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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

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NVLAP

NVLAP LAB CODE 200771-0

VSTL

EAC Lab Code 0704

TABLE OF CONTENTS

APPENDICES

	Revisions		**REVISION** B
			REPORT NO. Test Plan T58200.01-01, Rev. B
wyle laboratories			**DATE** February 18, 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."

	Revisions	**REVISION**	B
		REPORT NO.	Test Plan T58200.01-01, Rev. B
wyle laboratories		**DATE**	February 18, 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** B
			REPORT NO. Test Plan T58200.01-01, Rev. B
			DATE February 18, 2011

REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
B	2-18-11	Table of Contents	Reformatted revision pages
B	2-18-11	Section 1.1	Deleted second sentence
B	2-18-11	Table 1-1, FCA	Reworded definition
B	2-18-11	Section 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	2-18-11	Section 1.3.1	Condensed section and paraphrased information
B	2-18-11	Section 2.1, Table 2-1	Updated source code version from 1.4.3.9 to 1.4.3.10
B	2-18-11	Table 2-2	Added additional serial numbers for DS200 and M100 units
B	2-18-11	Table 2-3	Updated paper roll quantities, added table header
B	2-18-11	Section 3.2	Added "configured by" in last sentence.
B	2-18-11	Appendix A, WoP's 5a, 5b, 7 and 30a	Revised descriptions
B	2-18-11	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.

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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.

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- 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	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.
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.

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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.

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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.

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.

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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.

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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.

1.4   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.

2.1   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	1.4.3.10
Scanner Board Firmware	2.21.0.0
M100 Firmware	5.4.4.5

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2.0   MATERIALS REQUIRED FOR TESTING (CONTINUED)

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, DS0110340837, DS0110390905	B
M100	Precinct Count Optical Scanner	205071, 202975, 231531	
Ballot Box	Plastic Ballot Box	E076, E089, E099, 096, 57936-01, 57936-02	
Ballot Box	Metal Box with Diverter	E015, E017	
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: TM-XXX	A
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	

2.3   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.

Table 2-3 Test Tools/Materials

Test Material	Quantity	
Paper Rolls	160 rolls total (145-DS200, 15-M100)	B
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.

2.0   MATERIALS REQUIRED FOR TESTING (CONTINUED)

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:

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Table 3-1 Test Requirements

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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

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. 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
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

3.0   TEST SPECIFICATIONS (CONTINUED)

3.1   Requirements (continued)

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

- WoP 2 Receipt Inspection

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- 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 configured by and received from iBeta Quality Assurance.

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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.

3.0   TEST SPECIFICATIONS (CONTINUED)

3.3   Software System Functions (continued)

3.3.1   Discrepancy Testing (continued)

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

3.3.3   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.

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).

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

Unless otherwise specified herein, the following tolerances shall be used:
- Time $\pm 5\%$
- Temperature $\pm 3.6°F$ ($2°C$)
- Vibration Amplitude $\pm 10\%$
- Vibration Frequency $\pm 2\%$
- Random Vibration Acceleration
  20 to 500 Hertz ± 1.5 dB
  500 to 2000 Hertz ± 3.0 dB
- Random Overall grms ± 1.5 dB
- Acoustic Overall Sound Pressure Level   +4 /-2 dB

5.0   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	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 5b Source Code Functional Review	The purpose this review will determine if the software complies with stated functionality, has security vulnerabilities, and complies with all applicable coding standards.
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. At the conclusion of testing, a final trusted build will be conducted according to the procedures set forth in the RAC program manual. (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.

B

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.	A
WoP 30a Test case - LA-01	Use multiple races with multiple candidates. Simulation may be used to generate sufficient voted ballots to exercise at least 1,549,703 positions.	B
WoP 34 Test Report	National Certification Test Report	

APPENDIX B

IBETA TEST REPORT