diverter not found" message.* *Actual:*
10090	On the "Diverter Not Found" screen select <CONTINUE> button. *Expected: Presented with the "Welcome"screen.* *Actual:*
10100	Present the New Ballot in orientation 1. *Expected: Scan cycle is started.* *Actual:*
10110	If error message occurs and the scanning is halted, then remove ballot and log the scan number. Re-present ballot and continue scanning. *Expected: Scanning continues.* *Actual:*
10120	At the conclusion of the scanning cycle, remove the ballot. *Expected: Scanning completed 10 cycles.* *Actual:*
10130	Select the <PREVIOUS> button at the center bottom of the "Welcome" screen. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10140	Select <PRECINCT REPORT SUMMARY> button. *Expected: Printing of total report is started.* *Actual:*
10150	Review the total report and note any anomalies. *Expected: The count will be noted and reported.* *Actual:*
10160	On the "Election Test Menu" select <ZERO TOTALS> button. On the "Zero Totals" screen select <YES> button and on the confirmation <OK> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*

10170	On the "Election Test Menu" screen <REPEAT STEP 10080 – 10160> *Expected: All expected results are repeated.* *Actual:*
10180	Continue 10170 until 5 complete cycles have occurred *Expected: There are 5 complete cycles.* *Actual:*

Criteria for Evaluation of the Test Results
The DS200 with the "Threshold" set to 140 will record all votes for Gail Ross and none for Tetty Rogiers.

Test Case: DS0110340837-140-Original Ballot	
VVSG Requirements	Volume II Section 4.7.1.1 Data Accuracy
Test Objective:	**Test Configuration:**
Ensure the DS200 version 1.4.3.10 records selections and non-selections consistently and accurately.	Two DS200 with firmware 1.4.3.10 set with different "Threshold" values of 166 and 140.
Devices & Tools Utilized:	The ballot from the original Accuracy Test performed by Wyle on Feb. 4th 2011. A purposefully smudged ballot. Two USB thumb drives loaded with the Accuracy Test Election definition.
Special Requirements	DS 200 serial number DS0110340837 with the threshold level set to 140 using the Original Ballot.
Assumptions	The DS200 unit is on AC power and powered on. The firmware is version 1.4.3.10. The gate on the DS200 is unlocked and ready to receive the USB drive.

Step	Procedure
0	Insert USB thumb drive into slot B on the USB port array. Verify that the election definition is found. *Expected: Message election is found.* *Actual:*
10000	"Printing Intial State Report" screen select <CANCEL>. *Expected:"Cancel Report Printing?" screen is presented.* *Actual:*
10010	On the "Cancel Report Printing?" screen select <YES>. *Expected: Printing cancels* *Actual:*
10020	On the "Open Polls" screen select the <RIGHT ARROW> in the lower right hand corner. *Expected: The Admin screen is displayed.* *Actual:*
10030	Select <GO TO ADMIN> button. *Expected: Presented with password screen.* *Actual:*
10040	Input <87654321> and enter for the admin password. *Expected: Password is accepted.* *Actual:*
10050	On the "Admin Menu" screen select <ELECTION TEST> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10060	On the "Election Test Menu" screen select the <AUTO READ SETTINGS> button. *Expected: Presented with the "Auto Read Settings" screen.* *Actual:*

10070	On the "Auto Read Settings" screen select the <CLEAR> button and input <10> and select the <ENTER> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10080	On the "Election Test Menu" screen select <SCAN BALLOTS> button. *Expected: Presented with "Diverter not found" message.* *Actual:*
10090	On the "Diverter Not Found" screen select <CONTINUE> button. *Expected: Presented with the "Welcome" screen.* *Actual:*
10100	Present the Original Ballot in orientation 1. *Expected: Scan cycle is started.* *Actual:*
10110	If error message occurs and the scanning is halted, then remove ballot and log the scan number. Re-present ballot and continue scanning. *Expected: Scanning continues.* *Actual:*
10120	At the conclusion of the scanning cycle, remove the ballot. *Expected: Scanning completed 10 cycles.* *Actual:*
10130	Select the <PREVIOUS> button at the center bottom of the "Welcome" screen. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10140	Select <PRECINCT REPORT SUMMARY> button. *Expected: Printing of total report is started.* *Actual:*
10150	Review the total report and note any anomalies. *Expected: The count will be noted and reported.* *Actual:*
10160	On the "Election Test Menu" select <ZERO TOTALS> button. On the "Zero Totals" screen select <YES> button and on the confirmation <OK> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*

10170	On the "Election Test Menu" screen <REPEAT STEP 10080 – 10160> *Expected: All expected results are repeated.* *Actual:*
10180	Continue 10170 until 5 complete cycles have occurred *Expected: There are 5 complete cycles.* *Actual:*
Criteria for Evaluation of the Test Results The DS200 with the "Threshold" set to 140 will record all votes for Gail Ross and none for Tetty Rogiers.	

Test Case: Minimum Mark		
VVSG Requirements	Volume II Section 4.7.1.1 Data Accuracy	
Test Objective:		**Test Configuration:**
Ensure the DS200 version 1.4.3.10 records selections and non-selections consistently and accurately.		One DS200 with firmware 1.4.3.10
Devices & Tools Utilized:	A USB thumb drives loaded with the Accuracy Test Election definition. DS 200 serial number DS0110340905	
Special Requirements	A ballot marked with a 0.7 mm containing a 0.4 mm – 0.6 mm thick line that is made with a #2 pencil that crosses the entirety of the voting target on its long axis, that is centered on the voting target, and that is as dark as can practically be made with a #2 pencil. The straight party race will be under voted and the first candidate in every other race will be marked.	
Assumptions	The DS200 unit is on AC power and powered on. The firmware is version 1.4.3.10. The gate on the DS200 is unlocked and ready to receive the USB drive.	

Step	Procedure
0	Insert USB thumb drive into slot B on the USB port array. Verify that the election definition is found. *Expected: Message election is found.* *Actual:*
10000	"Printing Intial State Report" screen select <CANCEL>. *Expected:"Cancel Report Printing?" screen is presented.* *Actual:*
10010	On the "Cancel Report Printing?" screen select <YES>. *Expected: Printing cancels* *Actual:*
10020	On the "Open Polls" screen select the <RIGHT ARROW> in the lower right hand corner. *Expected: The Admin screen is displayed.* *Actual:*
10030	Select <GO TO ADMIN> button. *Expected: Presented with password screen.* *Actual:*
10040	Input <87654321> and enter for the admin password. *Expected: Password is accepted.* *Actual:*
10050	On the "Admin Menu" screen select <ELECTION TEST> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10060	On the "Election Test Menu" screen select the <AUTO READ SETTINGS> button. *Expected: Presented with the "Auto Read Settings" screen.* *Actual:*

10070	On the "Auto Read Settings" screen select the <CLEAR> button and input <50> and select the <ENTER> button. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10080	On the "Election Test Menu" screen select <SCAN BALLOTS> button. *Expected: Presented with "Diverter not found" message.* *Actual:*
10090	On the "Diverter Not Found" screen select <CONTINUE> button. *Expected: Presented with the "Welcome"screen.* *Actual:*
10100	Present the ballot in orientation 1. *Expected: Scan cycle is started.* *Actual:*
10110	If error message occurs and the scanning is halted, then remove ballot and log the scan number. Re-present ballot and continue scanning. *Expected: Scanning continues.* *Actual:*
10120	At the conclusion of the scanning cycle, remove the ballot. *Expected: Scanning completed 50 cycles.* *Actual:*
10130	Select the <PREVIOUS> button at the center bottom of the "Welcome" screen. *Expected: Presented with the "Election Test Menu" screen.* *Actual:*
10140	Select <PRECINCT REPORT SUMMARY> button. *Expected: Printing of total report is started.* *Actual:*
10150	Review the total report and note any anomalies. *Expected: The count will be noted and reported.* *Actual:*
Criteria for Evaluation of the Test Results The DS200 must accurately count the selections made and not count non-selection. The totals must match the voting pattern.	

TC-BALLOT PRESENTATION TEST

Test Case: Ballot Presentation Issue	
VVSG Requirements	
Test Objective:	**Test Configuration:**
Ensure the DS200 will accept ballots when the welcome screen is displayed	One DS200 with firmware 1.4.3.10 One DS200 with firmware 1.4.3.8
Devices & Tools Utilized:	20 USB thumb drives loaded with WIOPPRI Election definition. 2 DS 200 serial number DS0110340830 firmware 1.4.3.8 and serial number DS0110340905 firmware 1.4.3.10
Special Requirements	2 Ballots from WIOPPRI. Following the first two ballot voting pattern.
Assumptions	The DS200 unit is on AC power and powered on. The firmware is version (serial number DS0110340830 firmware 1.4.3.8 and serial number DS0110340905 firmware 1.4.3.10). The gate on the DS200 is unlocked and ready to receive the USB drive.

Step	Procedure
0	Insert USB thumb drive into slot B on the USB port array. Verify that the election definition is found. *Expected: Message election is found.* *Actual:*
10000	"Printing Initial State Report" screen select <CANCEL>. *Expected:" Cancel Report Printing?" screen is presented.* *Actual:*
10010	On the "Cancel Report Printing?" screen select <YES><NO> continuously until <YES><NO> disappears. *Expected: Printing cancels* *Actual:*
10020	On the "Election Definition Found Screen" screen select the <OPEN POLLS>. *Expected: The print state screen will appear.* *Actual:*
10030	"Printing Opening Polls Report" screen select <CANCEL>. *Expected:" Cancel Report Printing?" screen is presented.* *Actual:*
10040	On the "Cancel Report Printing?" screen select <YES><NO> continuously until <YES><NO> disappears. *Expected: Printing cancels* *Actual:*
10050	On the "Diverter Not Found" screen select <CONTINUE> button. *Expected: Presented with the "Welcome" screen.* *Actual:*
10060	Present ballot 1 in orientation 1. *Expected: Straight party acceptance screen appears.* *Actual:*
10070	Select <ACCEPT> on more than one party screen

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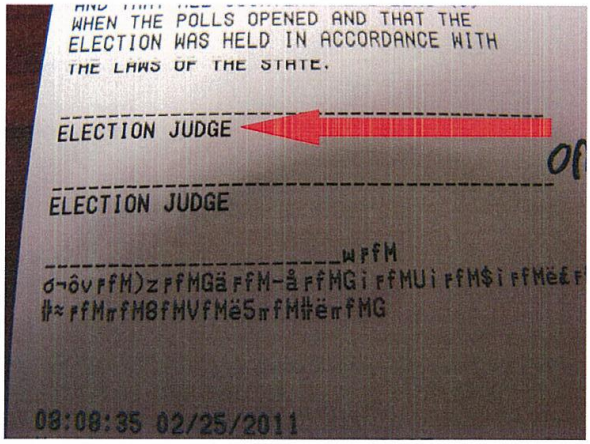
	Expected: Asks for second ballot. *Actual:*
10080	Present the ballot 2 in orientation 1. *Expected: Scan cycle is started.* *Actual:*
10090	If ballot 2 is not accepted The issue is reproduced. Continue to step 10160 *Expected: DS200 Does not accept ballot.* *Actual:*
10100	If ballot 2 is accepted select close polls *Expected: Printing Closing Polls Report page appears.* *Actual:*
10110	"Closing Polls Report" screen select <CANCEL>. *Expected:" Cancel Report Printing?" screen is presented.* *Actual:*
10120	On the "Cancel Report Printing?" screen select <YES>. *Expected: Printing cancels* *Actual:*
10130	Remove USB thumb drive from slot B on the USB port array. . *Expected: Message election not found.* *Actual:*
10140	At the close of polls, remove the ballot and repeat steps starting with step 0 for 10 runs. Utilize a new USB on each test cycle *Expected: Scanning completed after 10 cycles.* *Actual:*
10150	Repeat steps 0 > 10150 for SS# DS0110340830 *Expected: Scanning completed after 10 cycles.* *Actual:*
Criteria for Evaluation of the Test Results The test should reproduce the issue on firmware 1.4.3.8 and not on firmware 1.4.3.10. If at the conclusion of this test the issue	

is not seen in either firmware the test will be accepted pending the completion of the iBeta Reliability test. This is the test where the issue was discovered.

Signed _____ Approved _____

TC-PRINTER TIMEOUT TEST

Test Case: Printer Issue		
VVSG Requirements		
Test Objective:		**Test Configuration:**
Ensure the DS200 will Recover from a printer timeout error and recover from a printer reset		One DS200 with firmware 1.4.3.10 One DS200 with upgraded firmware 1.4.3.11
Devices & Tools Utilized:	1 USB thumb drive loaded with WIOPPRI Election definition where polls have been closed. Serial number DS0110340837 firmware 1.4.3.10 and upgraded to 1.4.3.11	
Special Requirements	2 Ballots from WIOPPRI. Following the first two ballot voting pattern.	
Assumptions	The DS200 unit is on AC power and powered on. The firmware is version (serial number DS0110340837 firmware 1.4.3.10). The gate on the DS200 is unlocked and ready to receive the USB drive. Cover has been removed (see attached photos figure 1 > figure 3) to access the printer reset button.	

Step	Procedure
0	Insert USB thumb drive into slot B on the USB port array. Verify that the election definition is found. *Expected: Cancel printing screen appears* *Actual:*
10000	Select <Cancel Print> Then <Yes> on "cancel print report screen" *Expected: Polls closed screen appears* *Actual:*
10010	Select <Precinct Report Summary> *Expected: The add certification screen appear.* *Actual:*
10020	Select <Yes> on "Add Certification Report" *Expected: The print state screen will appear.* *Actual:*
10030	*When the printer arrives at the first "Election Judge Signature" on the printout Press the blue printer door ejection tab and open door.* 

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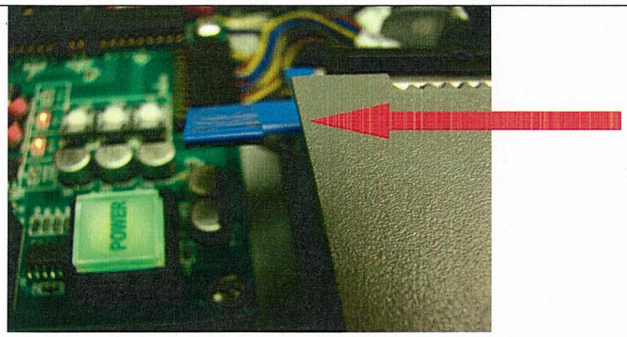
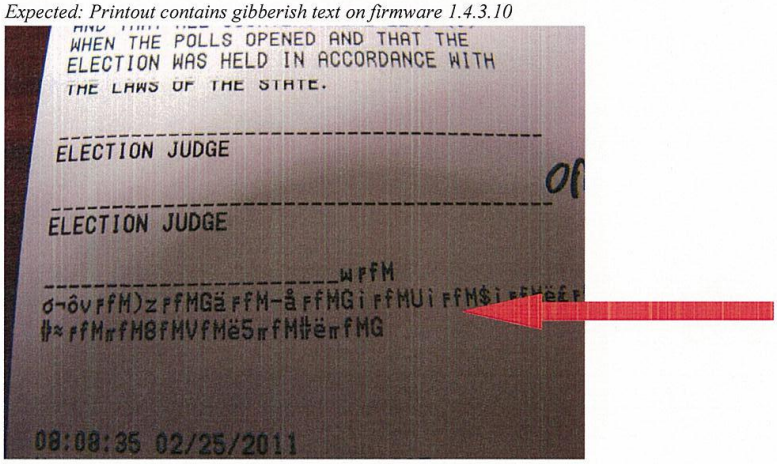
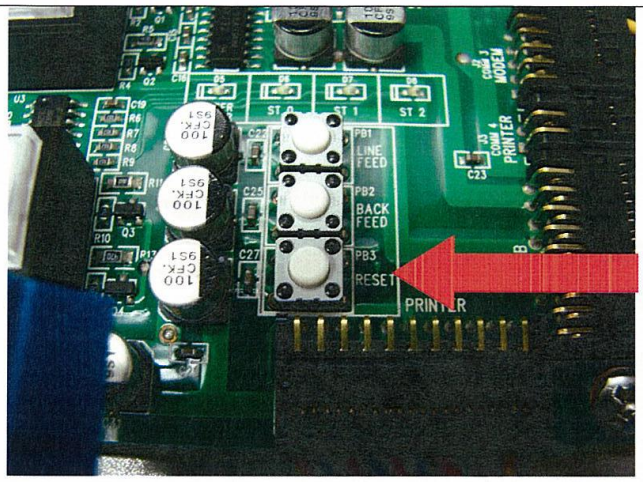
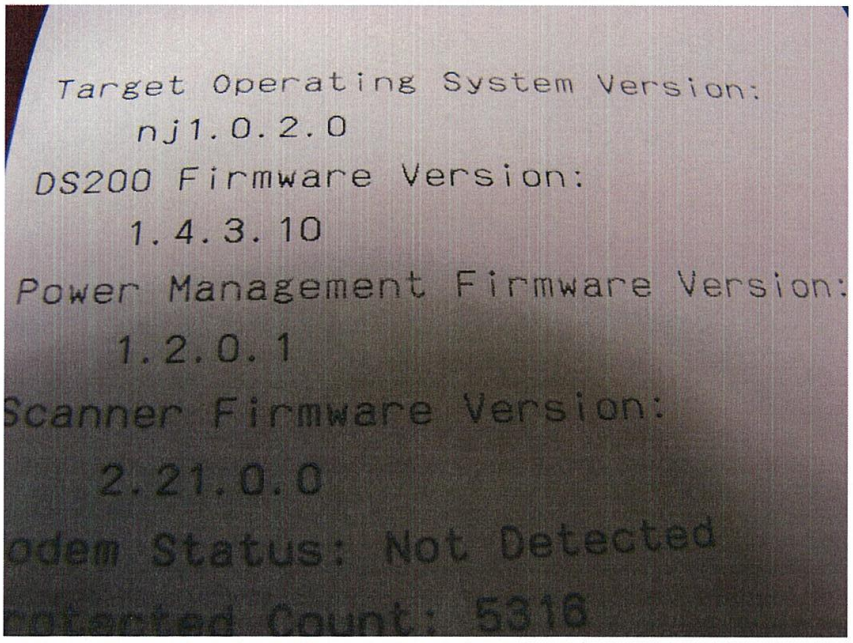
	 *Expected: The print will stop and timeout will appear.* *Actual:*
10040	Close printer door and Select <NO> on "cancel print page" view printout for gibberish text *Expected: Printout contains gibberish text on firmware 1.4.3.10*  *Actual:* *Expected: Printout does not contain gibberish text on firmware 1.4.3.11* *Actual:*
10050	Press reset button on power control board.

	 *Expected: Using 1.4.3.10 the print will print using default printer font (which is larger than original font).*  *Actual:* *Expected: Using 1.4.3.11 the print will print using selected printer font (which is same as than original font).* *Actual:*
10070	*Select <cancel print> and then <Yes>* *Expected: Closed Polls page appears* *Actual:*

10080	*Select <shutdown>.* *Expected: System powers down* *Actual:*
10080	*Load updated Firmware1.4.3.11 and repeat step 0 > 10040 to verify new firmware does not display same issue.* *Expected: Using 1.4.3.11 the print Issues were not reproduced and no other issues were noted.* *Actual:*
Criteria for Evaluation of the Test Results The test should reproduce the issue on firmware 1.4.3.10 and not on firmware 1.4.3.11. If at the conclusion of this test the issue is not seen in firmware 1.4.3.11 the test will be accepted. This is the test where the issue was discovered.	

Signed _____ Approved _____

System configuration images

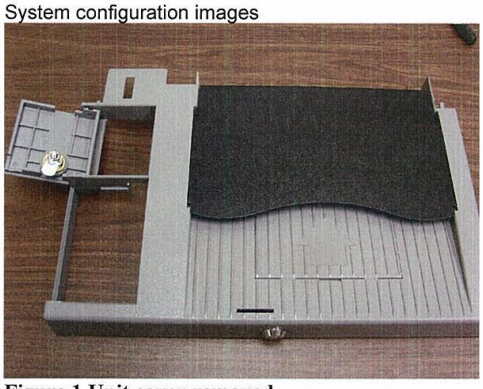


Figure 1 Unit cover removed

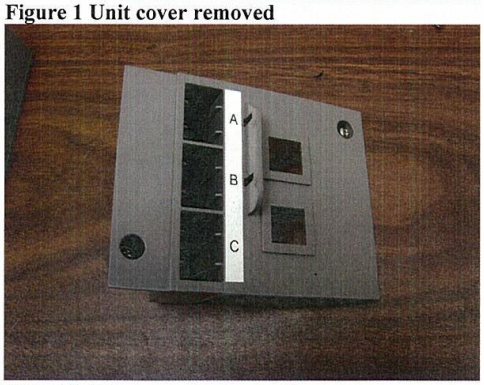


Figure 2 Power cover removed.

Figure 3 Unit ready for test

APPENDIX E

ELECTION DEFINITIONS

ELECTION DEFINITION

ACCURACY TEST

ELECTION DEFINITION: Accuracy Test

Regression Testing:

This test must exercise all possible voting positions for this ballot. There are 139 possible positions per ballot. ES&S will provide professional ballots on 11 inch card stock which will be hand marked with the pre-determined voting pattern. This election contains 15 contest compiled in 1 ballot style with 2 proposals.

- Closed Primary: No
- Open Primary: No
- Partisan offices: Yes
- Non-Partisan offices: Yes
- Write-in voting: Yes
- Primary presidential delegation nominations: No
- Ballot Rotation: No
- Straight Party voting: Yes
- Cross-party endorsement: Yes
- Split Precincts: No
- Vote for N of M: Yes
- Recall issues, with options: No
- Cumulative voting: No
- Ranked order voting: No
- Provisional or challenged ballots: No
- Early Voting: No

Equipment: 3 M100 units and 3 DS200 units and 44 printed hand marked ballots per machine

Configuration

EMS computer is used to create ballots with the following characteristics:
Election named: : Accuracy Test

Precinct Based Testing
6 machines used for voting in 1 precinct
1precinct: Lincoln Hills
8 parties: American, Communist, Constitution, Democrat, Green, Labor, Libertarian, Republican

Languages: English
Contests as listed:

General Election
Straight Party
American
Communist
Constitution
Democrat
Green
Labor
Libertarian
Republican
Vote for 1

ELECTION DEFINITION: Accuracy Test

President of the United States

Barbara Barrett Hicks	Amer
Edris Thomas	Comm
Fiero Finn	Const
Gail Keefe	Dem
Imran Rashid	Green
Jack "Duke" Brodisky	Labor
Kay Raab	Lib
Sam Patel	Rep
Write-In	

Vote for 1

United States Senator

Barry Josey	Amer
Edwin Best	Comm
Floyd W. Schisler	Const
Gail Ross	Dem
Jack Hall	Green
Keith Satterwhite	Labor
Laurie St Laurent	Lib
Tetty Rogiers	Rep
Write-In	

Vote for 1

Representative in Congress
District 1

Ben Baker	Amer
Edwin Lewis	Comm
Frank L. Matthews	Const
Gale Smith	Dem
James A. Clark	Green
Ken Anderson	Labor
Leo Cross	Lib
Theodore Judd	Rep
Write-In	

Vote for 1

State Assembly
District 1

Betty Williams	Amer
Elizabeth Mack	Comm
Frank Pearson	Const
Gary Klemann	Dem
James Ayers	Green
Kenneth Interlicchio	Labor
Leon Lewis	Lib
Theodore Kopp	Rep
Write-In	

Vote for 1

State Supreme Court Justice
Seat A

Bruce Willis	Amer
Ernst Lynch	Comm
Glenn T Combs	Const
Herbert Schweppenhauser	Dem
Linda Hall	Green
Micheal McClelland	Labor
Philip Thorrp	Lib
Eugene Kessler	Rep
Write-In	

Vote for 1

Associate Judge of Court of Appeals
District 1

ELECTION DEFINITION: Accuracy Test

Ala Dee Smith	Amer
Calvin Marino	Comm
David Cox	Const
Eugene Ruff	Dem
Kerry Jones	Green
Mildred Dudo	Labor
Philip Thorrp	Lib
Thomas Reiss	Rep
Write-in	

Vote for 1

County Commissioner
District 1

Brent Gilley	Amer
Elizabeth Piazza	Comm
Franklin Margo	Const
Gene Tillman	Dem
James Collins	Green
Kerry Jones	Labor
Lewis Tese	Lib
Tony Grzanich	Rep
Write-In	

Vote for 1

County Comptroller Seat A

Brian Edwards	Amer
Eric Sheehy	Comm
George A. Fisk	Const
Helena Slack	Dem
Lewis Touhay	Green
Mary L. Daniel	Labor
Nyda E Hamblin	Lib
Charles Place	Rep
Write-In	

Vote for 1

County Assessor

Brian Getz	Amer
Ernest Snyder	Comm
Gerald Danson	Const
Herbert Devine	Dem
Linda Gapp	Green
Micheal H Walker	Labor
Philip Rebis	Lib
William Sullivan	Rep
Write-In	
Write-In	

Vote for 1

Councilman District 2
(Non-Partisan)

Arthur Salamack
Carter McGaw
Derek Persons
Elizabeth Piazza
Franklin Margo
Louis Korte, Jr
Mary L. Daniel
Write-In

Vote for 1

Councilman District 5
(Non-Partisan)

Arnold Krill
Chistopher R. Richardson
Delores DeVan
Ernest Snyder

ELECTION DEFINITION: Accuracy Test

George A. Fisk
Helena Slack
Imran Rashid
Write-In

Vote for 1

Alderman District 11
(Non-Partisan)

Arthur Kumar
Barry Josey
Cecil Carey
David Heroux
Frank Pearson
Gloria Dillion
Howard Hwang
Write-In

Vote for 1

State University Trustees
(Non-Partisan)

Angela Pogoda
Charles Jasen
Derek Carlson
Eugene Ruff
Glenna P Cook-Lincoln
Write-In
Write-In
Write-In
Write-In
Write-In

Vote for 5

Delegates to 3rd Judicial Convention
(Non-Partisan)

Anne Neet
Barry Josey
Colby Lincoln
Davina Ayers-Grant
Edris Thomas
Floyd W. Schisler
Gloria Castle
Write-In

Vote for 1

Constitutional Amendment
Temporary Assignment of
Family Court Judges

Shall the proposed amendment to subdivision of section 26 of article VI of the Constitution, permitting the temporary assignment of a Judge of the family court to the supreme court in the judicial department of his residence, be approved?

Yes
No

Vote for 1

Referendum A
Bond Issue

To promote and assure the preservation and improvement of essential rail passenger and freight services to the inhabitants of the state, shall section two of chapter one hundred eighteen of the laws of nineteen hundred seventy-four, authorizing the creation of a state debt in the amount of two hundred fifty million dollars for capital facilities be approved?

Yes
No

ELECTION DEFINITION: Accuracy Test

Vote for 1

Voting Devices Used:
M100 and DS 200 precinct tabulation device

Test Deck Pattern:

The Test Deck will consist of 44 hand marked ballots for each precinct. The voting pattern will consist of a matrix pattern and three exception votes handled by the tabulators.

A) Under vote the straight party selections, vote for each candidate in each party per race and select the corresponding to Non Partisan ballot position in each Non Partisan race. Vote the "State University Trustee" race by selecting the corresponding five candidates to the ballot position of the other races. After the last candidate has been chosen in race 5 select all written in choices for ballots 6-8. Vote "Yes" for each proposal on the first ballot, vote "No" for the second ballot and vote Yes for the remaining ballots 3-8. Each candidate should have the number of ballots corresponding to their position on the ballot: First candidate- 1 ballot, Second candidate – 2 ballots, Third candidate – 3 ballots and continue the pattern for all 8 candidates. B) Vote the American Straight party candidate and under vote all other races on the ballot. Repeat this pattern voting the next Straight party and under voting all other races on the ballot. Continue this pattern until all 8 Straight part contests have been voted while under voting the remaining races on each ballot.

TEST RESULTS

Total ballots cast = 44

Straight party

American Amer	1
Communist Comm	1
Consitution Const	1
Democrat Dem	1
Green Green	1
Labor Labor	1
Libertarian Lib	1
Republican Rep	1
Over Votes	0
Under Votes	36
Totals	44

President of the United States

Barbara Barrett Hicks Amer	2
Edris Thomas Comm	3
Fiero Finn Const	4
Gail Keefe Dem	5
Imran Rashid Green	6
Jack "Duke" Brodisky Labor	7
Kay Raab Lib	8
Sam Patel Rep	9
Write-In	0
Over Votes	0
Under Votes	0
Totals	44

United States Senator

Barry Josey Amer	2
Edwin Best Comm	3
Floyd W. Schisler Const	4
Gail Ross Dem	5
Jack Hall Green	6

ELECTION DEFINITION: Accuracy Test

Keith Satterwhite Labor	7
Laurie St Laurent Lib	8
Tetty Rogiers Rep	9
Write-In	0
Over Votes	0
Under Votes	0
Totals	44

Representative in Congress

Ben Baker Amer	2
Edwin Lewis Comm	3
Frank L. Matthews Const	4
Gale Smith Dem	5
James A. Clark Green	6
Ken Anderson Labor	7
Leo Cross Lib	8
Theodore Judd Rep	9
Write-In	0
Over Votes	0
Under Votes	0
Totals	44

State Assembly

Betty Williams Amer	2
Elizabeth Mack Comm	3
Frank Pearson Const	4
Gary Klemann Dem	5
James Ayers Green	6
Kenneth Interlicchio Labor	7
Leon Lewis Lib	8
Theodore Kopp Rep	9
Write-In	0
Over Votes	0
Under Votes	0
Totals	44

State Supreme Court Justice

Bruce Willis Amer	2
Ernst Lynch Comm	3
Glenn T Combs Const	4
Herbert Schweppenhauser Dem	5
Linda Hall Green	6
Micheal McClelland Labor	7
Philip Thorrp Lib	8
Eugene Kessler Rep	9
Write-In	0
Over Votes	0
Under Votes	0
Totals	44

Associate Judge of Court of Appeals

Ala Dee Smith Amer	2
Calvin Marino Comm	3
David Cox Const	4
Eugene Ruff Dem	5
Kerry Jones Green	6
Mildred Dudo Labor	7
Philip Thorrp Lib	8
Thomas Reiss Rep	9
Write-in	0
Over Votes	0

ELECTION DEFINITION: Accuracy Test

Under Votes		0
Totals		44

County Commissioner

Brent Gilley	Amer	2
Elizabeth Piazza	Comm	3
Franklin Margo	Const	4
Gene Tillman	Dem	5
James Collins	Green	6
Kerry Jones	Labor	7
Lewis Tese	Lib	8
Tony Grzanich	Rep	9
Write-In		0
Over Votes		0
Under Votes		0
Totals		44

County Comptroller

Brian Edwards	Amer	2
Eric Sheehy	Comm	3
George A. Fisk	Const	4
Helena Slack	Dem	5
Lewis Touhay	Green	6
Mary L. Daniel	Labor	7
Nyda E Hamblin	Lib	8
Charles Place	Rep	9
Write-In		0
Over Votes		0
Under Votes		0
Totals		44

County Assessor

Brian Getz	Amer	2
Ernest Snyder	Comm	3
Gerald Danson	Const	4
Herbert Devine	Dem	5
Linda Gapp	Green	6
Micheal H Walker	Labor	7
Philip Rebis	Lib	8
Willlam Sulllvan	Rep	9
Write-In		0
Over Votes		0
Under Votes		0
Totals		44

Councilman District 2
(Non-Partisan)

Arthur Salamack	1
Carter McGaw	2
Derek Persons	3
Elizabeth Piazza	4
Franklin Margo	5
Louis Korte, Jr	6
Mary L. Daniel	7
Write-In	8
Over Votes	0
Under Votes	8
Totals	44

ELECTION DEFINITION: Accuracy Test

Councilman District 5
(Non-Partisan)

Arnold Krill	1
Chistopher R. Richardson	2
Delores DeVan	3
Ernest Snyder	4
George A. Fisk	5
Helena Slack	6
Imran Rashid	7
Write-In	8
Over Votes	0
Under Votes	8
Totals	44

Alderman District 11
(Non-Partisan)

Arthur Kumar	1
Barry Josey	2
Cecil Carey	3
David Heroux	4
Frank Pearson	5
Gloria Dillion	6
Howard Hwang	7
Write-In	8
Over Votes	0
Under Votes	8
Totals	44

State University Trustees
(Non-Partisan)

Angela Pogoda	1
Charles Jasen	3
Derek Carlson	6
Eugene Ruff	10
Glenna P Cook-Lincoln	15
Write-In	145
Over Votes	0
Under Votes	40
Totals	220

Delegates to 3rd Judicial Convention
(Non-Partisan)

Anne Neet	1
Barry Josey	2
Colby Lincoln	3
Davina Ayers-Grant	4
Edris Thomas	5
Floyd W. Schisler	6
Gloria Castle	7
Write-In	8
Over Votes	0
Under Votes	8
Totals	44

Constitutional Amendment Temporary Assignment

Yes	34
No	2
Over Votes	0
Under Votes	8
Totals	44

ELECTION DEFINITION: Accuracy Test

Referendum A Bond Issue

Yes	34
No	2
Over Votes	0
Under Votes	8
Totals	44

Criteria For Evaluation of Test Results: The results for this test will be accepted if no anomalies are recorded during the test execution and the results match the expected results for the test pattern.

ELECTION DEFINITION

IBETA NUMBER 187 REGRESSION TEST

ELECTION DEFINITION: iBeta Number 187 Regression Test

Regression Testing:

This test was designed to exercise multiple ballot lengths with exception votes. Four elections will be created with the following election definition. Each election will have a different size ballot length: "11 inch", "14 inch", "17 inch", and "19 inch" ballot. This election contains 15 contest compiled in 1 ballot style with 2 proposals.

- Closed Primary: No
- Open Primary: No
- Partisan offices: Yes
- Non-Partisan offices: Yes
- Write-in voting: Yes
- Primary presidential delegation nominations: No
- Ballot Rotation: No
- Straight Party voting: Yes
- Cross-party endorsement: Yes
- Split Precincts: No
- Vote for N of M: Yes
- Recall issues, with options: No
- Cumulative voting: No
- Ranked order voting: No
- Provisional or challenged ballots: No
- Early Voting: No

Equipment: 4 DS200 units and 372 ballots for each size including 11 inch, 14 inch, 17 inch, and 19 inch printed ballots

Configuration

EMS computer is used to create ballots with the following characteristics:
Election named: : iBeta Number 187 Regression Test

Precinct Based Testing
4 machines used for voting in 4 separate precincts
4 precincts: Lincoln Hills, Hillwood, Fox Run, Davis Hills
8 parties: American, Communist, Constitution, Democrat, Green, Labor, Libertarian, Republican

Languages: English
Contests as listed:

General Election
Straight Party
American
Communist
Constitution
Democrat
Green
Labor
Libertarian
Republican

ELECTION DEFINITION: iBeta Number 187 Regression Test

Vote for 1	
President of the United States	
Barbara Barrett Hicks	Amer
Edris Thomas	Comm
Fiero Finn	Const
Gail Keefe	Dem
Imran Rashid	Green
Jack "Duke" Brodisky	Labor
Kay Raab	Lib
Sam Patel	Rep
Write-In	
Vote for 1	
United States Senator	
Barry Josey	Amer
Edwin Best	Comm
Floyd W. Schisler	Const
Gail Ross	Dem
Jack Hall	Green
Keith Satterwhite	Labor
Laurie St Laurent	Lib
Tetty Rogiers	Rep
Write-In	
Vote for 1	
Representative in Congress District 1	
Ben Baker	Amer
Edwin Lewis	Comm
Frank L. Matthews	Const
Gale Smith	Dem
James A. Clark	Green
Ken Anderson	Labor
Leo Cross	Lib
Theodore Judd	Rep
Write-In	
Vote for 1	
State Assembly District 1	
Betty Williams	Amer
Elizabeth Mack	Comm
Frank Pearson	Const
Gary Klemann	Dem
James Ayers	Green
Kenneth Interlicchio	Labor
Leon Lewis	Lib
Theodore Kopp	Rep
Write-In	
Vote for 1	
State Supreme Court Justice Seat A	
Bruce Willis	Amer
Ernst Lynch	Comm
Glenn T Combs	Const
Herbert Schweppenhauser	Dem
Linda Hall	Green
Micheal McClelland	Labor
Philip Thorrp	Lib
Eugene Kessler	Rep
Write-In	
Vote for 1	
Associate Judge of Court of Appeals	

ELECTION DEFINITION: iBeta Number 187 Regression Test

District 1

Ala Dee Smith	Amer
Calvin Marino	Comm
David Cox	Const
Eugene Ruff	Dem
Kerry Jones	Green
Mildred Dudo	Labor
Philip Thorrp	Lib
Thomas Reiss	Rep
Write-in	

Vote for 1

County Commissioner
District 1

Brent Gilley	Amer
Elizabeth Piazza	Comm
Franklin Margo	Const
Gene Tillman	Dem
James Collins	Green
Kerry Jones	Labor
Lewis Tese	Lib
Tony Grzanich	Rep
Write-In	

Vote for 1

County Comptroller Seat A

Brian Edwards	Amer
Eric Sheehy	Comm
George A. Fisk	Const
Helena Slack	Dem
Lewis Touhay	Green
Mary L. Daniel	Labor
Nyda E Hamblin	Lib
Charles Place	Rep
Write-In	

Vote for 1

County Assessor

Brian Getz	Amer
Ernest Snyder	Comm
Gerald Danson	Const
Herbert Devine	Dem
Linda Gapp	Green
Micheal H Walker	Labor
Philip Rebis	Lib
William Sullivan	Rep
Write-In	
Write-In	

Vote for 1

Councilman District 2
(Non-Partisan)

Arthur Salamack
Carter McGaw
Derek Persons
Elizabeth Piazza
Franklin Margo
Louis Korte, Jr
Mary L. Daniel
Write-In

Vote for 1

Councilman District 5
(Non-Partisan)

Arnold Krill
Chistopher R. Richardson
Delores DeVan

ELECTION DEFINITION: iBeta Number 187 Regression Test

Ernest Snyder
George A. Fisk
Helena Slack
Imran Rashid
Write-In

Vote for 1

Alderman District 11
(Non-Partisan)

Arthur Kumar
Barry Josey
Cecil Carey
David Heroux
Frank Pearson
Gloria Dillion
Howard Hwang
Write-In

Vote for 1

State University Trustees
(Non-Partisan)

Angela Pogoda
Charles Jasen
Derek Carlson
Eugene Ruff
Glenna P Cook-Lincoln
Write-In
Write-In
Write-In
Write-In
Write-In

Vote for 5

Delegates to 3rd Judicial Convention
(Non-Partisan)

Anne Neet
Barry Josey
Colby Lincoln
Davina Ayers-Grant
Edris Thomas
Floyd W. Schisler
Gloria Castle
Write-In

Vote for 1

Constitutional Amendment
Temporary Assignment of
Family Court Judges

Shall the proposed amendment to subdivision of section 26 of article VI of the Constitution, permitting the temporary assignment of a Judge of the family court to the supreme court in the judicial department of his residence, be approved?

Yes
No

Vote for 1

Referendum A
Bond Issue

To promote and assure the preservation and improvement of essential rail passenger and freight services to the inhabitants of the state, shall section two of chapter one hundred eighteen of the laws of nineteen hundred seventy-four, authorizing the creation of a state debt in the amount of two hundred fifty million dollars for capital facilities be approved?

Yes
No

ELECTION DEFINITION: iBeta Number 187 Regression Test
Vote for 1
Voting Devices Used: DS 200 precinct tabulation device
Test Deck Pattern: The Test Deck will consist of 372 hand marked ballots for each precinct (ballot length). The voting pattern will consist of three exception votes handled by the DS200. Cross Over Exception – This exception will consist of a selection for straight party and the crossover vote for a candidate in another party. Mark the "American" (first position) party oval and crossover vote the "Communist" (second position) candidate in the "President of the United States" race. Vote for the nonpartisan candidate corresponding to the position of the straight party selection (i.e. American = First NP candidate, Communist= Second NP Candidate). Vote for the first five candidates in the "State University Trustees" race and Yes for the proposals. Continue crossover voting each candidate in the "President of the United States". After all candidates have been crossover voted in the "President of the United States" move to the "United States Senator" race. Continue this pattern until all Partisan races have been crossover voted for the "American" party. Repeat this pattern for each Straight Party selection. Under Vote Exception – This exception will consist of selection for straight party and under voting nonpartisan contests. A) Under vote the straight party selections, vote for each candidate in each party per race and select the corresponding to Non Partisan ballot position in each Non Partisan race. Vote the "State University Trustee" race by selecting the corresponding five candidates to the ballot position of the other races cycling back to the top of the candidate list if there are not enough candidates left. Vote Yes for each proposal. B) Vote the American Straight party candidate and under vote Councilman District 2 contest. Vote the "State University Trustee" race by selecting the corresponding first four candidates to the ballot position of the other races cycling back to the top of the candidate list if there are not enough candidates left. Vote Yes for each proposal. Repeat this pattern under voting the next nonpartisan until all nonpartisan contests have been under voted for the American party. Repeat this pattern for each Straight Party selection. Over Vote Exception – A) Vote for the first two Straight party selections. Vote for the first candidate in each of the nonpartisan contests and the first five in the "State University Trustee" race. Vote for Yes for each proposal. Vote for the second and third Straight party selections. Continue voting for two straight party selections until the end of the candidate list. B) Vote for the American Straight Party Selection. Vote for Edris Thomas and Fiero Finn in the President of the United States. Vote for the first candidate in each of the nonpartisan contests and the first five in the "State University Trustee" race. Vote for Yes for each proposal.
TEST RESULTS **Total ballots cast = 372**

ELECTION DEFINITION: iBeta Number 187 Regression Test

Test Deck:

Straight party

American Amer	77
Communist Comm	67
Consitution Const	58
Democrat Dem	49
Green Green	40
Labor Labor	31
Libertarian Lib	22
Republican Rep	13
Over Votes	7
Under Votes	8
Totals	372

President of the United States

Barbara Barrett Hicks Amer	69
Edris Thomas Comm	62
Fiero Finn Const	55
Gail Keefe Dem	48
Imran Rashid Green	41
Jack "Duke" Brodisky Labor	34
Kay Raab Lib	27
Sam Patel Rep	20
Write-In	8
Over Votes	1
Under Votes	7
Totals	372

United States Senator

Barry Josey Amer	70
Edwin Best Comm	62
Floyd W. Schisler Const	55
Gail Ross Dem	48
Jack Hall Green	41
Keith Satterwhite Labor	34
Laurie St Laurent Lib	27
Tetty Rogiers Rep	20
Write-In	8
Over Votes	0
Under Votes	7
Totals	372

Representative in Congress

Ben Baker Amer	70
Edwin Lewis Comm	62
Frank L. Matthews Const	55
Gale Smith Dem	48
James A. Clark Green	41
Ken Anderson Labor	34
Leo Cross Lib	27
Theodore Judd Rep	20
Write-In	8
Over Votes	0
Under Votes	7
Totals	372

State Assembly

Betty Williams Amer	70
Elizabeth Mack Comm	62

ELECTION DEFINITION: iBeta Number 187 Regression Test

Frank Pearson	Const	55
Gary Klemann	Dem	48
James Ayers	Green	41
Kenneth Interlicchio	Labor	34
Leon Lewis	Lib	27
Theodore Kopp	Rep	20
Write-In		8
Over Votes		0
Under Votes		7
Totals		372

State Supreme Court Justice

Bruce Willis	Amer	70
Ernst Lynch	Comm	62
Glenn T Combs	Const	55
Herbert Schweppenhauser	Dem	48
Linda Hall	Green	41
Micheal McClelland	Labor	34
Philip Thorrp	Lib	27
Eugene Kessler	Rep	20
Write-In		8
Over Votes		0
Under Votes		7
Totals		372

Associate Judge of Court of Appeals

Ala Dee Smith	Amer	70
Calvin Marino	Comm	62
David Cox	Const	55
Eugene Ruff	Dem	48
Kerry Jones	Green	41
Mildred Dudo	Labor	34
Philip Thorrp	Lib	27
Thomas Reiss	Rep	20
Write-in		8
Over Votes		0
Under Votes		7
Totals		372

County Commissioner

Brent Gilley	Amer	70
Elizabeth Piazza	Comm	62
Franklin Margo	Const	55
Gene Tillman	Dem	48
James Collins	Green	41
Kerry Jones	Labor	34
Lewis Tese	Lib	27
Tony Grzanich	Rep	20
Write-In		8
Over Votes		0
Under Votes		7
Totals		372

County Comptroller

Brian Edwards	Amer	70
Eric Sheehy	Comm	62
George A. Fisk	Const	55
Helena Slack	Dem	48
Lewis Touhay	Green	41
Mary L. Daniel	Labor	34
Nyda E Hamblin	Lib	27

ELECTION DEFINITION: iBeta Number 187 Regression Test

Charles Place	Rep	20
Write-In		8
Over Votes		0
Under Votes		7
Totals		372

County Assessor

Brian Getz	Amer	70
Ernest Snyder	Comm	62
Gerald Danson	Const	55
Herbert Devine	Dem	48
Linda Gapp	Green	41
Micheal H Walker	Labor	34
Philip Rebis	Lib	27
William Sullivan	Rep	20
Write-In		8
Over Votes		0
Under Votes		7
Totals		372

Councilman District 2
(Non-Partisan)

Arthur Salamack	84
Carter McGaw	67
Derek Persons	58
Elizabeth Piazza	49
Franklin Margo	40
Louis Korte, Jr	31
Mary L. Daniel	22
Write-In	13
Over Votes	0
Under Votes	8
Totals	372

Councilman District 5
(Non-Partisan)

Arnold Krill	84
Chistopher R. Richardson	67
Delores DeVan	58
Ernest Snyder	49
George A. Fisk	40
Helena Slack	31
Imran Rashid	22
Write-In	13
Over Votes	0
Under Votes	8
Totals	372

Alderman District 11
(Non-Partisan)

Arthur Kumar	84
Barry Josey	67
Cecil Carey	58
David Heroux	49
Frank Pearson	40
Gloria Dillion	31
Howard Hwang	22
Write-In	13
Over Votes	0
Under Votes	8
Totals	372

State University Trustees

ELECTION DEFINITION: iBeta Number 187 Regression Test

(Non-Partisan)

Angela Pogoda	343
Charles Jasen	343
Derek Carlson	347
Eugene Ruff	352
Glenna P Cook-Lincoln	353
Write-In	90
Over Votes	0
Under Votes	32
Totals	372

Delegates to 3rd Judicial Convention
(Non-Partisan)

Anne Neet	84
Barry Josey	67
Colby Lincoln	58
Davina Ayers-Grant	49
Edris Thomas	40
Floyd W. Schisler	31
Gloria Castle	22
Write-In	13
Over Votes	0
Under Votes	8
Totals	372

Constitutional Amendment Temporary Assignment

Yes	372
No	0
Totals	372

Referendum A Bond Issue

Yes	372
No	0
Totals	372

Criteria For Evaluation of Test Results: The results for this test will be accepted if no anomalies are recorded during the test execution and the results match the expected results for the test pattern.

APPENDIX F

WYLE LABORATORIES' CERTIFICATION TEST PLAN NO. T58200.01-01, REV.C

wyle laboratories
7800 Highway 20 West
Huntsville, Alabama 35806
Phone (256) 837-4411
Fax (256) 721-0144
www.wylelabs.com

Job No. T58200.01
Certification Test Plan No. T58200.01-01, Rev. C
February 25, 2011

CERTIFICATION TEST PLAN

Prepared for:

Manufacturer Name	ES&S
Manufacturer System	Unity 3.2.1.0
EAC Application No.	ESS00703
Manufacturer Address	11208 John Galt Boulevard Omaha, NE 68137

Jack Cobb 2-25-11
Jack Cobb, Test Plan Preparer

Frank M Padilla 2-25-11
Frank Padilla, Voting Systems Manager

Robert Hardy 2/28/11
Robert Hardy, Department Manager

Raul Terceno 2/28/11
Raul Terceno, Q.A. Manager

NVLAP LAB CODE 200771-0

VSTL
EAC Lab Code 0704

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Wyle Test Plan No. 58200.01-01, Rev. C

Revisions		**REVISION** C
		REPORT NO. Test Plan T58200.01-01, Rev. C
wyle laboratories		**DATE** February 25, 2011

REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
---	1-25-11	Entire Document	Original Release
A	2-8-11	1.0	"…required to validate modification made to…" was replaced with "that Wyle Laboratories, Inc., will follow to perform certification testing of…"
A	2-8-11	1.0	Changed "this" to "the iBeta" in the following sentence: "At the conclusion of ~~this~~ the iBeta test campaign…."
A	2-8-11	1.0	First sentence: Added: "...that Wyle Laboratories, Inc., will follow to perform certification testing of…" and removed: "…required to validate modifications made to…"
A	2-8-11	Section 1.2, Table 1-1	Added definition for COTS
A	2-8-11	Section 1.3	Replaced: "...conclusion of the test campaign…" with "…time of iBeta's withdrawal from the EAC Testing & Certification Program.".
A	2-8-11	Section 1.3	Changed "identified" to "open"
A	2-8-11	Section 1.3	Removed "tests" in the following sentence: "Additionally, Wyle will design and execute ~~tests~~ the following tests:…"
A	2-8-11	Section 1.3	"To resolve all open issues resulting…" was changed to "To resolve all open discrepancies…"
A	2-8-11	Section 1.3.2	Added clarification of test procedure
A	2-8-11	Section 1.3.3	Added: "…to verify that the modem code was removed…"
A	2-8-11	Section 1.3	Added: "Wyle is only regression testing the open discrepancies at the conclusion of the iBeta test campaign; therefore Wyle is not documenting the full system."

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Wyle Test Plan No. 58200.01-01, Rev. C

Revisions			**REVISION** C
			REPORT NO. Test Plan T58200.01-01, Rev. C
wyle laboratories			**DATE** February 25, 2011
REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
A	2-8-11	Section 2.2	Added description of transport media drives
A	2-8-11	Section 2.2, Table 2-2	Reconfigured table
A	2-8-11	Section 3.1	Changed "program" to "testing campaign".
A	2-8-11	Section 3.1	Reconfigured paragraphs and added Table 3-1 and last paragraph.
A	2-8-11	Section 3.3.1	Removed repeat of word "testing", added reference to iBeta document.
A	2-8-11	Section 3.3.2	Added clarification of test procedure
A	2-8-11	Section 3.3.3	Added: "…to verify that the modem code was removed…"
A	2-8-11	Section 4.1	Added "Wyle will report these discrepancies in the Final Report."
A	2-8-11	Section 4.2	Corrected typo ("VVS" to "VSS") and added "VSS" where omitted
A	2-8-11	Appendix A, Table A-1, System Integration Test	Changed "test" to "tests"
A	2-8-11	Appendix B	Inserted iBeta Test Report No. (V)2010-13Dec-001(A), Version 1.0, "ES&S Unity 3.2.1.0 VSTL Certification Test Report for testing completed by iBeta as of November 29, 2010"
A	2-8-11	Entire Document	Reformatted due to revisions (updated TOC, page numbering, etc.)

Revisions			**REVISION** C
			REPORT NO. Test Plan T58200.01-01, Rev. C
wyle laboratories			**DATE** February 25, 2011
REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
B	2-21-11	Table of Contents	Reformatted revision pages
B	2-21-11	1.3.1, opening paragraph	Revised to read as follows: "The nine open discrepancies identified at the conclusion of the iBeta test campaign are summarized below. Detailed descriptions are presented in iBeta document "ESS Unity 3 2 1 0 PCA and FCA Discrepancy Report.xls":"
B	2-21-11	1.3.1	Condensed section and paraphrased information
B	2-21-11	2.1, Table 2-1	Updated source code version from 1.4.3.9 to 1.4.3.10
B	2-21-11	Entire Document	Reformatted due to revisions (updated TOC, page numbering, etc.)
C	2-25-11	Section 1.3.5	Added this section.
C	2-25-11	Section 1.3.6	Added this section.
C	2-25-11	Section 1.3.7	Added this section.
C	2-25-11	Section 1.3.8	Added this section.
C	2-25-11	Section 2.1, Table 2-1	Updated source code version from 1.4.3.10 to 1.4.3.11
C	2-25-11	Section 3.1, Table 3-1	Added last four rows.
C	2-25-11	Section 3.3.5	Added this section.
C	2-25-11	Section 3.3.6	Added this section.

Revisions			**REVISION** C
			REPORT NO. Test Plan T58200.01-01, Rev. C
wyle laboratories			**DATE** February 25, 2011
REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
C	2-25-11	Section 3.3.7	Added this section.
C	2-25-11	Section 3.3.8	Added this section.
C	2-25-11	Entire Document	Reformatted due to revisions (updated TOC, page numbering, etc.)

1.0 INTRODUCTION

The purpose of this Test Plan is to document the procedures that Wyle Laboratories, Inc., will follow to perform certification testing of the Election Systems and Software (ES&S) Unity 3.2.1.0 System. Initial certification testing of the Unity 3.2.1.0 System was performed by iBeta Quality Assurance. iBeta Quality Assurance withdrew from the Election Assistance Commission (EAC) Voting Systems Test Laboratory (VSTL) Program on December 13, 2010 as documented in the letter "iBeta's Intention to Withdraw from the EAC Program" dated November 29, 2010. At the conclusion of the iBeta test campaign, ES&S requested a transition of all remaining testing responsibilities to Wyle Laboratories in the letter "VSTL Change Decision" dated December 17, 2010. The EAC granted this transition on January 11, 2011. A

ES&S Unity 3.2.1.0 System certification was tested to the United States Federal Election Commission (FEC) 2002 Voting System Standards (VSS) and all applicable EAC 2005 Voluntary Voting Systems Guidelines (VVSG). All testing performed by Wyle will be to the FEC 2002 VSS and applicable EAC 2005 VVSG.

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
- United States Federal Election Commission Voting System Standards Volume I, "Performance Standards" and Volume II, "Test Standards" dated April 2002
- 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)

1.0 INTRODUCTION (CONTINUED)

1.1 References (continued)

- EAC Notices of Clarification (listed on www.eac.gov)
- iBeta Quality Assurance ES&S Unity 3.2.1.0 VSTL Certification Test Plan Version 5.0
- iBeta Test Report No. (V)2010-13Dec-001(A), Version 1.0, "ES&S Unity 3.2.1.0 VSTL Certification Test Report for testing completed by iBeta as of November 29, 2010"
- EAC DS200 Freeze/Shutdown Failures and X Windows Correlation dated October 13, 2010
- EAC Letter Response to ES&S VSTL Change Request, dated January 11, 2011
- ES&S DS200 Ballot Drop Issue Analysis, Unity 3.2.1.0, Print Date January 18, 2011

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	Commercial, readily available hardware or software
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.
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.
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	---
Technical Data Package	TDP	Manufacturer documentation related to the voting system required to be submitted as a precondition of certification testing.
Voting System Standards	VSS	Published by the FEC, second iteration of national level voting system standards.
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

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1.0 INTRODUCTION (CONTINUED)

1.3 Scope of Testing

The ES&S Unity 3.2.1.0 System testing performed by iBeta Quality Assurance resulted in nine open discrepancies at the time of iBeta's withdrawal from the EAC Testing & Certification Program. To resolve all open discrepancies resulting from the iBeta test campaign, Wyle will be designing and executing tests for these discrepancies and iBeta's reliability test. Additionally, Wyle will design and execute the following tests: a modem test to insure the DS200 modem does not function and an accuracy test on the DS200 and M100. Wyle is only regression testing the open discrepancies at the conclusion of the iBeta test campaign; therefore Wyle is not documenting the full system. A

1.3.1 Discrepancy Description

The nine open discrepancies identified at the conclusion of the iBeta test campaign are summarized below. Detailed descriptions are presented in iBeta document "ESS Unity 3 2 1 0 PCA and FCA Discrepancy Report.xls":

iBeta Number 178 – Although the disclaimer at the front of various TDP documents contains a statement disallowing the use of "remote transmission", no procedural or technical controls were found to prevent the installation of a modem in the DS200.

iBeta Number 181 – Some existing error codes are not listed in the TDP.

iBeta Number 182 - DS200 documentation of unrecoverable system errors and the scanner interface is insufficient.

iBeta Number 187 – A ballot was dropped into the ballot bin without incrementing the counter. B

Note: Refer to the ES&S DS200 Ballot Drop Issue Analysis, Unity 3.2.1.0, Print Date January 18, 2011, for the ES&S analysis of this issue.

iBeta Number 188 – The M100 audit logs do not record the change of date.

iBeta Number 189 – The DS200 failed to shut down when the "COUNTER BLOCK FAILED CRC" error screen was displayed.

iBeta Number 190 – The DS 200 does not record a printer-time out event in the audit log.

iBeta Number 191 - Battery Charge Indicator functionality descriptions are inconsistent across the TDP.

iBeta Number 192 – The DS200 functions inconsistently when presenting the "continue on battery only" screen.

1.3.2 Reliability Test Description

Wyle will execute the iBeta Reliability Test that was halted during testing. This test is documented in Section 5.3.4 of iBeta Test Report No. (V)2010-13Dec-001(A), Version 1.0, "ES&S Unity 3.2.1.0 VSTL Certification Test Report for testing completed by iBeta as of November 29, 2010". Wyle will begin execution of this test at Step 5. The previous test determined the three units that displayed the error more frequently. Wyle will use these identified units for execution of this test. A

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1.0 INTRODUCTION (CONTINUED)

1.3 Scope of Testing (continued)

1.3.3 Modem Test Description

Per the EAC correspondence to Wyle received on January 13, 2011, Wyle will design and execute a Modem Test to verify that the DS200 modem does not function. This test will consist of a source code review to verify that the modem code was removed and necessary functional testing required for verification that a modem cannot be used in the system. | A

1.3.4 Accuracy Test Description

Wyle will design and execute an Accuracy Test to Volume II, Section 4.7.1.1 "Data Accuracy" of the EAC 2005 VVSG. The DS200 and M100 will be subjected to recording the selection and non-selection of approximately 1.6 million ballot positions. Ballots will be hand-marked for the execution of this test.

1.3.5 Threshold Test Description

Wyle will design and execute a Threshold Test to verify that the change in the default setting of the scanner threshold value (from 166 to 140) ensures that the DS200, loaded with firmware version 1.4.3.10, records selections and non-selections accurately and consistently. | C

1.3.6 Date/Time Change Event Test Description

Wyle will design and execute a DS200 Date/Time Change Event Test to verify that the DS200, loaded with firmware version 1.4.3.10, records the date/time change event in the Audit Log Report. | C

1.3.7 Ballot Presentation Test Description

Wyle will design and execute a Ballot Presentation Test to verify that the DS200 machine, loaded with firmware version 1.4.3.10, will operate properly if an unexpected key press ID occurs. | C

1.3.8 Printer Timeout Test Description

Wyle will design and execute a Printer Timeout Test to verify that the DS200 machine, loaded with firmware version 1.4.3.11, does not change printer fonts or print "gibberish" during a printer timeout event. | C

1.4 Target of Evaluation Description

The full ES&S Unity 3.2.1.0 system description can be found in Section 1.4 of iBeta Quality Assurance ES&S Unity 3.2.1.0 VSTL Certification Test Plan, Version 5.0. Wyle is only regression testing the open discrepancies at the conclusion of the iBeta test campaign; therefore Wyle is not documenting the full system.

2.0 MATERIALS REQUIRED FOR TESTING

The materials required for testing of the Unity 3.2.1.0 include software, hardware, test materials, and deliverable materials shipped directly to Wyle by iBeta. The equipment to be used during this test campaign is the same equipment used during the original certification campaign performed by iBeta. The materials documented in this section are the materials used during regression testing of the open discrepancies at the conclusion of the iBeta test campaign and the additional tests. The documented materials are not a complete list of materials used in the certification of Unity 3.2.1.0.

2.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

2.1 Software

The software being evaluated is limited to the firmware builds for the DS200 and M100. This software is only being evaluated for changes to the software evaluated by iBeta. The "Build" software environments were constructed by iBeta and shipped to Wyle. Wyle is accepting the build environments for this test campaign. Wyle will be utilizing an EMS setup configured by iBeta to load election information onto transport media and receive voted election data from the tabulators. Wyle will not be testing the EMS for any other EMS functionality. Wyle will be using two election definitions built by iBeta (REG1S1EN and WIOPPRI) to test iBeta discrepancy numbers 188, 189, 190, and 192. Wyle has developed an election definition for discrepancy 187 and the accuracy test.

Table 2-1 Software Required for Testing

Software Required For Testing	Software Version	
DS200 Firmware	1.4.3.11	C
Scanner Board Firmware	2.21.0.0	
M100 Firmware	5.4.4.5	

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 Unity 3.2.1.0 Test Equipment

Equipment	Description	Serial Numbers	
DS200	Precinct Count Optical Scanner	ES0107380927, ES0107370025, ES0107360007, DS02093900001	
M100	Precinct Count Optical Scanner	205071	
Ballot Box	Plastic Ballot Box	E015, E046, E089, E099	
Ballot Box	Metal Box with Diverter	E096	
Dell Optiplex 760 (EMS PC)	Processor: Intel Duo Core E8400 Wolfdale Memory: 4x 1GB, 800 Mhz Ram Hard Drive Capacity: 80 GB	3x6FKK1	
COTS Printer	HP LaserJet 4050N	USQX074394	
Dell Latitude E6400 (ERM Laptop)	Processor: Intel Duo Core P8600 2.4 Ghz Memory: 1x 2GB, 800 Mhz Ram Hard Drive Capacity: 80 GB	137FMJ1	
Transport Media (USB Flash Drives)	SanDisk 2GB Cruzer Micro	Wyle-assigned numbers as needed: TM-XXX	A
Compact Flash	Delkin Devices 1 GB Compact Flash	Wyle-assigned numbers as needed: CF-XXX	
PCMCIA Card	Vikant Corporation PCMCIA SRAM Card, P/N: VT-SRA-512, 5.16.2008	Wyle-assigned numbers as needed: PCMCIA-XXX	

2.0 MATERIALS REQUIRED FOR TESTING (CONTINUED)

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
Paper Rolls	85 rolls total (70-DS200, 15-M100)
Pre Printed Ballots	700 of each size (11",14", 17", 19")

2.4 Deliverable Materials

The materials delivered by ES&S as part of the Unity 3.2.1.0 System to the user are documented in Section 3.4, "Deliverable Materials", of iBeta Quality Assurance ES&S Unity 3.2.1.0 VSTL Certification Test Plan, Version 5.0.

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 to evaluate the ES&S Unity 3.2.1.0 system was to research documentation provided by iBeta Quality Assurance, ES&S and the EAC for all documented open discrepancies from iBeta certification test campaign. Wyle has determined that the open discrepancies relate to the following requirements: A

Table 3-1 Test Requirements

Test Requirement	WoP	iBeta Discrepancy/ Additional Test
FEC 2002 VSS Vol. I: 2.2 This section defines required functional capabilities that are system-wide in nature and not unique to pre-voting, voting, and post-voting operations. All voting systems shall provide the following functional capabilities: ... Error recovery;	5a	189
FEC 2002 VSS Vol. I: 2.2.1 .b Provide system functions that are executable in the intended manner and order, and only under the intended conditions.	5a	187
FEC 2002 VSS Vol. I: 2.2.4.1 g. Record and report the date and time of normal and abnormal events;	5a	190

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3.0 TEST SPECIFICATIONS (continued)

3.1 Requirements (continued)

Table 3-1 Test Requirements (continued)

Test Requirement	WoP	iBeta Discrepancy/ Additional Test
FEC 2002 VSS Vol. I: 2.2.5.1 Election audit trails provide the supporting documentation for verifying the correctness of reported election results. They present a concrete, indestructible archival record of all system activity related to the vote tally, and are essential for public confidence in the accuracy of the tally, for recounts, and for evidence in the event of criminal or civil litigation.	5a	190
FEC 2002 VSS Vol. II: 2.8.5.c. Provides procedures that clearly enable the operator to intervene the system operations to recover from an abnormal system state;	5a	189
EAC 2005 VVSG Vol. I: 2.2.1.e&f e. Provide security provisions that are compatible with the procedures and administrative tasks involved in equipment preparation, testing, and operation, f. Incorporate a means of implementing a capability if access to a system function is to be restricted or controlled	3	178
EAC 2005 VVSG Vol. I: 2.1.1 .b Provide system functions that are executable in the intended manner and order, and only under the intended conditions.	5a	192
EAC 2005 VVSG Vol. I: 2.1.2 .c Record each vote precisely as indicated by the voter and be able to produce an accurate report of all votes cast.	5a&b	187
EAC 2005 VVSG Vol. I: 2.1.4.g Record and report the date and time of normal and abnormal events.	5a	188
EAC 2005 VVSG Vol. I: 2.1.8. b Records the number of ballots cast during a particular test cycle or election.	5a	187
EAC 2005 VVSG Vol. II: 2.5.7.2.e If the software module or unit contains, receives, or outputs data, a description of its inputs, outputs, and other data elements as applicable.	3	181
EAC 2005 VVSG Vol. II: 2.2.1.d&f The system description shall include written descriptions, drawings and diagrams that present: d. Descriptions of the functional and physical interfaces between subsystems and components; f. Interfaces among internal components, and interfaces with external systems. For components that interface with other components for which multiple products may be used, the TDP shall provide an identification of: 1) File specifications, data objects, or other means used for information exchange; and 2) The public standard used for such file specifications, data objects, or other means;	3	182

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3.0 TEST SPECIFICATIONS (continued)

3.1 Requirements (continued)

Table 3-1 Test Requirements (continued)

Test Requirement	WoP	iBeta Discrepancy/ Additional Test
EAC 2005 VVSG Vol. II: 2.5.6.2.a&b The vendor shall describe the software's capabilities or methods for detecting or handling: a. Exception conditions; b. System failures;	3	182
EAC 2005 VVSG Vol. II: 2.9 The system maintenance procedures shall provide information in sufficient detail to support election workers, systems personnel, or maintenance personnel in the adjustment or removal and replacement of components....	3	191
EAC 2005 VVSG Vol. II: Section 4.7.1.1 Data Accuracy	30,30a	Accuracy Test
EAC 2005 VVSG Vol. I: Section 4.3.3 Reliability	---	iBeta Reliability Test
Modem Test	26	Modem Test
DS200 Date/Time Event Test	26	Date/Time Event Test
Threshold Test	26	Threshold Test
Ballot Presentation Test	26	Ballot Presentation Test
Printer Timeout Test	26	Printer Timeout Test

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Additionally, the following WoPs will be used to support this test campaign but are not mapped to specific iBeta discrepancies or additional test requirements:

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- WoP 2 Receipt Inspection
- WoP 4 Test Plan Preparation– (This document)
- WoP 7 Trusted Build
- WoP 34 Test Report

3.2 Hardware Configuration and Design

All hardware testing required for ES&S Unity 3.2.1.0 system was performed under the guidance of iBeta Quality Assurance. Wyle will not be performing any hardware tests for this test campaign.

All hardware used during testing for this test campaign will be configured "As Used" for voting. Each tabulator will be placed on a ballot box and loaded with the proper firmware.

The Unity 3.2.1.0 EMS suite will be loaded on a COTS desktop. All media used during testing will be loaded from this EMS desktop.

All hardware used to build the software was received from iBeta Quality Assurance.

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3.0 TEST SPECIFICATIONS (CONTINUED)

3.3 Software System Functions

The open discrepancies for this test campaign are documented in Section 1.3 of this document. The modifications submitted for these discrepancies 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.

3.3.1 Discrepancy Testing

The strategy for ensuring the open discrepancies have been closed includes functional testing and documentation review. The documentation review will be to review the TDP documents to ensure the open discrepancies of a specific document have been addressed in the TDP. This includes iBeta Discrepancy Numbers 178, 181, 182, and 191. Any other issues discovered in the test campaign will be documented and tracked through resolution. Wyle will report these discrepancies in the Final Report.

Functional testing will be utilized to verify the resolution of iBeta Discrepancy Numbers 188, 189, 190, and 192. Wyle has researched and was able to recreate these discrepancies. Wyle used a DS200 and a M100 loaded with the same firmware version as iBeta used. Wyle reviewed the documented issue and designed specific test cases for each item. Wyle is grouping these tests, along with the tests designed to test the functionality of the modem, into a single test group consisting of five individual test cases. Any issues discovered in the test campaign will be documented and tracked through resolution. Wyle will report these discrepancies in the Final Report.

iBeta Discrepancy Number 187, a ballot counter issue, will also be regression tested. Wyle has researched this issue with ES&S in Omaha, Nebraska. Wyle was on site to examine a simulator that was designed to demonstrate the reported issue in a repeatable manner. The root cause of the issue was at the hardware communication level and could not be easily reproduced in a normal test environment. Wyle has designed tests using both structural testing (white-box) and functional testing (black-box) techniques to verify this discrepancy has been resolved. Wyle will perform a functional source code review to understand the problem, the repair, and the additional checks on the source code submitted by ES&S. Wyle will provide an engineering analysis documenting the issue from a software engineering perspective. Wyle will also design a functional test case to exercise the source code repairs to ensure the repairs fixed the problem and did not adversely affect other areas of the firmware.

In addition to these discrepancies, Wyle noted during test setup that the DS200 audit logs do not record the date and time event described in iBeta Discrepancy Number 188 for the M100. Wyle designed a test case for this specific event for the DS200. Wyle will execute this test case and report all findings in the Final Report.

3.3.2 Reliability Test

The Reliability Test was executed during the iBeta certification test campaign. This test was halted and never re-started. Wyle will execute this test using the original equipment and election data as documented by iBeta. Wyle will begin execution of this test at Step 5. The previous test determined the three units that displayed the error more frequently. Wyle will use these identified units for execution of this test. All issues discovered during this area of testing will be documented and tracked through resolution. Wyle will report these discrepancies in the Final Report. A

3.0 TEST SPECIFICATIONS (CONTINUED)

3.3 Software System Functions (continued)

3.3.3 Modem Test

This test will consist of a source code review to verify that the modem code was removed and necessary functional testing. For the test, two DS200's will be utilized (one with a modem and one without). Wyle will execute test cases to test the modem is not allowed on the unit containing the modem. Wyle will report all findings in the Final Report. | A

3.3.4 Accuracy Test

The Accuracy Test will test the DS200 and the M100 to Volume II, Section 4.7.1.1 "Data Accuracy" of the EAC 2005 VVSG. Any issues discovered in the test campaign will be documented and tracked through resolution. Wyle will report these discrepancies in the Final Report.

3.3.5 Threshold Test Description

Wyle will design and execute a Threshold Test to verify that the change in the default setting of the scanner threshold value (from 166 to 140) ensure that the DS200, loaded with firmware version 1.4.3.10, records selections and non-selections accurately and consistently. Wyle will report all findings in the Final Report. | C

3.3.6 Date/Time Change Event Test Description

Wyle will design and execute a DS200 Date/Time Change Event Test to verify that the DS200, loaded with firmware version 1.4.3.10, records the date/time change event in the Audit Log Report. Wyle will report all findings in the Final Report. | C

3.3.7 Ballot Presentation Test Description

Wyle will design and execute a Ballot Presentation Test to verify that the DS200 machine, loaded with firmware version 1.4.3.10, will operate properly if an unexpected key press ID occurs. Wyle will report all findings in the Final Report. | C

3.3.8 Printer Timeout Test Description

Wyle will design and execute a Printer Timeout Test to verify that the DS200 machine, loaded with firmware version 1.4.3.11, does not change printer fonts or print "gibberish" during a printer timeout event. | C

4.0 TEST DATA

4.1 Data Recording

All equipment utilized for test data recording shall be identified in the test data package. For source code and TDP reviews, results shall be compiled in output reports and submitted to ES&S 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 during the execution of a test. Wyle will report these discrepancies in the Final Report. | A

4.0 TEST DATA (CONTINUED)

4.2 Test Data Acceptance Criteria

Wyle Laboratories shall evaluate all test results against ES&S provided technical documentation for the Unity 3.2.1.0 System; the requirements set forth in the FEC 2002 VSS; and the applicable EAC 2005 VVSG. The Unity 3.2.1.0 System shall be evaluated for its performance against the FEC 2002 VSS and the EAC 2005 VVSG. The acceptable range for system performance and the expected results for each test case shall be derived from the Unity 3.2.1.0 system documentation. Per the FEC 2002 VSS and the EAC 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). A

5.0 TEST PROCEDURE AND CONDITIONS

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

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 ± 10°C (77°F ± 18°F)
- Relative Humidity: 20 to 90%
- Atmospheric Pressure: Local Site Pressure

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

- Time ± 5%
- Temperature ± 3.6°F (2°C)
- Vibration Amplitude ± 10%
- Vibration Frequency ± 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

5.0 TEST PROCEDURE AND CONDITIONS (CONTINUED)

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 ES&S 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 ES&S 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 Functional 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 ES&S technical documentation. 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. For more details of the procedures used, refer to Appendix A.

Table 5-1 Unity 3.2.1.0 Software and System Testing Sequence

Test	Description	Procedure	Test Level	Specimen	Election Data
Receipt Inspection	Receipt and inspection of all equipment to be tested	WoP 2	---	---	---
Technical Data Package (TDP) Review *(Pre-testing Activity)*	Documentation review for compliance, correctness, and completeness	WHVS07.1 WoP 3	Document	TDP package	---
Test Plan Preparation	Preparation of formal test plan	WoP 4	---	---	---

5.0 TEST PROCEDURE AND CONDITIONS (CONTINUED)

5.3 Test Sequence (continued)

Table 5-1 Unity 3.2.1.0 Software and System Testing Sequence (continued)

Test	Description	Procedure	Test Level	Specimen	Election Data
Compliance Source Code Review *(Pre-testing Activity)*	Source code review for compliance	WHVS07.2 WoP 5a	Component	DS 200 and M100 Source Code package	---
Compliance Build	Use the build documents and source code to construct the application	WHVS07.3 WoP 7	Component & System	DS 200 and M100 Source Code package	---
Functional Configuration Audit	Functional testing to the system documentation and 2005 VVSG requirements	WHVS07.4 WoP 26 WoP30a	Component & Integration	---	Reliability Regression Ballot Counter
Logic and Accuracy	Test of accuracy to ~1.6 million ballot positions	WHVS07.9 WoP 30	System	---	L & A Election
Trusted Build	Creation and installation of the final system software	WHVS07.6 WoP 7 WoP 7a	Component	EMS Source Code package	---
Test Report	Generation of final test report	WoP 34	---	---	---

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

TEST PROCEDURE DESCRIPTION

Table A-1 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 – (*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 ES&S to conduct a new "build" of the system to ensure that the certified executable release of the system is built from tested components).
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 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.

Table A-1 Test Procedure Description (continued)

Test Procedure	Test Procedure Description
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 tests 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 - 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

APPENDIX B

IBETA TEST REPORT