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CERTIFICATION TEST PLAN

Prepared for:

Manufacturer Name	ES&S
Manufacturer System	Unity 3.4.1.0
EAC Application No.	ESS1301
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REV	**DATE**	**PAGE OR PARAGRAPH AFFECTED**	**DESCRIPTION OF CHANGES**
---	10-24-13	Entire Document	Original Release
A	11-20-13	Section 1.0	Updated sentence to include Unity 3.4.0.0 was a modification to Unity 3.2.1.0
A	11-18-13	Section 1.1	Removed "do not affect any" and replaced with "do not adversely affect"
A	11-18-13	Section 1.1	Updated sentence to include previous test campaigns and sections stated
A	11-20-13	Section 1.1	Updated paragraph to include brief description of modifications taking place within campaign
A	11-20-13	Section 1.1	Updated section to include 100% of modified code reviewed and functional testing will be performed
A	11-18-13	Section 2.1	Updated paragraph with additional information and provide further clarification
A	11-18-13	Section 3.1	Corrected misspelled word "compilers"
A	11-18-13	Section 4.4.3	Updated sentence to include root cause cannot be determined
A	11-18-13	Section 4.7	Removed paragraph and included TDP reference for coding standards
A	11-18-13	Section 4.7	Updated section to include automated source tools
A	11-18-13	Section 6.3.2	Updated sentence to include clarification and automated source tools
A	11-18-13	Section 6.3.3	Removed sentence as no networking is included within this system

TABLE OF CONTENTS

1.0 INTRODUCTION

The purpose of this National Certification Test Plan is to document the strategy Wyle Laboratories, Inc. will follow during certification testing of the Election Systems and Software (ES&S) Unity 3.4.1.0 System. Unity 3.4.1.0 is a modification to the Unity 3.4.0.0 system (Unity 3.4.0.0 is a modification to Unity 3.2.1.0 system which currently holds a 2002 VSS certification). ES&S submitted the Unity 3.4.1.0 System to Wyle Laboratories, Inc., for certification to the 2002 VSS. Per Section 4.4.2.3 of the EAC Testing and Certification Program Manual, all testing on the modifications to the system will be tested to the 2005 VVSG. Pending successful completion of this test campaign, the Unity 3.4.1.0 system will be granted a 2002 VSS certification based on the original full system certification, Unity 3.2.1.0, being tested to that standard.

At test conclusion, the results of all testing performed as part of this test campaign will be submitted to the EAC in the form of a final report.

1.1 Scope

The Unity 3.4.1.0 Voting System is a paper-based voting system that includes:

- Audit Manager
- Election Data Manager (EDM)
- ES&S Ballot Image Manager (ESSIM)
- Hardware Programming Manager (HPM)
- Election Reporting Manager (ERM)
- Log Monitor Service
- AIMS
- VAT Previewer
- Polling Place Scanners – DS200 and M100
- Polling Place American Disability Act (ADA) Devices – AutoMARK™ A100 and AutoMARK™ A200
- Central Count Digital Scanners – DS850 and M650

The DS200, M100, AutoMARK™ A100/A200, DS850 and M650 were submitted for testing previously during the EAC approved Unity 3.4.0.0 and/or Unity 3.2.1.0 testing campaigns. Wyle Laboratories' personnel will analyze each unit to determine prior testing acceptance (annotated later in the test plan under section 2.1) based on modifications to the unit, which includes software, hardware and functional modifications. Based on this data, each unit shall be subjected to the tests required to ensure that all applicable VVSG requirements are met.

The software utilized in the system will also be compared to versions that have been submitted for testing in previous EAC campaigns at Wyle Laboratories to determine the extent of the source code review required (annotated later in the test plan). All modified source code will be reviewed 100% by Wyle. Wyle Laboratories' personnel will perform functional testing to ensure that all applicable VVSG requirements are met and changes to the software do not adversely affect operational features of the voting system.

The system changes submitted to the EAC in the Application for Certification include functional and hardware modifications to the EMS, DS850, and DS200. Functional upgrades were made throughout this modification including but not limited to known field issue fixes, conformance with new RFIs released before application submission, software and operating system upgrades to enhance usability, replacement of hardware parts nearing end of life, and integration with the EVS suite to enhance usability and performance. These modifications are presented in their entirety in Appendix B.

The complete system shall be tested in a full system integration test to ensure all components interact properly in the current system configurations listed in the Unity 3.4.1.0 Voting System scope.

1.2 References

The documents listed below were used in the development of the Test Plan and are utilized to perform certification testing.

- Election Assistance Commission 2005 Voluntary Voting System Guidelines, Volume I, Version 1.0, "Voting System Performance Guidelines," and Volume II, Version 1.0, "National Certification Testing Guidelines," dated December 2005
- Election Assistance Commission Testing and Certification Program Manual, Version 1.0, effective date January 1, 2007
- Election Assistance Commission Voting System Test laboratory Program Manual, Version 1.0, effective date July 2008
- National Voluntary Laboratory Accreditation Program NIST Handbook 150, 2006 Edition, "NVLAP Procedures and General Requirements (NIST Handbook 150)," dated February 2006
- National Voluntary Laboratory Accreditation Program NIST Handbook 150-22, 2008 Edition, "Voting System Testing (NIST Handbook 150-22)," dated May 2008
- United States 107th Congress Help America Vote Act (HAVA) of 2002 (Public Law 107-252), dated October 2002
- Wyle Laboratories' Test Guidelines Documents: EMI-001A, "Wyle Laboratories' Test Guidelines for Performing Electromagnetic Interference (EMI) Testing," and EMI-002A, "Test Procedure for Testing and Documentation of Radiated and Conducted Emissions Performed on Commercial Products"
- Wyle Laboratories' Quality Assurance Program Manual, Current Revision
- Wyle Laboratories Quality Assurance Manual, Current Revision
- 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)
- EAC Quality Monitoring Program residing on:
  http://www.eac.gov/testing_and_certification/quality_monitoring_program.aspx
- Guidance – Unity 3.2.1.0 Rev. 1 Certification Test Plan, dated August 26, 2011
- ES&S 3.4.0.0 Modification VSTL Certification Test Report Rev. B (listed on www.eac.gov)

A listing of the Unity 3.4.1.0 System Technical Data Package (TDP) documents submitted for this certification test effort is provided in Table 4-2 - Unity 3.4.1.0 TDP Documents.

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1.3 Terms and Abbreviations

This subsection 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.
AutoMARK Management Information System	AIMS	A windows-based election management system software application to define election parameters for the VAT, including functionality to import election definition files produced by the Unity EMS and create VAT flash memory cards
Audit Manager	AM	System software that provides security and user tracking for Election Data Manager (EDM) and ES&S Ballot Image Manager (ESSIM).
Configuration Management	CM	---
Commercial Off the Shelf	COTS	Commercial, readily available hardware or software
United States Election Assistance Commission	EAC	Commission created, per the Help America Vote Act of 2002, the assigned responsibility for setting voting system standards and providing for the voluntary testing and certification of voting systems.
Election Data Manager	EDM	Unity EMS data entry component.
Election Management System	EMS	Within the Unity 3.4.1.0 System, the EMS is comprised of eight components: AIMS, AM, EDM, HPM, ESSIM, ERM, Log Monitor Service, and VAT Previewer.
Election Reporting Manager	ERM	Unity EMS reporting component.
Election Systems and Software	ES&S	---
ESSIM	ESS Image Manager	A desktop publishing tool that allows users to design and print ES&S paper ballots.
Functional Configuration Audit	FCA	Verification of system functions and combination of functions cited in the manufacturer's documentation.
Hardware Programming Manager	HPM	An election package primarily used for converting election files and creating and loading election parameters.
Help America Vote Act	HAVA	Act created by United States Congress in 2002.
Intelligent Mark Recognition	IMR	Visible light scanning technology to detect completed ballot targets

1.0 INTRODUCTION (Continued)

1.3 Terms and Abbreviations (Continued)

Table 1-1 Terms and Abbreviations (Continued)

Term	Abbreviation	Definition
National Institute of Standards and Technology	NIST	Government organization created to promote the 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 an accredited test laboratory to compare voting system components submitted for certification testing to the manufacturer's technical documentation, and confirmation of the documentation meets national certification requirements.
Quality Assurance	QA	--
System Under Test	SUT	---
Technical Data Package	TDP	Manufacturer documentation related to the voting system required to be submitted as a precondition of certification testing.
Test Case Procedure Specifications	TCPS	Wyle Laboratories' developed document that specifies test items, input specifications, output specifications, environmental needs, special procedural requirements, inter-case dependencies, and all validated test cases that will be executed during the area under test.
Voter Assist Terminal	VAT	The electronic ballot marking device component is the ES&S AutoMARK.
Voluntary Voting System Guidelines	EAC 2005 VVSG	Published by the EAC, the third iteration of national level voting system standards.
Wyle Laboratories, Inc.	Wyle	---
Wyle Operating Procedure	WoP	Wyle Test Method or Test Procedure.

1.4 Testing Responsibilities

Prior to the development of this test plan, Wyle Laboratories evaluated the test results from previous test campaigns performed by the EAC's accredited VSTL as well as test cases and results of developmental testing conducted by ES&S during the pre-certification process that were provided by ES&S in their TDP. The purpose of this evaluation was to determine the scope of testing required for system certification. Following the review, Wyle Laboratories determined that testing from previous test campaigns could be utilized to satisfy the requirements of this test campaign. All other core and non-core software and hardware certification testing shall be conducted under the guidance of Wyle Laboratories' personnel verified by Wyle Laboratories to be qualified to perform the testing.

1.0 INTRODUCTION (Continued)

1.4 Testing Responsibilities (Continued)

1.4.1 Project Schedule

This information is contained in a Wyle-generated Microsoft Project schedule. This schedule is presented in Appendix A, "ES&S Project Schedule." The dates on the schedule are not firm dates but planned estimates presented for informational purposes.

1.4.2 Owner Assignments

This information is contained in Wyle Laboratories' generated Microsoft Project schedule. This schedule is presented in Appendix A - ES&S Project Schedule.

1.4.3 Test Case Development

Wyle Laboratories will utilize the "Wyle Baseline Test Cases" for the Functional Configuration Audit (FCA). These shall be augmented with specially-designed test cases tailored to the ES&S Unity 3.4.1.0 System. Wyle Laboratories has designed specific election definition and test cases for the Operational Status Check and the Accuracy Tests. The "Baseline" functional test cases and the election definitions have been previously submitted to the EAC for review.

1.4.4 Test Procedures Development and Validation

Wyle Laboratories will utilize Wyle Laboratories' Operating Procedures (WoP) throughout the duration of this test campaign. The validated WoP's have been previously submitted to the EAC for review.

1.4.5 Third-Party Tests

Wyle will not utilize any 3rd party testing during performance of the ES&S Unity 3.4.1.0 System test campaign.

1.4.6 EAC and Manufacturer Dependencies

This information is contained in Wyle Laboratories' generated Microsoft Project schedule. This schedule is presented in Appendix A, ES&S Project Schedule.

1.4.7 VVSG

The Unity 3.4.1.0 System test campaign will consist of testing all modifications (including all ECO's and source code updates) and the DS850 to the applicable EAC 2005 VVSG requirements.

1.4.8 Beyond VVSG

No additional test results have been submitted for consideration as part of this test campaign.

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description

The following sections address the design methodology and product description of the Unity 3.4.1.0 System taken from the ES&S technical documentation.

1.5.1 System Overview

The ES&S Unity 3.4.1.0 Election System is a comprehensive suite of vote tabulation equipment and software solutions providing end-to-end election management. The Unity 3.4.1.0 Voting System includes the core system components detailed in Tables 1-2 and 1-3.

Table 1-2 Unity 3.4.1.0 System Hardware Components

Component	Hardware Version(s)	Firmware Version
Model 100	1.3	5.4.4.5
DS200	1.2 (512K DRAM)	1.7.0.0
DS200	1.2 (1GB DRAM)	1.7.0.0
DS200	1.2.3.0 (512K DRAM)	1.7.0.0
DS200	1.3 (2GB DRAM)	1.7.0.0
Model 650	1.1, 1.2	2.2.2.0
AutoMARK A100	1.0	1.3.2907
AutoMARK A200	1.1	1.3.2907
AutoMARK A200	1.3 (Printer Board 1.70)	1.3.2907
AutoMARK A200	1.3 (Printer Board 1.65)	1.3.2907
DS850	1.0	2.9.0.0

Table 1-3 Unity 3.4.1.0 System Software Components

Component	Version
AIMS	1.3.257
Audit Manager (AM)	7.5.2.0
Election Data Manager (EDM)	7.8.2.0
Hardware Programming Manager (HPM)	5.9.0.0
ES&S Ballot Image Manager (ESSIM)	7.7.2.0
Election Reporting Manager (ERM)	7.9.0.0
Log Monitor Service	1.1.0.0
VAT Previewer	1.3.2907

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.2 System Hardware

The ES&S Unity 3.4.1.0 System can be set up to support one or more of the following hardware components:

- DS200 Precinct Tabulator
- Model 100 Precinct Tabulator
- AutoMARK Voting Assist Terminal
- Model 650 Central Tabulator
- DS850 Central Tabulator

Each of these components is described below.

Precinct Ballot Tabulator: DS200

The DS200 is a digital scan paper ballot tabulator designed for use at the polling place level. After the voter marks a paper ballot, their ballot is inserted into the unit and immediately tabulated. The tabulator uses a high-resolution image-scanning device to image the front and rear of the ballot simultaneously. The resulting ballot images are then decoded by a proprietary recognition engine.

The system includes a 12-inch touch screen display providing voter feedback and poll worker messaging. Once a ballot is tabulated and the system updates internal vote counters, the ballot is dropped into an integrated ballot box. The DS200 includes an internal thermal printer for the printing of the zero reports, log reports, and polling place totals upon the official closing of the polls.

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.2 System Hardware (Continued)

Photograph No. 1: DS200 (on plastic ballot box)

Photograph No. 2: DS200 (on metal ballot box)

1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.2 System Hardware (Continued)

Model 100

The Model 100 is a precinct-based, voter-activated paper ballot tabulator that uses Intelligent Mark Recognition (IMR) visible light scanning technology to detect completed ballot targets. The Model 100 is designed to alert voters of overvotes, undervotes and blank ballots. It accepts ballots inserted in any orientation. Once the ballot is scanned by the Model 100, it is passed to the integrated ballot box.

Photograph No. 3: Model 100 (on metal ballot box)

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.2 System Hardware (Continued)

Electronic Ballot Marking Device: AutoMARK Voter Assist Terminal (VAT)

The electronic ballot marking device component is the ES&S AutoMARK Voter Assist Terminal (VAT). The AutoMARK VAT assists voters with disabilities by marking optical scan ballots.

The AutoMARK VAT includes two user interfaces to accommodate voters who are visually or physically impaired and voters who are more comfortable reading and/or hearing instructions or choices in an alternative language. The AutoMARK is equipped with a touch screen and keypad. The touch screen interface includes various colors and effects to prompt and guide the voter through the ballot marking process. Each key has both Braille and printed text labels designed to indicate function and a related shape to help the voter determine its use.

Regardless whether the voter uses the touch screen or other audio interface, changes can be made throughout the voting process by navigating back to the appropriate screen and selecting the change or altering selections at the mandatory vote summary screen that closes the ballot marking session.

The A100 and A200 both operate the same and have the same features. The difference between the models is the location of two printed circuit boards and related wiring harness and cables. In the A200, the Printer Engine Board and Power Supply Board were moved from under the machine to the top.

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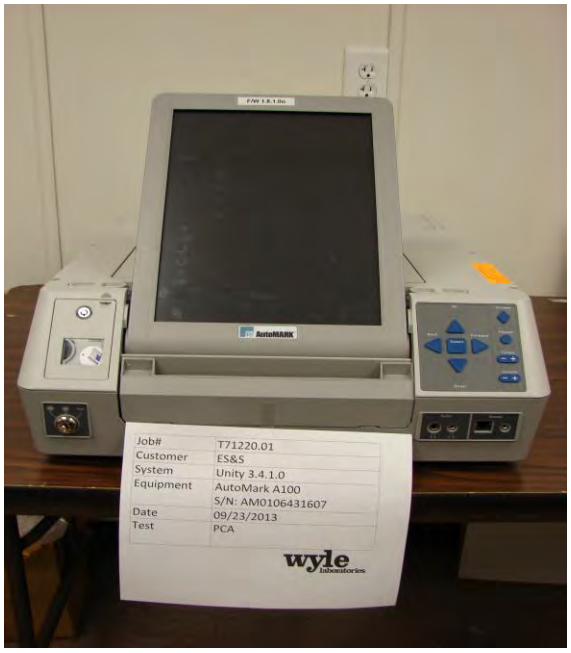
1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.2 System Hardware (Continued)



Photograph No. 4: AutoMARK A100 VAT

Photograph No. 5: AutoMARK A200 VAT

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.2 System Hardware (Continued)

Tabulator: Model 650

The Model 650 is a high-speed and optical scan central ballot counter. During scanning, the Model 650 prints a continuous audit log to a dedicated printer and can print results directly from the scanner to another printer. The M650 can transfer results to a Zip Disk that officials use to generate results using Election Reporting Manager. The M650 is capable of sorting write-ins, blanks, overvotes and illegal ballots.

Photograph No. 6: Model 650

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.2 System Hardware (Continued)

Tabulator: DS850

The DS850 is a high-speed and digital scan central ballot counter. During scanning, the DS850 prints a continuous audit log to a dedicated audit log printer and can print results directly from the scanner to a second connected printer. The scanner saves results internally and to results collection media that officials can use to format and print results from a PC running Election Reporting Manager. The DS850 has an optimum throughput rate of up to 365 ballots per minute and uses cameras and imaging algorithms to image the front and back of a ballot, evaluate the results and sort ballots into discrete bins to maintain continuous scanning.

Photograph No. 7: DS850

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.3 System Software

The Unity 3.4.1.0 Election Management System is an application suite comprised of eight components: AutoMark Information Management System, Audit Manager, Election Data Manager, ES&S Ballot Image Manager, Hardware Programming Manager, Election Reporting Manager, Log Monitor Service, and VAT Previewer.

AutoMark Information Management System (AIMS)

AIMS is a windows-based election management system software application used to define election parameters for the VAT including functionality to import election definition files produced by the Unity EMS and create VAT flash memory cards.

VAT Previewer

The VAT Previewer is an application within the AIMS program that allows the user to preview audio text and screen layout prior to downloading election-day media for the AutoMARK.

Audit Manager (AM)

The Audit Manager (AM) utility provides security and user tracking for Election Data Manager and ES&S Ballot Image Manager. Audit Manager runs in the background of the other Unity programs and provides password security and a real-time audit log of all user inputs and system outputs. Election coders use Audit Manager to set Unity system passwords and track user activity.

Election Data Manager (EDM)

The Election Data Manager (EDM) is the entry point for the Unity Election Management System. Election Data Manager is a single-entry database that stores precinct, office, and candidate information. Data entered for an initial election is stored to a re-useable database to be recalled and edited for all elections that follow. Election Data Manager is used in conjunction with other Unity software to format and print ballots, program ballot scanning equipment, and produce Election Day reports.

ES&S Ballot Image Manager (ESSIM)

The ES&S Ballot Image Manager (ESSIM) uses ballot style information created by Unity Election Data Manager to display the ballots in a WYSIWIG design interface. Users can apply typographic formatting (font, size, attributes, etc.) to individual components of the ballot. Text and graphic frames can also be added to the ballot.

Hardware Programming Manager (HPM)

The Hardware Programming Manager (HPM) uses the election specific database created with Election Data Manager and ES&S Ballot Image Manager to program the appropriate media for ES&S tabulation devices. Hardware Programming Manager converts the ballot layout data into the format required for each ES&S tabulator. HPM then writes this data to the appropriate media required; a USB flash drive for the DS200 and DS850, a PCMCIA card for the Model 100, a CF card for the AutoMark or a Zip disk for Model 650 tabulators.

1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.3 System Software (Continued)

Election Reporting Manager (ERM)

Election Reporting Manager (ERM) generates paper and electronic reports for election workers, candidates, and the media. Jurisdictions can use a separate ERM installation to display updated election totals on a monitor as ballot data is tabulated, and send results reports directly to media outlets. ERM supports accumulation and combination of ballot results data from all ES&S tabulators. Precinct and accumulated totals reports provide a means to accommodate candidate and media requests for totals and are available upon demand. High-speed printers are configured as part of the system accumulation/reporting stations - PC and related software.

Log Monitor Service

The Log Monitor Service is a Windows Service that runs in the background of any active ES&S Election Management software application to monitor the proper functioning of the Windows Event Viewer. The Log Monitor Service closes any active ES&S software application if the system detects the improper deactivation of the Windows Event Viewer.

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.4 System Operational Concept

The operational flow and low-level system interfaces for the ES&S Unity 3.4.1.0 Voting System are illustrated in Figure 1-2.

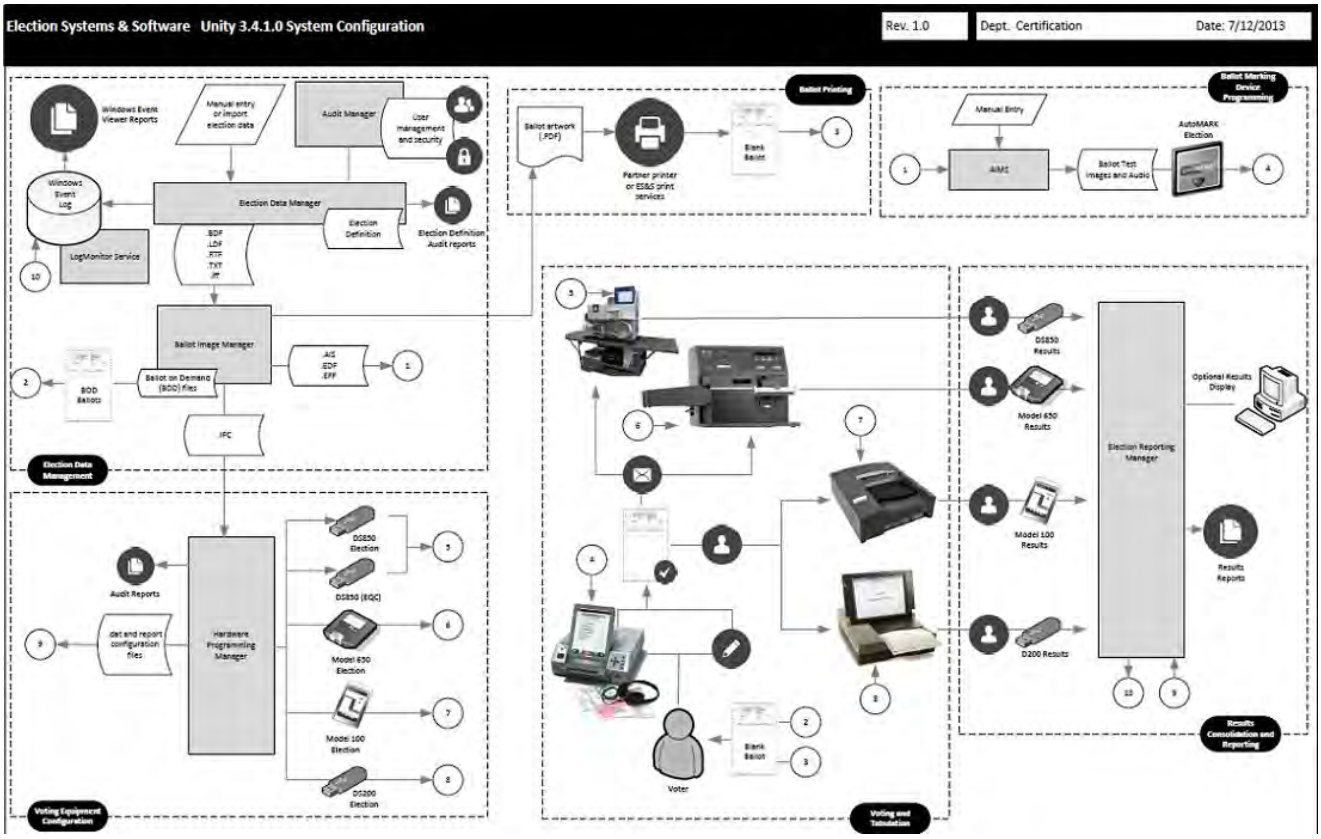

Figure 1-1 System Configuration Diagram

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.4 System Operational Concept (Continued)

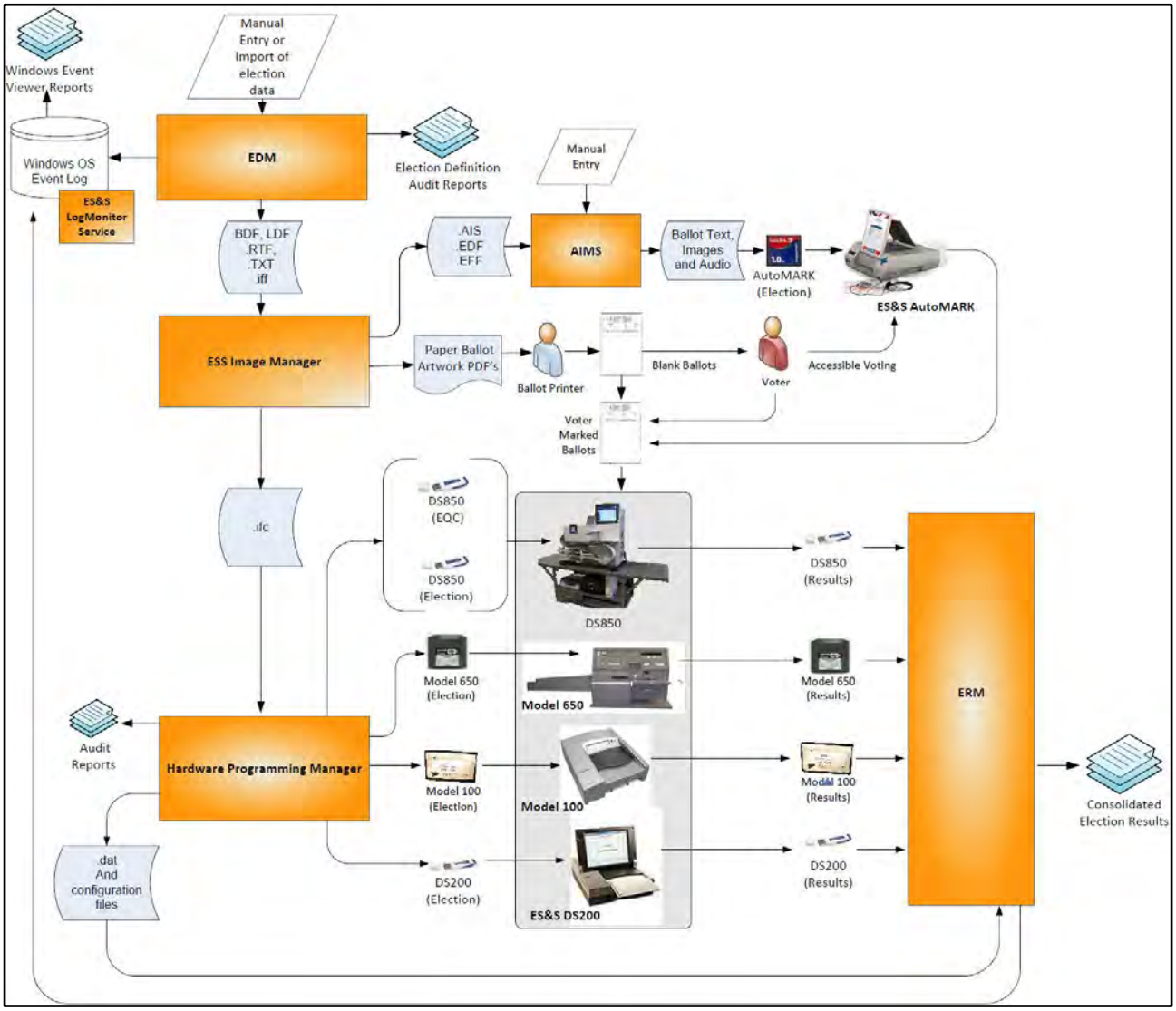

Figure 1-2 System Overview Diagram

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.5 System Limits

The system limits and the ballot target limits that ES&S has stated to be supported by the Unity 3.4.1.0 System are compiled in Tables 1-4 and 1-5.

Table 1-4 Unity 3.4.1.0 System Limits

Limit Description (Maximum)	Limit Value	Limiting Factor
Precincts allowed in an election	2900(1639 if using paper ballot coded by precinct)	HPM/ERM (ballot sequence code)
Precinct included per poll (reporting limit)	1900	ERM
Candidate/counters per election	21000	ERM
Maximum candidates	9900	HPM
Contest allowed in an election	Depends on election(limited by 21,000 maximum counters)	ERM
Candidates/Counters allowed per precinct	1,000	ERM Import
Ballot styles allowed per election	5500 (1639 if using paper ballot coded by style)	HPM (ballot sequence code)
Contests allowed per ballot style	200 or number of positions on a ballot	HPM
Precincts allowed per ballot style	1500	HPM
Candidates (ballot choices) allowed per contest	175	HPM
Count for any precinct element	500,000 (65,550 from any tabulator media)	ERM report (ERM results Import)
Number of parties allowed	18	HPM
'Vote for' per contest	90	HPM

Table 1-5 Unity 3.4.1.0 Ballot Target Limits

Ballot Size (ovals per inch Left or Right)	Positions per Column x Row
8 ½ x 11" (4 ovals per inch)	36 rows x 3 columns = 108/side
8 ½ x 14" (3 ovals per inch)	36 rows x 3 columns = 108/side
8 ½ x 14" (4 ovals per inch)	48 rows x 3 columns = 144/side
8 ½ x 17" (3 ovals per inch)	41 rows x 3 columns = 123/side
8 ½ x 17" (3 ovals per inch)	45 rows x 3 columns = 135/side
8 ½ x 17" (4 ovals per inch)	60 rows x 3 columns = 180/side
8 ½ x 19" (3 ovals per inch)	51 rows x 3 columns = 153/side
8 ½ x 19" (4 ovals per inch)	68 rows x 3 columns = 204/side

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1.0 INTRODUCTION (Continued)

1.5 Target of Evaluation Description (Continued)

1.5.6 Supported Languages

The following languages have been stated by ES&S to be supported by the Unity 3.4.1.0 System:

- English
- Spanish

1.5.7 Supported Functionality

The Unity 3.4.1.0 System is designed to support the following voting variations:

- General Election
- Open Primary
- Closed Primary
- Partisan offices
- Non-Partisan offices
- Write-in voting
- Straight Party voting
- Cross-Party endorsement
- Split Precincts
- Ballot Rotation
- Provisional or Challenged Ballots
- Recall with Options
- Vote for N of M
- Audio Ballot

The Unity 3.4.1.0 System does not include functions for Primary Presidential Delegation Nominations, Ranked Order Voting, or Cumulative Voting; therefore, testing will not be conducted on these functions.

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2.0 PRE-CERTIFICATION TESTING AND ISSUES

2.1 Evaluation of Prior VSTL Testing

EMC and Environmental Tests were performed by Wyle Laboratories for the DS200 Hardware Version 1.3, and were completed successfully to the EAC 2005 VVSG standards. The information and results from this testing can be located within the Wyle Laboratories' Test Report No. T71013.01-01which was completed as a State effort by Wyle Laboratories, and can be located in Appendix C of this document.

Wyle Laboratories will reutilize the hardware testing only from the test campaigns listed in Table 2-1.

Table 2-1 Test Campaigns

Component	Hardware Version	Reviewed in Test Report
DS200	1.2	Unity 3.2.0.0 (iBeta Test Report)
DS200	1.3	FL EVS 4.5.0.0 (Wyle Labs)
DS850	1.0	Unity 5.0.0.0 (iBeta/Criterion Test Report)

Wyle Laboratories will reutilize the components in Tables 2-2 and 2-3 from previously-certified systems. These systems have not been modified or changed since Unity 3.2.1.0 approved test campaign. These reports can be found on the EAC website at:

http://www.eac.gov/testing_and_certification/certified_voting_systems.aspx.

Table 2-2 Hardware Table

Component	Hardware Version	*Reviewed in Test Report*	Firmware Version	Reviewed in Test Report
Model 100	1.3	*Unity 3.2.1.0 (iBeta Test Report)*	5.4.4.5	*Unity 3.2.1.0 (iBeta Test Report)*
Model 650	1.1, 1.2	*Unity 3.2.1.0 (iBeta Test Report)*	2.2.2.0	*Unity 3.2.1.0 (iBeta Test Report)*
AutoMARK	1.0, 1.1, 1.3	*Unity 3.2.1.0 (iBeta Test Report)*	1.3.2907	*Unity 3.2.1.0 (iBeta Test Report)*

Table 2-3 Software Table

Component	Version	Reviewed in Test Report
Audit Manager (AM)	7.5.2.0	*Unity 3.2.1.0 (iBeta Test Report)*
Election Data Manager (EDM)	7.8.1.0	*Unity 3.2.1.0 (iBeta Test Report)*
ES&S Ballot Image Manager (ESSIM)	7.7.1.0	*Unity 3.2.1.0 (iBeta Test Report)*
Log Monitor Service	1.1.0.0	*Unity 3.2.1.0 (iBeta Test Report)*
AIMS	1.3.257	*Unity 3.2.1.0 (iBeta Test Report)*
VAT Previewer	1.3.2907	*Unity 3.2.1.0 (iBeta Test Report)*

For details of the hardware qualitative examination performed by Wyle Laboratories, refer to Section 4.4.1 of this test plan.

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2.0 PRE-CERTIFICATION TESTING AND ISSUES (Continued)

2.1 Evaluation of Prior VSTL Testing (Continued)

The DS850 EMC testing performed by Criterion was directed by iBeta for an EAC 2005 VVSG test campaign for Unity 5.0.0.0. The hardware testing was performed on Hardware version 1.0 and Firmware version 1.0.0.0j. Wyle Laboratories is accepting the stated tests based on a review of the test reports. Wyle Laboratories will validate that no hardware changes have been made to the DS850 that were not covered by an approved ECO deemed de minimis to ensure no further hardware testing is required for this test campaign. In addition Wyle Laboratories will utilize the DS850 baseline source code which was reviewed during the Unity 5.0.0.0 test campaign. All modifications to the DS850 source code shall be reviewed and verified by Wyle to the EAC 2005 VVSG coding standards to ensure compliance. Wyle Laboratories will be performing all other testing on the DS850 cited in Section 4.4 of this document.

2.2 Known Field Issues

The EAC Formal investigation Report, dated December 20, 2011.

Two technical advisories have been issued by the EAC concerning known field issue of the DS200, each of which is summarized below:

- *EAC Technical Advisory ESS2011-02: During local acceptance testing in a jurisdiction, multiple DS200 Ballot Scanners exhibited an anomaly where the touch screen interface would stop responding to touches.

- EAC Technical Advisory ESS2011-03: During local acceptance testing, a DS200 Ballot Scanner failed to count a marked ballot position resulting in a lost vote.

In response to the technical advisories, ES&S has published two Technical Bulletins (PRBDS2000013 and FYIDS2000021, both of which are dated August 3, 2011).

*Tested and fixed in Unity 3.2.0.0 Rev. 3

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3.0 MATERIALS REQUIRED FOR TESTING

The materials required for certification testing of the ES&S Unity 3.4.1.0 Voting System include software, hardware, test materials, and deliverable materials to enable the test campaign to occur shall be delivered by ES&S to Wyle Laboratories.

3.1 Software

This section defines the two types of software needed for testing:

- software used for the testing of hardware, software, and security
- supporting software required for the test environment (operating systems, compilers, assemblers, database managers, and any other supporting software)

The Unity 3.4.1.0 System's software and firmware submitted for review is identified in Table 3-1, Unity 3.4.1.0 System Software and Firmware. Wyle Laboratories will only be reviewing and building the source code pertaining to the DS200, DS850, HPM, and ERM. The other components for EMS will be retrieved from the "Trusted Builds" archived at Wyle Laboratories. Wyle Laboratories will have a SHA1 hash made of the resulting software files or disc images.

3.2 Equipment

This subsection categorizes the equipment the manufacturer has submitted for testing. 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.

Every effort is made to verify that equipment purported to be COTS, is in fact COTS, as defined by the VVSG, and that the COTS equipment has not been modified for use. Wyle Laboratories will perform research using the COTS equipment manufacturers' websites based on the serial and service tag numbers for each piece of equipment and will evaluate COTS hardware, system software and communications components for proven performance in commercial applications other than elections. For PCs and laptops, the service tag information is compared to the system information found on each machine. An external and internal physical analysis is also performed to the best of Wyle Laboratories' abilities when the equipment is easily accessible without the possibility of damage. Hard drives, RAM memory, and other components are examined to verify that the components match the information found on the COTS equipment manufacturers' websites.

The equipment that the manufacturer submitted for testing is listed in Table 3-1. Each test element is included in the list of the equipment required for testing of that element including system hardware, general purpose data processing, communications equipment, and any required test instrumentation.

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3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.2 Equipment (Continued)

Table 3-1 Unity 3.4.1.0 Voting System Equipment Description

Equipment	Description	Serial Numbers
Model 100 • Hardware v. 1.3 • Firmware v. 5.4.4.5	A precinct-based, voter-activated paper ballot tabulator that uses a proprietary recognition engine to detect completed ballot targets.	205071
DS200 • Hardware v. 1.2 • 512 Kb memory • Firmware v. 1.7.0.0	A digital scan paper ballot tabulator designed for use at the polling place level.	ES0108330180
DS200 • Hardware v. 1.2 • 1 Gb memory • Firmware v. 1.7.0.0	A digital scan paper ballot tabulator designed for use at the polling place level.	DS0110340480, TBD
DS200 • Hardware v. 1.2.3.0 • 512 Kb memory • Firmware v. 1.7.0.0	A digital scan paper ballot tabulator designed for use at the polling place level.	DS0113360186
DS200 • Hardware v. 1.3 • 2 Gb memory • Firmware v. 1.7.0.0	A digital scan paper ballot tabulator designed for use at the polling place level.	DS0313380006, DS0313350007
Model 650 • Hardware v. 1.1, 1.2 • Firmware v. 2.2.2.0	A high-speed, optical scan central ballot counter. During scanning, the Model 650 prints a continuous audit log to a dedicated audit log printer and can print results directly from the scanner to a second connected printer.	11027011
AutoMARK VAT A100 • Hardware v. 1.0 • Firmware v. 1.3.2907	ADA Ballot Marking Device	AM0106431607
AutoMARK VAT A200 • Hardware v.1.1, and 1.3 • Firmware v. 1.3.2907	ADA Ballot Marking Device	AM0308421809, AM0206443671
DS850 • Hardware v. 1.0 • Firmware v. 2.9.0.0	A high-speed, digital scan central ballot counter. During scanning, the DS850 prints a continuous audit log to a dedicated audit log printer and can print results directly from the scanner to a second connected printer.	DS850: DS8511090074 Cart: 58836.01 Laser Printer Oki B430dn: AK16009803A0 UPS APC-RS 1500: BB0907016404 Dot Matrix Printer Oki 420: AE72011780C0
Ballot Box Hardware v. 1.3, & 1.4	Plastic Ballot Box	T71013-BB-002, T71013-BB-003, T71013-BB-005, T59087-Box4, T71220-BB-001
Ballot Box Hardware v. 1.0, 1.1 , 1.2	Metal Box with/without Diverter	T71013-BB-001

3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.2 Equipment (Continued)

Table 3-1 Unity 3.4.1.0 Voting System Equipment Description (Continued)

Equipment	Description	Serial Number
Client PC	Dell OptiPlex 3010 Windows 7 Professional SP1	8L98FX1
Server PC	Dell PowerEdge T110 II Windows Server 2008 R2 SP1	BY6XHX1
Ballot on Demand Printer	OKI C9650	AF85027113A0
Report Printer	HP LaserJet 4050N	USQX074394
Headphones	Avid FV 60	HP-57936-1- 9

Table 3-2 Unity 3.4.1.0 Voting System Build Machine Description
(Equipment use: software witness and trusted builds)

Description of Equipment	Serial Number	Operating System
Dell OptiPlex 760	6DCKJG1	Windows XP SP3 or Vista
Dell Keyboard – Model L100	CN0RH659735716B402JS	N/A
Dell Mouse – Model XN966	HS847130DLE	N/A
ACER Monitor – Model AL1716	ETL460C005609012DCPY11	N/A
Dell Precision T3500	15TNMN1	Windows 7
Dell Keyboard – Model L100	CN0RH65965890660029T	N/A
Dell Mouse – Model DHY933	F0N002Y1	N/A
Dell OptiPlex GX110	20PW10B	QNX 4.22A
CPU Intel inside Xenon DELL	Dell 0T7570	Linux 6.2.5
Logitec keyboard (white) - Y-ST39	BTD40203069	---
Microsoft Intellimouse 1.3A PS/2 compatible	63618-OEM-3189502-1	---
Corsair Orbit PC	1112719 (D72500343200710)	---
WhiteSanport 17" Monitor model: H996 BBM	GK0M03C317000657	---
Logitec keyboard (white) - Y-SG13	MCT02201651	---
Microsoft Intellimouse 1.2A PS/2 compatible	63618-OEM-4593581-6	---

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3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.2 Equipment (Continued)

Table 3-2 Unity 3.4.1.0 Voting System Build Machine Description (Continued)
(Equipment use: software witness and trusted builds)

Description of Equipment	Serial Number	Operating System
Acer LCD Monitor AL1716 P/N: ET 1716B.012	ETL 480C00580900290PY11	---
CPU Intel inside Xenon DELL	Dell 0T7570	Linux
Dell Monitor	8176324	N/A
Keyboard	CN-OW7658-37172-584-06MV	None
Mouse	HCD45048365	None
Dell PC Monitor	500120	None
Dell Precision T3500	15TNMN1	Linux

3.3 Test Support Materials

This subsection lists any and all test support materials needed to perform voting system testing. The scope of testing determines the quantity of a specific material required. The test materials listed in Table 3-3 are required to support the Unity 3.4.1.0 System certification testing.

Table 3-3 Unity 3.4.1.0 System Test Support Materials

Test Material	Quantity	Make	Model
8 ½" X 11" Paper in Speed Loading Box (2700 Sheets)	4	Dot Matrix	951027
COTS Printer	1	EPSON LQ-590	FSQY140868
Security Seals	5000	Intab	800-0038R
Security Locks	20	E. J. Brooks	86022
	25	E. J. Brooks	6024
	50	American Casting Corp.	00561-03
	50	A. Rifkin	RIFSI
ES&S Pens	20	BIC	Grip Roller
Security Sleeves	7	ES&S	PS-S7-936-XX(1-7)
CF Card Reader	1	SanDisk	018-6305
Magnifier	3	---	---
Headphone Covers	30	---	---
Paddles (yes/no)	3	---	---
Transport Media (USB Flash Drives)	Delkin	512 MB Capacity	Wyle-assigned numbers: TM-XXX
	Delkin	1.0 GB Capacity	Wyle-assigned numbers: TM-XXX

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3.0 MATERIALS REQUIRED FOR TESTING (Continued)

3.3 Test Support Materials (Continued)

Table 3-3 Unity 3.4.1.0 System Test Support Materials (Continued)

Test Material	Quantity	Make	Model
	Delkin	2.0 GB Capacity	Wyle-assigned numbers: TM-XXX
	Delkin	4.0 GB Capacity	Wyle-assigned numbers: TM-XXX
	Delkin	8.0 GB Capacity	Wyle-assigned numbers: TM-XXX
Compact Flash	SanDisk	512 MB Capacity	Wyle-assigned numbers: CF-XXX
	SanDisk	1.0 GB Capacity	Wyle-assigned numbers: CF-XXX
	SanDisk	2.0 GB Capacity	Wyle-assigned numbers: CF-XXX
	Toshiba	1.0 GB Capacity	Wyle-assigned numbers: CF-XXX
PCMCIA	Vikant	512 KB Capacity	Wyle-assigned numbers: PCMCIA-XXX
	Centon	4 MB Capacity	Wyle-assigned numbers: PCMCIA-XXX

3.4 Deliverable Materials

The hardware and software components listed in Table 3-4 and the TDP documents listed in Section 4.6 are to be delivered as part of the Unity 3.4.1.0 System to the users.

Table 3-4 Deliverable Materials for Unity 3.4.1.0 System

Deliverable Material	Version	Description
AM	7.5.2.0	EMS
EDM	7.8.2.0	EMS
ESSIM	7.7.2.0	EMS
HPM	5.9.0.0	EMS
ERM	7.9.0.0	EMS
Log Monitor Service	1.1.0.0	EMS
AIMS	1.3.257	EMS
VAT Previewer	1.3.2907	EMS
Model 100	Firmware 5.4.4.5; Hardware 1.3	Optical scan precinct scanner
DS200	Firmware 1.7.0.0; Hardware 1.2, 1.2.3.0, 1.3	Precinct ballot scanner
AutoMARK	Firmware 1.3.2907; Hardware 1.0, 1.1 and 1.3	Voter Assist Terminal
Model 650	Firmware 2.2.2.0; Hardware 1.1, 1.2	Central ballot scanner
DS850	Firmware 2.9.0.0; Hardware 1.0	Central ballot scanner
Headphones	Avid FV 60	Stereo headphones

4.0 TEST SPECIFICATIONS

The certification testing of the Unity 3.4.1.0 System is to the configuration submitted in the EAC application ESS1301.

Wyle Laboratories' qualified personnel involved with certification testing performed on the manufacturer's voting system will follow Wyle Laboratories' procedures for testing. Results are used to determine if the system has met and passed the specific test cases associated with those procedures based on EAC 2005 VVSG and EAC Testing and Certification Program Manual.

This test campaign is based on the previous test campaign conducted for the ES&S Unity 3.4.0.0 System, the results of which are documented in Wyle Laboratories' Test Report No. T58722.01-01, Rev. B. During this test campaign, the ES&S Unity 3.4.0.0 System was tested and found to be in conformance with the United States Federal Election Commission (FEC) 2002 Voting System Standards (VSS) and all applicable EAC 2005 Voluntary Voting Systems Guidelines (VVSG). Per Section 4.4.2.3 of the EAC Testing and Certification Program Manual, all testing on the modifications to the system will be tested to the 2005 VVSG; however, pending successful completion of this test campaign, the system will only be granted a 2002 VSS certification since the system, as a whole, will not be tested to the 2005 VVSG.

The following list contains EAC Request for Interpretations (RFI) and Notice of Clarifications (NOC) that will be incorporated in the test campaign:

Requests for Interpretation

2103-04 EAC Decision on Usability Testing

2013-03 EAC Decision on Timestamps

2013-02 EAC Decision on Audio Presentation Volume Levels

2013-01 EAC Decision on the Extensions Clause

2012-06 EAC Decision on Use of Public Telecommunications Networks and Data Transmission

2012-05 EAC Decision on Public Telecommunications and Cryptography

2012-04 EAC Decision on Software Setup Validation

2012-03 EAC Decision on Configuration of COTS Products

2012-02 EAC Decision on Transmission of Results (Official and Unofficial Results)

2012-01 EAC Decision on Ballot Handling – Multi-feed

2012-02 EAC Decision on Clarification of System Identification Tool Functionality

2012-03 EAC Decision on Configuration Management of COTS Products

2010-08 EAC Decision on Calling Sequence

2010-07 EAC Decision on Module Length

2010-06 EAC Decision on DRE Accessibility Requirements and Other Accessible Voting stations

2010-05 EAC Decision on Testing of Modifications to a Certified System

2010-04 EAC Decision on Functional Requirements with Respect to Security

2010-03 EAC Decision on Database Coding Conventions

2010-02 EAC Decision on Coding Conventions

2010-01 EAC Decision on Voltage Levels and ESD Test

4.0 TEST SPECIFICATIONS (Continued)

Requests for Interpretation (Continued)

2009-06 EAC Decision on Temperature and Power Variation

2009-05 EAC Decision on T-Coil Requirements

2009-04 EAC Decision on Audit Log Events

2009-03 EAC Decision on Battery Backup for Central Count Systems

2009-02 EAC Decision on Alternate Languages

2009-01 EAC Decision on VVPAT Accessibility New

2008-12 EAC Decision on Ballot Marking Device/Scope of Testing

2008-10 EAC Decision on Electrical Fast Transient

2008-09 EAC Decision on Safety Testing

2008-08 EAC Decision on Automatic Bar Code Readers

2008-07 EAC Decision on Zero Count to Start Election

2008-06 EAC Decision on Battery Backup for Central Count

2008-05 EAC Decision on Durability

2008-04 EAC Decision on Supported Languages

2008-03 EAC Decision on OS Configuration

2008-02 EAC Decision on Battery Backup for Optical Scan Voting Machines

2008-01 EAC Decision on Temperature and Power Variation

2007-06 EAC Decision on Recording and Reporting Undervotes

2007-05 EAC Decision on Testing Focus and Applicability

2007-04 EAC Decision on Presentation of Alternative Language

2007-03 EAC Decision on Summative Usability Testing

2007-02 EAC Decision on Variable Names

2007-01 EAC Decision on Accessible Design

Notices of Clarification

NOC 2012-02 – Clarification of System Identification Tool Functionality

NOC 2012-01 – Clarification of COTS Product Equivalency for De Minimis Change

NOC 2012-02 – Decision on Transmission of Results (Official and Unofficial Results)

NOC 2011-01 – Clarification of De Minimis Change Determination Requirements Related to Data

NOC 2009-005 – Development and Submission of Test Plans for Modifications to EAC Certified Systems

NOC 2009-004 – Development and Submission of Test Reports

NOC 2009-003 – De Minimis Change Determination Requirement

NOC 2009-002 - Laboratory Independence Requirement

NOC 2009-001 - Requirements for Test Lab Development and Submission of Test Plans

4.0 TEST SPECIFICATIONS (Continued)

Notices of Clarification (Continued)

NOC 2008-003 - EAC Conformance Testing Requirements

NOC 08-002 - EAC Mark of Certification

NOC 2008-001 - Validity of Prior Non-core Hardware Environmental and EMC Testing

NOC 2007-005 - Voting System Test Laboratory Responsibilities in the Management and Oversight of Third Party Testing

NOC 2007-004 - Voting System Manufacturing Facilities

NOC 2007-003 - State Testing Done in Conjunction with Federal Testing within the EAC Program

NOC 2007-002 - VSTL Work with Manufacturers Outside of Voting System Certification Engagements

NOC 2007-001 - Timely Submission of Certification Application

4.1 Requirements (Strategy of Evaluation)

To evaluate the system test requirements, each section of the EAC 2005 VVSG will be analyzed to determine the applicable tests. The EAC 2005 VVSG Volume I Sections, along with the strategy for evaluation, are described below:

- **Section 2: Functional Requirements** – The requirements in this section will be tested during the FCA utilizing the "Wyle Baseline Test Cases" along with test cases specially designed for the ES&S Unity 3.4.1.0 System. The data input during these tests will be based on the predefined election definitions submitted as part of the Test Plan Package.
- **Section 3: Usability and Accessibility** – The requirements in this section will be tested during this test campaign on the DS200 tabulator. These tabulators were previously certified under the 2002 VSS, and during this campaign the tabulators will be verified to meet the Usability and Accessibility requirements of the 2005 VVSG.
- **Section 4: Hardware Requirements** – The requirements in this section will be evaluated utilizing data obtained during prior VSTL test campaigns.
- **Section 5: Software Requirements** – The requirements in this section will be tested during source code review, TDP review, and FCA. A combination of review and functional testing will be performed to ensure these requirements are met.
- **Section 6: Telecommunication** – The requirements in this section will not be tested during this test campaign because telecommunications are disabled for the Unity 3.4.1.0 system.
- **Section 7: Security Requirements** – The requirements in this section will be tested during source code review, FCA, and Security Tests.
- **Section 8: Quality Assurance (QA) Requirements** – The requirements in this section will be tested throughout the test campaign via various methods. TDP review will be performed on ES&S QA documentation to determine compliance to EAC 2005 VVSG requirements and the requirements stated in the ES&S QA Program document. All source code will be checked to ensure that proper QA documentation has been completed. All equipment received for initial testing and follow up testing will be checked against ES&S documentation to ensure their QA process is being followed. Wyle Laboratories' personnel will complete the requirements of EAC 2005 VVSG Vol. 2 Section 7,

4.0 TEST SPECIFICATIONS (Continued)

4.1 Requirements (Strategy of Evaluation)

Quality Assurance Testing and Section 1.3.1.5, Focus of Vendor Documentation that requires Wyle Laboratories' personnel to physically examine documents at ES&S's location or conduct an external evaluation utilizing equipment, documents and support information provided by ES&S during the test campaign.

- **Section 9: Configuration Management (CM) Requirements** – The requirements in this section will be tested throughout the test campaign. TDP review will be performed on the ES&S configuration management documentation to determine EAC 2005 VVSG compliance and to further determine whether ES&S is following its documented CM requirements within the TDP. Any anomalies will be formally reported to ES&S and the EAC. Wyle Laboratories' personnel will conduct an audit of the ES&S CM Program at the ES&S facility at the conclusion of the test campaign

Wyle Laboratories' personnel shall maintain a test log of the procedure(s) employed. This log identifies the system and equipment by model and serial number. In the event that the project engineer deems it necessary to deviate from requirements pertaining to the test environment, the equipment arrangement and method of operation, the specified test procedure, or the provision of test instrumentation and facilities, the deviation shall be recorded in the test log. (A discussion of the reasons for the deviation and the effect of the deviation on the validity of the test procedure shall also be provided and approved.)

Wyle Laboratories utilizes an internal bug tracking system in order to capture and track all issues and discrepancies found during the testing campaign. This allows for all issues and discrepancies to be monitored for reoccurrence, tracks the root cause analysis, and provides a resolution status. Wyle Laboratories shall verify all items logged into the bug tracking system are resolved prior to the completion of testing and before any recommendation may be made for certification.

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

The specific Wyle WoP to be used during the test include the following:

- WoP 1 Operations Status Checks
- WoP 2 Receipt Inspection
- WoP 3 Technical Data Package Review (limited)
- WoP 4 Test Plan Preparation *(This document)*
- WoP 5a-d Source Code Review
- WoP 6 Security
- WoP 7 Trusted Build
- WoP 24 1 – 1g Usability
- WoP 24 2 – 2h Accessibility
- WoP 25 Physical Configuration Audit

4.0 TEST SPECIFICATIONS (Continued)

4.1 Requirements (Strategy of Evaluation)

- WoP 26 Functional Configuration Audit
- WoP 27 Maintainability
- Wop 28 Availability
- Wop 29 Electrical Supply
- WoP 30 System Integration Test
- WoP 34 Test Report
- WoP 41 Logic & Accuracy

4.2 Hardware Configuration and Design

The ES&S Unity 3.4.1.0 System is a paper-based precinct voting system using touch screen and scan technology to scan and validate ballots, provide voter-assisted ballots, and tabulate precinct results. The ES&S Unity 3.4.1.0 System consists of an election management system (an application suite consisting of AM, AIMS, EDM, ESSIM, HPM, ERM, Log Monitor Service, and VAT Previewer); the M100 and the DS200 are voting devices that scan, validate and tabulate voter ballots at the precinct level; either the AutoMARK Model A100 or A200 are voter assisted terminal to facilitate special needs voters; the DS850 and M650, both are high-speed scanners to process large batches of ballots at a central location.

In the ES&S Unity 3.4.1.0 System all EMS functions are handled by proprietary software running on COTS PC/Laptops. Wyle Laboratories has determined that these COTS, PC/Laptops are not subject to the hardware test requirements per the EAC 2005 VVSG per "2007-05 Decision on Testing Focus and Applicability." The provided PC/Laptops documented in Section 3, Materials Required For Testing all contained CE, UL, and FCC labeling.

4.3 Software System Functions

The Unity 3.4.1.0 Voting System software is comprised of multiple applications written in many languages. The system software is broken down into four areas: EMS, Precinct tabulator software acting as firmware, central count software running as firmware and ADA device software running as firmware. The main components and their subcomponents are as follows:

- AIMS
- AM
- Log Monitor
- HPM
- EDM
- ESSIM
- ERM
- DS200 – CoNG, HAL, PresentationLayer
- DS850 – CoNG, MCP, UI
- M100
- M650
- AutoMARK™

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design

Wyle Laboratories uses the V-Model Life Cycle as defined by the Institute of Electrical and Electronics Engineers (IEEE). The IEEE definition of the V-Model Life Cycle uses two concepts "Verification" and "Validation." Wyle Laboratories' test approach is to use both "Verification" and "Validation" to some degree. There are four basic levels of testing in the V-Model Life Cycle: Component, Integration, System, and Acceptance. Wyle Laboratories will be evaluating the ES&S Unity 3.4.1.0 to all four levels.

4.4.1 Hardware Qualitative Examination Design

Wyle Laboratories performed EMC and Environmental Testing on the DS200 Version 1.3 during the FL EVS 4.5.0.0 effort and will utilize this testing data to satisfy the hardware testing for the Unity 3.4.1.0 DS200. Based on the results of the examination, the summary of acceptable testing is provided in Table 4-1. The M100, M650, DS850, and AutoMARK remain unchanged and compliant with previously tested versions. Wyle has determined no additional hardware testing will be included within this campaign outside of the DS200.

Table 4-1 Hardware Test Examination Results

Test/EAC 2005 VVSG Section	Procedure/Description	Configuration Tested	Reuse Status	Test Date
Electromagnetic Radiation/4.1.2.9	FCC Part 15 Class B for both radiated and conducted emissions	DS200	Accept	9/2013
Low Temperature/4.1.2.14	MIL-STD-810D minimum temperature shall be -4 degrees F	DS200	Accept	9/2013
Vibration/4.1.2.14	MIL-STD-810D, Meth0d 514.3 physical shock and vibration during handling and transport	DS200	Accept	9/2013
Lightning Surge/4.1.2.7	IEC 61000-4-5 (1995-02)	DS200	Accept	9/2013
High Temperature/4.1.2.14	MIL-STD-810D, Method 501.2 maximum temperature shall be 140 degrees F	DS200	Accept	9/2013
Bench Handling	MIL-STD-810D, Method 516.3 Procedure VI six 4" drops on each edge totaling 24 drops	DS200	Accept	10/2013

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.1 Hardware Qualitative Examination Design (Continued)

Table 4-1 Hardware Test Examination Results (Continued)

Test/EAC 2005 VVSG Section	Procedure/Description	Configuration Tested	Reuse Status	Test Date
Electrical Fast Transient/4.1.2.6	IEC 61000-4-4	DS200	Accept	9/2013
Humidity Test/4.1.2.14	MIL-STD-810D, Method 501.2 ten 24 hour humidity cycles	DS200	Accept	9/2013
Electrostatic Disruption/4.1.2.8	IEC 61000-4-2 (1995-01) 15kV air discharge and 8kV contact discharge	DS200	Accept	10/2013
Electromagnetic Susceptibility/4.1.2.10	IEC 61000-4-3 electromagnetic field of 10V/m modulated by a 1kHZ, 80% AM modulation at 80MHz to 1000MHz frequency	DS200	Accept	9/2013
Conducted RF Immunity/4.1.2.11	IEC 61000-4-6 (1996-04) conducted radio frequency energy	DS200	Accept	9/2013
Magnetic Fields Immunity/4.1.2.12	IEC 61000-4-8 (1993-06) AC magnetic fields of 30 A/m at 60Hz	DS200	Accept	9/2013
Electrical Power Disturbance/4.1.2.5	IEC 61000-4-11 (1994-06) power surges and dips	DS200	Accept	9/2013
Temperature/Power Variation/4.1.2.13	MIL-STD-810D, Method 502.2 and Method 501.2 163 hours at 50 degrees to 95 degrees	DS200	Accept	10/2013
Safety/4.3.8	UL 60950-1 product safety review	DS200	Accept	10/2013
Maintainability/4.3.4	The ease with which preventive maintenance actions can be performed	DS200	Reject	N/A
Electrical Supply/4.1.2.4	Meets voltage and power requirements of EAC 2005 VVSG Vol. 1 Section 4.1.2.4	DS200	Reject	N/A

4.4.1.1 Mapping of Requirements to Specific Interfaces

Please refer to the EAC online program requirements matrix.

4.4.2 Hardware Environmental Test Case Design

Hardware testing on the components of the ES&S Unity 3.4.1.0 System has been performed in previous test campaigns. Based on a review of the data, Wyle Laboratories has accepted the results of the previous hardware testing for all required hardware tests with the exception of the following which will be tested during this campaign:

- Maintainability
- Electrical Supply

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.3 Software Module Test Case Design and Data

Wyle Laboratories implements Component Level Testing during the FCA for each component and subcomponent, exercising the functionality of each component and subcomponent as designed and documented. Wyle Laboratories will utilize limited structural-based techniques (white-box testing) mainly in the area of Source Code Review, Compliance Builds, Security Testing and TPD Review. Wyle Laboratories will depend heavily on specification-based techniques (black-box testing) for the individual software components. The most common specification-based techniques applied to the ES&S Unity 3.4.1.0 System during the software testing portion of testing will be "equivalence partitioning" and "boundary value testing".

- "Equivalence Partitioning" is a technique to select a value within a given range and at least one value outside the given range as applied to a software function. This technique will be used for numeric ranges as well as non-numeric ranges throughout FCA to test for normal and abnormal conditions.

- "Boundary Value Testing" is a techniques used to identify minimum and maximum boundary errors as applied to software functions. This technique will be used for numeric ranges as well as non-numeric ranges throughout FCA to test for normal and abnormal conditions.

Wyle Laboratories will document an expected result for each test. The ACCEPT/REJECT criteria at the Component Level will be based on the expected result. If the System Under Test (SUT) performs as expected, the results will be accepted. If the SUT does not perform as expected, the test will be evaluated for tester error. If it is determined there was no tester error, the test will be repeated in an attempt to reproduce the results. If the results can be reproduced and the expected results are not met, the SUT will have failed the test. If the results cannot be reproduced, the manufacturer and VSTL will determine the root cause of the error. If the root cause has been corrected and the SUT performs as expected, then the results will be accepted. If the root cause cannot be determined, the problem has not been corrected, or the SUT still does not perform as expected, the SUT will have failed the test.

Wyle Laboratories will document the error and track the error through resolution. Wyle Laboratories will not move to the next level of testing until all documented errors are resolved to try and minimize errors that might occur farther along in the test campaign. Engineering analysis will be performed to determine what effect the resolution has on the component. A determination will be made whether Regression Testing will be sufficient or a complete re-test is necessary.

4.4.4 Software Functional Test Case Design and Data

Wyle Laboratories implements Integration Level Testing primarily focusing on the interface between components and applications. The test approach to be used for the ES&S Unity 3.4.1.0 System will be a bottom-up approach where the lower level components will be tested first and then used to facilitate the testing of higher-level components. The specification-based technique used by Wyle Laboratories at the Integration Level is "Use Case." The actors that have been identified to use the ES&S Unity 3.4.1.0 System are the following:

- Election Administrator – the actor with responsibility of entering the election definition with translation and audio. This actor is also responsible for maintaining EMS users and the election database.

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.4 Software Functional Test Case Design and Data (Continued)

- Warehouse Technician – the actor responsible for loading the election definition onto DS200, AutoMARK VAT, M100, M650, and DS850. This actor also runs diagnostic test and maintains the units.

- Poll Worker- the actor at the precinct location to set up and close down the DS200, AutoMARK VAT, M100, M650, and DS850 on Election Day.

- Voter – the actor who physically casts the ballot on Election Day.

- ADA Voter – the actor with special needs who has to vote unassisted on Election Day.

- Election Official – the actor who reports and audits the election result post-Election Day.

"Use Case" will be used during the FCA with a single pass through each component using only valid data. This pass will be considered the "Master Copy" of data to be passed between interfacing points of applications during Integration level testing. If a component downstream in the test process needs data from previous processes, the "Master Copy" of data can be used or altered to accelerate the test process. Known tests that will utilize the "Master Copy" of data at the Integration Level are Security and Usability.

If an error occurs between data interfaces or in the process flow, an engineering analysis will be performed to determine if the error is data, process, or tester error. The ACCEPT/REJECT criteria for Integration Level testing is whether the components and applications interface using the documented process for each actor. If there is an error interfacing between components, the error shall be documented and tracked through resolution. Engineering analysis shall be performed to determine what effect the resolution has on the component. A determination will be made whether regression testing will be sufficient or a complete re-test is necessary.

4.4.5 System Level Test Case Design

During System Level Testing, Wyle Laboratories will test the ability of proprietary software, hardware, and peripherals in addition to the COTS software, hardware, and peripherals as a complete system in a configuration of the systems for intended use. The ES&S Unity 3.4.1.0 System is intended to support both large and small jurisdictions. Wyle Laboratories' approach for the ES&S Unity 3.4.1.0 System will be to execute System Level Testing with a variety of elections that include various combinations of jurisdictions, parties and ballot styles.

The ACCEPT/REJECT criteria for System Level testing is whether the system can continue in testing. The two scenarios are: ACCEPT or REJECT. 'ACCEPT' is either 1) if no errors are found, or 2) if an error is encountered but the system continues to operate and engineering analysis determines that the root cause does not affect system testing. 'REJECT' if an error is encountered and the system is too unstable to continue or engineering analysis determines the root cause could affect further testing. If an error occurs during System Level Testing, the error shall be documented. If the ES&S Unity 3.4.1.0 System is able to recover and continue, the test will continue. If the error causes the system to become unstable, the test shall be halted. All errors documented during System Level Testing shall be tracked through resolution.

4.0 TEST SPECIFICATIONS (Continued)

4.4 Test Case Design (Continued)

4.4.5 System Level Test Case Design (Continued)

The engineering analysis shall be performed to determine what effect the resolution has on the system. A determination shall be made by Wyle Laboratories' senior level engineer whether regression testing shall be sufficient or a complete re-test is necessary.

Wyle Laboratories implements Acceptance Level Testing focusing on all the data collected during the entire test campaign along with performing the "Trusted Build" for the system. All data from pre-testing, hardware testing, software testing, functional testing, security testing, volume testing, stress testing, telecommunication testing, usability testing, accessibility testing, and reliability testing activities will be combined to ensure all requirements that are supported by the ES&S Unity 3.4.1.0 System in the EAC 2005 VVSG have been tested. All requirements will be checked against the test data to ensure the EAC 2005 VVSG requirements are met. Items not supported by the ES&S Unity 3.4.1.0 System will be documented. Any issues documented during testing will be resolved or annotated in the test report.

Wyle Laboratories will test every EAC 2005 VVSG requirement supported by the ES&S Unity 3.4.1.0 System. Wyle Laboratories will report all issues discovered during this test campaign to ES&S and the EAC. If Wyle Laboratories determines there is not enough data to ensure a requirement was met, the test plan will be altered and further testing will be done. The EAC has the final decision as to whether the system meets all the requirements for an EAC-certified system. Wyle will either recommend approval, if the system meets all applicable sections of the VVSG or recommend disapproval if the system does not meet all applicable sections of the VVSG.

4.5 Security Functions

The purpose of the security testing shall be to evaluate the effectiveness of the Unity 3.4.1.0 Voting System in detecting, preventing, logging, reporting and recovering from any security risks identified by simulating attacks on the system. To accomplish this, Wyle has developed internal operating procedures to evaluate the Unity 3.4.1.0 Voting System to the security requirements set forth in the EAC 2005 VVSG. These procedures have been specifically tailored to assess the Unity 3.4.1.0 Voting System to the applicable requirements. Wyle Laboratories will attempt to defeat the access controls and physical security measures documented in the ES&S technical data package. A threat matrix shall be created to determine the risks and vulnerabilities.

Wyle Laboratories will utilize a combination of functional testing, source code review, and Fortify SCA to evaluate the Unity 3.4.1.0 Voting System. Wyle Laboratories will report all issues discovered during this test campaign to ES&S and the EAC. A report containing all findings shall be issued to the EAC as an addendum to the final test report.

4.6 TDP Evaluation

Wyle Laboratories' qualified personnel will perform a review of the ES&S TDP to determine compliance to the EAC 2005 VVSG, EAC requirements, and ES&S-specific requirements. The focus of this review will be on any modifications made to the TDP documents due to the changes in the system from Unity 3.4.0.0 and Unity 3.4.1.0.

4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation (Continued)

During the TDP review process, each document will be reviewed for completeness, clarity, and correctness as well as continuity between the TDP documents. The findings will be communicated to ES&S for resolution on a regular basis to keep current. All revised documents received will be checked for corrections. The TDP will be continuously reviewed during the entire testing process as these documents will be utilized to set up the systems, verify correct operational results and numerous other tests. At the end of the TDP review process, an Anomaly Report will be issued listing all non-compliance on an individual basis. A listing of all documents contained in the ES&S Unity 3.4.1.0 System TDP is provided in Table 4-2.

Table 4-2 Unity 3.4.1.0 TDP Documents

Unity 3.4.1.0 TDP Documents	Version	Doc No.	Document Code
Voting System Overview	1.0	01-01	U3410_C_D_0100_SysOvr
System Functionality Description			
System Functionality Description	1.0	02-01	U3410_C_D_0200_SFD
System Hardware Specification			
DS200 Engineering Hardware Specification – Hardware Revision 1.2	1.0	03-01	DS200HW_M_SPC_0312_HWSpec
DS200 Engineering Hardware Specification – Hardware Revision 1.3	1.0	03-02	DS200HW_M_SPC_0313_HWSpec
DS850 Engineering Hardware Specification	1.0	03-03	DS850HW_M_SPC_0310_HWSpec
System Hardware Specification – Model 100	3.0	03-04	M100HW_M_SPC_0313_HWSpec
System Hardware Specification – Model 650	3.0	03-05	M650HW_M_SPC_0312_HWSpec
Software Design and Specification			
Coding Standards	1.0	04-01	ESSSYS_D_D_0100_Coding Standards
ES&S System Development Program	1.0	04-02	ESSSYS_SG_P_1000_SystemDevProgram
Software Design Specifications – Audit Manager	1.0	04-03	U3410_SDS00_AM
Audit Manager Appendix – County Model	--	04-03	U3410_SDS00_AM01_CountyModel
Software Design Specifications – DS200	1.0	04-04	U3410_SDS00_DS200
Software Design Specifications – DS850	1.0	04-05	U3410_SDS00_DS850
Software Design Specifications – Election Data Manager	1.0	04-06	U3410_SDS00_EDM
Election Data Manager Appendix – County Model	--	04-06	U3410_SDS00_EDM01_CountyModel

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4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation (Continued)

Table 4-2 Unity 3.4.1.0 TDP Documents (Continued)

Unity 3.4.1.0 TDP Documents	Version	Doc No.	Document Code
Software Design and Specification			
Election Data Manager Appendix – Election Model	--	04-06	U3410_SDS00_EDM02_ElectionModel
Software Design Specifications – Election Reporting Manager	1.1	04-07	U3410_SDS00_ERM
Election Reporting Manager Appendices	--	04-07	U3410_SDS00_ERM01_Appendices
Software Design and Specification – ES&S Ballot Image Manager	1.0	04-07	U3410_SDS00_ESSIM
Software Design and Specification – Hardware Programming Manager	1.0	04-08	U3410_SDS00_HPM
Hardware Programming Manager Appendices	1.0	04-08	U3410_SDS00_HPM01_Appendices
Software Design Specifications – LogMonitor	3.0	04-09	U3410_SDS00_LogMonitor
Software Design Specifications – Model 100	1.0	04-10	U3410_SDS00_M100
Software Design Specifications – Model 650	3.0	04-11	U3410_SDS00_M650
Ballot Image Processing Specification	1.0	04-12	U3410_SDS02_BallotImageProcessingSpec
Ballot Data File Specification	--	04-13	U3410_SDS01_FS_BDF
Ballot Set Collection File Specification	--	04-13	U3410_SDS02_FS_BSC
EDMXML File Specification	--	04-13	U3410_SDS03_FS_EDMXML
EL80 File Specification	--	04-13	U3410_SDS04_FS_EL80
ESSCRYPT Functional Specification	--	04-13	U3410_SDS05_FS_ESSCRYPT
ESSDECPT Functional Specification	--	04-13	U3410_SDS06_FS_ESSDECPT
ESSXML File Specification	--	04-13	U3410_SDS07_FS_ESSXML
Interface (IFC) File Specification	--	04-13	U3410_SDS08_FS_IFC
Language Data File Specification	--	04-13	U3410_SDS09_FS_LDF
Model 650 Output File Specification	--	04-13	U3410_SDS10_FS_M650 OUTPUT
System Test/Verification Specification			
System Test Plan	1.0	05-01	U3410_QA_D_0500_SysTestPlan
ISO/IEC 25062 Common Industry Format for Usability Test Report - ES&S AutoMARK Voter Assist Terminal (VAT)	1.X	05-02	AMVATHW_P_D_0510_CIFRptAMVAT
ISO/IEC 25062 Common Industry Format for Usability Test Report – DS200 Precinct Ballot Scanner	1.2.1	05-02	DS200HW_P_D_0512_CIFRptDS200

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4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation (Continued)

Table 4-2 Unity 3.4.1.0 TDP Documents (Continued)

Unity 3.4.1.0 TDP Documents	Version	Doc No.	Document Code
System Security Specification			
Voting System Security Specification	1.0	06-01	U3410_SSS00
Security Script Description	1.0	06-02	U3410_SSS02.01_SecScriptDesc
Hardening Procedures for the Election System	1.0	06-03	U3410_SSS02_HardeningProcedures
Ballot on Demand – Printer Setup & Printing Procedures	1.0	07-01	U3410_ESSIM02_BOD
System Operation Procedures			
Audit Manager User's Guide	1.0	07-02	U3410_SOP00_AM
DS200 Operator's Guide	1.0	07-03	U3410_SOP00_DS200
DS850 Operator Guide	1.0	07-04	U3410_SOP00_DS850
Election Data Manager Operator's Guide	1.0	07-05	U3410_SOP00_EDM
Election Reporting Manager User's Guide	1.0	07-06	U3410_SOP00_ERM
ES&S Image Manager User's Guide	1.0	07-07	U3410_SOP00_ESSIM
Hardware Programming Manager User's Guide	1.0	07-08	U3410_SOP00_HPM
ES&S LogMonitor System Operations Procedures	1.0	07-09	U3410_SOP00_LogMonitor
M100 Operator Guide	1.0	07-10	U3410_SOP00_M100
ES&S Model 650 System Operation Procedures	1.0	07-11	U3410_SOP00_M650
System Maintenance Manuals			
System Maintenance Manual – DS200	1.0	08-01	U3410_SMM00_DS200
System Maintenance Manual – DS850	1.0	08-02	U3410_SMM00_DS850
System Maintenance Manual – Model 100	1.0	08-03	U3410_SMM00_M100
System Maintenance Manual – DS850	1.0	08-04	U3410_SMM00_M650
Personnel Deployment			
Personnel Deployment and Training Program	1.0	09-01	ESSSYS_T_D_0900_TrainingProgram
Configuration Management Plan			
Configuration Management Plan	2.0	10-1	ESSSYS_CMP_P_1000_ESSCMProgram
ES&S Technical Documentation Program	3.0	10-2	ESSSYS_DOC_P_1000_TDProgram
QA Program			
Manufacturing Quality Assurance Program	1.0	11-01	ESSSYS_M_P_1000_MNFQualityAssurance Plan
Software Quality Assurance Program	1.0	11-02	ESSSYS_Q_P_0100-SoftwareQualityAssuranceProgram

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4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation (Continued)

Table 4-2 Unity 3.4.1.0 TDP Documents (Continued)

Unity 3.4.1.0 TDP Documents	Version	Doc No.	Document Code
System Maintenance Manuals			
Software Firmware Acceptance Checklist	---	11-03	ESSSYS_Q_C_SWF01_Software_Firmware_ Acceptance
DS850 Acceptance Checklist	---	11-04	850_AccptChklst_revC
DS850 Onsite Acceptance Checklist	---	11-05	850_OAccptChklst_revB
AutoMARK Acceptance Checklist	---	11-06	AutoMark_AccptChklst_001_Rev.A
AutoMARK QC Checklist	---	11-07	AutoMark_QC_Chklst_001Rev.A
Quality Control Sheet for the DS200 Carrying Case	---	11-08	Carrying Case QC sheet rev 1.0
DS200 Acceptance Checklist	---	11-09	DS200_AccptChklst_001RevB
M100 Quality Control Checklist	---	11-10	M100_DemoQAChklst_001Rev.A
M650 Quality Control Checklist	---	11-11	M650_QAChklst_001Rev.A
System Change Notes			
Unity 3.4.1.0 System Change Notes	1.0	12-01	U3410_DOC_D_0100_ReleaseNotes
Attachments			
ES&S Ballot Production Guide	5.0	13-01	U3410_ORPT02_BallotProductionGuide
AIMS and AutoMARK Technical Data Packages			
AIMS Cover Page	---	14-00	AIMS 3410 Sect00A Cover Page
AIMS Table of Contents	---	14-00	AIMS 3410 Sect00B TDP TOC
AIMS Requirements Trace Matrix	---	14-00	AIMS 3410 Sect00C Requirements Trace Matrix AQS-13-5000-203-R
AIMS Release Notes	---	14-00	AIMS 3410 Sect00D Release Notes AQS-13-5002-204-R
AIMS System Overview	10	14-01	AIMS 3410 Sect01 System Overview AQS-13-5002-200-R
AIMS System Functionality	9	14-02	AIMS 3410 Sect02 System Functionality AQS-13-5001-201-R
AIMS System Hardware Specifications	8	14-03	AIMS 3410 Sect03 System Hardware Specification AQS-13-5000-201-R
AIMS Compact Flash Memory Card Design Specifications	8	14-04	AIMS 3410 Sect04 AutoMark Compact FMC Specs AQS-13-5001-008-R
AIMS Programming Specifications Details	7	14-04	AIMS 3410 Sect04 Programming Specifications Details AQS-13-5001-212-R
AIMS Software Design Specifications	9	14-04	AIMS 3410 Sect04 Software Design Specifications AQS-13-5001-202-R
AIMS Election Official's Guide	24	14-05	AIMS 3410 Sect05 Election Officials Guide AQS-13-5001-208-R 07
AIMS System Operations Procedures	8	14-05	AIMS 3410 Sect05 System Operations Procedures AQS-13-5011-200-R
AIMS System Security Specifications	9	14-06	AIMS 3410 Sect06 System Security Specification AQS-13-5002-201-R

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4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation (Continued)

Table 4-2 Unity 3.4.1.0 TDP Documents (Continued)

Unity 3.4.0.0 TDP Documents	Version	Doc No.	Document Code
AIMS and AutoMARK Technical Data Packages (Continued)			
AIMS Quality Assurance Policy & Procedures	9	14-07	AIMS 3410 Sect07 Quality Assurance Policy & Procedures AQS-13-5011-000-R
AIMS Quality Assurance Test Cases	10	14-07	AIMS 3410 Sect07 Quality Assurance Test Cases AQS-13-5011-002-R
AIMS Quality Assurance Test Procedures	8	14-07	AIMS 3410 Sect07 Quality Assurance Test Procedures AQS-13-5011-001-R
AIMS Configuration Management Plan	8	14-08	AIMS 3410 Sect08 Configuration Management Plan AQS-13-5020-200-R
AIMS System Change Notes	30	---	AIMS 3410 System Change Notes AQS-13-3010-002-A
AIMS Software Compilation Instructions	3	---	AutoMARK AIMS Software Compilation Instructions
ATS Corrective Action Control Log	---	---	ATS Corrective Action Log AQS-13-5011-004-R
ATS Design Review Attendance Sheet	---	---	ATS Design Review Attendance Form AQS-13-2020-005-R
ATS Design Review Minutes Form	---	---	ATS Design Review Minutes Form AQS-13-2020-004-R
ATS Document Change Order Form	---	---	ATS DocChange Order Form AQS-13-2020-001-F
ATS Document Change Control Form	---	---	ATS Document Change Control Form AQS-13-2020-006-R
ATS Engineering Change Order Change Form	---	---	ATS Engineering Change Order Change Request Form AQS-13-2020-002-F
ATS System Bug Report – Online Version	---	---	ATS System Bug Report form online version AQS-13-2020-000-F
ATS Quality System Master Audit Schedule	---	---	AutoMARK Quality Systems Audit Schedule AQS-13-5020-003-F
ATS Quality System Procedures Master List	---	---	AutoMARK QSP Master List AQS-13-5010-008-F
ATS Bug Report – Hard Copy	---	---	Bug Report hard copy AQS-13-2020-003-R
AutoMARK Release Notes	20	---	AutoMARK 3410 Release Notes AQS-13-5002-205-R
AutoMARK VAT Requirements Trace Matrix	1	---	AutoMARK 3410 Requirement Trace Matrix AQS-13-5000-003-F
AutoMARK System Change Notes	96	---	AutoMARK 3410 System Change Notes AQS-13-3010-001-A
AutoMARK Technical Data Package – Table of Contents	---	---	AutoMARK 3410 TDP TOC

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4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation (Continued)

Table 4-2 Unity 3.4.1.0 TDP Documents (Continued)

TDP Documents	Version	Doc No.	Document Code
AIMS and AutoMARK Technical Data Packages (Continued)			
AutoMARK System Introduction	8	14-01	AutoMARK 3410 System Introduction AQS-13-5001-000-R
AutoMARK System Overview	10	14-01	AutoMARK 3410 System_Overview AQS-13-5002-000-S
AutoMARK System Functionality	10	14-02	AutoMARK 3410 System Functionality AQS-13-5001-001-R
AutoMARK System Hardware Specification	8	14-03	AutoMARK 3410 System Hardware Specification AQS-13-5000-001-F
AutoMARK 1.1 - 1.2 BOM	---	14-03	U3401_SHS01_AutoMARK1.1-1.2 BOM
AutoMARK 1.3 BOM	---	14-03	U3401_SHS01_AutoMARK1.3 BOM
AutoMARK Cables Schematic	---	14-03	CABLE_PHASE2
AutoMARK Printer Engine Board Schematic	---	14-03	PEB_RevB
AutoMARK Power Supply Board Schematic	---	14-03	PSB_RevB
AutoMARK PI211MC-B4DR Schematic	---	14-03	Scanner_PI211MC-B4DR May04
AutoMARK Gas Gauge Board Schematic	---	14-03	SD_GGB_REV_A
AutoMARK Switch Interface Board Schematic	---	14-03	SD_GGB_REV_A
AutoMARK Ultrasonic Sheet Detector Schematic	---	14-03	USD-A-SCH
AutoMARK Ballot Image Processing Specification	9	14-04	AutoMARK 3410 Ballot Image Processing Specification AQS-13-5002-003-S
AutoMARK Ballot Scanning and Printing Specification	8	14-04	AutoMARK 3410 Ballot Scanning and Printing Specification AQS-13-5002-007-S
AutoMARK Driver API Specification	8	14-04	AutoMARK 3410 Driver API Specification AQS-13-5000-002-F
AutoMARK Embedded Database Interface Specifications	10	14-04	AutoMARK 3410 Embedded Database Interface Specifications AQS-13-5002-005-S
AutoMARK GUI Design Specifications	8	14-04	AutoMARK 3410 GUI Design Specifications AQS-13-5001-005-R
AutoMARK Operating Software Design Specifications	8	14-04	AutoMARK 3410 Operating Software Design Specifications AQS-13-5001-002-R
AutoMARK Programming Specifications Details	10	14-04	AutoMARK 3410 Programming Specifications Details AQS-13-5001-011-R

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4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation (Continued)

Table 4-2 Unity 3.4.1.0 TDP Documents (Continued)

TDP Documents	Version	Doc No.	Document Code
AIMS and AutoMARK Technical Data Packages (Continued)			
AutoMARK Rapid Application Development Methodology (RAD)	9	14-04	AutoMARK 3410 RAD Methodology AQS-13-5001-010-R
AutoMARK Software Design Specifications	9	14-04	AutoMARK 3410 Software Design Spec AQS-13-5001-004-S
AutoMARK Software Development Environment Specifications	9	14-04	AutoMARK 3410 Software Design Spec
AutoMARK Software Diagnostics Specifications	9	14-04	AutoMARK 3410 Software Diagnostics Specifications AQS-13-5000-004-F
AutoMARK Software Standards Specification	9	14-04	AutoMARK 3410 Software Standards Specification AQS-13-4000-000-S
AutoMARK System Security Specifications	11	14-05	AutoMARK 3410 System Security Specification AQS-13-5002-001-S
AutoMARK System Security Test Cases	9	14-05	AutoMARK 3410 System Security Test Cases AQS-13-5030-005-S
AutoMARK System Security Test Procedures	8	14-05	AutoMARK 3410 System Security Test Cases
AutoMARK Environmental Test Cases	10	14-06	AutoMARK 3410 Environmental Test Cases AQS-13-5030-001-F
AutoMARK Environmental Test Plan	10	14-06	AutoMARK 3410 Environmental Test Plan AQS-13-5020-001-F
AutoMARK Environmental Test Procedures	10	14-06	AutoMARK 3410 Environmental Test Procedure AQS-13-5010-013-F
AutoMARK Operations and Diagnostics Log Specifications	10	14-06	AutoMARK 3410 Operations and Diagnostic Log Specs AQS-13-5002-004-S
AutoMARK Operations Log Test Cases	9	14-06	AutoMARK 3410 Operations Log Test Cases AQS-13-5032-005-S
AutoMARK Operations Log Test Procedures	9	14-06	AutoMARK 3410 Operations Log Test Procedures AQS-13-5012-004-S
AutoMARK Software Quality Assurance Test Plan	8	14-06	AutoMARK 3410 SQA Test Plan AQS-13-5021-000-R
AutoMARK Software Quality Assurance Test Cases	10	14-06	AutoMARK 3410 SQA_Test_Cases AQS-13-5031-000-R
AutoMARK Software Quality Assurance Test Procedures	9	14-06	AutoMARK 3410 SQA_Test_Procedures AQS-13-5011-001-R
AutoMARK System Level Test Cases	9	14-06	AutoMARK 3410 System Level Test Cases AQS-13-5030-000-F
AutoMARK System Level Test Plan	8	14-06	AutoMARK 3410 System Level Test Plan AQS-13-5020-002-F
AutoMARK System Level Test Procedures	8	14-06	AutoMARK 3410 System Level Test Procedures AQS-13-5010-000-F
AutoMARK Jurisdiction Guide	13	14-07	AutoMARK 3410 Jurisdiction Guide AQS-13-5061-003-R
AutoMARK Poll Workers Guide	14	14-07	AutoMARK 3410 Poll Workers Guide AQS-13-5061-002-R

4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation (Continued)

Table 4-2 Unity 3.4.1.0 TDP Documents (Continued)

TDP Documents	Version	Doc No.	Document Code
AIMS and AutoMARK Technical Data Packages (Continued)			
AutoMARK Voters Guide	13	14-07	AutoMARK 3410 Voters Guide AQS-13-5061-001-R
AutoMARK System Installation and Maintenance Guide	16	14-08	AutoMARK 3410 System Installation and Maintenance Guide AQS-13-5010-001-F
ATS Employee Training Procedure	8	14-09	ATS 3410 Employee Training Procedure AQS-13-5010-012-F
AutoMARK Personnel Deployment and Training	9	14-09	AutoMARK 3410 Personnel Deployment and Training AQS-13-5000-000-F
AutoMARK VAT – Printer Engine Board Firmware Compilation Instructions	8	14-10	ATS 3410 AutoMARK PEB Firmware Compilation Instructions
AutoMARK Configuration Management Policy	9	14-10	ATS 3410 Configuration Management Policy AQS-13-2000-004-F
AutoMARK Software and Hardware Release Process	10	14-10	ATS 3410 Software and Hardware Release Process AQS-13-2011-000-R
AutoMARK Configuration Management Plan	9	14-10	AutoMARK 3410 Configuration Management Plan AQS-13-5020-000-F
AutoMARK Initial Software Installation Procedure	6	14-10	AutoMARK 3410 Initial Software Installation Procedure AQS-13-5012-008-S
AutoMARK VAT 1.3.2907 Software and Firmware Compilation Instructions	5	14-10	AutoMARK VAT 1.3.2907 Software and Firmware Compilation Instructions
AutoMARK Voter Assist Terminal (VAT) – Version 1.3 & 1.4 Firmware, Hardware & Windows CE Operating System Installation Instructions	5	14-10	AutoMARK VAT Firmware and Hardware Installation Instructions
AutoMARK VAT Software and Firmware Compilation Instructions	17	14-10	AutoMARK VAT Software and Firmware Compilation Instructions AQS-13-5013-000-A
Pre-Build Task List, ES&S AutoMARK Applications – VAT 1.3.2907	1.0	14-10	Unity_PreBuildTaskList_VAT_1.3.2907
Pre-Build Task List – ES&S AutoMARK Applications – VAT 1.3.2907, VAT Preview 1.3.2907	2.0	14-10	Unity_PreBuildTaskList_VAT_1.3.2907a
AutoMARK Component Storage and Handling Procedure	8	14-11	ATS 3410 Component Storage and Handling Procedure AQS-13-5010-007-F
AutoMARK Design Review Policy	7	14-11	ATS 3410 Design Review Policy AQS-13-2000-002-F

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4.0 TEST SPECIFICATIONS (Continued)

4.6 TDP Evaluation (Continued)

Table 4-2 Unity 3.4.1.0 TDP Documents (Continued)

TDP Documents	Version	Doc No.	Document Code
AIMS and AutoMARK Technical Data Packages (Continued)			
AutoMARK Document Change and Issue Procedure	8	14-11	ATS 3410 Document Change and Issue Procedure AQS-13-5010-004-F
AutoMARK Document Control Policy	8	14-11	ATS 3410 Document Control Policy AQS-13-2000-007-F
AutoMARK Engineering Change Request/ Change Order Process	9	14-11	ATS 3410 Engineering Change Request Change Order Process AQS-13-5010-010-F
AutoMARK Engineering Development Policy	8	14-11	ATS 3410 Engineering Development Policy AQS-13-2000-003-F
AutoMARK Purchasing Procedure	8	14-11	ATS 3410 Purchasing Procedure AQS-13-5010-011-F
AutoMARK Quality Assurance Policy	8	14-11	ATS 3410 Quality Assurance Policy AQS-13-2000-001-F
AutoMARK Quality System Audit Process	8	14-11	ATS 3410 Quality System Audit Process AQS-13-2010-001-F
AutoMARK Receiving Procedure	8	14-11	ATS 3410 Receiving Process AQS-13-5010-005-F
AutoMARK System (Bug Reporting) Procedure	8	14-11	ATS 3410 System Bug Reporting Procedure AQS-13-5010-006-F

4.7 Source Code Review

The strategy for evaluating ES&S Unity 3.4.1.0 will be based on the previously identified modification to the system. All changes from Unity 3.4.0.0 (ESSUnity3400) will be reviewed to the EAC 2005 VVSG coding standards and the manufacturer-supplied coding standards (**ESSSYS_D_D_0100_Coding Standards)**.

As the source code is received, a SHA1 hash value will be created for each source code file. The source code team will conduct a visual scan of each line of source code for an initial review and every line of modified source code for acceptance of all languages other than Java. For applications written in Java, Wyle will utilize automated tools (Checkstyle and NetBeans) to augment source code review. This is done to verify compliance of EAC 2005 VVSG coding standards or manufacturer -supplied coding standards. Each identified violation shall be recorded by making notes of the standards violation along with directory name, file name, and line number.

All identified violations will be recorded by making notes of the standards violation along with the directory name, file name, and line number. A technical report of all identified violations will be sent to ES&S for resolution on a regular basis. All revised source code will be checked for corrections until the final issue is resolved. At the end of the Source Code review process, an Anomaly Report will be issued listing all non-compliance on an individual basis to the EAC and ES&S. The results will be included in the final test report.

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4.0 TEST SPECIFICATIONS (Continued)

4.7 Source Code Review (Continued)

A "Compliance Build" will be built by Wyle from the reviewed source code using the Compliance Build Procedure to build iterative builds throughout the test campaign. This process follows the documented procedure in the EAC Testing and Certification Program Manual, Version 1.0, effective date January 1, 2007 with two exceptions: The image products will not be submitted to the EAC, and a manufacturer representative will not be required to be present or on-site for these builds. The next step in the source code review will be to create a "Trusted Build" from the approved source code.

Trusted Build Process

- Clean the build machine
- Retrieve the compliant source code
- Retrieve the installation media for OS, compilers, and build software
- Construct the build environment
- Create digital signatures of the build environment
- Load the compliant source code into the build environment
- Create a digital signature of the pre build environment
- Create a disk image of the pre-build environment
- Build executable code
- Create a digital signature of executable code
- Create a disk image of the post-build environment
- Build installation media
- Create a digital signature of the installation media
- Install executable code onto the system to validate the software/firmware
- Deliver source code with digital signature, disk image of pre-build environment with digital signatures, disk image of post-build environment with digital signatures, executable code with digital signatures, and installation media with signatures to the EAC Repository.

The "Trusted Build" for the ES&S Unity 3.4.1.0 System includes source code, data, and script files, in clear text form. The build also includes COTS software on commercially available media, COTS software downloaded by the VSTL, COTS software verified by digital signature from the software supplier, and picture and sound files in binary format provided by ES&S. The first step of the process is to clean the hard drives by writing zeros to every spot on the hard drive, so the drive is cleared of existing data. The operating system will then be loaded and the applications from the VSTL reviewed source along with the VSTL verified COTS software will be built. The final step is installing the applications on the hardware.

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4.8 QA and CM System Review

Both the ES&S QA Plan and CM Plan will be reviewed to determine compliance with EAC 2005 VVSG Volume II Section 2, and Volume I Sections 8 and 9, EAC stated requirements, and with the requirements of the internal ES&S documentation. Also, the ES&S TDP documentation package will be reviewed to determine if the ES&S QA Plan and the CM Plan are being followed. The results of the TDP review shall be entered on a spreadsheet as previously described in Section 4.6 of this test plan. The results of the TDP review, including the QA and CM compliance results of the Technical Data Package Review, will also be included in the final Test Report.

5.0 TEST DATA

5.1 Test Data Recording

All equipment utilized for test data recording shall be identified in the test data package. For hardware environmental and operational testing, the equipment shall be listed on the Instrumentation Equipment Sheet for each test. The output test data shall be recorded in an appropriate manner as to allow for data analysis. For source code and TDP reviews, results shall be compiled in output reports and submitted to ES&S for resolution.

Additionally, all test results, including functional test data, will be recorded on the relevant Wyle Laboratories' Operating Procedure and Test Cases. Results will also be recorded real-time in engineering log books. Incremental reports will be submitted to ES&S and the EAC at the completion of major test areas to communicate progress and results as deemed necessary by the stakeholders.

5.2 Test Data Criteria

Wyle will evaluate all test results and performance against the ES&S-provided technical documentation for the Unity 3.4.1.0 System and the requirements set forth in the EAC 2005 VVSG. The acceptable range for system performance and the expected results for each test case shall be derived from the Unity 3.4.1.0 System documentation and the 2005 VVSG. Per 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).

5.3 Test Data Reduction

Test data shall be processed and recorded in the relevant Wyle Operating Procedures and Test Cases. Results will also be recorded real-time in engineering log books.

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6.0 TEST PROCEDURES AND CONDITIONS

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

6.1 Facility Requirements

All testing will be conducted at the Wyle Huntsville, AL facility unless otherwise annotated. The Hardware environmental non-operating (storage) and operating testing will be conducted utilizing an adequately sized environmental test chamber or dynamic shaker system equipped with the required data gathering support equipment. All remaining operating hardware tests will 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 program will 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

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up

All voting machine equipment (hardware and software), shall be received and documented utilizing Wyle Laboratories' Receiving Ticket (WL-218, Nov'85) and proper QA procedures. When voting system hardware is received, Wyle Laboratories' Shipping and Receiving personnel will notify Wyle Laboratories' QA personnel. With Wyle Laboratories' QA personnel present, each test article will 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. All TDP and source code modules received will be inventoried and maintained by the Wyle Laboratories' Project Engineer assigned to testing.

For test setup, the system will be configured as would for normal field use. This includes connecting all supporting equipment and peripherals. Wyle Laboratories' personnel will properly configure and initialize the system, and verify that it is ready to be tested, by following the procedures detailed in the Unity 3.4.1.0 System technical documentation. Wyle Laboratories will develop an Operational Status Check to be performed prior to and immediately following each hardware test. Wyle Laboratories will develop the system performance levels to be measured during operational tests.

Wyle Laboratories has developed eight election definitions that shall be used during this test campaign:

Operational Status Check

This election definition will exercise the operational status of the equipment, during the operational tests, and prior to and immediately following the non-operational hardware tests.

Accuracy

The accuracy test insures that each component of the voting system can each process 1,549,703 consecutive ballot positions correctly within the allowable target error rate. The Accuracy test is designed to test the ability of the system to "capture, record, store, consolidate and report" specific selections and absences of a selection. The required accuracy is defined as an error rate. This rate is the maximum number of errors allowed while processing a specified volume of data. For paper-based voting systems, the ballot positions on a paper ballot must be scanned to detect selections for individual candidates and contests and the conversion of those selections detected on the paper ballot converted into digital data.

General Election: GEN-01

A basic election held in four precincts, one of which is a split precinct, containing nineteen contests compiled into four ballot styles. Five of the contests are in all four ballot styles. The other fifteen contests are split between at least two of the precincts with a maximum of four different contests spread across the four precincts. This election was designed to functionally test the handling of multiple ballot styles, support for at least two languages, support for common voting variations, and audio support for at least two languages.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

General Election: GEN-01 (Continued)

- 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: Yes
- Vote for N of M: Yes
- Recall Issues With Options: No
- Cumulative Voting: No
- Ranked Order Voting: No
- Provisional or Challenged Ballots: Yes
- Early Voting: No

This election was designed to functionally test the handling of multiple ballot styles, support for at least two languages, support for common voting variations, and audio support for at least two languages. Test Pattern 8 was chosen for audio input in an alternative language because it is a basic voting pattern using an ADA device. Test pattern 9 was chosen for audio input to demonstrate support for write-in voting using an ADA device. Test Pattern 3 was chosen for Spanish language input because it is a basic vote pattern using Spanish. Test Pattern 10 was chosen for Spanish language input because it exercises write-in using Spanish.

General Election: GEN-02

A basic election held in three precincts. This election contains fifteen contests compiled into three ballot styles. Ten of the contests are in all three ballot styles with the other five split across the three precincts. This election was designed to functionally test the handling of multiple ballot styles, support for ballot rotation, support for two languages, support for complex voting variations, and audio support for multiple languages.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

General Election: GEN-02 (Continued)

- Closed Primary: No
- Open Primary: No
- Partisan Offices: Yes
- Non-Partisan Offices: Yes
- Write-in Voting: Yes
- Primary presidential delegation nominations: No
- Ballot Rotation: Yes
- Straight Party Voting: No
- Cross-Party Endorsement: No
- Split Precincts: No
- Vote for N of M: Yes
- Recall Issues With Options: Yes
- Cumulative Voting: No
- Ranked Order Voting: Yes
- Provisional or Challenged Ballots: No
- Early Voting: Yes

This election was designed to functionally test the handling of multiple ballot styles, support for ballot rotation, support for two languages, support for complex voting variations, and audio support for multiple languages. The election will be an early voting election with at least one machine running all precincts. Voting options for overvoting and undervoting will be exercised. Ballots 7 and 16 were selected for Spanish based language input. Ballots 13 and 17 were selected for casting of ballot using the ADA Audio capability.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

General Election: GEN-03

A basic election held in two precincts. This election contains eight contests compiled into two ballot styles. Four of the contests are in both ballot styles. The other four contests are split between the two precincts.

This election was designed to functionally test the handling of multiple ballot styles, support for at least two languages, support for common voting variations, and audio support for at least three languages and an ADA binary input device.

- 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: 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: Yes
- Early Voting: No

This election was designed to functionally test the handling of multiple ballot styles, support for at least three languages including a character-based language, support for common voting variations, and audio support for at least three languages and an ADA binary input device. Test patterns 3 and 4 were chosen for input in the Spanish language because they are a basic voting pattern with a write-in. Test patterns 5 and 6 were chosen for audio input using the Spanish language to demonstrate support for write-in voting using an ADA device with and alternative language. Test pattern 7 was chosen for character-based language input because it is a basic vote pattern using Chinese. Test pattern 8 was chosen for character-based language using an ADA device to demonstrate support for character-based ADA device support. Test pattern 9 was chosen for binary input to show support for ADA binary input device. Test pattern 10 was chosen for binary input using ADA audio deceive to show support for binary input and ADA support.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

Primary Election: PRIM-01

An open primary election in two precincts, containing thirty contests compiled into five ballot styles. Each ballot style contains six contests. This election was designed to functionally test an open primary with multiple ballot styles, support for two languages, and support for common voting variations.

- Closed Primary: No
- Open Primary: Yes
- 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: Yes
- Vote for N of M: Yes
- Recall Issues With Options: No
- Cumulative Voting: No
- Ranked Order Voting: No
- Provisional or Challenged Ballots: Yes
- Early Voting: No

This election designed to functionally test an open primary with multiple ballot styles, support for two languages, and support for common voting variations. Test patterns 5 and 18 are input in an alternative language. Test patterns 8 and 18 are input using an ADA audio device. These patterns were select to exercise the write-in functionality in a primary election.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

Primary Election: PRIM-02

A basic election held in two precincts. This election contains thirteen contests compiled into three ballot styles. One contest is in all three ballot styles and all other contests are independent. This election was designed to functionally test the handling of multiple ballot styles, support for Primary presidential delegation nominations, support for two languages, support for complex voting variations, and audio support for multiple languages.

- Closed Primary: No
- Open Primary: Yes
- Partisan Offices: Yes
- Non-Partisan Offices: Yes
- Write-in Voting: Yes
- Primary Presidential Delegation Nominations: Yes
- Ballot Rotation: No
- Straight Party voting: No
- Cross-Party Endorsement: Yes
- Split Precincts: No
- Vote for N of M: No
- Recall Issues With Options: No
- Cumulative Voting: No
- Ranked Order Voting: No
- Provisional or Challenged Ballots: No
- Early Voting: No

This election was designed to functionally test the handling of multiple ballot styles, support for Primary presidential delegation nominations, support for two languages, support for complex voting variations, and audio support for multiple languages. The election will be an open primary election with one machine running for each precinct. Voting options for Over-voting, Under-voting and write-in voting will be exercised. Ballots 5 and 18 were selected for Spanish based language input. Ballots 8 and 17 were selected for casting of ballot using the ADA Audio capability.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.2 Test Set-Up (Continued)

Primary Election: PRIM-03

A closed election held in two precincts. This election contains ten contests and is compiled into two ballot styles. Two of the contests are in both ballot styles. The other eight contests are split between the two parties' ballots. This election was designed to functionally test the handling of multiple ballot styles, support for at least two languages, support for common voting variations, and audio support for at least two languages and an ADA binary input device.

- Closed Primary: Yes
- 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: 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: Yes
- Early Voting: No

This election was designed to functionally test the handling of multiple ballot styles, support for at least two languages including an Ideographic based language, support for common voting variations, and audio support for at least two languages and an ADA binary input device. Test patterns 3 and 4 were chosen for input in the Spanish language because it is a basic voting pattern with a write-in. Test patterns 5 and 6 were chosen for audio input using the Spanish language to demonstrate support for write-in voting using an ADA device with and alternative language. Test pattern 7 was chosen for Ideographic based language input because it is a basic vote pattern using Chinese. Test pattern 8 was chosen for character based language using an ADA device to demonstrate support for Ideographic based ADA device support. Test pattern 9 was chosen for binary input to show support for ADA binary input device. Test pattern 10 was chosen for binary input using ADA audio deceive to show support for binary input and ADA support.

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence

The components of the Unity 3.4.1.0 System will undergo all applicable tests in the EAC 2005 VVSG. The following sections provide a list of each test, a brief description of each, and a location of each test. Wyle Laboratories will utilize a combination of functional testing, source code review, and TDP reviews to evaluate the system performance. The list of tests is not in a specific sequence.

6.3.1 Hardware Test Description

All of the hardware tests have previously been performed during prior VSTL test campaigns with the exception of the following which will be tested during this campaign:

- Maintainability
- Electrical Supply

6.3.2 Software Test Description

The software tests include the following:

Source Code Compliance Review – Wyle Laboratories' personnel will compare the source code to the manufacturer's software design documentation to ascertain how completely the software conforms to the manufacturer's specifications. A listing of the TDP documents for Software Design and Specification can be found in Table 4-5 of this document. Source code inspection shall also assess the extent to which the code adheres to the requirements in Section 5 of Volumes I and II.

Compliance Build of the Unity 3.4.1.0 System Software, Firmware, and Utilities– Before testing can begin a compliance build of all the applications will be constructed by Wyle Laboratories' personnel using the build environment, build documentation and reviewed source code. This is to insure the software being tested is constructed from the same source code that was reviewed.

COTS Source Code Review – Unmodified, general purpose COTS non-voting software (e.g., operating systems, programming language compilers, data base management systems, and Web browsers) is not subject to the detailed examinations specified in this section. However, Wyle Laboratories' personnel will examine such software to ensure that the specific version of software being used is identical to the design specification in order to confirm that the software has not been modified. Wyle will verify by downloading the software directly from the manufacturer site, verifying against NRSL, or by being provided original OEM discs.

Portions of COTS software that have been modified by the manufacturer in any manner are subject to review. Unmodified COTS software is not subject to code examination. However, source code generated by a COTS package and embedded in software modules for compilation or interpretation will be provided in human readable form to Wyle Laboratories. Wyle Laboratories' personnel may inspect COTS source code units to determine testing requirements or to verify the code has not been modified.

Wyle Laboratories may inspect the COTS generated software source code in preparation of test plans and to provide some minimal scanning or sampling to check for embedded code or unauthorized changes. Otherwise, the COTS source code is not subject to the full code review and testing. For purposes of code analysis, the COTS units shall be treated as unexpanded macros.

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.2 Software Test Description (Continued)

Baseline of EMS Operating and Build Machine OS – Wyle Laboratories will review the submitted NIST SCAP FDCC checklist for the EMS Operating System and Build Machine OS ES&S. The review will be performed for completeness, clarity, and consistency.

Error Recovery Test – This will be tested to ensure that unit is capable of recovering from a non- catastrophic failure of a device, or from any error or malfunction that is within the operator's ability to correct and restoration of the device gracefully from the failures. Testing will include powering units off while operating, disconnecting various cables and components to ensure operation once restored.

Security Source Code Review – The security source code review is a detailed review of the functionality of the source code that has been submitted. A manual line by line review will then be utilized, which can be augmented by an automated analysis of the source code utilizing Checkstyle and NetBeans when the code is written in Java.

Trusted Build – The trusted build is a process of converting the reviewed source code into machine-readable binary instructions for a computer. This test will follow Section 5.6 of the EAC Testing and Certification Program manual.

Table 6-1 Unity 3.4.1.0 System Software Test Sequence

Test	Description	Procedure	Test Level	Specimen	Election Data
Technical Data Package (TDP) Review	Documentation review for compliance, correctness, and completeness	WHVS07.1 WoP 3	Document	TDP package	---
Compliance Source Code Review	Source code review for compliance	WHVS07.2 WOP 5a	Component	Source Code	---
Physical Configuration Audit	Audit hardware and software models and versions	WHVS07.3 WoP 25	Component & System	System hardware and software	---
Compliance Build	Using the build documents and source code to construct the EMS	WHVS07.3 WOP 25	Component	Source Code	---
Functional Configuration Audit	Functional testing to the system documentation and EAC 2005 VVSG requirements	WHVS07.4 WoP 26 WoP30a	Component & Integration	System	Gen-01 Prim-01

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.2 Software Test Description (Continued)

Table 6-1 Unity 3.4.1.0 System Software Test Sequence (Continued)

Test	Description	Procedure	Test Level	Specimen	Election Data
Source Code COTS Review	Source code review to examine 3rd party products for modification and versions	WHVS07.2 WOP 5d	Component	COTS Source Code	---
Baseline OS	RFI 2008-03 OS Configuration	WHVS07.3 WOP 25	Component	NIST SCAP FDCC Checklist	---
Source Code Functional Review	Source code review for functionality and high level software design	WHVS07.2 WOP5b	Component & Integration	Source Code	---
Source Code Security Review (manual)	Source code review for specific security concerns augmented by an automated review	WHVS07.2 WOP5d WOP 6a	Component & Integration	Source Code	---
Trusted Build	Creation and installation of the final system software	WHVS07.6 WoP 7 WoP 7a	Component	System software	---

6.3.3 System Testing

Physical Configuration Audit – The Physical Configuration Audit compares the voting system components submitted for qualification to the manufacturer's technical documentation, and shall include the following activities:

- 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.

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing (Continued)

Functional Configuration Audit – 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 will be conducted to insure all applicable EAC 2005 VVSG requirements are met. This testing is accomplished through a process called sequencing.

Sequencing is the act of navigating through the user interface to verify that the system performs as described by the manufacturer and does not violate any of the VVSG requirements. The path that the tester navigates follows the logical flow of accomplishing task required to conduct an election. For example, a task in conducting an election is to add a candidate. The tester will follow the flow of the user interface to add the candidate to a contest. If there are multiple ways to achieve this, then each method will be tested. This process will continue until all tasks for conducting an election are completed. Any paths, or combination of paths, that are determined to be at risk for failure that are outside of the normal flow of the interface will be tested on an individual basis.

TDP Review – The technical data package must be submitted as a precondition of national certification testing. These items are necessary to define the product and its method of operation; to provide technical and test data supporting the manufacturer's claims of the system's functional capabilities and performance levels; and to document instructions and procedures governing system operation and field maintenance. Any information relevant to the system evaluation shall be submitted to include source code, object code, and sample output report formats.

Security Test – The security test is designed and performed to test the capabilities of the voting system against the requirements defined in Volume I, Section 7. These procedures shall focus on the ability of the system to detect, prevent, log, and recover from a broad range of security risks identified. This test will also examine system capabilities and safeguards claimed by ES&S in the TDP to go beyond these risks. The range of risks tested is determined by the design of the system and potential exposure to risk.

Usability/Accessibility – The usability test is a measure of the effectiveness, efficiency, and satisfaction achieved by a specified set of users with a given product in the performance of specified tasks. This test applies to the requirements for Volume I, Section 3 of the EAC 2005 VVSG.

Accuracy – The accuracy test insures that each component of the voting system can each process 1,549,703 consecutive ballot positions correctly within the allowable target error rate. The Accuracy test is designed to test the ability of the system to "capture, record, store, consolidate and report" specific selections and absences of a selection. The required accuracy is defined as an error rate. This rate is the maximum number of errors allowed while processing a specified volume of data. For paper-based voting systems the ballot positions on a paper ballot must be scanned to detect selections for individual candidates and contests and the conversion of those selections detected on the paper ballot converted into digital data.

6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing (Continued)

System Integration – System Level certification test to 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 in scope. In order to further verify compatibility between the system in scope, ballots shall be presented across the system and all results shall be verified against the expected results matrix. The created test deck for system integration shall include hand marked ballots, pre-marked ballots, and folded ballots. The generated test deck will then be utilized for system integration testing on the DS200, DS850, M100, and the M650 with all expected results verified within ERM. The M100, M650, and AutoMARK are not in scope for this project and included within System Integration only to verify compatibility with the updated EMS.

Regression Testing - Regression Testing will be performed on all system components to verify all functional and firmware modifications made during the test campaign did not affect the system adversely.

Wyle will verify the audit log records for error and exception activity to verify proper documentation and recovery action for all functional tests performed. A detailed listing of all audit log entries shall be provided by ES&S in the TDP submitted. During testing, audit log entries will be compared to this list to ensure that all expected events were recorded. To ensure the system's ability to gracefully shutdown and recover from error conditions, negative test cases will be performed to introduce such error conditions. The error conditions introduced will be based on the system limits specified within the vendors TDP documentation.

Table 6-2 Unity 3.4.1.0 System Testing Sequence

Test	Description	Procedure	Test Level	Specimen	Election Data	Re-Use from Previous VSTL Testing
Technical Data Package (TDP) Review	Documentation review for compliance, correctness, and completeness	WHVS07.1 WoP 3	Document	TDP package	---	N/A
Physical Configuration Audit	Audit hardware and software models and versions	WHVS07.3 WoP 25	Component & System	System hardware and software	---	N/A

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing (Continued)

Table 6-2 Unity 3.4.1.0 System Testing Sequence (Continued)

Test	Description	Procedure	Test Level	Specimen	Election Data	Re-Use from Previous VSTL Testing
Functional Configuration Audit	Functional testing to the system documentation and EAC 2005 VVSG requirements	WHVS07.4 WoP 26 WoP30a	Component & Integration	DS200 DS850	Gen-01 Prim-01	11/15/11 Wyle Labs
Usability/ Accessibility	Testing to the system documentation and EAC 2005 VVSG requirements	WOP 24-1 WOP 24-1a WOP 24-1b WOP 24-1c WOP 24-1d WOP 24-1f WOP 24-1g WOP 24-2 WOP 24-2a WOP 24-2b WOP 24-2c WOP 24-2d WOP 24-2e WOP 24-2f WOP 24-2g WOP 24-2h	DS200 DS850	DS200 DS850	Gen-01 Prim-01	N/A
Security	Assess the system to the 2005 VVSG requirements and execute basic system security tests.	WHVS07.7 WoP 6 WoP 6a WoP 6b WoP 6c WoP 6d	DS200 DS850	DS200 DS850	Gen-01 Prim -01	N/A

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6.0 TEST PROCEDURES AND CONDITIONS (Continued)

6.3 Test Sequence (Continued)

6.3.3 System Testing (Continued)

Table 6-2 Unity 3.4.1.0 System Testing Sequence (Continued)

Test	Description	Procedure	Test Level	Specimen	Election Data	Re-Use from Previous VSTL Testing
Accuracy	Test of accuracy to ~1.6 million ballot positions per component	WHVS07.9 WoP 41	DS200 DS850	DS200 DS850	Accuracy Election	N/A
System Integration Test	Test of all system hardware, software and peripherals.	WoP 30	System	System	Gen-01-03 Prim-01-03	N/A

7.0 TEST OPERATIONS PROCEDURES

7.1 Proprietary Data

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

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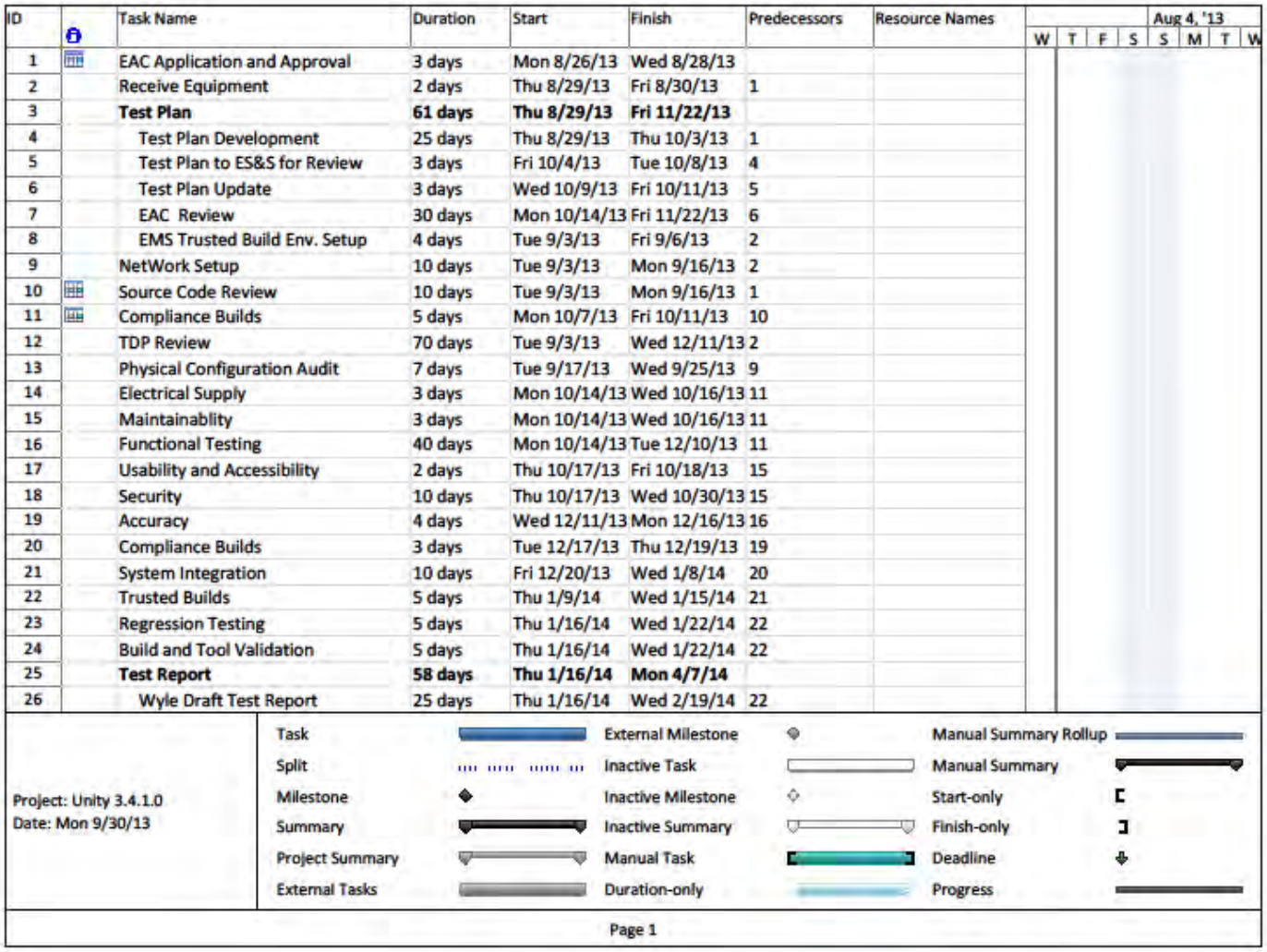
APPENDIX A

ES&S PROJECT SCHEDULE



ID	Task Name	Duration	Start	Finish	Predecessors	Resource Names
1	EAC Application and Approval	3 days	Mon 8/26/13	Wed 8/28/13		
2	Receive Equipment	2 days	Thu 8/29/13	Fri 8/30/13	1	
3	**Test Plan**	**61 days**	**Thu 8/29/13**	**Fri 11/22/13**		
4	Test Plan Development	25 days	Thu 8/29/13	Thu 10/3/13	1	
5	Test Plan to ES&S for Review	3 days	Fri 10/4/13	Tue 10/8/13	4	
6	Test Plan Update	3 days	Wed 10/9/13	Fri 10/11/13	5	
7	EAC Review	30 days	Mon 10/14/13	Fri 11/22/13	6	
8	EMS Trusted Build Env. Setup	4 days	Tue 9/3/13	Fri 9/6/13	2	
9	NetWork Setup	10 days	Tue 9/3/13	Mon 9/16/13	2	
10	Source Code Review	10 days	Tue 9/3/13	Mon 9/16/13	1	
11	Compliance Builds	5 days	Mon 10/7/13	Fri 10/11/13	10	
12	TDP Review	70 days	Tue 9/3/13	Wed 12/11/13	2	
13	Physical Configuration Audit	7 days	Tue 9/17/13	Wed 9/25/13	9	
14	Electrical Supply	3 days	Mon 10/14/13	Wed 10/16/13	11	
15	Maintainablity	3 days	Mon 10/14/13	Wed 10/16/13	11	
16	Functional Testing	40 days	Mon 10/14/13	Tue 12/10/13	11	
17	Usability and Accessibility	2 days	Thu 10/17/13	Fri 10/18/13	15	
18	Security	10 days	Thu 10/17/13	Wed 10/30/13	15	
19	Accuracy	4 days	Wed 12/11/13	Mon 12/16/13	16	
20	Compliance Builds	3 days	Tue 12/17/13	Thu 12/19/13	19	
21	System Integration	10 days	Fri 12/20/13	Wed 1/8/14	20	
22	Trusted Builds	5 days	Thu 1/9/14	Wed 1/15/14	21	
23	Regression Testing	5 days	Thu 1/16/14	Wed 1/22/14	22	
24	Build and Tool Validation	5 days	Thu 1/16/14	Wed 1/22/14	22	
25	**Test Report**	**58 days**	**Thu 1/16/14**	**Mon 4/7/14**		
26	Wyle Draft Test Report	25 days	Thu 1/16/14	Wed 2/19/14	22	

APPENDIX B

UNITY 3.4.1.0 SCOPE OF CERTIFICATION

Item Number	Module Affected	Version Number	Modification
1	DS200	Hardware v1.3	Implement new motherboard and new scanner board as previous boards are going end-of-life (EOL).
2	DS200	Hardware v1.3	Transport component update to enhance ballot handling and manufacturing tolerances.
3	DS200	Hardware v1.3	Replace CFL backlight with LED backlight due to EOL (end of life).
4	DS200	Hardware v1.3	Usability and compatibility enhancements to battery compartment access, ballot box replacement rails, power/close compartment switch, and equipment labeling.
5	ES&S Ballot Image Manager	7.7.2.0	Chinese characters to eliminate truncation of specific characters.
6	EMS	Audit Manager 7.5.2.0, Election Data Manager 7.8.2.0, ES&S Ballot Image Manager 7.7.2.0, AutoMARK Management Information System 1.3.257, Hardware Programming Manager 5.9.0.0, Election Reporting Manager 7.9.0.0, Log Monitor 1.1.0.0	Implement Windows 7 Operating System platform to the Unity software suite.
7	ES&S Ballot Image Manager	7.7.2.0	Upgrade to Adobe version 11.
8	DS200 & DS850	DS200 Firmware 1.7.0.0; Hardware 1.2, 1.2.3.0, 1.3 DS850 Firmware 2.9.0.0; Hardware 1.0	Implement method to validate hash values with Trusted Build to conform to RFI 2012-04.
9	System-wide	N/A	TDP update for Configuration Management to conform to RFI 2012-03.
10	Hardware Programming Manager & Election Reporting Manager	Hardware Programming Manager 5.9.0.0 & Election Reporting Manager 7.9.0.0	Audit Log timestamp updates to conform with RFI 2013-03.
11	Hardware Programming Manager	5.9.0.0	Software update – merging all tabulator results within an election.

Item Number	Module Affected	Version Number	Modification
12	Hardware Programming Manager	5.9.0.0	Hardware Programming Manager update to search for 71 contests in base record versus 73.
13	DS850	Firmware 2.9.0.0; Hardware 1.0	Overvote/write-in sorting updated to allow all overvote write-ins to be treated as overvotes.
14	DS850 & Hardware Programming Manager	Firmware 2.9.0.0; Hardware 1.0 Hardware Programming Manager 5.9.0.0	Illinois & Hawaii overvote addition to require over voted contest to record single overvote versus total number of votes lost to overvote. This will be a recognition of State code flag.
15	DS850 & Hardware Programming Manager	Firmware 2.9.0.0; Hardware 1.0 Hardware Programming Manager 5.9.0.0	Addition of statistical counter to DS850 reports to allow for ballot total shown in conjunction with statistical count of each type.
16	Election Reporting Manager	7.9.0.0	Enhancement to ERM update with multiple office groups associated with contest and entry of manual results to require undervotes and overvotes.
17	DS200	Firmware 1.7.0.0; Hardware 1.2, 1.2.3.0, 1.3	Enhancement to differentiate audible warning for cast ballot versus error or exception; repeat key to work in all keyboard menu screens, replaced word “error” in query screens.
18	ES&S Ballot Image Manager	7.7.2.0	Update of scaling to increase size of ballot display in Windows 7
19	Election Data Manager & ES&S Ballot Image Manager	Election Data Manager 7.8.2.0 ES&S Ballot Image Manager 7.7.2.0	Known Field Issues – 1. Local/split office relations updated in Import Wizard 2. Selection of election precincts from County Master versus importing into election 3. Flow candidates placement for following contest
20	Election Data Manager	7.8.2.0	EDM combine splits updated to allow for grouping splits only and rotation to be used in conjunction.
21	Election Reporting Manager	7.9.0.0	Texas mode enhancement for continuous audit printer while dedicated to application only and unable to get to operating system.
22	DS850	Firmware 2.9.0.0; Hardware 1.0	Integration of on-screen ballot counts to the DS850 from the EVS suite.
23	DS850	Firmware 2.9.0.0; Hardware 1.0	Integration of exception handling to the DS850 from the EVS suite to improve handling of various exception conditions.
24	DS850	Firmware 2.9.0.0; Hardware 1.0	Integration of fixes for Unclear marks as blank ballot and MCP fix updated within EVS suite.
25	System-wide	N/A	Routine task updates for every release. For example: TDP updates, hardening scripts, source code file listings, and change notes.

Item Number	Module Affected	Version Number	Modification
26	DS850 & Election Reporting Manager	DS850 Firmware 2.9.0.0; Hardware 1.0 Election Reporting Manager 7.9.0.0	Integration of advanced sorting from the EVS suite to include middle bin adjustment from write-in only in addition to middle bin handling processed or not processed; Invalid ID sort condition added.
27	DS850	Firmware 2.9.0.0; Hardware 1.0	Integration of Limited Functionality Mode from EVS suite to allow for reduced user interface upon a major failure versus forced user shutdown.
28	DS850	Firmware 2.9.0.0; Hardware 1.0	Integration of the Audit Log enable configuration from the EVS suite to allow DS850 to continue scanning if continuous log printer is disabled.
29	DS850	Firmware 2.9.0.0; Hardware 1.0	Integration of CVR backup from the EVS suite to allow ability to perform collection from CVR backup to create a results stick.
30	DS850	Firmware 2.9.0.0; Hardware 1.0	Enhancement to create an Export Files backup to a USB media.
31	DS850	Firmware 2.9.0.0; Hardware 1.0	Enhancement of ballot display with export capabilities.

APPENDIX C

WYLE STATE TEST REPORT T71013.01-01

wyle laboratories

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CLIENT P.O. NO.: ES&S-MSA-TA029

CONTRACT: N/A

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DATE: September 18, 2013

TEST REPORT

HARDWARE COMPLIANCE TESTING OF THE ELECTION SYSTEMS & SOFTWARE FL EVS 4.5.0.0 VOTING SYSTEM DS200 HARDWARE VERSION 1.3

for

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

STATE OF ALABAMA
COUNTY OF MADISON }

Robert R. Bridges, Director, 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.

SUBSCRIBED and sworn to before me this 18 day of Sept 20 13

Natalie Vucea
Notary Public in and for the State of Alabama at Large

My Commission expires 3/19/16

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: Ryan D. Chambers, Project Engineer 09/18/2013 Date

APPROVED BY: Frank Padilla, Voting Systems Manager 9/18/13 Date

WYLE Q. A.: Raul Terceno, Q. A. Manager 9/18/13 Date

NVLAP LAB CODE 200771-0

VSTL
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REPORT NO. T71013.01-01

DATE September 18, 2013

wyle laboratories

REV	DATE	PAGE OR PARAGRAPH AFFECTED	DESCRIPTION OF CHANGES
---	9-12-12	Entire Document	Original Release

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ATTACHMENTS

1.0 INTRODUCTION

1.1 Scope

This report documents the test procedures followed and the results obtained from the Environmental and Electrical Testing performed on the Florida Election Voting System (FL EVS) 4.5.0.0 for Election Systems & Software (ES&S). Upon receipt by Wyle Laboratories, the systems were inspected and subjected to a Physical Configuration Audit (PCA). All testing was performed at Wyle Laboratories' Huntsville, Alabama, Test Facility.

1.2 Objective

The ES&S FL EVS 4.5.0.0 Voting System was tested in reference to the United States Federal Election Commission (FEC) 2002 Voting System Standards (VSS) and all applicable EAC 2005 Voluntary Voting Systems Guidelines (VVSG).

1.3. Test Report Overview

This test report consists of four main sections and attachments:

- 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 and Overview – Provides information about the equipment tested.
- 3.0 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 Procedures and Results – Provides a summary of the results of the testing process.
- Attachments – Information supporting reviews and testing of the voting system are included as attachments to this report.

1.4 Customer

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

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1.0 INTRODUCTION (Continued)

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
- Florida Voting System Standards, Form DS-DE 101, 1-12-05
- 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 5
- 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)

2.0 SYSTEM IDENTIFICATION AND OVERVIEW

2.1 System Overview

The ES&S FL EVS 4.5.0.0 Voting System is a new system that contains a newly configured DS200 hardware version 1.3. The new DS200 tabulator configuration consists of a new mother board, scanner board, redesigned transport path, and a removable battery access panel. Based on the upgrades and modifications to the DS200 a full hardware testing suite was performed at Wyle. For the ES&S FL EVS 4.5.0.0 Voting System, Wyle subjected the DS200 to: non-operating environmental tests, operating environmental tests and Electromagnetic Compatibility (EMC) tests. The ElectionWare EMS was only utilized to generate election media and verify results. Wyle only documented the configuration used during testing conducted at Wyle.

2.2 System Identification

The materials required for testing of the ES&S FL EVS 4.5.0.0 Voting System included software, hardware, test materials, and deliverable materials shipped directly to Wyle by ES&S. The materials documented in the following sections are the materials used during Wyle's testing of only the DS200 and the interface with the EMS.

2.2.1 Hardware

This subsection categorizes the equipment the manufacturer submitted for testing and is listed in Table 2-1. 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 ES&S FL EVS 4.5.0.0 Test Equipment

Equipment	Description	Serial Numbers
DS200 (Hardware Revision 1.3)	Precinct Count Digital Scanner	DS0313350006 (ENV) DS0313350010 (ENV) DS0313350009 (EMI)
Ballot Box	Plastic Ballot Box/Plastic Transport Case	T71013-BB-002
Ballot Box	Hard Vinyl Transport Case	T71013-BB-003
Ballot Box	Metal Box with Electromechanical Diverter	T71013-BB-001
Dell Latitude Laptop	CPU: Intel Core i5-2540M 2.60Ghz RAM: 4.00 GB HDD: 250 GB – ST250LT007-9ZV14C OS: Windows 7 Professional SP1 – 64 bit	39CMJS1
Transport Media/ Memory Device/ USB Flash Drive	Approved Manufacturer List: Kingston SanDisk Delkin Approved Capacity List: 512 MB 1 GB 2 GB 4 GB 8GB	Wyle-assigned: TM-XXX*
Compact Flash Card/ CF Card	Approved Manufacturer List: Delkin Approved Capacity List: 1 GB	Wyle-assigned: CF-XXX*

*Wyle uniquely labels each media device with the information (election, results, test utilized for) loaded on the device.

2.0 SYSTEM IDENTIFICATION AND OVERVIEW (Continued)

2.2 System Identification (Continued)

2.2.2 Software

The software evaluated was limited to ElectionWare, Election Reporting Manager (ERM), and the firmware build for the DS200. Only the changes incorporated since the EVS 5.0.0.0 test campaign were evaluated by Wyle. Wyle utilized an EMS setup with new versions of ElectionWare and ERM to load election information onto transport media. Wyle did not test the EMS for any other functionality.

Table 2-2 Software Required for Testing

Software Identification	Version
DS200 Firmware	2.11.0.0l
DS200 Scanner Board Firmware	3.0.0.0b
DS200 Power Management Board	1.2.10.0a

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 ES&S FL EVS 4.5.0.0 test campaign:

Table 2-3 Test Support Equipment

Test Material	Quantity
Paper Rolls	25 rolls total
Pre Printed Ballots	1,200 total (14” size)

2.4 Vendor Technical Data Package

The Technical Data Package (TDP) contains information about requirements, design, configuration management, quality assurance, and system operations. A scaled version of the TDP was submitted for this campaign due to only Hardware Testing being performed. The table below provides the TDP documents submitted and reviewed for the ES&S FL EVS 4.5.0.0 campaign.

Table 2-5 ES&S FL EVS 4.5.0.0 Voting System TDP

ES&S FL EVS 4.5.0.0 TDP Documents	Version	Doc No.	Document Code
System Hardware Specification			
System Hardware Specification – DS200	1.0	03-01	DS200HW_M_SPC_0313_HWSpec
System Test/Verification Specification			
System Operations Procedures – DS200	1.0	07-06	FLEVS4500_SOP_DS200
System Maintenance Manuals			
System Maintenance Manual – DS200	1.0	08-01	FLEVS4500_SMM_DS200

3.0 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
- 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 Test Process

All testing performed as part of the test effort was performed at the Wyle Labs Huntsville, AL facility. Conformance testing was limited to the ES&S FL EVS 4.5.0.0 Voting System component 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 ES&S FL EVS 4.5.0.0 EMS suite was loaded on a COTS PC. All media used during testing was loaded from this EMS PC. All hardware used to build the DS200 firmware was configured by Wyle.

3.2 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).

3.3 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.

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3.0 TEST BACKGROUND (Continued)

3.4 Terms and Abbreviations

Table 3-1 in 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	---
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

4.0 TEST FINDINGS AND RECOMMENDATIONS

The ES&S FL EVS 4.5.0.0 Voting System component, as listed in Section 2.0, were subjected to the tests described in Section 3.2 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 System Level Baseline

A System Level Baseline was performed to evaluate the system being submitted for testing in comparison to the system TDP. A Physical Configuration Audit was performed on the ES&S FL EVS 4.5.0.0 submitted for Hardware Testing.

4.1.1 Physical Configuration Audit

A focused Physical Configuration Audit (PCA) of the ES&S FL EVS 4.5.0.0 Voting System was performed in accordance with Section 6.6 of Volume II of the VVSG. The PCA compares the voting system components submitted for certification with the vendor's technical documentation and confirms that the documentation submitted meets the requirements of the Guidelines. The purpose of the PCA is to: establish a configuration baseline (both hardware and software) of the system to be tested; verify that the reviewed source code conforms to the vendor's specification; and assess the adequacy of user acceptance test procedures and data.

The PCA performed on the ES&S FL EVS 4.5.0.0 Voting System consisted of inspecting the DS200 scanner, firmware/software, and the TDP used in the ES&S FL EVS 4.5.0.0 Voting System.

Summary Findings: A focused PCA was performed to baseline the system's hardware and software components prior to commencement of the test campaign. No discrepancies were noted during the PCA.

4.2 Technical Data Package Review

The ES&S FL EVS 4.5.0.0 Voting System Technical Data Package (TDP) was not reviewed to the 2005 VVSG. The supplied TDP documents were only utilized as reference material for EUT configuration and test set-up.

Summary Findings: TDP was not performed.

4.3 Hardware Testing

Hardware testing included: the inspection and evaluation of voting system documentation; tests of voting system under conditions simulating the intended storage, operation, and transportation; and operational tests verifying system performance and function under normal and abnormal conditions. Hardware testing was limited to the ES&S FL EVS 4.5.0.0 Voting System. Hardware Testing Data can be located in Attachments A - G of this document for additional information

The DS200 was subjected to hardware tests as summarized in Table 4-1.

Table 4-1 Test Program Requirements

REPORT SECTION	VVSG VOL. I SECTION	VVSG VOL. II SECTION	TEST DESCRIPTION
4.5.1	N/A	4.6.4	Low Temperature Test
4.5.1	N/A	4.6.5	High Temperature Test
4.5.1	N/A	4.6.3	Vibration Test

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.3 Hardware Testing (Continued)

Table 4-1 Test Program Requirements (Continued)

REPORT SECTION	VVSG VOL. I SECTION	VVSG VOL. II SECTION	TEST DESCRIPTION
4.5.1	N/A	4.6.2	Bench Handling Test
4.5.1	N/A	4.6.6	Humidity Test
4.5.2	N/A	4.7.1	Temperature/Power Variation Test
4.6.1	4.1.2.5	4.8A	Electrical Power Disturbance Test
4.6.2	4.1.2.9	4.8B	Electromagnetic Radiation Test
4.6.3	4.1.2.8	4.8C	Electrostatic Disruption Test
4.6.4	4.1.2.10	4.8D	Electromagnetic Susceptibility Test
4.6.5	4.1.2.6 (a)	4.8E	Electrical Fast Transient Test
4.6.6	4.1.2.7 (a) (b)	4.8F	Lightning Surge Test
4.6.7	4.1.2.11 (a)	4.8G	Conducted RF Immunity Test
4.6.8	4.1.2.12	4.8H	Magnetic Fields Immunity Test
4.6.9	4.3.8	N/A	Product Safety Review, UL60950-1

4.4 Environmental Tests

Environmental tests were performed to ensure that the EUT and associated machine resident firmware were in compliance with the VVSG.

During test performance, the EUT was configured as it would be for use in an election precinct.

4.4.1 Non-Operating Environmental Tests

The EUT was subjected to various Non-Operating Environmental Tests. Prior to and immediately following each test environment, the EUT was powered on and subjected to operability functional checks to verify continued proper operation. The EUT was not powered on during the performance of any of the non-operating tests.

Low Temperature Test

The EUT was subjected to a Low Temperature Test in accordance with section 4.6.4 of Volume II of the VVSG. The purpose of this test is to simulate stresses associated with the storage of voting machines and ballot counters. This test is equivalent to the procedure of MIL-STD-810D, Method 502.2, Procedure I-Storage, with a minimum temperature of -4°F.

Prior to test initiation, the EUT was subjected to a baseline operability checkout to verify system readiness. The EUT was then placed in an environmental test chamber and the chamber temperature was lowered to -4°F and allowed to stabilize. Upon temperature stabilization, the temperature was maintained for an additional four hours. The temperature was then returned to standard laboratory ambient conditions at a rate not exceeding 10°F per minute.

During the Low Temperature Test there was one anomaly encountered (reference Notice of Anomaly No. 7 in Attachment A for further reference). This anomaly required testing to be repeated.

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.4.1 Non-Operating Environmental Tests (Continued)

Upon completion of the second attempt the EUT was removed from the chamber and inspected for any obvious signs of degradation and/or damage. None were observed. The EUT was successfully subjected to a post-test operability checkout.

The EUT successfully completed the requirements of the Low Temperature Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, C, and G of this report.

High Temperature Test

The EUT was subjected to a High Temperature Test in accordance with section 4.6.5 of Volume II of the VVSG. The purpose of this test is to simulate stresses associated with the storage of voting machines and ballot counters. This test is equivalent to the procedure of MIL-STD-810D, Method 501.2, Procedure I-Storage, with a maximum temperature of 140°F.

Prior to test initiation, the EUT was subjected to a baseline operability checkout to verify system readiness. The EUT was then placed in an environmental test chamber and the chamber temperature was raised to 140°F and allowed to stabilize. Upon temperature stabilization, the temperature was maintained for an additional four hours. The temperature was then returned to standard laboratory ambient conditions at a rate not exceeding 10°F per minute.

The EUT was removed from the chamber and inspected for any obvious signs of degradation and/or damage. None were observed. The EUT was successfully subjected to a post-test operability checkout.

The EUT successfully completed the requirements of the High Temperature Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, C, and G of this report.

Vibration Test

The EUT was subjected to a Vibration Test in accordance with section 4.6.3 of Volume II of the VVSG. The purpose of this test is to simulate stresses faced during transport of voting machines and ballot counters between storage locations and polling places. This test is equivalent to the procedure of MIL- STD-810D, Method 514.3, Category 1- Basic Transportation, Common Carrier.

Prior to test initiation, the EUT was subjected to a baseline operability checkout to verify system readiness. Upon completion, the EUT was secured to an electro dynamics shaker. One control accelerometer was affixed to the shaker table. The EUT was subjected to the Basic Transportation, Common Carrier profile as depicted in Mil-Std-810D, Method 514.3, Category I, with a frequency range from 10 to 500 Hz and an overall rms level of 1.04, 0.74, and 0.20 G for durations of 30 minutes in each orthogonal axis.

The DS200 successfully completed the requirements of the Vibration Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, C, and G of this report.

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.4 Environmental Tests (Continued)

4.4.1 Non-Operating Environmental Tests (Continued)

Bench Handling Test

The EUT was subjected to a Bench Handling Test in accordance with section 4.6.2 of Volume II of the VVSG. The purpose of this test is to simulate stresses faced during maintenance and repair of voting machines and ballot counters. This test is equivalent to the procedure of MIL-STD-810D, Method 516.3, Procedure VI.

Prior to performance of the test, the EUT was subjected to a baseline operability checkout. Following the checkout, each edge of the base of the machine was raised to a height of four inches above the surface and allowed to drop freely. This was performed six times per edge, for a total of 24 drops.

Upon test completion, the EUT was inspected for any obvious signs of degradation and/or damage. None were observed. The EUT was subjected to a post-test operability checkout and continued operability verified.

The EUT successfully completed the requirements of the Bench Handling Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, C, and G of this report.

Humidity Test

The EUT was subjected to a Humidity Test in accordance with section 4.6.6 of Volume II of the VVSG. The purpose of the test was to simulate stresses encountered during storage of voting machines and ballot counters. This test is similar to the procedure of MIL-STD-810D, Method 507.2, Procedure I-Natural Hot-Humid.

The EUT was subjected to a baseline operability checkout to verify system readiness. Upon completion, the EUT was placed in an environmental test chamber and was subjected to a 10-day humidity cycle in accordance with the 24-hour cycle values as shown in Table 4-2.

Upon test completion, the EUT was inspected for any obvious signs of degradation and/or damage. The DS200 successfully completed the requirements of the Humidity Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, C, and G of this report.

Table 4-2 Humidity Test Cycle Values

Time	Hot-Humid (Cycle 1)			Time	Hot-Humid (Cycle 1)		
	Temperature		RH		Temperature		RH
	ºF	ºC	%		ºF	ºC	%
0000	88	31	88	1200	104	40	62
0100	88	31	88	1300	105	41	59
0200	88	31	88	1400	105	41	59
0300	88	31	88	1500	105	41	59
0400	88	31	88	1600	105	41	59
0500	88	31	88	1700	102	39	65
0600	90	32	85	1800	99	37	69
0700	93	34	80	1900	97	36	73
0800	96	36	76	2000	94	34	76
0900	98	37	73	2100	97	33	85
1000	100	38	69	2200	90	32	85
1100	102	39	65	2300	89	32	88

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.4 Environmental Tests

4.4.2 Operating Environmental Tests

Temperature/Power Variation Test

The DS200 was subjected to a Temperature and Power Variation Test in accordance with section 4.7.1 of Volume II of the VVSG. The purpose of this test was to evaluate system operation under various environmental conditions. The cumulative duration of at least 163 hours was achieved by utilizing three units for a period of 64 hours based on the (EAC RFI 2008-01), with 48 hours in the environmental test chamber. For the remaining hours, the equipment was operated at room temperature. This test is similar to the low temperature and high temperature tests of MIL-STD-810-D, Method 502.2 and Method 501.2.

To perform the test, the EUTs were placed inside an environmental walk-in test chamber and connected to a variable voltage power source. The temperature inside the chamber and the voltage supplied to the hardware varied from 50°F to 95°F and from 105 VAC to 129 VAC (as depicted in Figures 4-1 through 4-4). During test performance, the operational functions were continuously exercised by the scanning of ballots. A minimum of 100 ballots per hour were scanned.

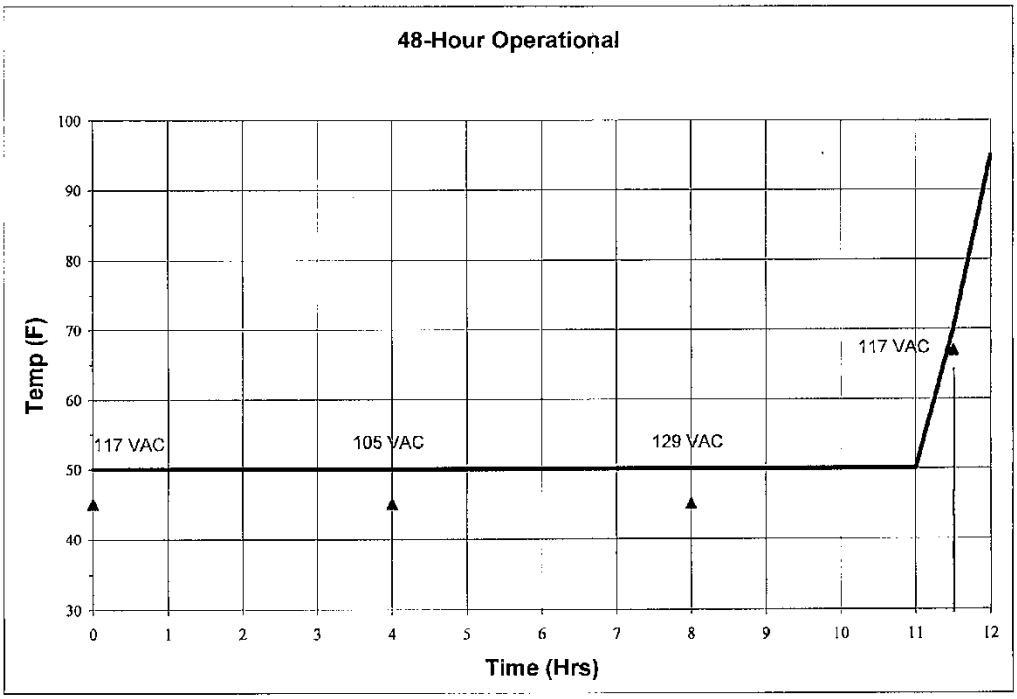

Figure 4-1 Temperature/Power Variation Profile Hours 0-12

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4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.4.2 Operating Environmental Tests (Continued)

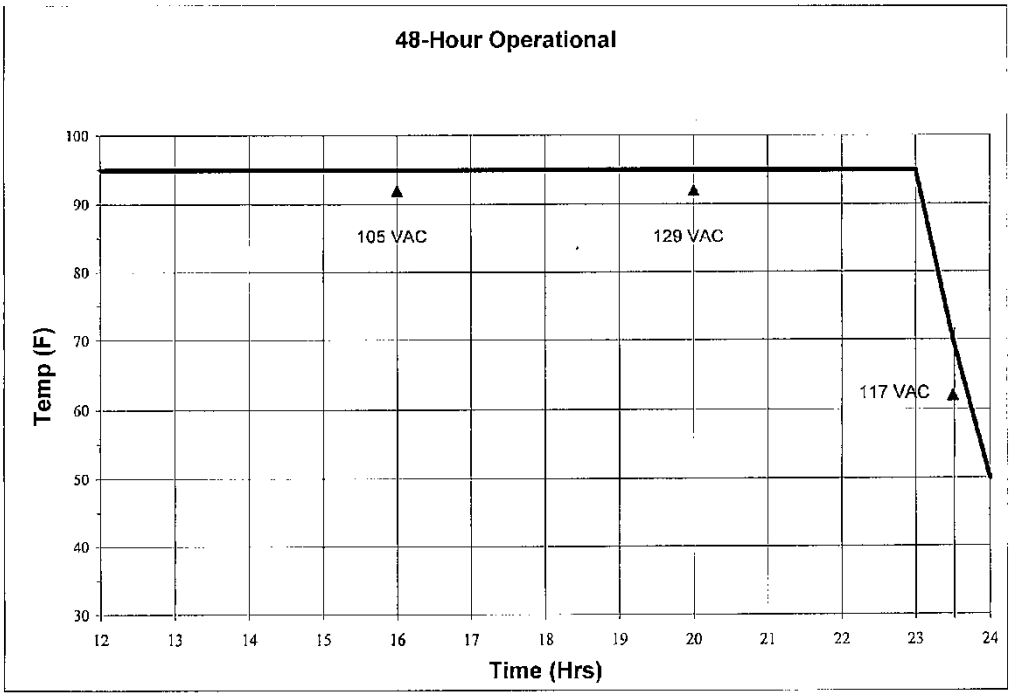

Figure 4-2 Temperature/Power Variation Profile Hours 12-24

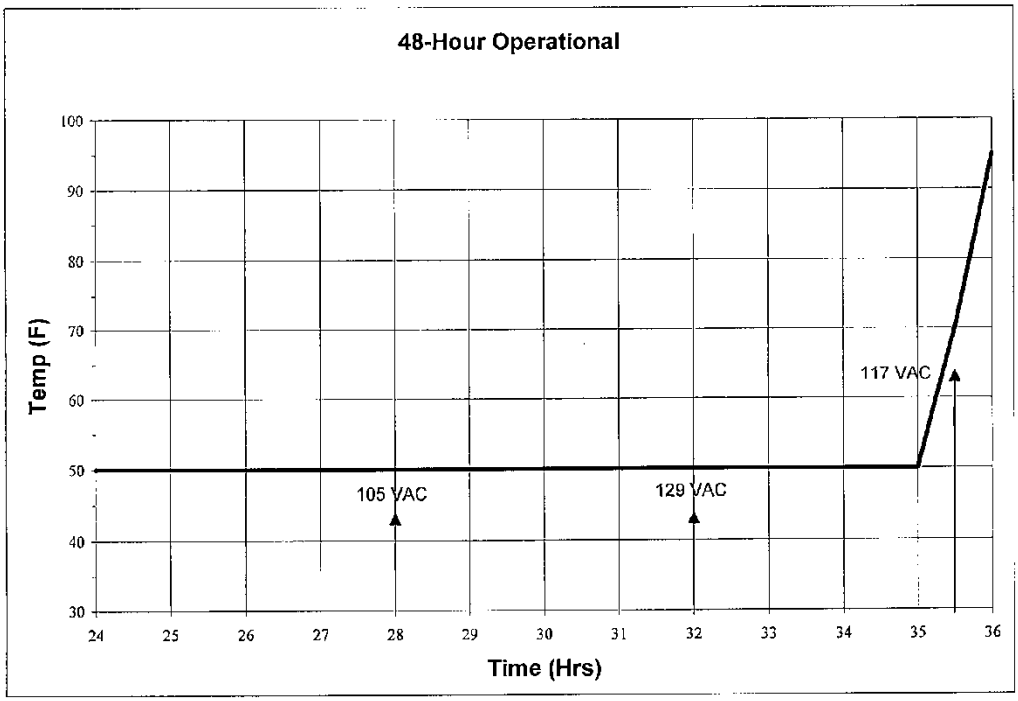

Figure 4-3 Temperature/Power Variation Profile Hours 24-36

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.4.2 Operating Environmental Tests (Continued)

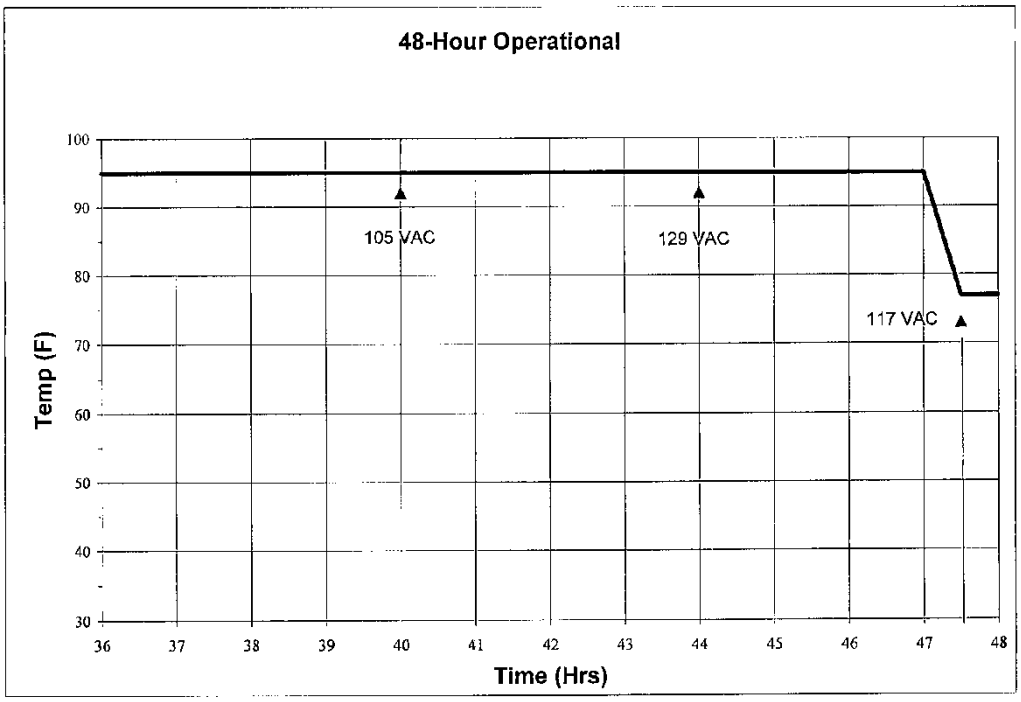

Figure 4-4 Temperature/Power Variation Profile Hours 36-48

Summary Findings

The DS200 successfully completed the requirements of the Temperature/Power Variation Test on the first attempt without issue.

4.5 Electrical Tests

Electrical tests were performed to ensure that the EUT and associated machine resident firmware were in compliance with the VVSG.

During test performance, the EUT was configured as it would be for use in an election precinct.

The EUT was subjected to various electrical tests to ensure continued system operation and reliability in the presence of abnormal electrical events. The EUT was powered and actively counting ballots during all electrical tests. Prior to and immediately following each electrical test, an operational status check was performed. The Test Data Sheets, Photographs, and Instrumentation Equipment Sheets are contained in Attachments B, D, and G of this report.

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4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.5.1 Electrical Power Disturbance

Electrical Power Disturbance testing was performed in accordance with sections 4.1.2.5 of Volume I and 4.8 of Volume II of the VVSG. This testing was performed to ensure that the EUT was able to withstand electrical power line disturbances (dips/surges) without disruption of normal operation or loss of data.

The EUT was configured to run in an automated ballot count test mode, where continual ballot processing would occur during the testing, and subjected to the voltage dips and surges over periods ranging from 20ms to four hours.

The EUT successfully met the requirements of the Electrical Power Disturbance Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, D, and G of this report.

4.5.2 Electromagnetic Radiation Test (FCC Part 15 Emissions)

Electromagnetic Radiation emissions measurements were performed in accordance with sections 4.1.2.9 of Volume I and 4.8 of Volume II of the VVSG. This testing was performed to ensure that emissions emanating from the unit do not exceed the limits of 47 CFR Part 15, Subpart B, Class B Limits.

The EUT was configured to run in an automated ballot count test mode, where continual ballot processing would occur during the testing. The DS200 was subjected to the test requirements detailed in Table 4-3.

Table 4-3 Conducted and Radiated Emissions Requirements

Conducted Emissions			Radiated Emissions	
Frequency Range (MHz)	Limits (dBµV)		Frequency Range (MHz)	3 Meter Test Limit (dBµV)
	Quasi-peak	Average		
0.15 to 0.50	66 to 56	56 to 46	30 to 88	40.0
0.50 to 5.0	56	46	88 to 216	43.5
5.0 to 30.0	60	50	216 to 960	46.0
			960 to 1000	54.0

Testing was performed at the Wyle Laboratories' Open Air Test Site 2 (OATS-2) located on the Intergraph Complex in Huntsville, AL. The OATS-2 is fully described in reports provided to the Federal Communication Commission (FCC) (FCC Reference 98597). The site was tested and complies with the requirements of ANSI C63.4-2003.

To perform the Conducted Emissions portion of the test, the DS200 was set up as depicted in Figure 4-5.

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4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.5.2 Electromagnetic Radiation Test (FCC Part 15 Emissions) (Continued)

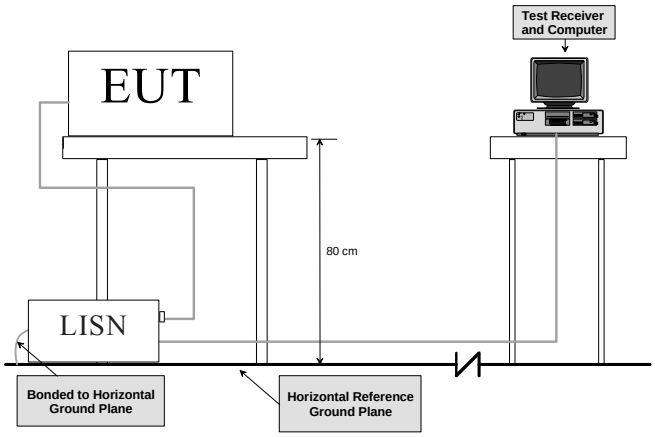

Figure 4-5 Conducted Emissions Test Setup

The DS200 was then subjected to the following test procedure:

1. The DS200 was placed on a non-metallic table 0.8 meters above the turntable and reference ground plane at the Open-Area Test Site.
2. The DS200 AC/DC Power Adapter was connected to the power mains through a Line Impedance Stabilization Network (L.I.S.N.). Other support units were connected to the power mains through another L.I.S.N. The L.I.S.Ns provided 50 ohm/50 µH of coupling impedance for the measuring instrument.
3. The DS200 was placed in an active state and monitored for functionality throughout testing.
4. Both Line and Neutral of the power mains connected to the DS200 were checked for maximum conducted interference.
5. The frequency range from 150 kHz to 30 MHz was evaluated and recorded. Emissions levels below – 20 dB were not recorded.

To perform the Radiated Emissions portion of the test, the DS200 was set up as depicted in Figure 4-6.

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4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.5.2 Electromagnetic Radiation Test (FCC Part 15 Emissions) (Continued)

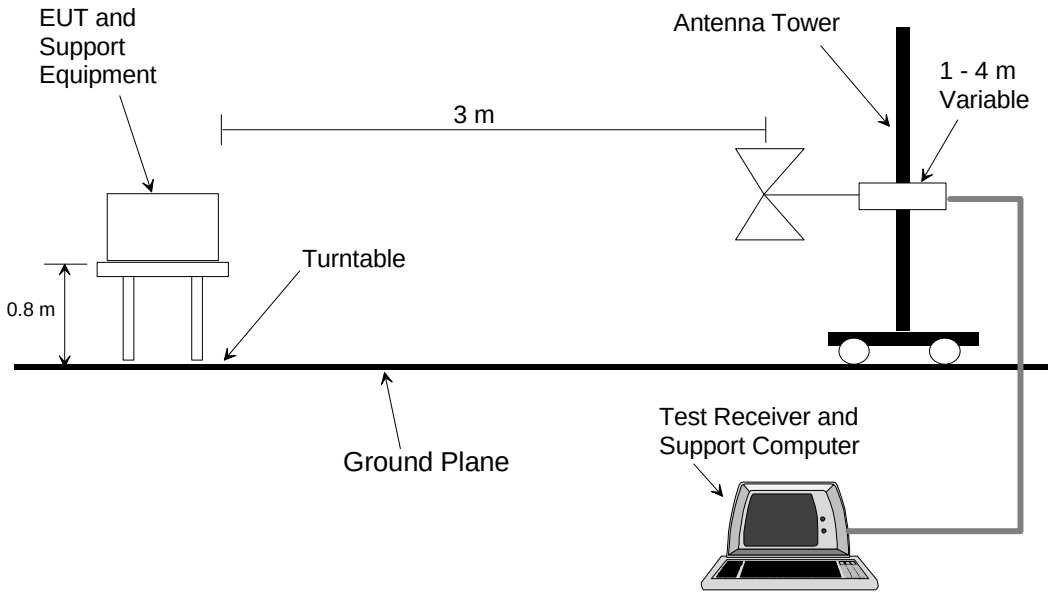

Figure 4-6 Radiated Emissions Test Setup

The DS200 was then subjected to the following test procedure:

1. The DS200 was placed on a non-metallic turn-table 0.8 meters above the reference ground plane at the Open-Area Test Site.

2. The DS200 was placed 3 meters away from the interference-receiving antenna, which was mounted on a variable-height antenna tower. The interference-receiving antenna used was a broadband antenna.

3. For each suspected emissions point, the DS200 was arranged in a worst case configuration. The table was rotated from 0 to 360 degrees and the antenna height was varied from one (1) to four (4) meters to identify the maximum reading.

4. All emissions points identified within 20 dB of the specified limit were tested individually using the quasi-peak method as specified and then reported in the tabular data.

The EUT was found to comply with the required emissions limits. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, D, and G of this report.

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.5 Electrical Tests (Continued)

4.5.3 Electrostatic Disruption

Electrostatic Disruption testing was performed in accordance with sections 4.1.2.8 of Volume I and 4.8 of Volume II of the VVSG to ensure that should an electrostatic discharge event occur during equipment setup and/or ballot counting, that the EUT would continue to operate normally. A momentary interruption is allowed so long as normal operation is resumed without human intervention or loss of data.

The EUT was configured to run in an automated ballot count test mode, where continual ballot processing would occur during the testing without operator intervention. The EUT was then subjected to electrostatic discharges of +/- 8 kV contact and +/- 15 kV air as shown in Table 4-4. Discharges were performed at areas typical of those which might be touched during normal operation, including the touch screen, user buttons, and other likely points of contact. The DS200 was then setup per the following conditions:

1. Power lines and power line returns were configured as required by the system configuration.
2. The EUT was raised approximately 10 cm from the ground using isolated stand-offs.
3. Signal/control test cables were positioned approximately 5 cm (2 in.) above the ground.

Table 4-4 Electrostatic Discharge Transients

	Requirements		
Characteristic	**Capacitance**	**Resistance**	**Value**
Pulse Wave Shape (RC Network)	150	330	pf / Ω
Test Levels	**Discharge Types**		**Value**
	Air Gap	**Direct Contact**	
	±15	±8	KV
Rise Time	≤1		nanosecond
Pulse Decay Time	≈30 at 50% height		nanosecond
Pulse Repetition	≥1		per second
Total Injected Pulse at each Test Point	10		per polarity (±)
Temperature	≥15 to ≤35		°C
Relative Humidity	≥30 to ≤60		%

During the ESD Test there was one anomaly encountered (reference Notice of Anomaly No. 8 in Attachment A for further reference).

During the second attempt the EUT successfully met the requirements of the ESD Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, D, and G of this report.

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.5 Electrical Tests (Continued)

4.5.4 Electromagnetic Susceptibility

Electromagnetic Susceptibility testing was performed in accordance with sections 4.1.2.10 of Volume I and 4.8 of Volume II of the 2005 VVSG. This testing was performed to ensure that the EUT was able to withstand a moderate level of ambient electromagnetic fields without disruption of normal operation or loss of data.

The EUT was configured to run in an automated ballot count test mode, where continual ballot processing would occur during the testing without operator intervention. The DS200 was then subjected to ambient electromagnetic fields at 10 V/m over a range of 80 MHz to 1000 MHz, as shown in Figure 4-7. Testing was conducted utilizing both horizontally and vertically polarized waves. The limits were measured with a maximum scan rate of 1% of the fundamental frequency and the dwell duration was three seconds.

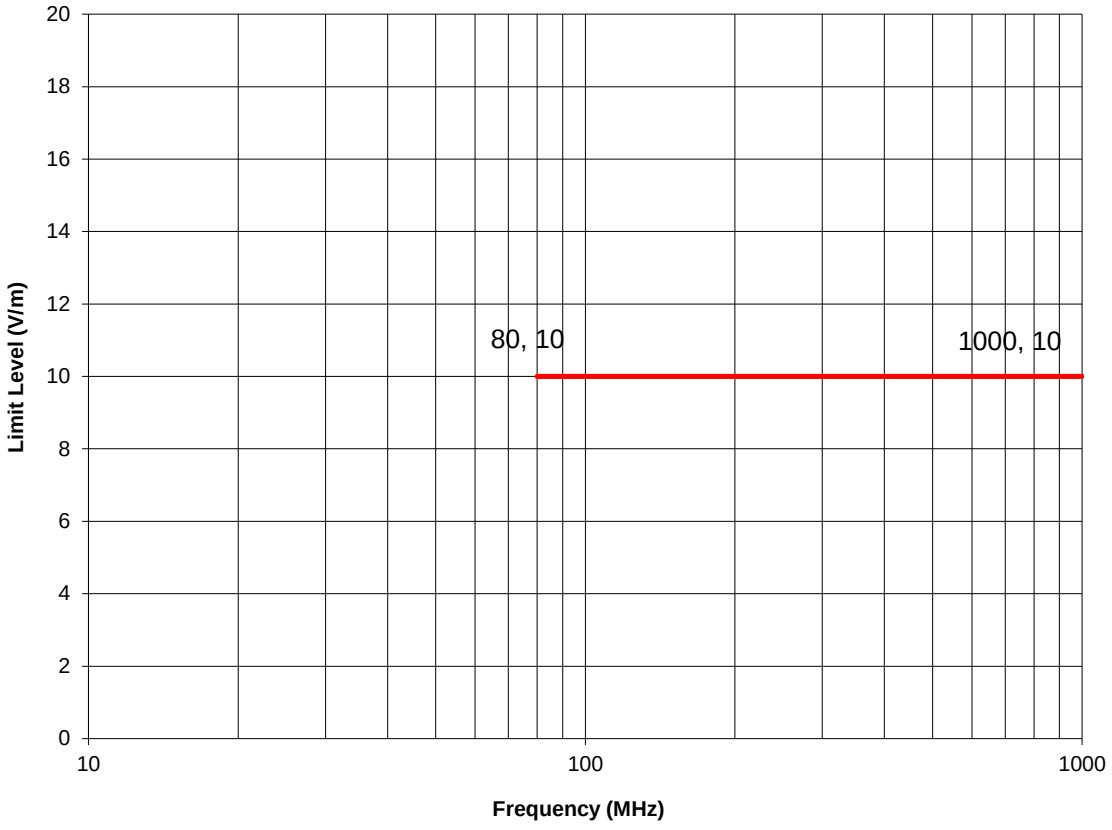

Figure 4-7 Radiated Susceptibility Limit

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.5 Electrical Tests (Continued)

4.5.4 Electromagnetic Susceptibility

During the Susceptibility Test there were three anomalies encountered (reference Notice of Anomaly Nos. 4, 5 and 6 in Attachment A). During the fourth attempt there was no loss of normal operation or loss of data as a result of the applied electromagnetic fields.

On the fourth attempt the EUT successfully met the requirements of the Electromagnetic Susceptibility Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, D, and G of this report.

4.5.5 Electrical Fast Transients

Electrical Fast Transients (EFT) testing was performed in accordance with sections 4.1.2.6 (a) of Volume I and 4.8 of Volume II of the 2005 VVSG to ensure that, should an electrical fast transient event occur on a power line, the EUT would continue to operate without disruption of normal operation of loss of data. Section 4.1.2.6 (b) of Volume I is not applicable because there are no I/O lines greater than three meters.

The EUT was configured to run in an automated ballot count test mode, where continual ballot processing would occur during the testing without operator intervention. The EUT was then subjected to electrostatic fast transients of 2 kV applied to its AC power lines. The pulse characteristics are listed in Table 4-5.

Table 4-5 EFT Pulse Characteristics

Pulse Description	Requirements	Units
Pulse Amplitude	+/-2.0	kV peak to peak
Pulse Rise Time	5 ±30%	nanoseconds
Pulse Width	50 ±30%	nanoseconds
Pulse Repetition Rate	100	kHz
Pulse Shape	Double exponential	N/A
Burst Duration	15	milliseconds
Burst Period	300	milliseconds
Test Duration	60	seconds

There was no loss of normal operation or loss of data as a result of the applied transients. The EUT successfully met the requirements of the Electrical Fast Transients Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, D, and G of this report.

4.5.6 Lightning Surge

Lightning Surge testing was performed in accordance with sections 4.1.2.7 (a), (b) of Volume I and 4.8 of Volume II of the 2005 VVSG to ensure that, should a surge event occur on a power line due to a lightning strike, the EUT will continue to operate without disruption of normal operation or loss of data. Sections 4.1.2.7 (c), (d), and (e) are not applicable because there are no DC lines greater than 10 meters and no I/O lines greater than 30 meters.

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.5 Electrical Tests (Continued)

4.5.6 Lightning Surge (Continued)

The EUT was configured to run in an automated ballot count test mode, where continual ballot processing would occur during the testing. The EUT power input lines were then subjected to lightning surge testing at a level of 2 kV applied to its AC power line per the surge characteristics listed in Table 4-6.

Table 4-6 Surge Characteristics

Test I.D.	Cable Type	Number of Interfacing Cables	Description	Injection Signals Summary Characteristics
Surge	Line (L) to Neutral (N)	1	120 VAC Power Lines	Injection at Power Input Sinewave: 0°, 90°, and 270° Combination Wave Test Levels: ±2.0 kV and Ring Wave Test Level = ±2.0 kV
	Line (L) to Ground (G)	1		
	Neutral (N) to Ground (G)	1		
	Line (L) & Neutral (N) to Ground (G)	1		

During the Lightning Surge Test there were two anomalies encountered (reference Notice of Anomaly Nos. 1 and 2 in Attachment A).

During the third attempt the EUT successfully met the requirements of the Lightning Surge Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, D, and G of this report.

4.5.7 Conducted RF Immunity

Conducted RF Immunity testing was performed in accordance with sections 4.1.2.11 (a) of Volume I and 4.8 of Volume II of the 2005 VVSG. Section 4.1.2.11 (b) of Volume I is not applicable because there are no signal/control lines greater than three meters. This testing was performed to ensure that the EUT was able to withstand conducted RF energy onto its power lines without disruption of normal operation or loss of data.

4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.5 Electrical Tests (Continued)

4.5.7 Conducted RF Immunity

The EUT was configured to run in an automated ballot count test mode, where continual ballot processing would occur during the testing without operator intervention. The EUT was then subjected to conducted RF energy of 10 V rms applied to its power lines over a frequency range of 150 kHz to 80 MHz.

There was no loss of normal operation or loss of data as a result of the applied conducted RF energy. The EUT successfully met the requirements of the Conducted RF Immunity Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, D, and G of this report.

4.5.8 Magnetic Fields Immunity

Magnetic Fields Immunity testing was performed in accordance with sections 4.1.2.12 of Volume I and 4.8 of Volume II of the 2005 VVSG. This testing was performed to ensure that the EUT was able to withstand AC magnetic fields without disruption of normal operation of loss of data.

The EUT was configured to run in an automated ballot count test mode, where continual ballot processing would occur during the testing. The EUT was then subjected to AC magnetic fields of 30 A/m at a 60 Hz power line frequency.

There was no loss of normal operation or loss of data as a result of the applied magnetic field.

The EUT successfully met the requirements of the Magnetic Fields Immunity Test. The Test Data Sheet, Photographs, and Instrumentation Equipment Sheet are contained in Attachments B, D, and G of this report.

4.5.9 Product Safety Review

The VVSG states that all voting systems shall meet the following requirements for safety:

All voting systems and their components shall be designed to eliminate hazards to personnel or to the equipment itself.

Defects in design and construction that can result in personal injury or equipment damage must be detected and corrected before voting systems and components are placed into service.

Equipment design for personnel safety shall be equal to or better than the appropriate requirements of the Occupational Safety and Health Act, Code of Federal Regulations, Title 29, Part 1910.

To satisfy these requirements, the voting system was subjected to a Product Safety Review in accordance with UL 60950-1, "Safety of Information Technology Equipment".

Attachment F of this report contains the Product Safety Certificate of Conformance.

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4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.6 Anomalies and Resolutions

Eight Notices of Anomalies 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. The Notices of Anomaly generated during testing are presented in their entirety in ATTACHMENT A and are summarized below.

Notice of Anomaly No. 1: Lightning Surge Test

After being subjected to the Lightning Surge Test, the AC Power Adapter ceased to function. As a result, the FL EVS 4500 system did not successfully pass the Lighting Surge Test.

Resolution to Notice of Anomaly No. 1
ES&S acknowledged the nonconformance observation and resubmitted a replacement AC Power Adapter for testing as part of the DS200.

Notice of Anomaly No. 2: Lightning Surge Test

After being subjected to the Lightning Surge Test, the AC Power Adapter ceased to function. As a result, the FL EVS 4500 system did not successfully pass the Lighting Surge Test.

Resolution to Notice of Anomaly No. 2
ES&S modified the FL EVS 4500 system to include an in-line COTS surge suppressor and resubmitted a replacement AC Power Adapter for testing as part of the DS200.

Notice of Anomaly No. 4: Electromagnetic Susceptibility Test

After being subjected to the Electromagnetic Susceptibility Test, the DS200 suffered disruption of normal operation. As a result, the FL EVS 4500 system did not successfully pass the Electromagnetic Susceptibility Test.

Resolution to Notice of Anomaly No. 4
ES&S acknowledged the nonconformance observation and provided a root cause analysis.

Notice of Anomaly No. 5: Electromagnetic Susceptibility Review

After being subjected to the Electromagnetic Susceptibility Test, the DS200 suffered disruption of normal operation. As a result, the FL EVS 4500 system did not successfully pass the Electromagnetic Susceptibility Test.

Resolution to Notice of Anomaly No. 5
ES&S acknowledged the nonconformance observation and provided a root cause analysis.

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4.0 TEST FINDINGS AND RECOMMENDATIONS (Continued)

4.6 Anomalies and Resolutions (Continued)

Notice of Anomaly No. 6: Electromagnetic Susceptibility Review

After being subjected to the Electromagnetic Susceptibility Test, the DS200 suffered disruption of normal operation. As a result, the FL EVS 4500 system did not successfully pass the Electromagnetic Susceptibility Test.

Resolution to Notice of Anomaly No. 6
ES&S acknowledged the nonconformance observation and provided a root cause analysis.

Notice of Anomaly No. 7: Low Temperature Test

After being subjected to the Low Temperature Test, the DS200 was damaged due to human error during testing. As a result, the FL EVS 4500 system did not successfully pass the Low Temperature Test.

Resolution to Notice of Anomaly No. 7
Wyle counseled and retrained all technicians on the associated Wyle Operating Procedure and performed the test correctly, at which time the DS200 successfully completed the Low Temperature Test.

Notice of Anomaly No. 8: Electrostatic Disruption Test (ESD)

After being subjected to the Electrostatic Disruption, the DS200 ceased to function and required human intervention in the form of a power cycle, during testing. As a result, the FL EVS 4500 system did not successfully pass the Electrostatic Disruption.

Resolution to Notice of Anomaly No. 8
ES&S acknowledged the nonconformance observation; Wyle performed the Electrostatic Disruption Test a second time and the EUT successfully passed.

4.7 Test Summary and Conclusion

Wyle performed conformance testing on all modifications submitted for the ES&S FL EVS 4.5.0.0 Voting System. Wyle only tested the DS200 for the modifications. Modifications of the DS200 met all applicable requirements in the EAC 2005 VVSG.

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

ATTACHMENT A

NOTICES OF ANOMALY

wyle laboratories

ORIGINAL

NOTICE OF ANOMALY | **DATE:** 07/11/2013

NOTICE NO: 1 **P.O. NUMBER:** ES&S-MSA-TA029 **CONTRACT NO:** N/A
CUSTOMER: ES&S **WYLE JOB NO:** T71013.01
NOTIFICATION MADE TO: Paul Huffman **NOTIFICATION DATE:** 07/11/2013
NOTIFICATION MADE BY: Ryan Chambers **VIA:** In person

CATEGORY: [X] SPECIMEN [ ] PROCEDURE [] TEST EQUIPMENT **DATE OF ANOMALY:** 07/11/2013
PART NAME: DS200 **PART NO.** DS200
TEST: Lightning Surge Test (LST) **I.D. NO.** DS0313350009
SPECIFICATION: VVSG Volume I
PARA. NO. Section 4.1.2.7

REQUIREMENTS: 2005 VVSG Volume I: Section 4.1.2.4

Vote scanning and counting equipment for paper-based systems, and all DRE equipment shall be able to withstand, without disruption of normal operation or loss of data, surges of:

a. +2 kV AC line to line
b. +2 kV AC line to earth
*c. + or – 0.5 kV DC line to line >10m
*d. + or – 0.5 kV DC line to earth >10m
*e. +1 kV I/O sig/control >30m

*Indicates requirements that do not apply to the Unit Under Test (UUT), due to the fact that UUT does not contain DC lines in excess of 10 Meters, nor does it contain any I/O lines greater than 30 meters.

DESCRIPTION OF ANOMALY:

After the being subjected to the Lightning Surge Test (LST) being performed on July 11, 2013 the AC Power Adapter ceased to function and as a result, the DS200 suffered a disruption of normal operation. The AC Power Adapter ceased to function, during application of 2 kV. The failure occurred at pulse 3 of 7 Sync: 0°/60Hz between the Path L1--N. Photographs were taken of the testing site.

Component Description: AC Power Adapter
Manufacturer: Power-Win Technology Corp.
Model: PW-080A2-1Y24AP

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wyle laboratories

NOTICE OF ANOMALY

DISPOSITION • COMMENTS • RECOMMENDATIONS:
The final disposition is pending a root cause analysis to be presented by the client.

Potential 10 CFR Part 21 ☐ YES ☒ NO

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

CAR Required: ☐ YES ☒ NO CAR No.

VERIFICATION:

TEST WITNESS: 7/17/13

PROJECT ENGINEER: 7/17/13

PROJECT MANAGER: 07/17/13

REPRESENTING: ES&S

INTERDEPARTMENTAL COORDINATION: N/A

QUALITY ASSURANCE: 7/17/13

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Field Issue Resolution Process

Date Reported		7/11/2013
Report Date		9/6/2013
Who is Reporting the Issue?		Ryan Chambers
Brief Description of the Issue		Power supply damaged during test (NOA #1 & #2)
Supplemental Information	**What location is reporting the issue?**	Wyle Labs
	Equipment Affected (Model & Hdw Rev)	*DS200, 1.3*
	What Version of Software are They Running	FLEVS4500
	Has this Issue Been Confirmed or Duplicated	Yes
	By Who	Paul Huffman
	How	Lightning Surge Test

Implement Action Plan

1. Assign Field Issue Tracking Number			
2. Notify Reg Acct Mgr, Cust Svc Mgr, Cert			Sue McKay,
3. Assess Warehouse Inventory as required			na
4. Categorize Issue	**Software**	**Notify Dir**	na
		Submit RCR	na
	Hardware	**Notify Dir**	
		Identify Product Line Manager	Paul Huffman
		Is situation trivial?	NO
5.Conference Call Date:____	**What are the customer expectations?**	**Short Term**	na
		Long Term	
	Immediate customer action		
	Is info gathered sufficient to resolve?		
	Engineering site visit required?		Yes
	Arrange return of equipment?		no
6.Find Root Cause	***Workmanship?*** ___ ***Wear/Handling?*** ___ ***Design?*** ___ ***Other?_Faulty Capacitor_____***	**How to fix?**	Add Tripp-Lite Spike Cube
		What prevents future occurrences?	Add to QC checklist
7. Confirm Solution		**Describe how fix was verified.**	Retest at Wyle was successful
		How does this solution impact the certified configuration?	Official testing already complete
		What additional customer testing required?	na

wyle laboratories

ORIGINAL

NOTICE OF ANOMALY | DATE: 07/12/2013

NOTICE NO: 2 P.O. NUMBER: ES&S-MSA-TA029 CONTRACT NO: N/A
CUSTOMER: ES&S WYLE JOB NO: T71013.01
NOTIFICATION MADE TO: Paul Huffman NOTIFICATION DATE: 07/12/2013
NOTIFICATION MADE BY: Ryan Chambers VIA: In person

CATEGORY: [X] SPECIMEN [ ] PROCEDURE [] TEST EQUIPMENT DATE OF ANOMALY: 07/12/2013
PART NAME: DS200 PART NO. DS200
TEST: Lightning Surge Test (LST) I.D. NO. DS0313350009
SPECIFICATION: VVSG Volume I
PARA. NO. Section 4.1.2.7

REQUIREMENTS: 2005 VVSG Volume I: Section 4.1.2.4

Vote scanning and counting equipment for paper-based systems, and all DRE equipment shall be able to withstand, without disruption of normal operation or loss of data, surges of:

a. +2 kV AC line to line
b. +2 kV AC line to earth
*c. + or – 0.5 kV DC line to line >10m
*d. + or – 0.5 kV DC line to earth >10m
*e. +1 kV I/O sig/control >30m

*Indicates requirements that do not apply to the Unit Under Test (UUT), due to the fact that UUT does not contain DC lines in excess of 10 Meters, nor does it contain any I/O lines greater than 30 meters.

DESCRIPTION OF ANOMALY:

After the being subjected to the Lightning Surge Test (LST) being performed on July 12, 2013 the AC Power Adapter ceased to function and as a result, the DS200 suffered a disruption of normal operation. The AC Power Adapter ceased to function, during application of 2 kV. The failure occurred at pulse 4 of 7 Sync: 0°/60Hz between the Path L1--N. Photographs were taken of the testing site.

Component Description: AC Power Adapter
Manufacturer: Power-Win Technology Corp.
Model: PW-080A2-1Y24AP

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wyle laboratories

NOTICE OF ANOMALY

DISPOSITION • COMMENTS • RECOMMENDATIONS:
The final disposition is pending a root cause analysis to be presented by the client.

Potential 10 CFR Part 21 ☐ YES ☒ NO

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

CAR Required: ☐ YES ☒ NO CAR No.

VERIFICATION:

TEST WITNESS: 7/17/13 **PROJECT ENGINEER:** 7/17/13

PROJECT MANAGER: 07/17/13

REPRESENTING: ES&S **INTERDEPARTMENTAL COORDINATION:** N/A

QUALITY ASSURANCE: 7/18/13

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Field Issue Resolution Process

Date Reported		7/11/2013
Report Date		9/6/2013
Who is Reporting the Issue?		Ryan Chambers
Brief Description of the Issue		Power supply damaged during test (NOA #1 & #2)
Supplemental Information	**What location is reporting the issue?**	Wyle Labs
	Equipment Affected (Model & Hdw Rev)	*DS200, 1.3*
	What Version of Software are They Running	FLEVS4500
	Has this Issue Been Confirmed or Duplicated	Yes
	By Who	Paul Huffman
	How	Lightning Surge Test

Implement Action Plan

1. Assign Field Issue Tracking Number			
2. Notify Reg Acct Mgr, Cust Svc Mgr, Cert			Sue McKay,
3. Assess Warehouse Inventory as required			na
4. Categorize Issue	**Software**	**Notify Dir**	na
		Submit RCR	na
	Hardware	**Notify Dir**	
		Identify Product Line Manager	Paul Huffman
		Is situation trivial?	NO
5.Conference Call Date:____	**What are the customer expectations?**	**Short Term**	na
		Long Term	
	Immediate customer action		
	Is info gathered sufficient to resolve?		
	Engineering site visit required?		Yes
	Arrange return of equipment?		no
6.Find Root Cause	***Workmanship?*** ___ ***Wear/Handling?*** ___ ***Design?*** ___ ***Other?_Faulty Capacitor_____***	**How to fix?**	Add Tripp-Lite Spike Cube
		What prevents future occurrences?	Add to QC checklist
7. Confirm Solution		**Describe how fix was verified.**	Retest at Wyle was successful
		How does this solution impact the certified configuration?	Official testing already complete
		What additional customer testing required?	na

wyle laboratories ORIGINAL

NOTICE OF ANOMALY	DATE: 08/28/2013
NOTICE NO: 4 a	P.O. NUMBER: ES&S-MSA-TA029
CONTRACT NO: N/A	
CUSTOMER: Election Systems and Software (ES&S)	WYLE JOB NO: T71013.01
NOTIFICATION MADE TO: Paul Huffman	NOTIFICATION DATE: 08/13/2013
NOTIFICATION MADE BY: Ryan Chambers	VIA: In person
CATEGORY: [x] SPECIMEN [ ] PROCEDURE [ ] TEST EQUIPMENT	DATE OF ANOMALY: 08/13/2013
PART NAME: EVS 4.5.0.0 FL	PART NO. DS200
TEST: Electromagnetic Susceptibility Test (EST)	I.D. NO. DS0313350009
SPECIFICATION: EAC 2005 VVSG, Volume I	PARA. NO. Section 4.1.2.10

REQUIREMENTS:

Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand an electromagnetic field of 10 V/m modulated by a 1 kHz 80% AM modulation over the frequency range of 80 MHz to 1000 MHz, without disruption of normal operation or loss of data.

DESCRIPTION OF ANOMALY:

The EUT was oriented at 180 degrees, with the back of the EUT facing the Anntenna. The Anntenna was oriented in the Vertical position. Upon exposure to an electromagnetic field of 10 V/m modulated by a 1kHz 80% AM modulation over the frequency range of 80 MHz to 1000 MHz, the DS200 suffered disruption of normal operation. The shoeshine setup menu was available on the display and the shoeshine ballot was hanging from the front of the DS200 paper path.

DISPOSITION • COMMENTS • RECOMMENDATIONS:

The final disposition is pending a root cause analysis to be presented by ES&S.

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:

PROJECT ENGINEER: Ryan D. Chambers 08/30/2013

TEST WITNESS: N/A

PROJECT MANAGER: Michael D. Walker 8/30/13

REPRESENTING: N/A

INTERDEPARTMENTAL COORDINATION: N/A

QUALITY ASSURANCE: Suleem 8/30/13

N/A

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Field Issue Resolution Process

Date Reported			8/28/2013
Report Date			9/6/2013
Who is Reporting the Issue?			Ryan Chambers
Brief Description of the Issue			Shoe shine mode stops. (NOA #4a)
Supplemental Information	**What location is reporting the issue?**		Wyle Labs
	Equipment Affected (Model & Hdw Rev)		*DS200, 1.3*
	What Version of Software are They Running		FLEVS4500
	Has this Issue Been Confirmed or Duplicated		Yes
	By Who		Paul Huffman
	How		Electromagnetic Susceptibility Test

Implement Action Plan

1. Assign Field Issue Tracking Number			
2. Notify Reg Acct Mgr, Cust Svc Mgr, Cert			Sue McKay
3. Assess Warehouse Inventory as required			na
4. Categorize Issue	**Software**	**Notify Dir**	na
		Submit RCR	na
	Hardware	**Notify Dir**	
		Identify Product Line Manager	Paul Huffman
		Is situation trivial?	no
5. Conference Call Date:____	**What are the customer expectations?**	**Short Term**	na
		Long Term	
	Immediate customer action		
	Is info gathered sufficient to resolve?		
	Engineering site visit required?		Yes
	Arrange return of equipment?		no
6. Find Root Cause	***Workmanship?*** ___ ***Wear/Handling?*** ___ ***Design?*** ___ ***Other? _Faulty Capacitor_____***	**How to fix?**	Double wrap sensor cable ferrite near scanner board
		What prevents future occurrences?	
7. Confirm Solution		**Describe how fix was verified.**	Retest at Wyle was successful
		How does this solution impact the certified configuration?	Official testing already complete
		What additional customer testing required?	
8. Close	**Release Planning**	**What's planned for this**	Change manufacturing process document

wyle laboratories ORIGINAL

NOTICE OF ANOMALY

DATE: 08/28/2013

NOTICE NO: 5 P.O. NUMBER: ES&S-MSA-TA029 CONTRACT NO: N/A
CUSTOMER: Election Systems and Software (ES&S) WYLE JOB NO: T71013.01
NOTIFICATION MADE TO: Paul Huffman NOTIFICATION DATE: 08/16/2013
NOTIFICATION MADE BY: Ryan Chambers VIA: In person

CATEGORY: [x] SPECIMEN [ ] PROCEDURE [ ] TEST EQUIPMENT DATE OF ANOMALY: 08/16/2013
PART NAME: EVS 4.5.0.0 FL PART NO. DS200
TEST: Electromagnetic Susceptibility Test (EST) I.D. NO. DS0313350009
SPECIFICATION: EAC 2005 VVSG, Volume I PARA. NO. Section 4.1.2.10

REQUIREMENTS:

Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand an electromagnetic field of 10 V/m modulated by a 1 kHz 80% AM modulation over the frequency range of 80 MHz to 1000 MHz, without disruption of normal operation or loss of data.

DESCRIPTION OF ANOMALY:

The EUT was oriented at 0 degrees, with the front of the EUT facing the Anntenna. The Anntenna was oriented in the Vertical position. Upon exposure to an electromagnetic field of 10 V/m modulated by a 1kHz 80% AM modulation over the frequency range of 80 MHz to 1000 MHz, the DS200 suffered disruption of normal operation. The following error was displayed on the DS200 "1003059: Event Log Write Failed" and the shoeshine ballot was hanging from the front of the DS200 paper path. When the EUT was unplugged from AC to be removed from the test chamber, the EUT unexpectedly shut off. The EUT would not power back on when only being supplied with DC power. When the EUT was plugged back into an AC outlet outside of the chamber, the EUT successfully powered on. After 5 minutes the plug was removed from the AC outlet, the EUT successfully switched to DC and displayed 75% power for the battery status. Within 3 minutes the EUT displayed 100% power. Within 1 minute the EUT displayed 50% power. Within 1 minute the EUT displayed 100% power.

DISPOSITION • COMMENTS • RECOMMENDATIONS:

The final disposition is pending a root cause analysis to be presented by ES&S.

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:
PROJECT ENGINEER: Ryan D Chambers 08/30/2013
TEST WITNESS: N/A
PROJECT MANAGER: Michael D Walker 8/30/13
REPRESENTING: N/A
INTERDEPARTMENTAL COORDINATION: N/A
QUALITY ASSURANCE: Steven 8/30/13
N/A

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Field Issue Resolution Process

Date Reported		8/28/2013
Report Date		9/6/2013
Who is Reporting the Issue?		Ryan Chambers
Brief Description of the Issue		Event Log write failed. (NOA #5)
Supplemental Information	**What location is reporting the issue?**	Wyle Labs
	Equipment Affected (Model & Hdw Rev)	*DS200, 1.3*
	What Version of Software are They Running	FLEVS4500
	Has this Issue Been Confirmed or Duplicated	Yes
	By Who	Paul Huffman
	How	Electromagnetic Susceptibility Test

Implement Action Plan

1. Assign Field Issue Tracking Number			
2. Notify Reg Acct Mgr, Cust Svc Mgr, Cert			Sue McKay,
3. Assess Warehouse Inventory as required			na
4. Categorize Issue	**Software**	**Notify Dir**	na
		Submit RCR	na
	Hardware	**Notify Dir**	
		Identify Product Line Manager	Paul Huffman
		Is situation trivial?	no
5. Conference Call Date:_____	**What are the customer expectations?**	**Short Term**	na
		Long Term	
	Immediate customer action		
	Is info gathered sufficient to resolve?		
	Engineering site visit required?		Yes
	Arrange return of equipment?		no
6. Find Root Cause	***Workmanship?*** ___ ***Wear/Handling?*** ___ ***Design?*** ___ ***Other? _Faulty Capacitor_____***	**How to fix?**	Copper tape shielding of paper entry
		What prevents future occurrences?	This modification will be added to the checklist to ensure application of tape
7. Confirm Solution		**Describe how fix was verified.**	Retest at Wyle was successful
		How does this solution impact the certified configuration?	Official testing already complete
		What additional customer testing required?	
8. Close	**Release Planning**	**What's planned for this**	Add copper tape during manufacturing process

wyle laboratories ORIGINAL

NOTICE OF ANOMALY	DATE: 08/28/2013
NOTICE NO: 6	P.O. NUMBER: ES&S-MSA-TA029
CONTRACT NO: N/A	
CUSTOMER: Election Systems and Software (ES&S)	WYLE JOB NO: T71013.01
NOTIFICATION MADE TO: Paul Huffman	NOTIFICATION DATE: 08/19/2013
NOTIFICATION MADE BY: Ryan Chambers	VIA: In person
CATEGORY: [x] SPECIMEN [ ] PROCEDURE [ ] TEST EQUIPMENT	DATE OF ANOMALY: 08/17/2013
PART NAME: EVS 4.5.0.0 FL	PART NO. DS200
TEST: Electromagnetic Susceptibility Test (EST)	I.D. NO. DS0313350009
SPECIFICATION: EAC 2005 VVSG, Volume I	PARA. NO. Section 4.1.2.10

REQUIREMENTS:

Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand an electromagnetic field of 10 V/m modulated by a 1 kHz 80% AM modulation over the frequency range of 80 MHz to 1000 MHz, without disruption of normal operation or loss of data.

DESCRIPTION OF ANOMALY:

The EUT was oriented at 0 degrees, with the back of the EUT facing the Anntenna. The Anntenna was oriented in the Vertical position. Upon exposure to an electromagnetic field of 10 V/m modulated by a 1kHz 80% AM modulation over the frequency range of 80 MHz to 1000 MHz, the DS200 suffered disruption of normal operation. The shoeshine setup menu was available on the display and the shoeshine ballot was hanging from the front of the DS200 paper path. When the EUT was unplugged from AC to be removed from the test chamber for ES&S representative, the EUT unexpectedly shut off. The EUT would not power back on when only being supplied with DC power. When the EUT was plugged back into an AC outlet outside of the chamber, the EUT successfully powered on. After 5 minutes the plug was removed from the AC outlet, the EUT successfully switched to DC and displayed 75% power for the battery status.

DISPOSITION • COMMENTS • RECOMMENDATIONS:

The final disposition is pending a root cause analysis to be presented by ES&S.

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:

PROJECT ENGINEER: Ryan D. Chambers 08/30/2013

TEST WITNESS: N/A

PROJECT MANAGER: Michael L Walker 8/30/13

REPRESENTING: N/A

INTERDEPARTMENTAL COORDINATION: N/A

QUALITY ASSURANCE: [signature] 8/30/13

N/A

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Field Issue Resolution Process

Date Reported			8/28/2013
Report Date			9/6/2013
Who is Reporting the Issue?			Ryan Chambers
Brief Description of the Issue			Unit shuts off when A/C removed. (NOA #6)
Supplemental Information	**What location is reporting the issue?**		Wyle Labs
	Equipment Affected (Model & Hdw Rev)		*DS200, 1.3*
	What Version of Software are They Running		FLEVS4500
	Has this Issue Been Confirmed or Duplicated		Yes
	By Who		Paul Huffman
	How		Electromagnetic Susceptibility Test

Implement Action Plan

1. Assign Field Issue Tracking Number			
2. Notify Reg Acct Mgr, Cust Svc Mgr, Cert			Sue McKay,
3. Assess Warehouse Inventory as required			na
4. Categorize Issue	**Software**	**Notify Dir**	na
		Submit RCR	na
	Hardware	**Notify Dir**	
		Identify Product Line Manager	Paul Huffman
		Is situation trivial?	yes
5. Conference Call Date:____	**What are the customer expectations?**	**Short Term**	na
		Long Term	
	Immediate customer action		
	Is info gathered sufficient to resolve?		
	Engineering site visit required?		Yes
	Arrange return of equipment?		no
6. Find Root Cause	***Workmanship?*** ___ ***Wear/Handling?*** ___ ***Design?*** ___ ***Other?_Faulty Capacitor_____***	**How to fix?**	Replaced battery pack
		What prevents future occurrences?	
7. Confirm Solution		**Describe how fix was verified.**	Retest at Wyle was successful
		How does this solution impact the certified configuration?	Official testing already complete
		What additional customer testing required?	
8. Close	**Release Planning**	**What's planned for this**	

wyle laboratories

ORIGINAL **NOTICE OF ANOMALY** DATE: 09/16/2013

NOTICE NO: 7 (Rev A) P.O. NUMBER: ES&S-MSA-TA029 CONTRACT NO: N/A
CUSTOMER: Election Systems and Software (ES&S) WYLE JOB NO: T71013.01
NOTIFICATION MADE TO: Paul Huffman NOTIFICATION DATE: 08/20/2013
NOTIFICATION MADE BY: Ryan Chambers VIA: In person

CATEGORY: [ ] SPECIMEN [x] PROCEDURE [ ] TEST EQUIPMENT DATE OF ANOMALY: 08/20/2013
PART NAME: EVS 4.5.0.0 FL PART NO. ---
TEST: Low Temperature I.D. NO. DS0313350009
SPECIFICATION: EAC 2005 VVSG, Volume II PARA. NO. Section 4.6.4

REQUIREMENTS:

The low temperature test simulates stresses faced during storage of voting machines and ballot counters. All system components, regardless of type, shall meet the requirements of this test. This test is equivalent to the procedure of MIL-STD-810D, Method 502.2, Procedure I-Storage. The minimum temperature shall be -4 degrees F. As outlined in the VVSG 4.6.4.2 Procedure, the following procedure is identified in Step 5: Allow the internal temperature of the equipment to stabilize at laboratory conditions before removing it from the chamber.

DESCRIPTION OF ANOMALY:

The technician removed the EUT from the environmental chamber approximately 1 hour after the interal temperature of the thermal chamber was returned to standard laboratory conditions. The technician did not allow the internal temperature of the equipment to stabilize at laboratory conditions before removing it from the chamber. As a result the accumulated moisture on the circuit board of the scanner assembly module caused a short circuit when the EUT was powered on. This anomaly was directly caused by human error in following the VVSG standard and the Wyle Operating Procedures.

DISPOSITION • COMMENTS • RECOMMENDATIONS:

The final disposition was to council and retrain all of the Wyle technicians on the associated Wyle Operating Procedure.

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: N/A
REPRESENTING: N/A
QUALITY ASSURANCE: Brenda Mena 9/18/13

PROJECT ENGINEER: Lynn Allen 09/16/2013
PROJECT MANAGER: Paul Patel 9/12/13
INTERDEPARTMENTAL COORDINATION: N/A
N/A

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wyle laboratories ORIGINAL

NOTICE OF ANOMALY	DATE: 08/30/2013
NOTICE NO: 8 P.O. NUMBER: ES&S-MSA-TA029	CONTRACT NO: N/A
CUSTOMER: Election Systems and Software (ES&S)	WYLE JOB NO: T71013.01
NOTIFICATION MADE TO: Paul Huffman	NOTIFICATION DATE: 07/31/2013
NOTIFICATION MADE BY: Ryan Chambers	VIA: In person
CATEGORY: [x] SPECIMEN [ ] PROCEDURE [ ] TEST EQUIPMENT	DATE OF ANOMALY: 07/31/2013
PART NAME: EVS 4.5.0.0 FL	PART NO. ---
TEST: Electrostatic Disruption (ESD)	I.D. NO. DS0313350009
SPECIFICATION: EAC 2005 VVSG, Volume I	PARA. NO. Section 4.1.2.8

REQUIREMENTS:

Vote scanning and counting equipment for paper-based systems, and all DRE equipment, shall be able to withstand ±15 kV air discharge and ±8 kV contact discharge without damage or loss of data. The equipment may reset or have momentary interruption so long as normal operation is resumed without human intervention or loss of data. Loss of data means votes that have been completed and confirmed to the voter.

DESCRIPTION OF ANOMALY:

Upon application of +15 kV air discharge to the top-right corner of the black plastic ballot tray cover, located closest to the front right of the DS200 screen. It was observed that the DS200 had become completely unresponsive and required human intervention, by means of a system reboot, to regain normal operation of the DS200. A clicking sound was observed during operation of the EUT, thus the shoeshine ballot was replaced with a new ballot and the clicking sound was resolved. After rebooting the EUT, the same test point was subjected to ±2,4,8,15 kV air discharge, at which time the EUT continued normal operation throughout the remainder of the test.

DISPOSITION • COMMENTS • RECOMMENDATIONS:

To ensure testing results where accumulated in accordance with the VVSG, the Electrostatic Disruption (ESD) was reperformed on 08/29/2013, for which there were no anomalies.
The final disposition is that the original observance could not be replicated.

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: N/A

REPRESENTING: N/A

QUALITY ASSURANCE: 8/30/13

PROJECT ENGINEER: 08/30/2013

PROJECT MANAGER: 8/30/13

INTERDEPARTMENTAL COORDINATION: N/A

N/A

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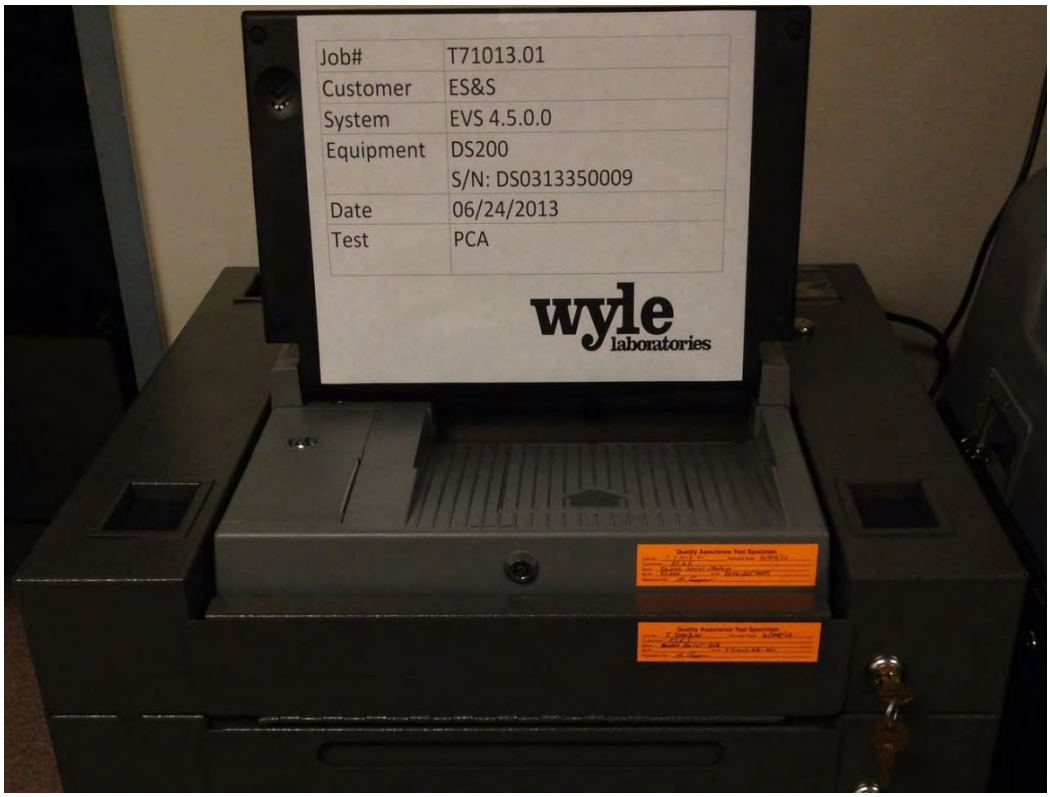
ATTACHMENT B

PHOTOGRAPHS

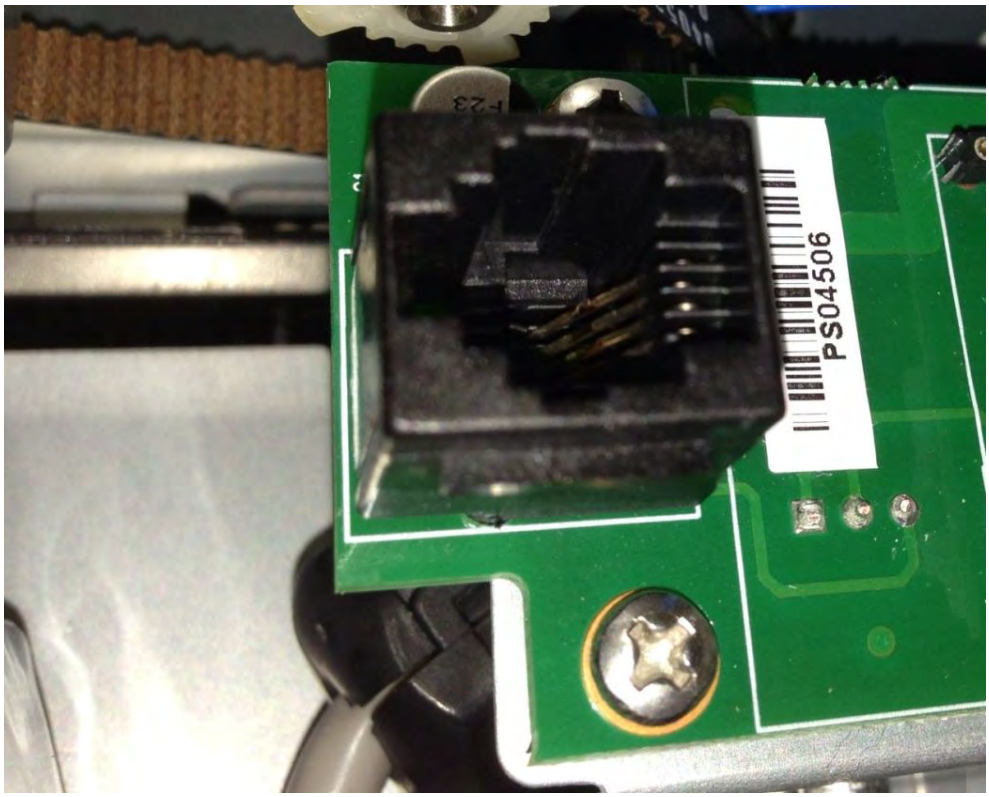
Photograph 1: ES&S FL EVS 4.5.0.0 PCA



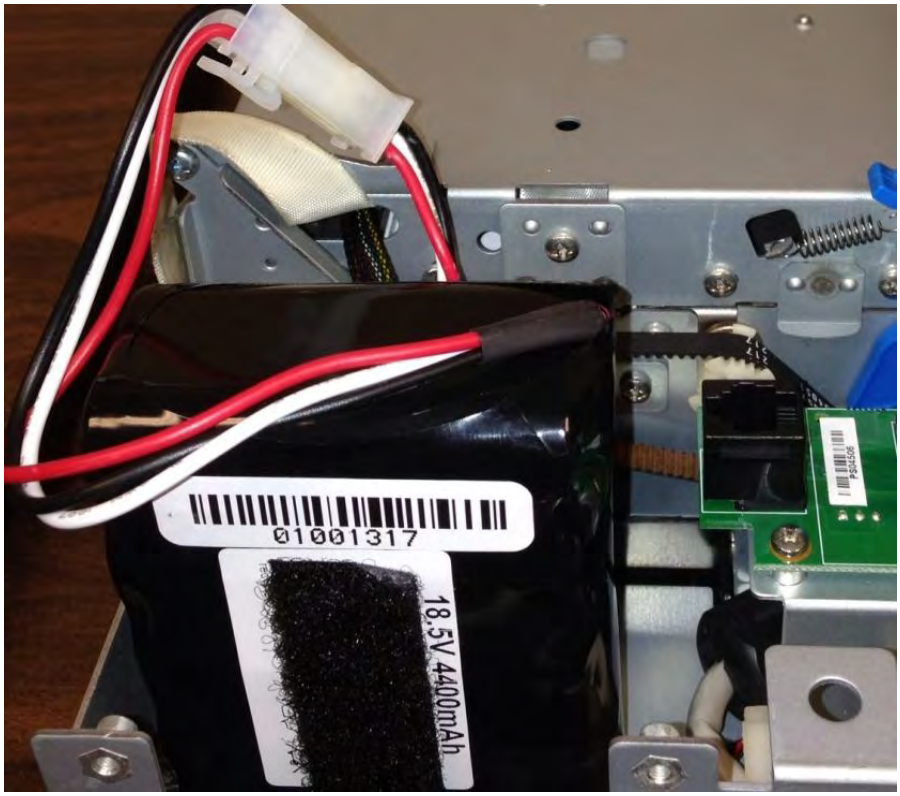
Photograph 2: ES&S FL EVS 4.5.0.0 PCA

Photograph 3: ES&S FL EVS 4.5.0.0 PCA

Photograph 4: ES&S FL EVS 4.5.0.0 PCA

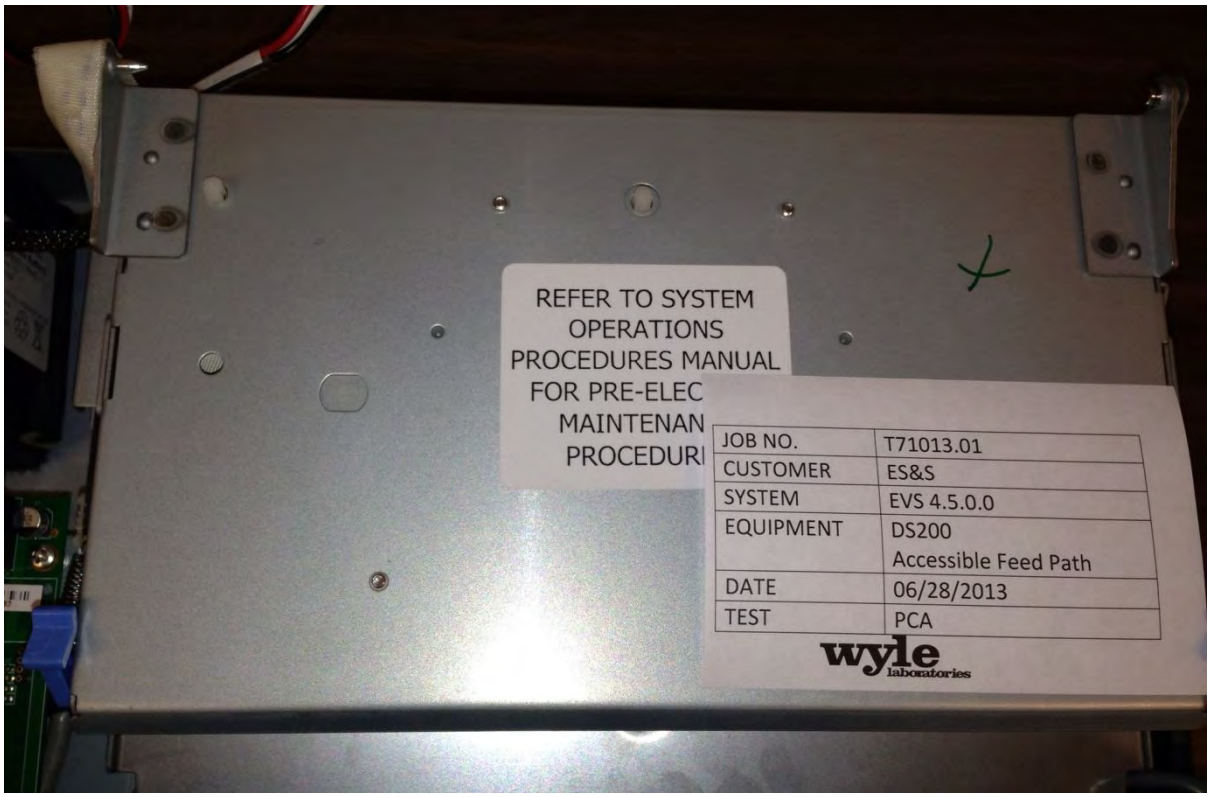


Photograph 5: ES&S FL EVS 4.5.0.0 PCA



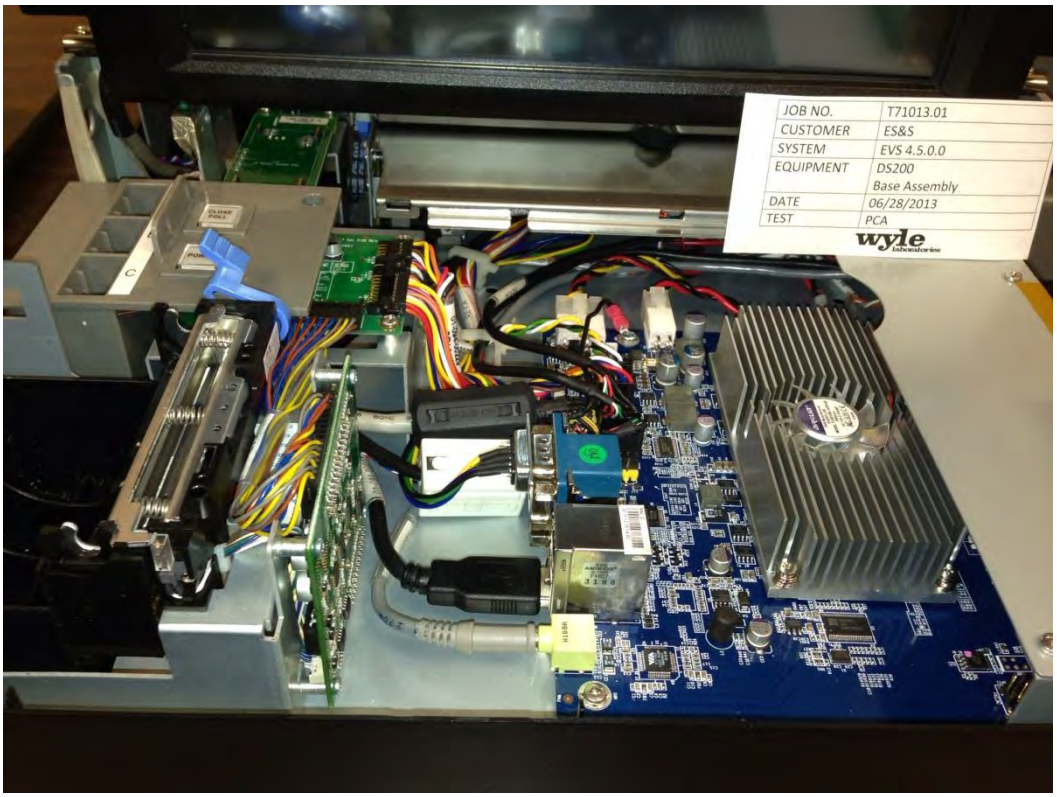
Photograph 6: ES&S FL EVS 4.5.0.0 PCA

Photograph 7: ES&S FL EVS 4.5.0.0 PCA



Photograph 8: ES&S FL EVS 4.5.0.0 PCA

Photograph 9: ES&S FL EVS 4.5.0.0 PCA



Photograph 10: ES&S FL EVS 4.5.0.0 PCA

Photograph 11: ES&S FL EVS 4.5.0.0 Lightning Surge

Photograph 12: ES&S FL EVS 4.5.0.0 Lightning Surge

Photograph 13: ES&S FL EVS 4.5.0.0 Magnetic Fields Immunity

Photograph 14: ES&S FL EVS 4.5.0.0 Magnetic Fields Immunity

Photograph 15: ES&S FL EVS 4.5.0.0 Electromagnetic Emissions

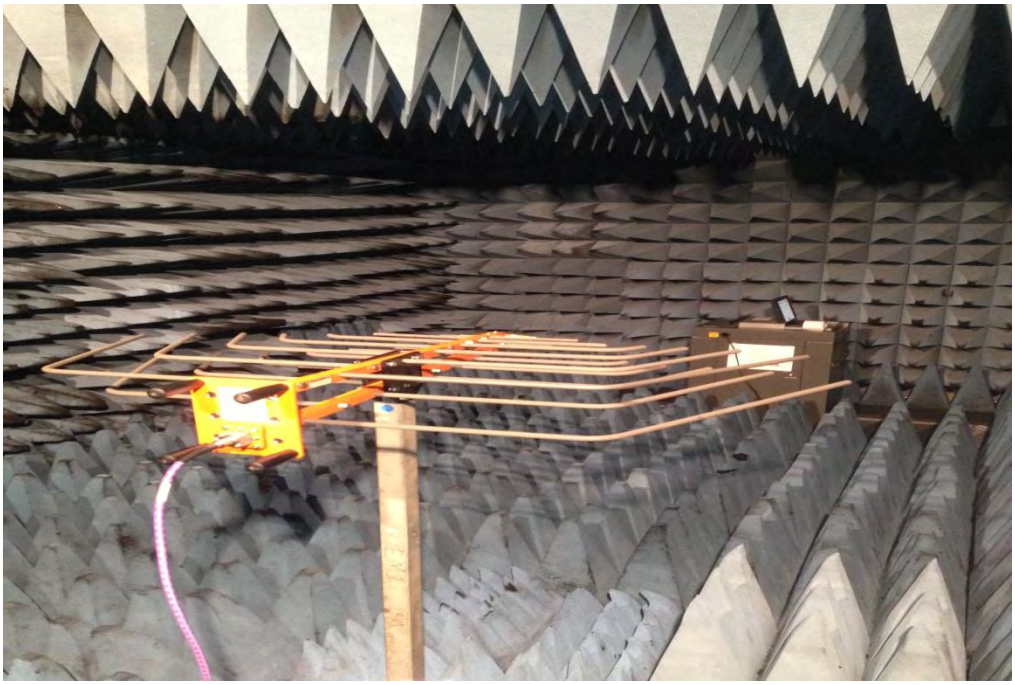
Photograph 16: ES&S FL EVS 4.5.0.0 Electromagnetic Emissions

Photograph 17: ES&S FL EVS 4.5.0.0 Electrostatic Disruption

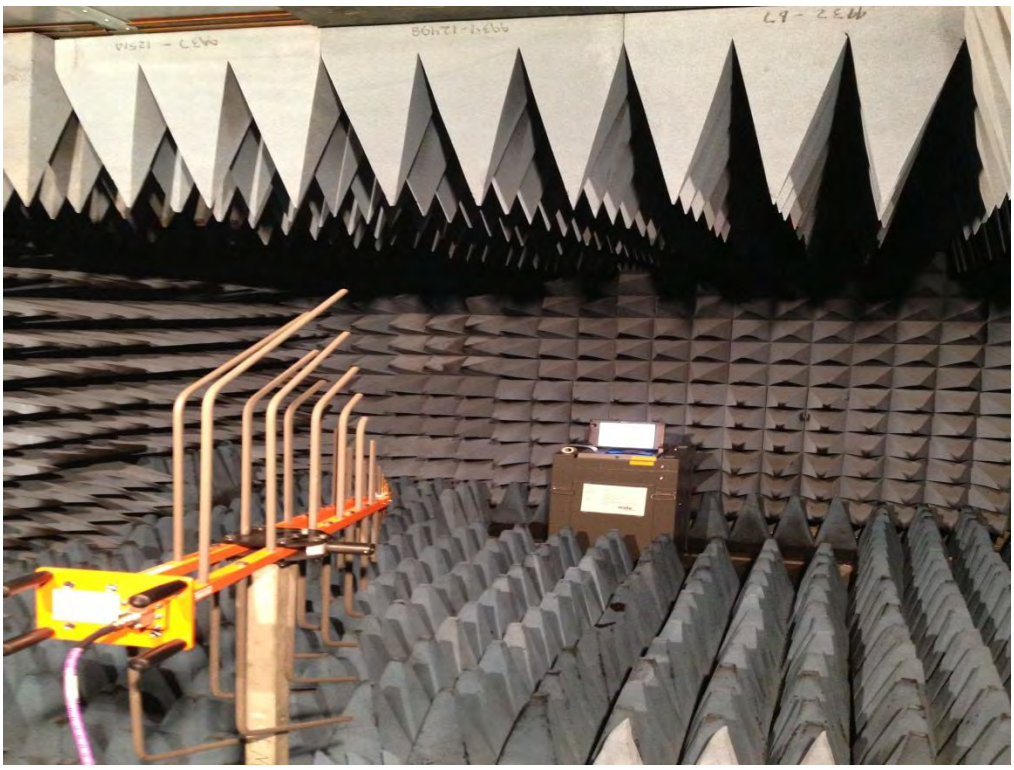
Photograph 18: ES&S FL EVS 4.5.0.0 Electrostatic Disruption

Photograph 19: ES&S FL EVS 4.5.0.0 Electrical Power Disturbance

Photograph 20: ES&S FL EVS 4.5.0.0 Electrical Power Disturbance



Photograph 21: ES&S FL EVS 4.5.0.0 Electromagnetic Susceptibility

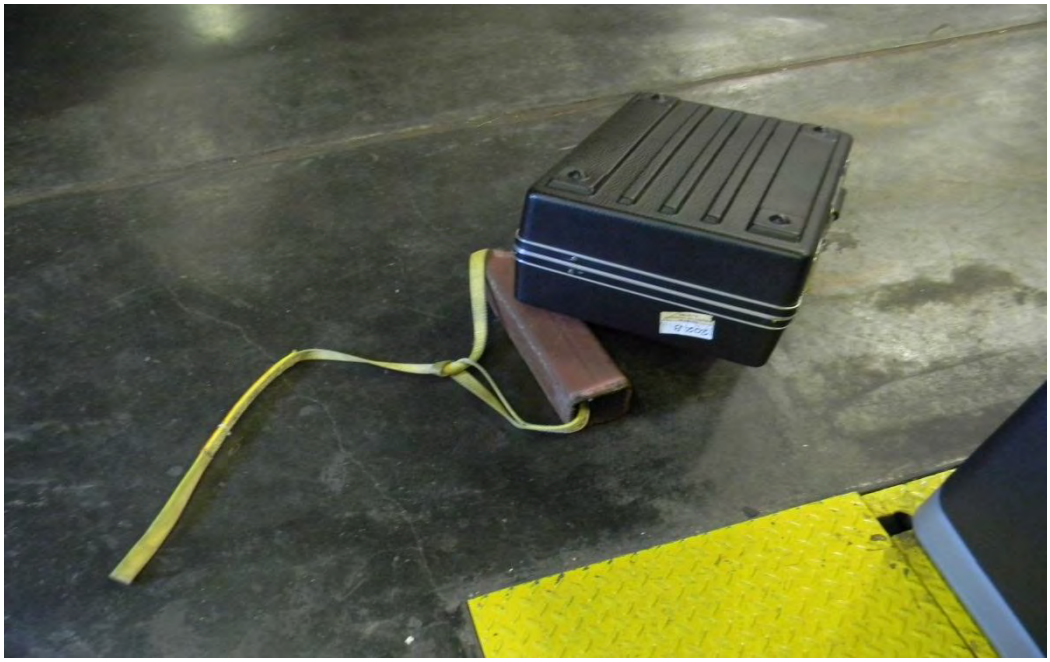


Photograph 22: ES&S FL EVS 4.5.0.0 Electromagnetic Susceptibility

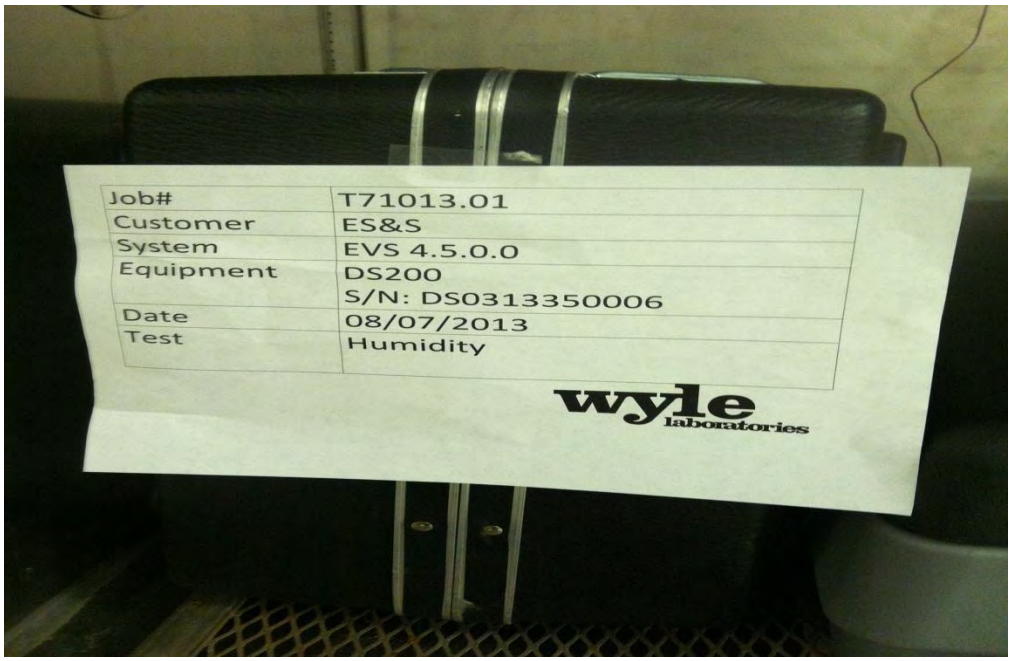
Photograph 23: ES&S FL EVS 4.5.0.0 Temperature and Power Variation

Photograph 24: ES&S FL EVS 4.5.0.0 Temperature and Power Variation

Photograph 25: ES&S FL EVS 4.5.0.0 Bench Handling



Photograph 26: ES&S FL EVS 4.5.0.0 Bench Handling



Photograph 27: ES&S FL EVS 4.5.0.0 Humidity

Photograph 28: ES&S FL EVS 4.5.0.0 Humidity

Photograph 29: ES&S FL EVS 4.5.0.0 Low Temperature

Photograph 30: ES&S FL EVS 4.5.0.0 Low Temperature

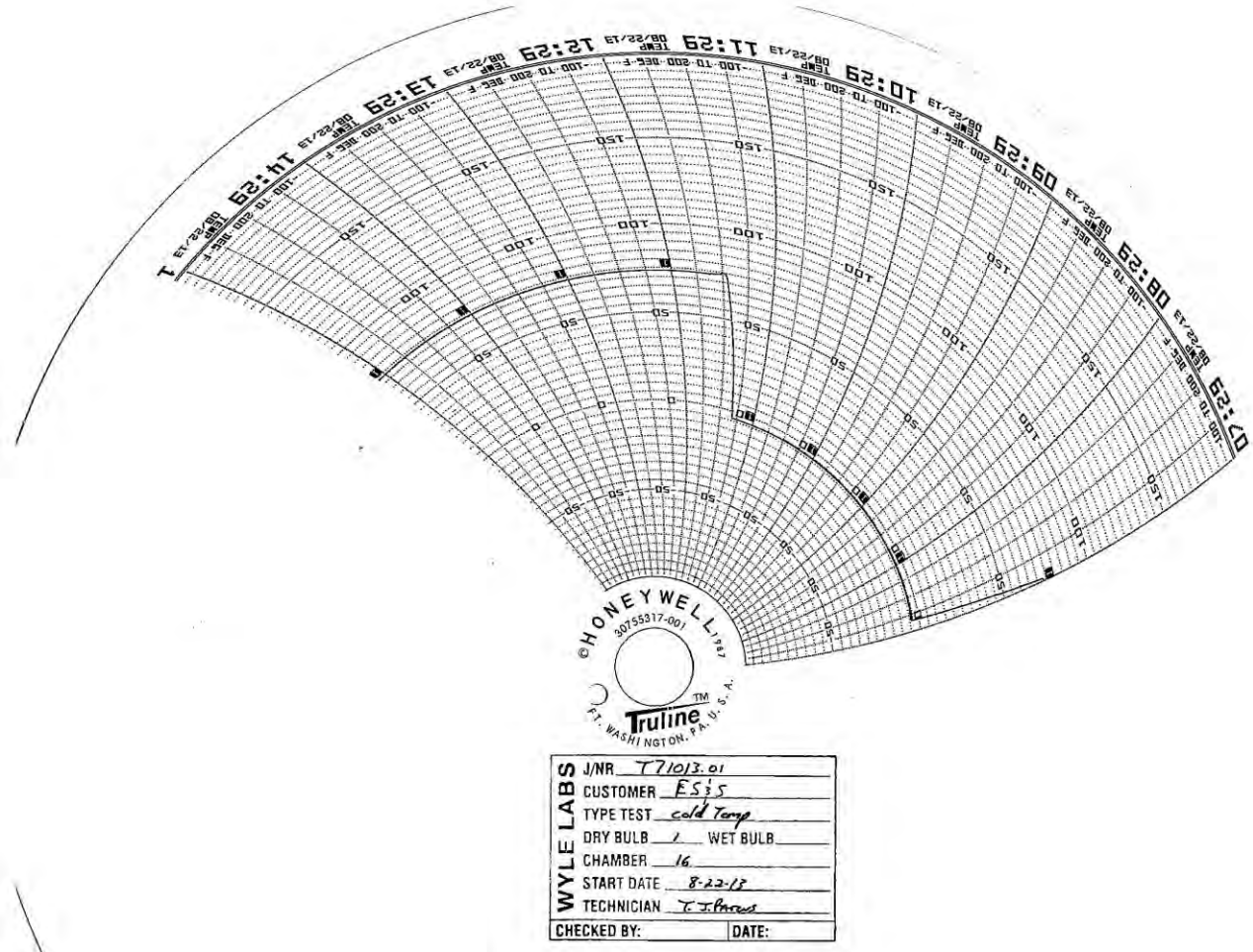
Photograph 31: ES&S FL EVS 4.5.0.0 High Temperature

Photograph 32: ES&S FL EVS 4.5.0.0 High Temperature

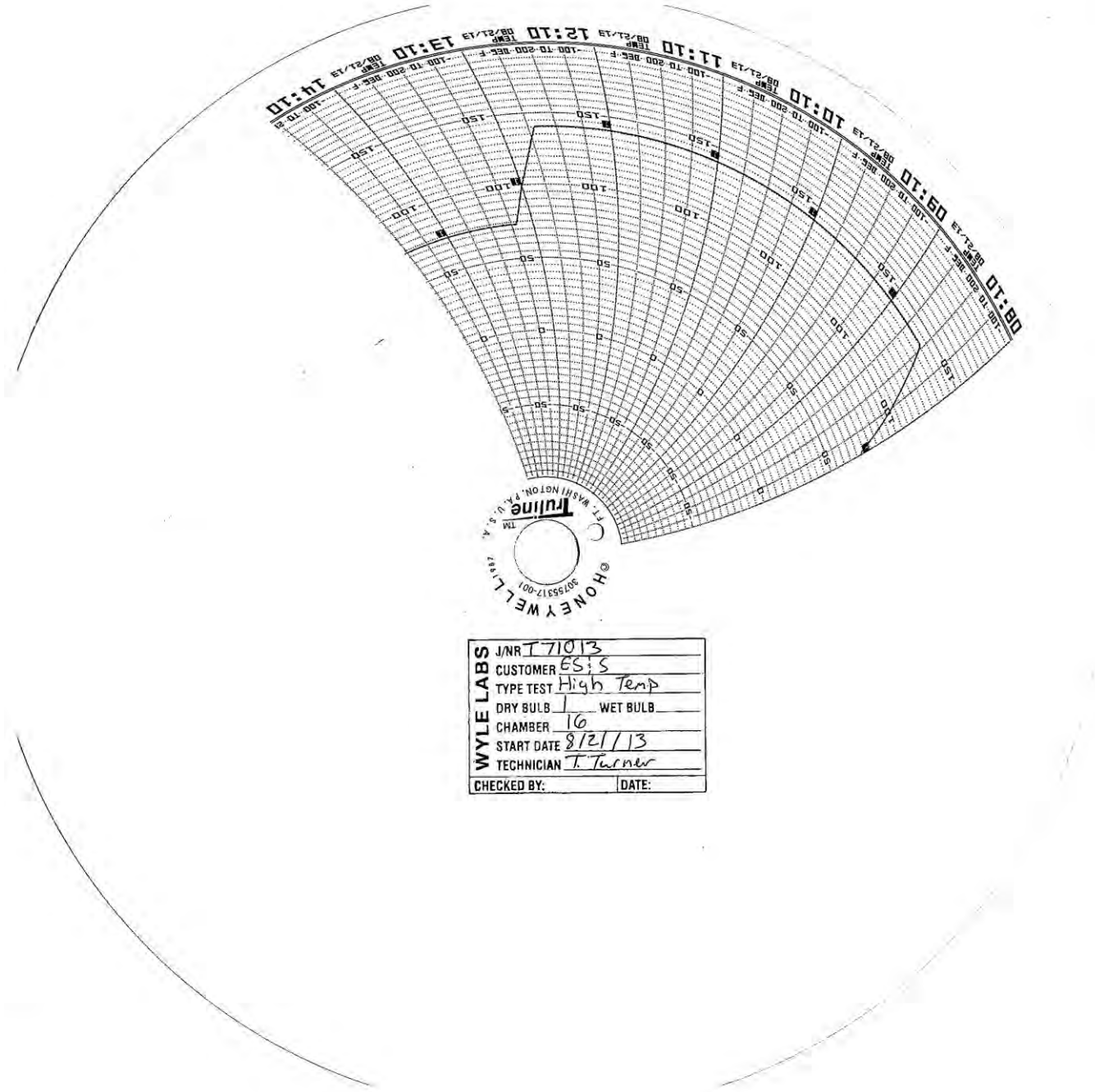
ATTACHMENT C

NON-OPERATING ENVIRONMENTAL TEST DATA

LOW TEMPERATURE TEST DATA


©HONEYWELL 1987
30755317-001
Truline
FT. WASHINGTON, PA. U.S.A.
WYLE LABS
J/NR T71013.01
CUSTOMER ESS
TYPE TEST cold Temp
DRY BULB 1 WET BULB
CHAMBER 16
START DATE 8-22-13
TECHNICIAN T. J. Parsons
CHECKED BY:
DATE:

HIGH TEMPERATURE TEST DATA


WYLE LABS
J/NR 71013
CUSTOMER ESS
TYPE TEST High Temp
DRY BULB 1 WET BULB
CHAMBER 16
START DATE 8/12/13
TECHNICIAN T. Turner
CHECKED BY:
DATE:
HONEY WELL
Fluke

VIBRATION TEST DATA

VIBRATION TEST DATA SHEET

Customer ES&S Spec. ______ Specimen DS200 Hardshell & DS200 Plastic Case

Job No. T71013.01 Method ______ Part No. ______ Specimen Temp. Ambient

GSI Yes [ ] No [X] Procedure ______ S/N ______ Photo Yes [X] No [ ]

Test Title ______

Date	Time	Axis	Temp (F)	SINUSOIDAL Freq. (cps)	SINUSOIDAL Disp. ("da)	SINUSOIDAL Accel. (±g)	RANDOM Freq. (cps)	RANDOM PSD (g2/Hz)	RANDOM Slope (dB/Oct)	TOTAL Accel. (grms)	Test Time (min)	COMMENTS	NAME
												TEST REQUIREMENT	
08/24/13	13:40	Trans	Amb				10	.00013				Run#1 Basic Transportation	
							20-30	.00065				Common Carrier Vibration	
							78	.00002					
							79-120	.00019					
							500	.00001		.205	30		
08/24/13	14:42	Long	Amb				10-20	.00650				Run#2 Basic Transportation	
							120	.00020				Common Carrier Vibration	
							121-200	.00030					
							240	.00150					
							340	.00003					
							500	.00015		.749	30		

Job No. T71013.01
Report No. ______
Date 08/24/13
Page 1 of 2

WH-1028A Signed ______ 9/5/13 Approved ______

VIBRATION TEST DATA SHEET

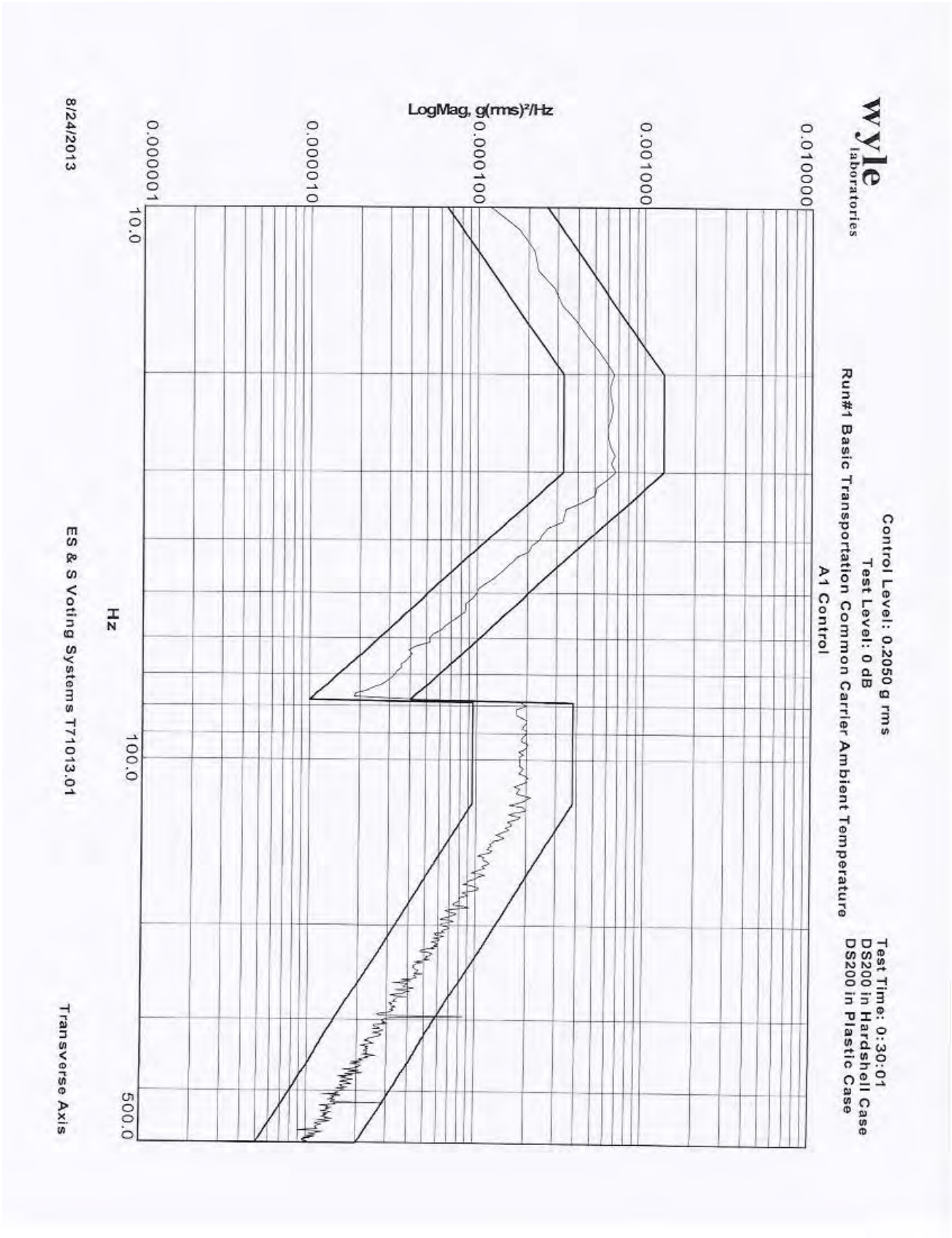
I D No. ______

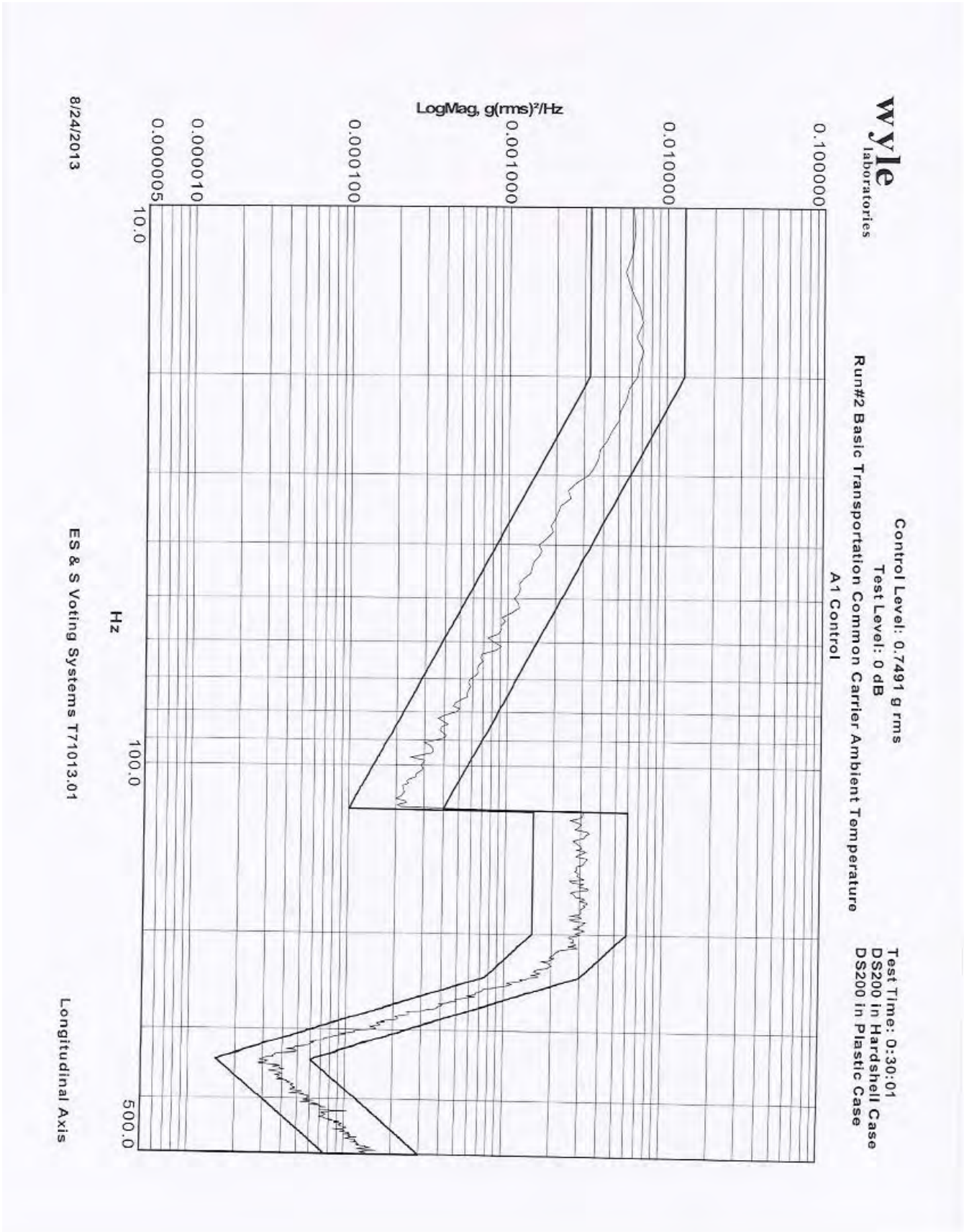
Date	Time	Axis	Temp (F)	SINUSOIDAL Freq. (cps)	SINUSOIDAL Disp. ("da)	SINUSOIDAL Accel. (±g)	RANDOM Freq. (cps)	RANDOM PSD (g2/Hz)	RANDOM Slope (dB/Oct)	TOTAL Accel. (grms)	Test Time (min)	COMMENTS	NAME
												TEST REQUIREMENT	
08/24/13	16:12	Vert	Amb				10-40	.01500				Run#3 Basic Transportation	
							500	.00015		1.06	30	Common Carrier Vibration	DM

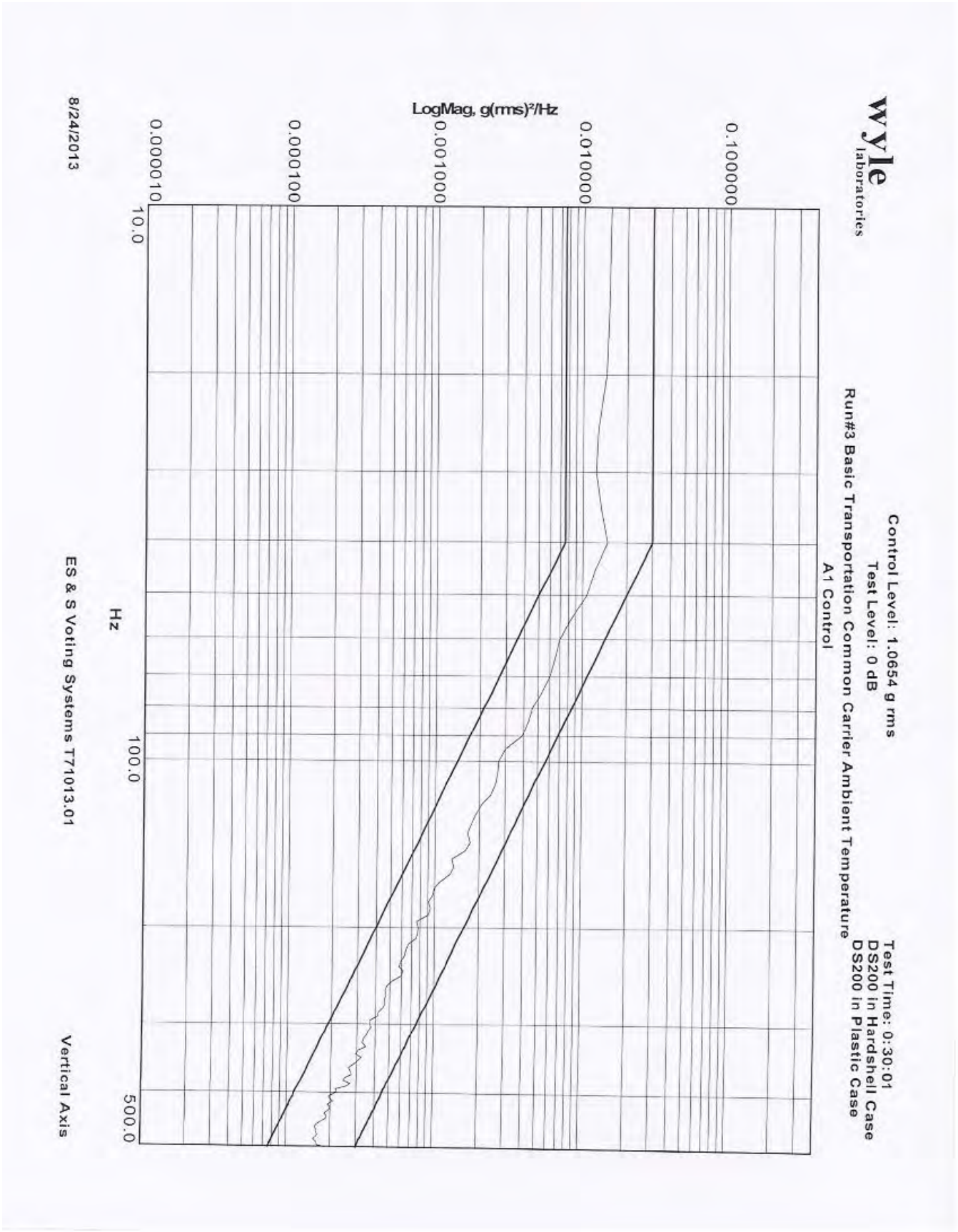
Job No. T71013.01
Report No. ______
Date 08/24/13
Page 2 of 2

WH-1028

Signed [signature] 9/3/13 Approved ______


wyle
laboratories
Control Level: 0.2050 g rms
Test Level: 0 dB
Run#1 Basic Transportation Common Carrier Ambient Temperature
A1 Control
Test Time: 0:30:01
DS200 in Hardshell Case
DS200 in Plastic Case
LogMag, g(rms)²/Hz
0.010000
0.001000
0.000100
0.000010
0.000001
10.0
100.0
500.0
Hz
8/24/2013
ES & S Voting Systems T71013.01
Transverse Axis


Wyle laboratories
Control Level: 0.7491 g rms
Test Level: 0 dB
Run#2 Basic Transportation Common Carrier Ambient Temperature
A1 Control
Test Time: 0:30:01
DS200 in Hardshell Case
DS200 in Plastic Case
LogMag, g(rms)²/Hz
0.100000
0.010000
0.001000
0.000100
0.000010
0.000005
10.0
100.0
500.0
Hz
8/24/2013
ES & S Voting Systems T71013.01
Longitudinal Axis


Wyle Laboratories
Control Level: 1.0654 g rms
Test Level: 0 dB
Run#3 Basic Transportation Common Carrier Ambient Temperature
A1 Control
Test Time: 0:30:01
DS200 in Hardshell Case
DS200 in Plastic Case
LogMag, g(rms)²/Hz
0.100000
0.010000
0.001000
0.000100
0.000010
10.0
100.0
500.0
Hz
8/24/2013
ES & S Voting Systems T71013.01
Vertical Axis

BENCH HANDLING TEST DATA

wyle laboratories

DATA SHEET

Customer ES&S
Specimen EVS 4500
Part No. DS200 **Amb. Temp.** ~75°F **Job No.** T71013
Spec. *EAC 2005 VVSG* **Photo** Yes **Report No.** T71013-01
Para. 4.6.2 **Test Med.** Air **Start Date** 8-26-13
S/N DS0313350010 & DS0313350006 **Specimen Temp.** Ambient

Test Title Bench Handling

Drop Height: 4"

	EUT 1	EUT 2
Edge 1: Drops 1-6	✓	✓
Edge 1: Drops 7-12	✓	✓
Edge 1: Drops 13-18	✓	✓
Edge 1: Drops 19-24	✓	✓

Post-Test Inspection: Post-DP Status check completed on both units under test without issue

Test Passed & completed 8/26/13 10:25 A.M.

Tested By _____ (Technician) **Date** 8/26/13

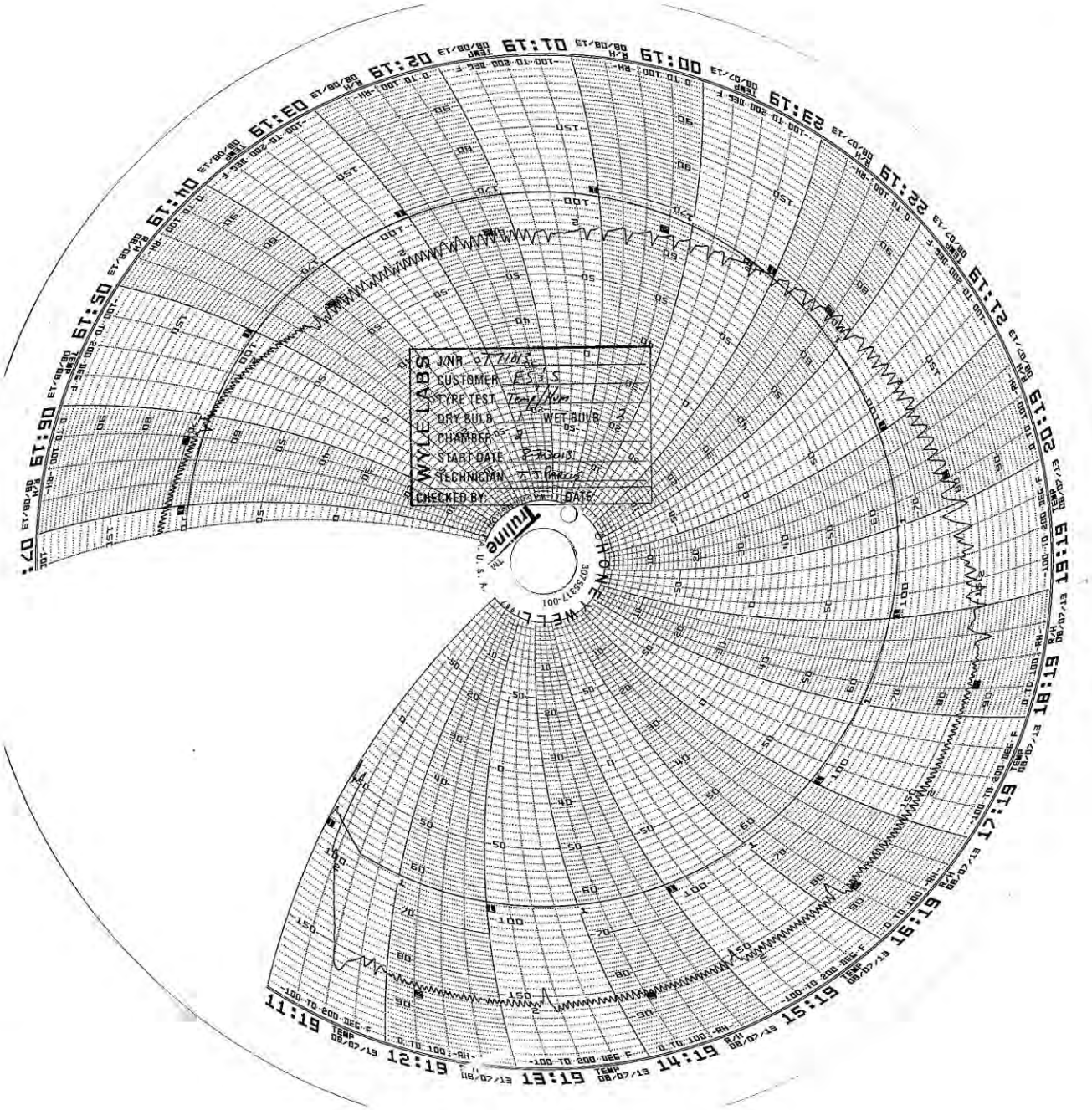
Sheet No. 1 **of** 1

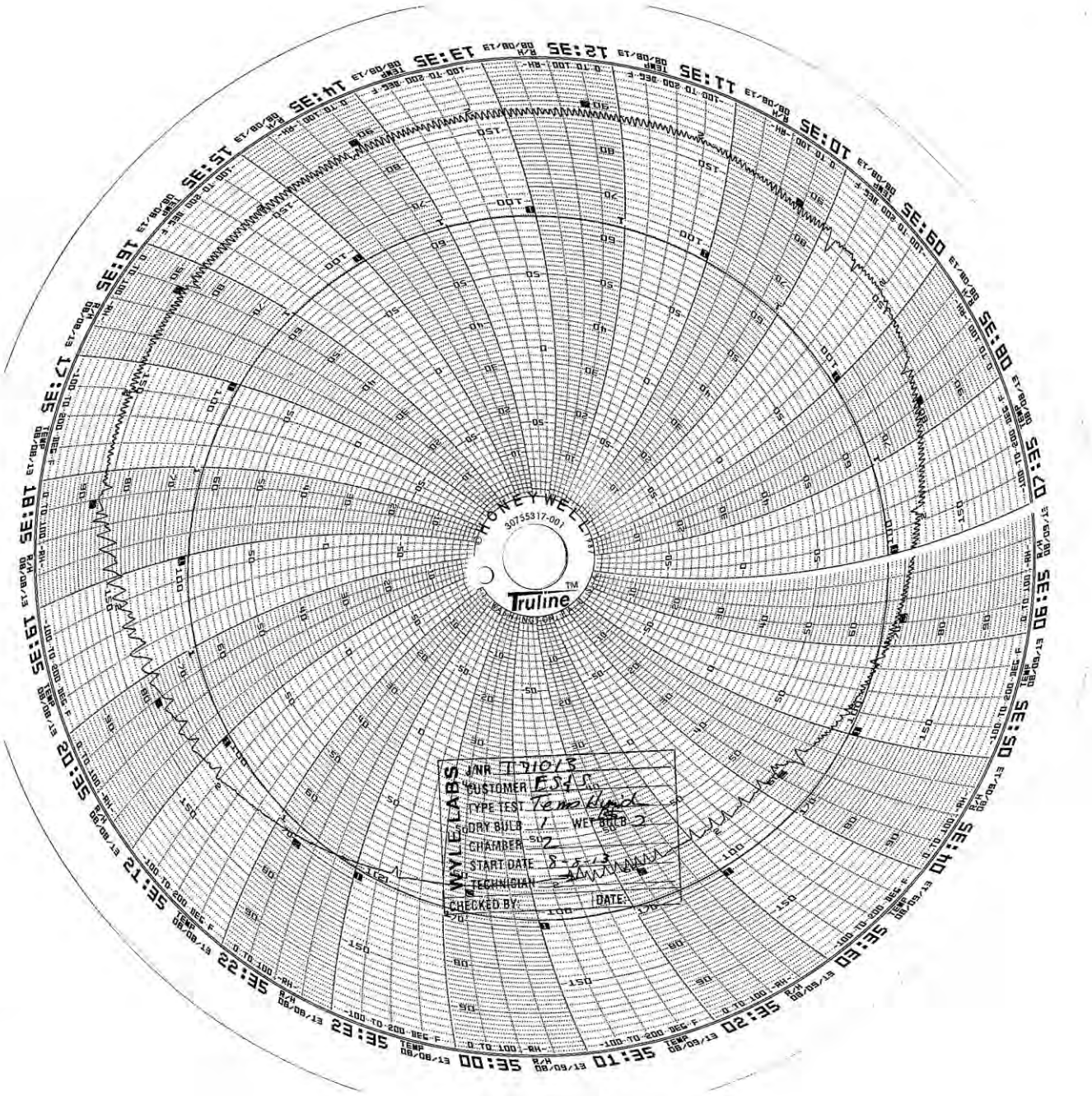
Notice of Anomaly N/A

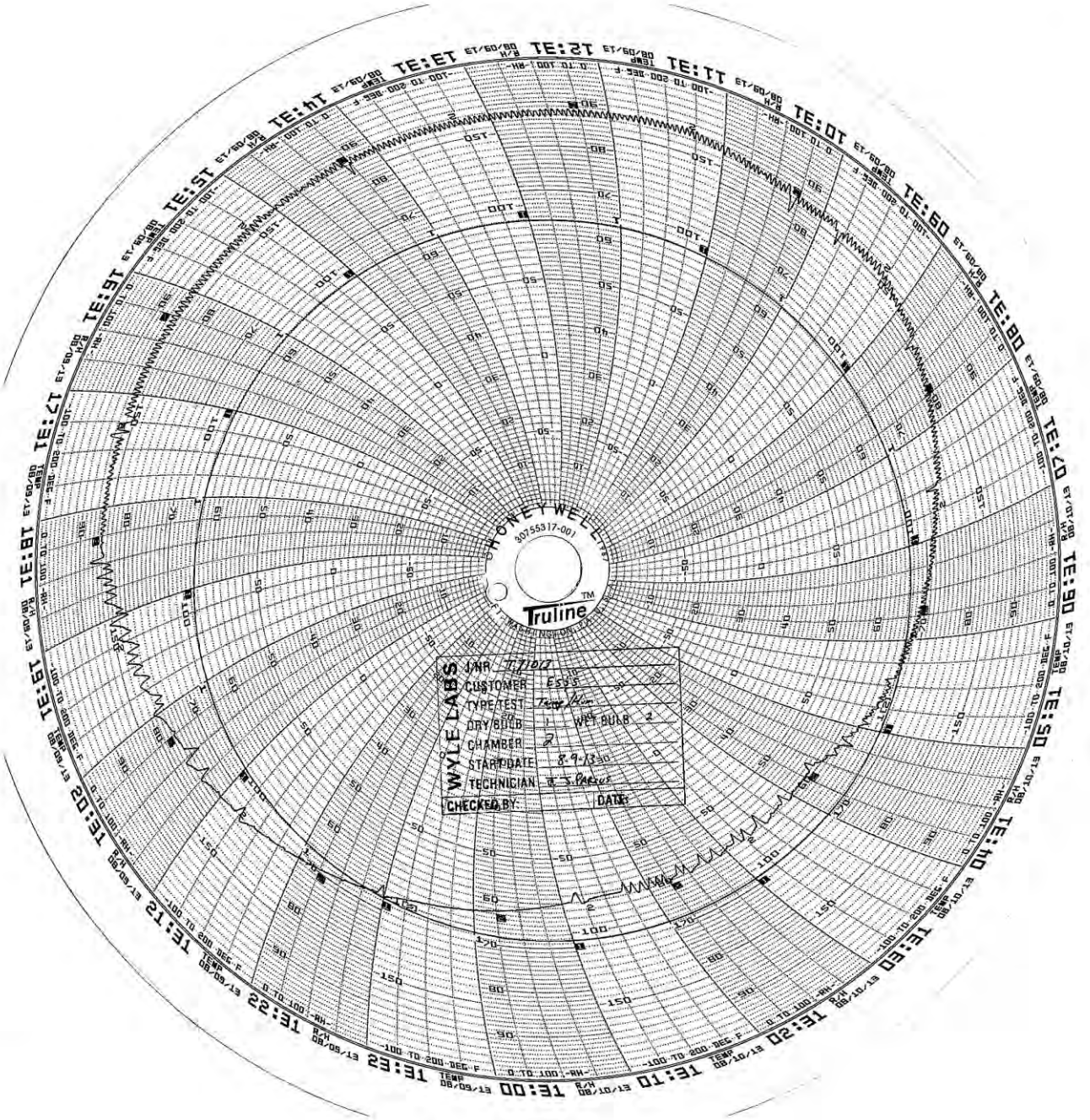
Approved Michael L Walker (Project Engineer)

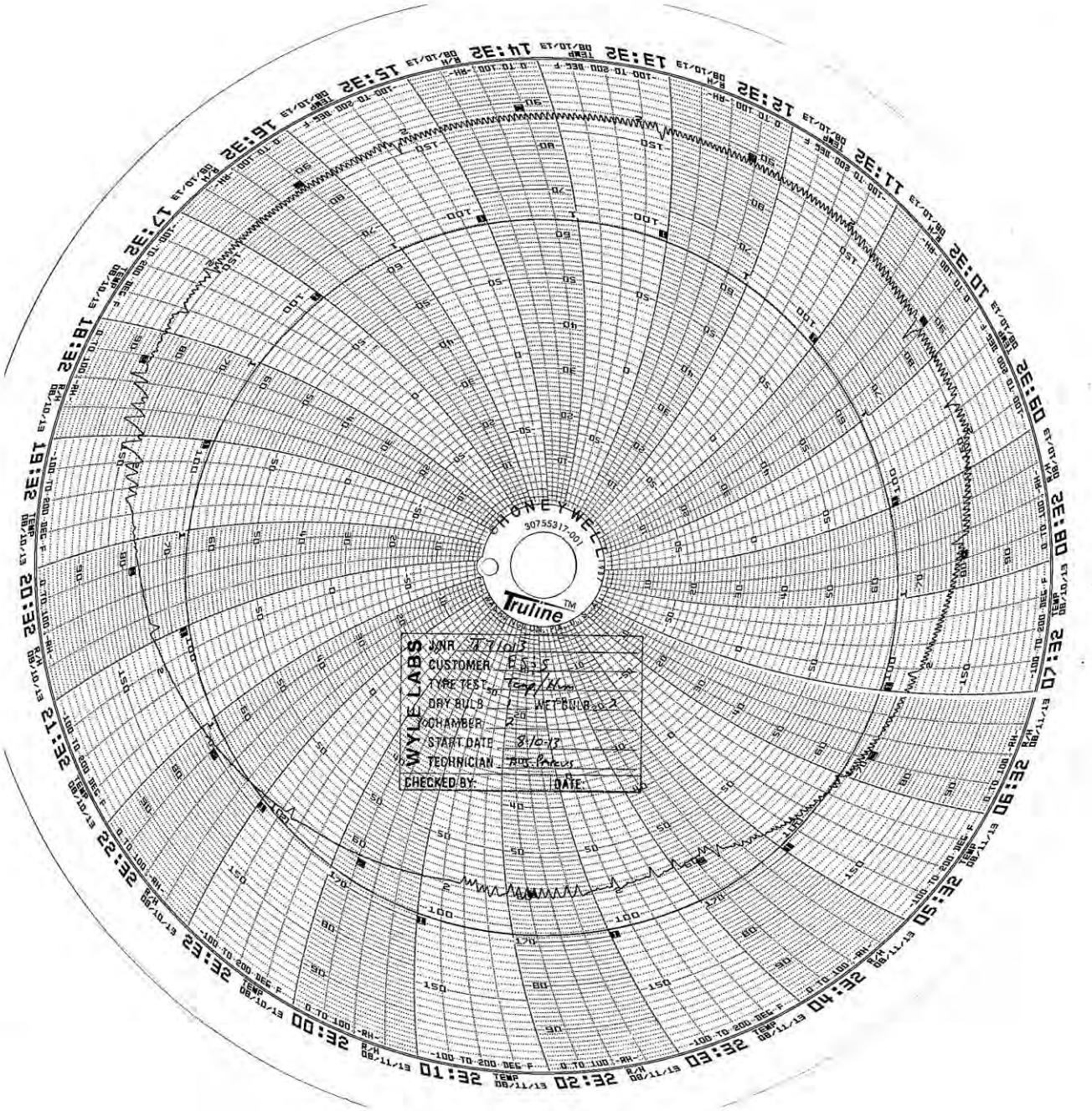
Wyle Form WH-614A, Rev. Jun 03

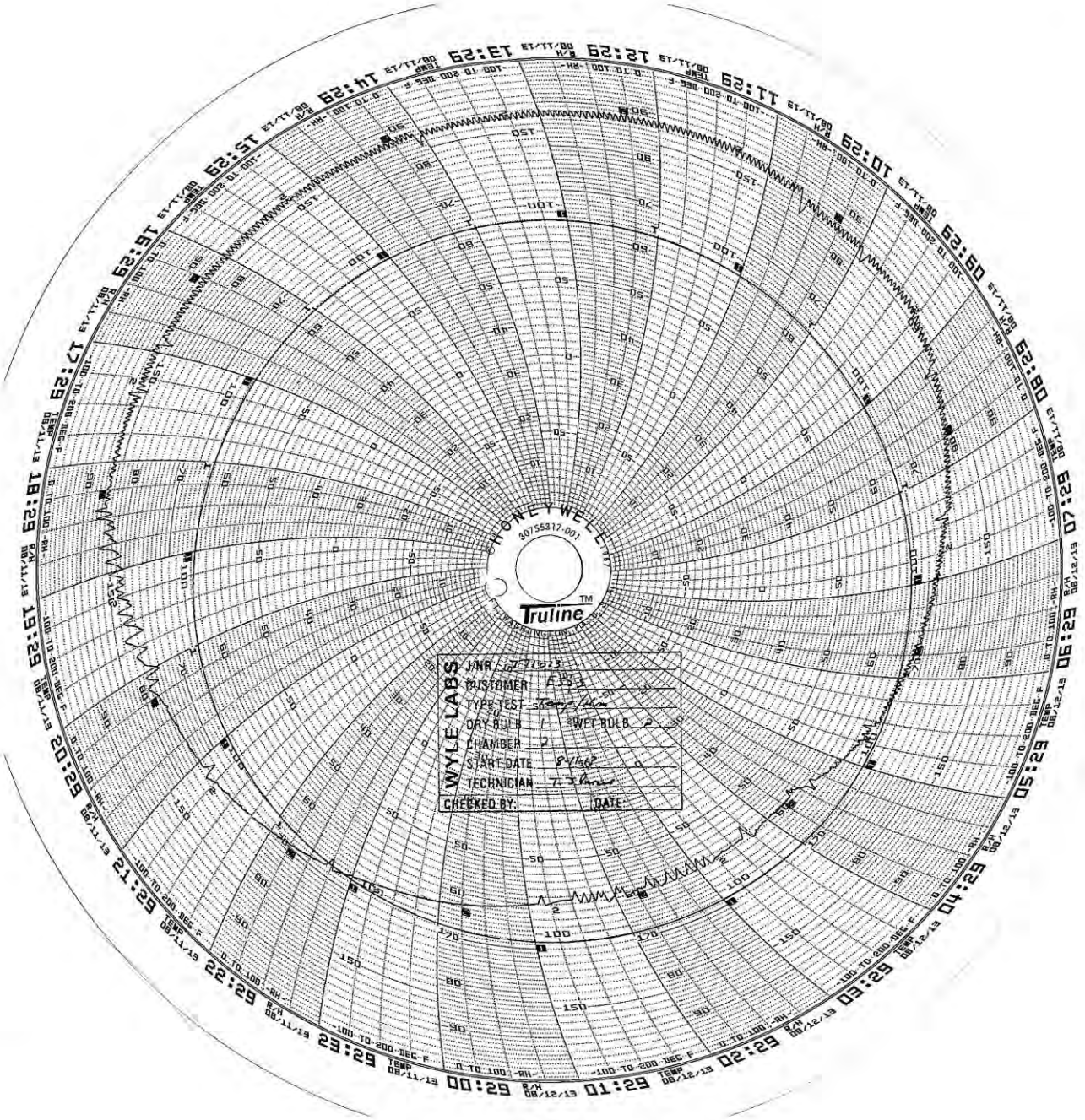
HUMIDITY TEST DATA

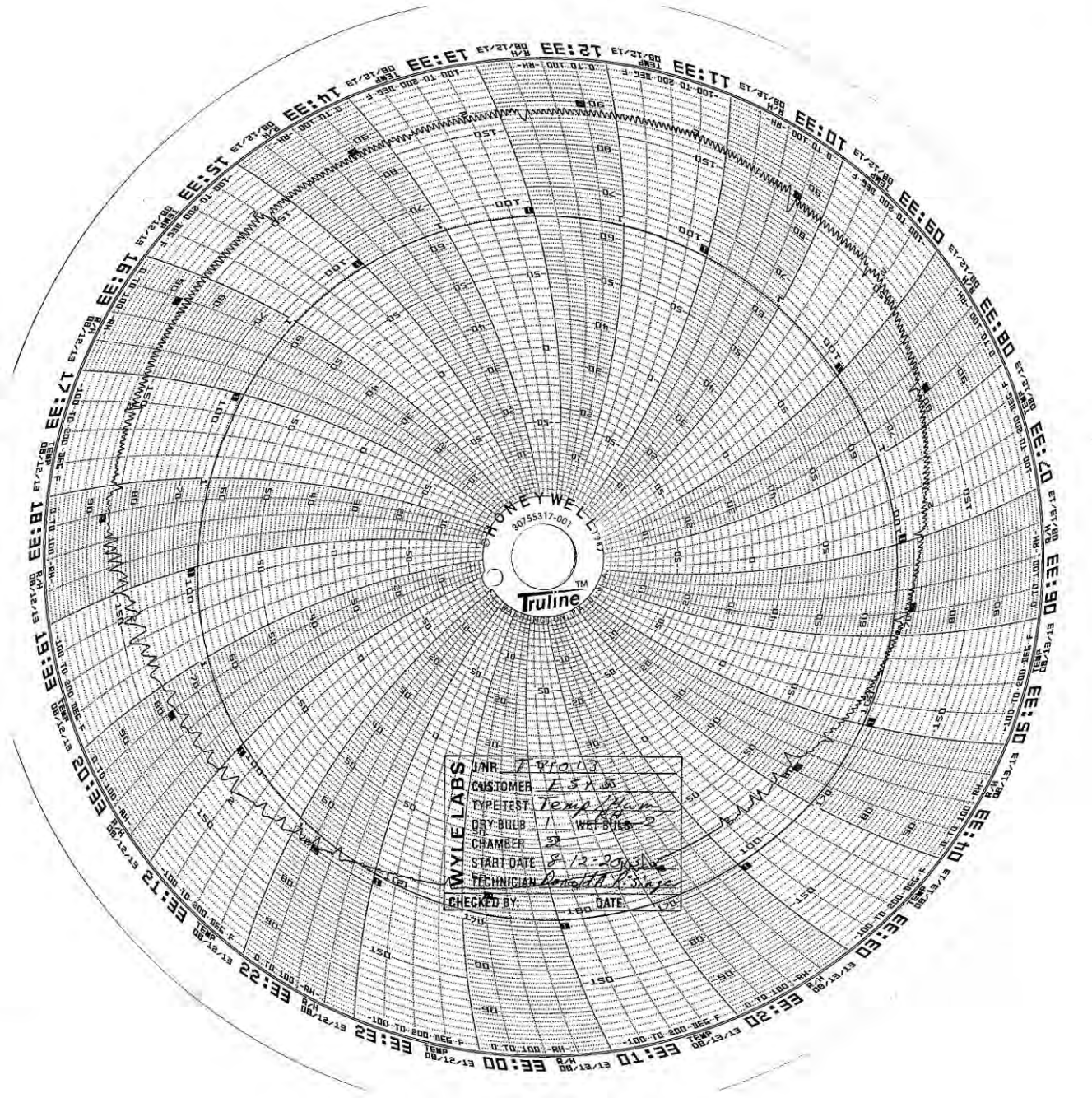

WYLE LABS
JOB
CUSTOMER
TYPE TEST
DRY BULB
WET BULB
CHAMBER
START DATE
TECHNICIAN
CHECKED BY
DATE
Honeywell
Truline

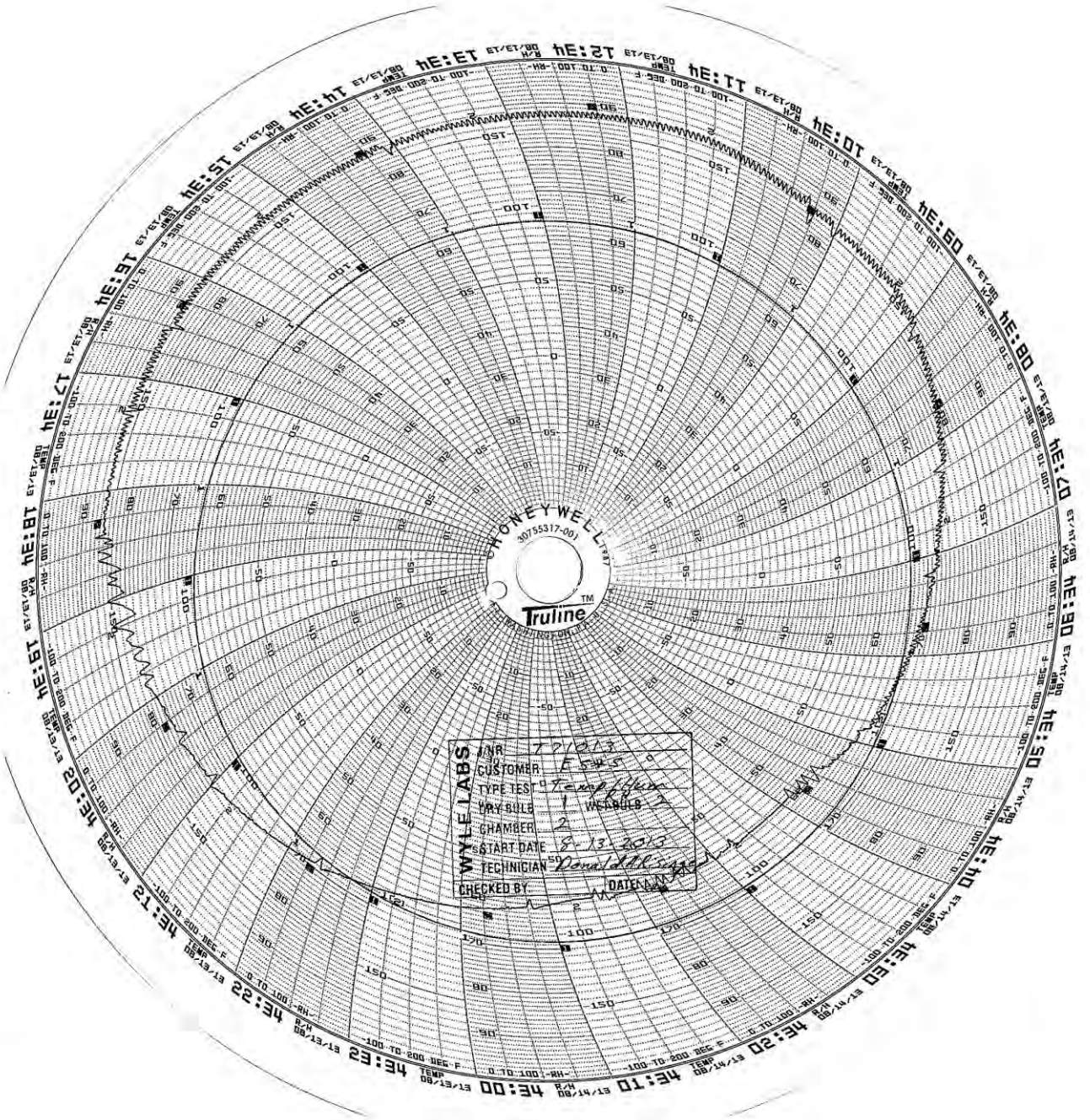

HONEYWELL
Truline
WYLE LABS
J/NR T71013
CUSTOMER ESIS
TYPE TEST Temp Cycle
DRY BULB 1
WET BULB 2
CHAMBER SD2
START DATE 8-5-13
TECHNICIAN
CHECKED BY:
DATE:

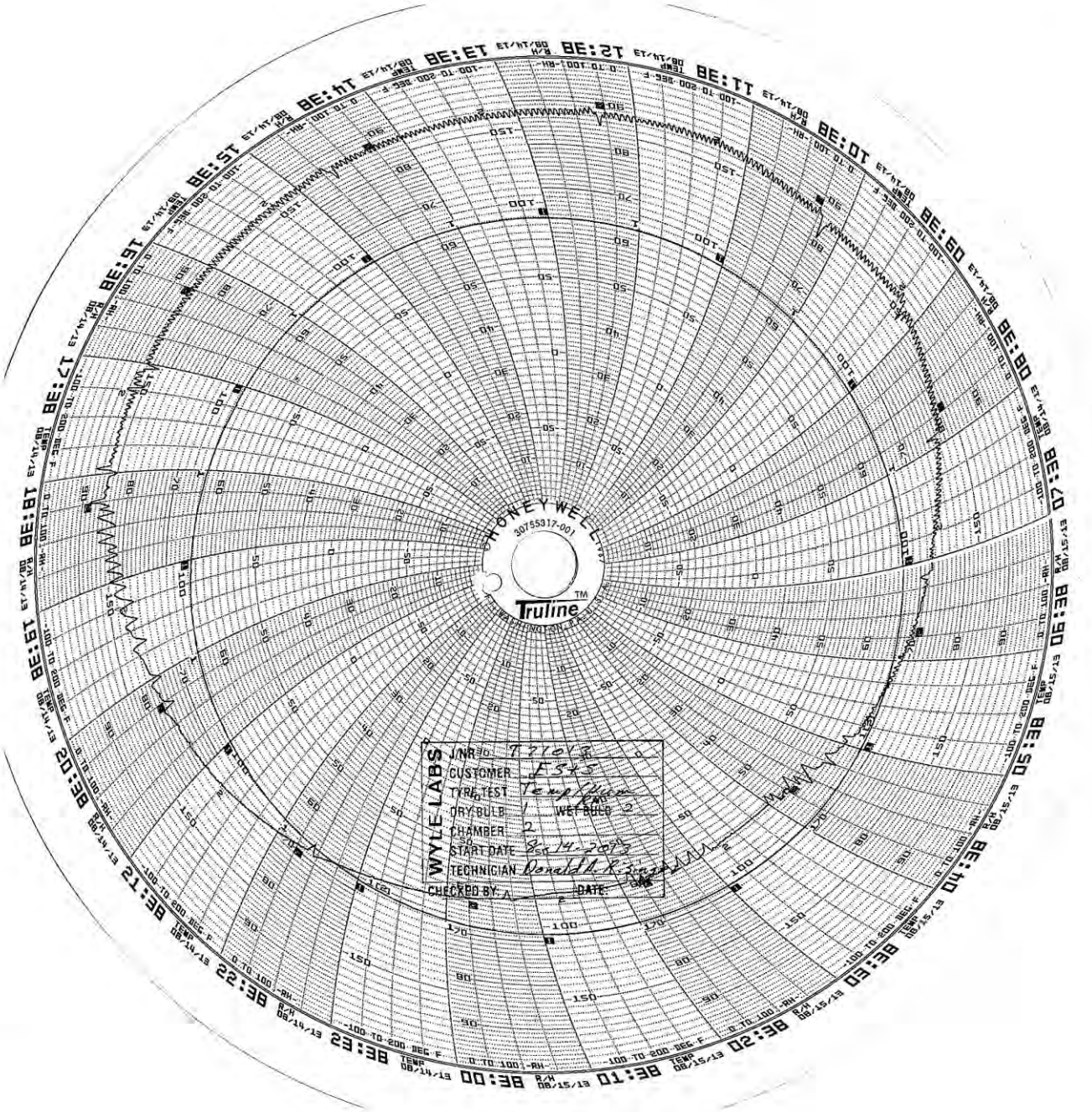

HONEYWELL
307553I7-001
Truline
WYLE LABS
J/NR T71013
CUSTOMER ESS
TYPE/TEST Temp/Alt
DRY/BULB WET BULB
CHAMBER 2
START DATE 8-9-13
TECHNICIAN
CHECKED BY: DATE:


HONEYWELL
30755317-001
Truline
WYLE LABS
JOB# T71013
CUSTOMER
TYPE TEST
DRY BULB
WET BULB
CHAMBER
START DATE 3-10-13
TECHNICIAN
CHECKED BY:
DATE:


HONEYWELL
30755317-001
Truline
WYLE LABS
J/NR 71013
CUSTOMER ESS
TYPE TEST Temp/Alt
DRY BULB WET BULB
CHAMBER 2
START DATE 8/5/13
TECHNICIAN
CHECKED BY:
DATE:


HONEYWELL
30755317-001
Truline
WYLE LABS
D/NR 7 Pro 13
CUSTOMER ESS
TYPE TEST Temp/Hum
DRY BULB 1 WET BULB 2
CHAMBER 50
START DATE 8-12-2013
TECHNICIAN Donald K. Stage
CHECKED BY: DATE:


HONEYWELL
(30755317-001)
Truline
WYLE LABS
T/NR 71013
CUSTOMER ESS
TYPE TEST Temp Cycle
DRY BULB 1 WET BULB 2
CHAMBER 2
START DATE 8-13-2013
TECHNICIAN Donald R Sipes
CHECKED BY DATE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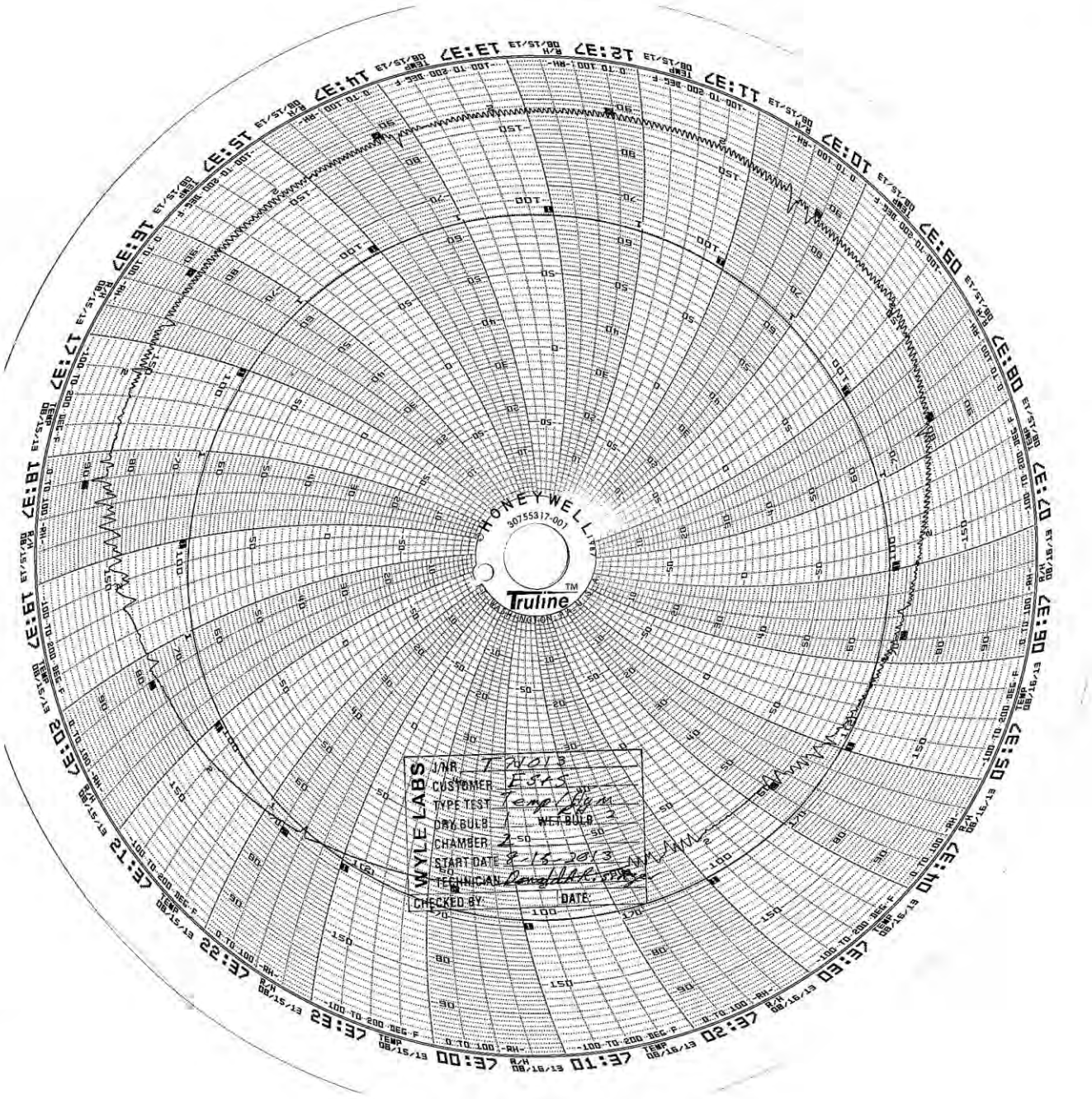
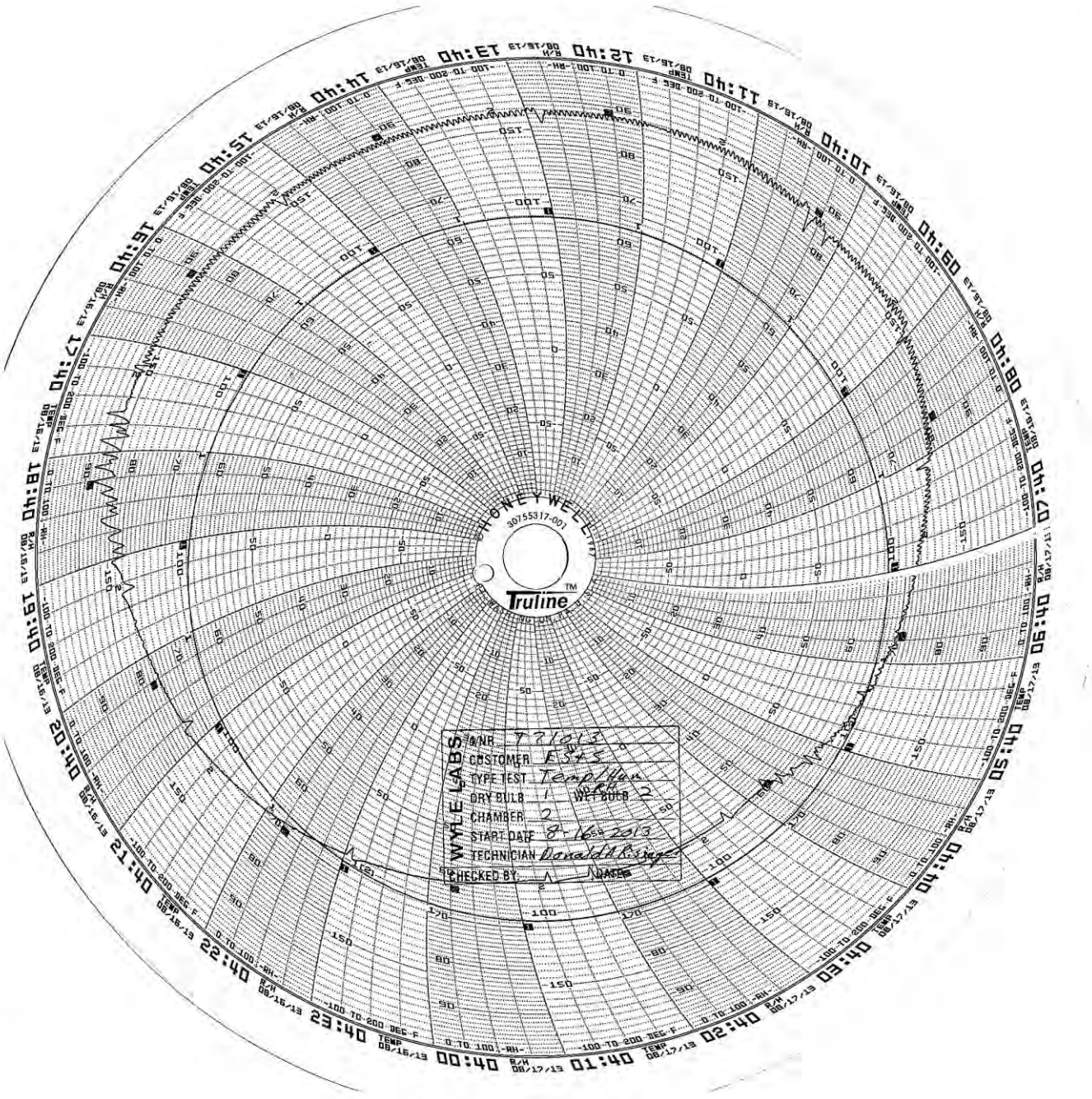
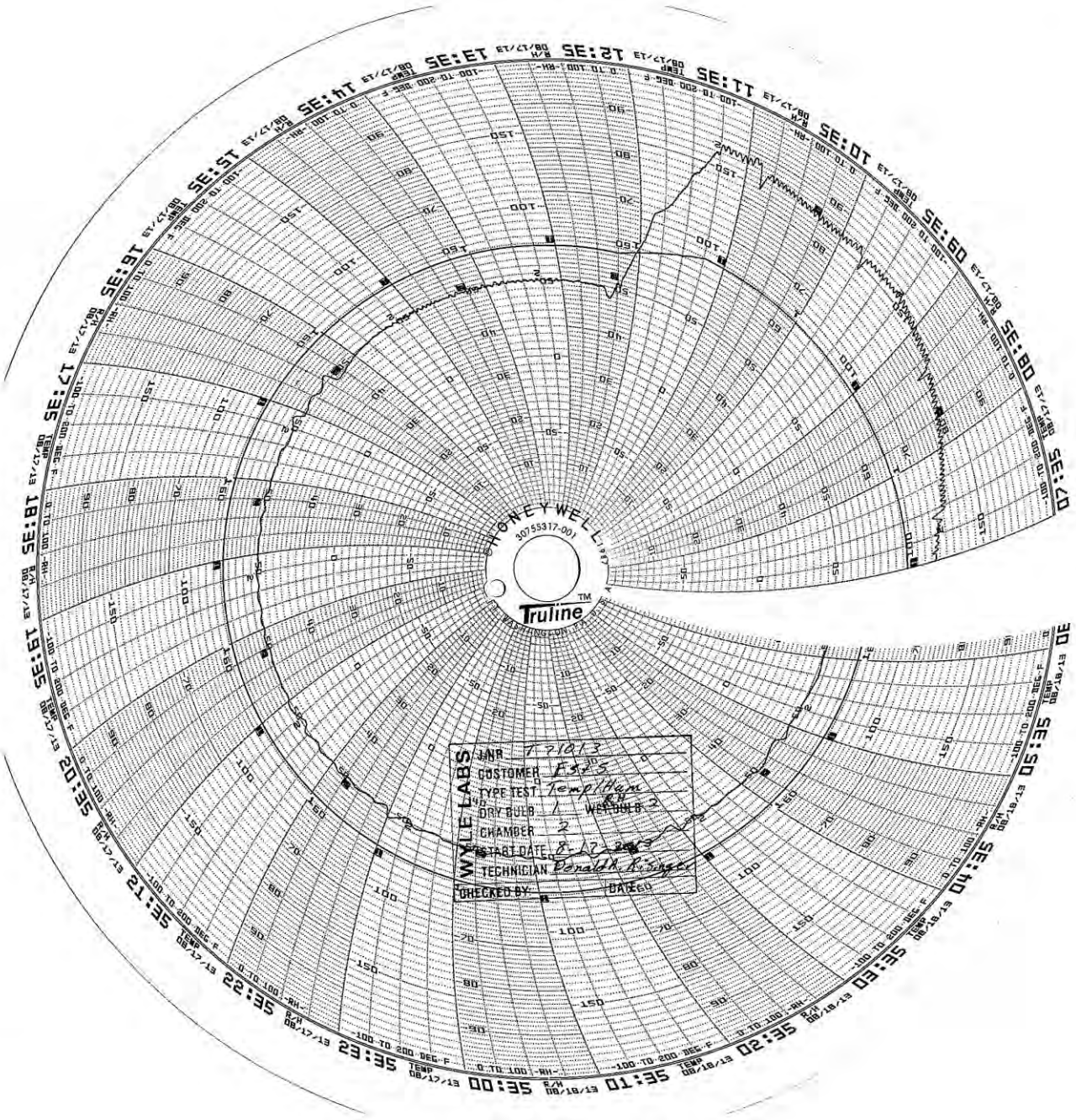
30755317-001
Truline
WYLE LABS
J/NR 71013
CUSTOMER ES45
TYPE TEST Temp Range
DRY BULB 1 WET BULB 2
CHAMBER 2
START DATE 8-14-2013
TECHNICIAN Donald K. Sweet
CHECKED BY DATE


HONEYWELL
30755317-007
Truline
WYLE LABS
T/NR T 20135
CUSTOMER Ester
TYPE TEST Temp Cycle
DRY BULB 1
WET BULB 2
CHAMBER 2
START DATE 8-15-2013
TECHNICIAN
CHECKED BY
DATE


HONEYWELL
30755317-001
Truline
WYLE LABS
S/NR T71013
CUSTOMER ESS
TYPE TEST Temp/Hum
DRY BULB 1 WET BULB 2
CHAMBER 2
START DATE 8-16-2013
TECHNICIAN Donald Kinger
CHECKED BY: DATE


HONEYWELL
30755317-001
Truline
WYLE LABS
JNR T-71013
CUSTOMER ES&S
TYPE TEST Temp/Hum
DRY BULB 1 WET BULB 2
CHAMBER 2
START DATE 8-17-2013
TECHNICIAN Donald R. Singer
CHECKED BY: DATED

ATTACHMENT D

ELECTRICAL TEST DATA

ELECTROSTATIC DISRUPTION

wyle laboratories

DATA SHEET

Job No.: T71013.01
Start Date: 8-29-2013

Customer: ES&S (page 1 of 2)
Temperature: 22.4°F
Humidity: 56%
EUT: 4500
Measurement Point: See Test Points Below
Model No.: DS200
Interference Signal: See Applied Signal
Serial No.:
Frequency Range: N/A
Test Title: Electrostatic Disruption

Test Points	Meets Limit		Applied Level (kV)	Discharge Type	Times Tested	Comments
	Yes	No				
TP001: Vertical Coupling Plane	✓		±2, 4, 8	Contact	10	Each Side of EUT
TP002: DS200 USB Well keyhole	✓		±2, 4, 8	Contact	10	Engineering Log book denotes TP002 as TP001.
TP003: DS200 Front keyhole	✓		±2, 4, 8	Contact	10	
TP004: Metal Ballot Box Front Upper Right Keyhole	✓		±2, 4, 8	Contact	10	
TP005: Metal Ballot Box Front Lower Right Keyhole	✓		±2, 4, 8	Contact	10	
TP006: Metal Ballot Box Top Right-Rear Keyhole	✓		±2, 4, 8	Contact	10	
TP007: Metal Ballot Box Right Ballot Box Door Keyhole	✓		±2, 4, 8	Contact	10	
TP008: Metal Ballot Box Above Right Ballot Door	✓		±2, 4, 8	Contact	10	
TP009: Metal Ballot Box Front Above the Auxiliary Slot	✓		±2, 4, 8	Contact	10	
TP010: Metal Ballot Box Back Upper Center	✓		±2, 4, 8	Contact	10	
TP011: Metal Ballot Box Above Left Ballot Box Door	✓		±2, 4, 8	Contact	10	
TP012: Metal Ballot Box Left Ballot Box Door Keyhole	✓		±2, 4, 8	Contact	10	
TP013: DS200 Modem Door Keyhole	✓		±2, 4, 8	Contact	10	
TP014: DS200 Track Cover Left Rear	✓		±2, 4, 8, 15	Air	10	
TP015: DS200 Track Cover Left Front	✓		±2, 4, 8, 15	Air	10	
TP016: DS200 Track Cover Right Front	✓		±2, 4, 8, 15	Air	10	
TP017: DS200 Track Cover Right Rear	✓		±2, 4, 8, 15	Air	10	
TP018: DS200 Ballot Track Front Center	✓		±2, 4, 8, 15	Air	10	
TP019: DS200 Screen Frame Front-face Left Top Corner Interior	✓		±2, 4, 8, 15	Air	10	

Notice of Anomaly: O

Witness:

Tested By: _____ Technician Date: 08/29/2013

Approved: _____ Project Engineer Date: 08/29/2013

WH-1433, Rev. Dec. 2004

wyle laboratories

DATA SHEET

Job No.: T71013.01
Start Date: 8-29-2013

Customer: ES&S (Page 2 of 2)
EUT: 4500
Model No.: DS200
Serial No.:
Test Title: Electrostatic Disruption

Temperature: 22.4F
Humidity: 56%
Measurement Point: See Test Points Below
Interference Signal: See Applied Signal
Frequency Range: N/A

Test Points	Meets Limit		Applied Level (kV)	Discharge Type	Times Tested	Comments
	Yes	No				
TP020: DS200 Screen Frame Front-face Left Top Corner Exterior	✓		±2, 4, 8, 15	Air	10	
TP021: DS200 Screen Frame Front-face Top-Span	✓		±2, 4, 8, 15	Air	10	
TP022: DS200 Screen Frame Front-face Top Right Corner	✓		±2, 4, 8, 15	Air	10	
TP023: DS200 Screen Top Right Corner	✓		±2, 4, 8, 15	Air	10	
TP024: DS200 Screen Top Right-Center	✓		±2, 4, 8, 15	Air	10	
TP025: DS200 Screen Top Left-Center	✓		±2, 4, 8, 15	Air	10	
TP026: DS200 Screen Top Left Corner	✓		±2, 4, 8, 15	Air	10	
TP027: DS200 Screen Middle Left Side	✓		±2, 4, 8, 15	Air	10	
TP028: DS200 Screen Middle left-Center	✓		±2, 4, 8, 15	Air	10	
TP029: DS200 Screen Middle Right-Center	✓		±2, 4, 8, 15	Air	10	
TP030: DS200 Screen Middle Right Side	✓		±2, 4, 8, 15	Air	10	
TP031: DS200 Screen Lower Right Corner	✓		±2, 4, 8, 15	Air	10	
TP032: DS200 Screen Lower Middle-Right	✓		±2, 4, 8, 15	Air	10	
TP033: DS200 Screen Lower Left Corner	✓		±2, 4, 8, 15	Air	10	
TP034: DS200 USB Door Rear	✓		±2, 4, 8, 15	Air	10	
TP035: DS200 Screen Frame Left-face	✓		±2, 4, 8, 15	Air	10	
TP036: DS200 Modem Door Rear	✓		±2, 4, 8, 15	Air	10	
TP037: DS200 Rear Cover Front Center	✓		±2, 4, 8, 15	Air	10	
TP038: DS200 Rear Cover Right Front	✓		±2, 4, 8, 15	Air	10	
TP039: DS200 Rear Cover Back	✓		±2, 4, 8, 15	Air	10	

Notice of Anomaly: None

Witness:

Tested By: [signature] Technician Date: 08/29/2013

Approved: [signature] Project Engineer Date: 08/29/2013

WH-1433, Rev. Dec. 2004

ELECTRICAL POWER DISTURBANCE TEST DATA

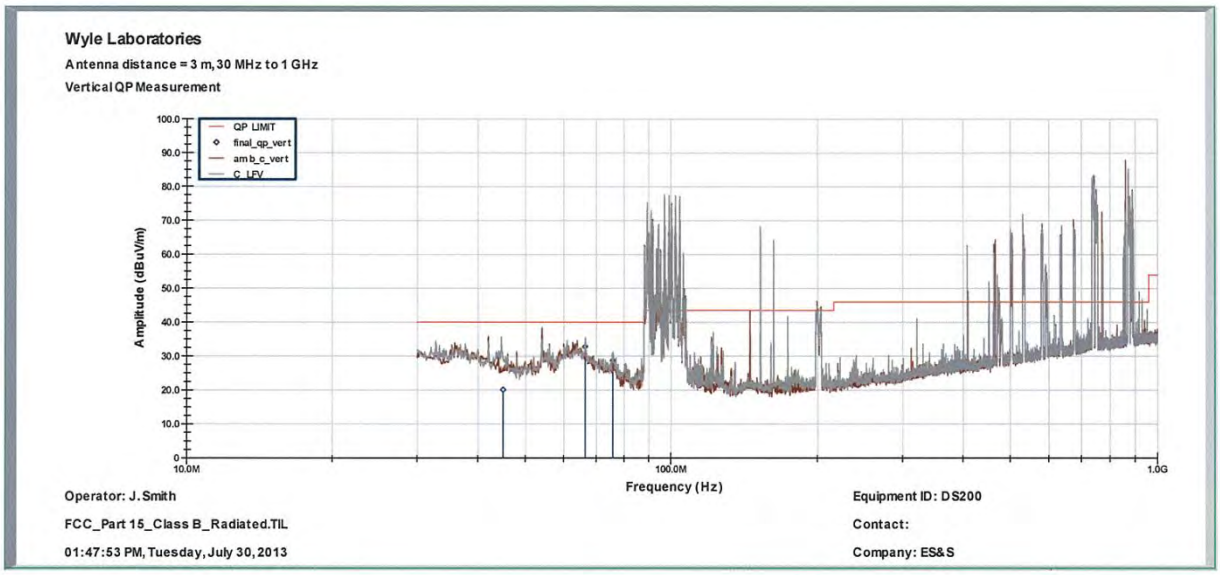
California Instruments Corp.
Data entry mode: Absolute

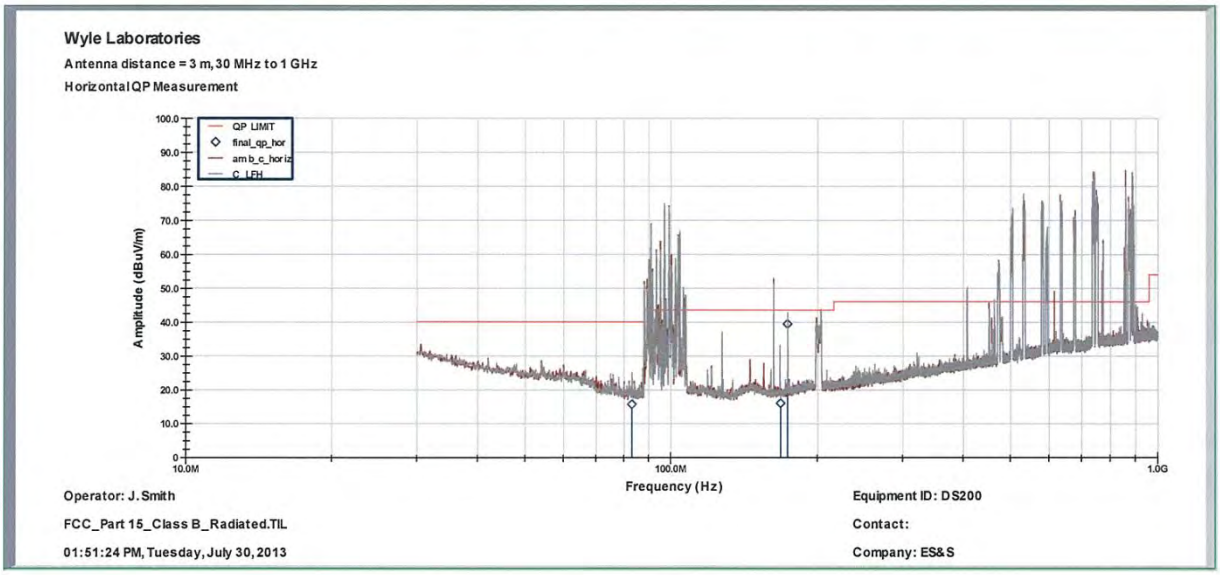
No.	Type	Time (s)	Volt
1	V Step	60.000	120.0
2	V Step	0.020	84.0
3	V Step	60.000	120.0
4	V Step	0.100	48.0
5	V Step	60.000	120.0
6	V Step	1.000	48.0
7	V Step	60.000	120.0
8	V Step	5.000	6.0
9	V Step	60.000	120.0
10	V Step	1.000	102.0
11	V Step	60.000	120.0
12	V Step	1.000	138.0
13	V Step	60.000	120.0
14	V Step	14400.000	129.0
15	V Step	60.000	120.0
16	V Step	14400.000	105.0
17	V Step	60.000	120.0
18	Empty		

Transient List: <NEW>
Printed on: Friday, July 26, 2013 9:50:02 AM

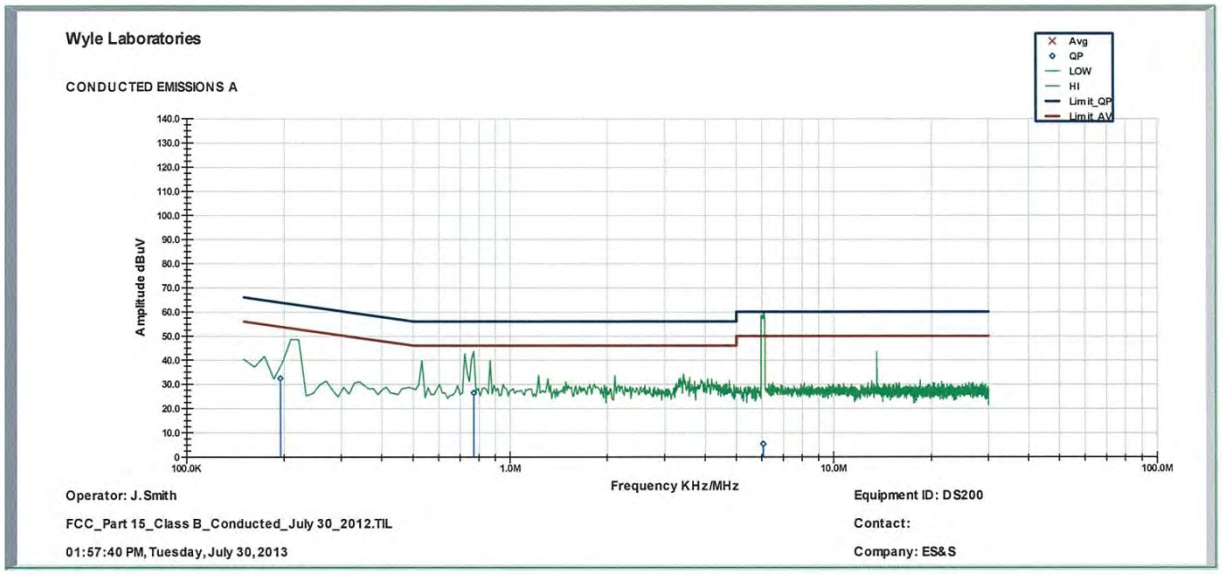
Page #1

ELECTROMAGNETIC EMISSIONS: RADIATED EMISSIONS TEST DATA


Wyle Laboratories
Antenna distance = 3 m, 30 MHz to 1 GHz
Vertical QP Measurement
QP LIMIT
final_qp_vert
amb_c_vert
C_LFV
Amplitude (dBuV/m)
Frequency (Hz)
10.0M
100.0M
1.0G
Operator: J. Smith
FCC_Part 15_Class B_Radiated.TIL
01:47:53 PM, Tuesday, July 30, 2013
Equipment ID: DS200
Contact:
Company: ES&S


Wyle Laboratories
Antenna distance = 3 m, 30 MHz to 1 GHz
Horizontal QP Measurement
QP LIMIT
final_qp_hor
amb_c_horiz
C_LFH
Amplitude (dBuV/m)
Frequency (Hz)
10.0M
100.0M
1.0G
Operator: J. Smith
FCC_Part 15_Class B_Radiated.TIL
01:51:24 PM, Tuesday, July 30, 2013
Equipment ID: DS200
Contact:
Company: ES&S

ELECTROMAGNETIC EMISSIONS: CONDUCTED EMISSIONS TEST DATA


Wyle Laboratories
CONDUCTED EMISSIONS A
Avg
QP
LOW
HI
Limit_QP
Limit_AV
Amplitude dBuV
140.0
130.0
120.0
110.0
100.0
90.0
80.0
70.0
60.0
50.0
40.0
30.0
20.0
10.0
0
100.0K
1.0M
10.0M
100.0M
Frequency KHz/MHz
Operator: J.Smith
FCC_Part 15_Class B_Conducted_July 30_2012.TIL
01:57:40 PM, Tuesday, July 30, 2013
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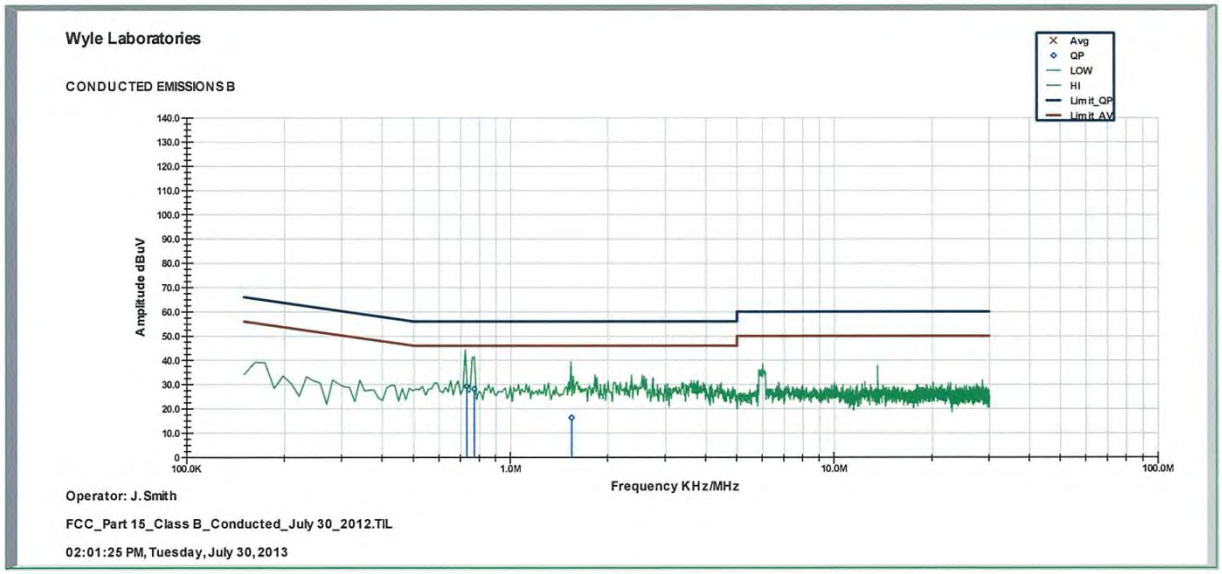
Contact:
Company: ES&S


Wyle Laboratories
CONDUCTED EMISSIONS B
Avg
QP
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HI
Limit_QP
Limit_AV
Amplitude dBuV
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10.0
0
100.0K
1.0M
10.0M
100.0M
Frequency KHz/MHz
Operator: J.Smith
FCC_Part 15_Class B_Conducted_July 30_2012.TIL
02:01:25 PM, Tuesday, July 30, 2013

ELECTROMAGNETIC SUSCEPTIBILITY TEST DATA

wyle laboratories

DATA SHEET

Job No.: T71013.01
Start Date: 23 Aug 13

Customer: ES&S
Temperature: 21.7° C
Humidity: 49.9%
EUT: DS200
Measurement Point: EUT @ All Four Sides
Model No.: DS200
Interference Signal: 1Khz @ 80% AM
Serial No.: DS0313350009
Frequency Range: 80Mhz to 1Ghz

Test Title EN 61000-4-3 (Electromagnetic Susceptibility)

Test Frequency	Meets Limit		Susceptibility Threshold Level	Maximum Signal Applied	Comments
( )kHz (X)MHz ( )GHz	Yes	No	( )A ( )V ( )kV (X)V/m ( )Vrms ( )dBµA ( )dBµV ( )dBµV/m ( )dBpT		
80	X		>10	10	Vertical and Horizontal
↓	↓		↓	↓	↓
1,000	X		>10	10	Vertical and Horizontal

Notice of Anomaly: _____

Witness: _____

Tested By: _____ Technician **Date:** 8/23/13

Approved: _____ Project Engineer **Date:** 08/23/2013

Page ___ **of** ___

WH-1432, Rev. Dec. 2004

ELECTRICAL FAST TRANSIENT TEST DATA

wyle laboratories

DATA SHEET

Job No.: T71013.01
Start Date: 24 Jul 13

Customer: ES&S
EUT: DS200
Model No.: DS200
Serial No.: DS0313350009

Temperature: 21.7° C
Humidity: 50.1%
Measurement Point: See Comments Below
Interference Signal: Test Signal Applied @ 5/50nS
Frequency Range: See Test Frequencies Below

Test Title EN 61000-4-4 (Electrical Fast Transient)

Test Frequency	Meets Limit		Susceptibility Threshold Level	Maximum Signal Applied	Comments
(X)kHz ( )MHz ( )GHz	Yes	No	( )A ( )V (X)kV ( )V/m ( )Vrms ( )dBµA ( )dBµV ( )dBµV/m ( )dBpT		
.060	X		>1	1	Line to Neutral
.060	↓		↓	↓	Line to Ground
.060	X		>1	1	Neutral to Ground

Notice of Anomaly: _____

Witness: _____

Tested By: _____ Technician **Date:** 7/24/13

Approved: _____ Project Engineer **Date:** 07/24/2013

Page ____ **of** ____

WH-1432, Rev. Dec. 2004

LIGHTNING SURGE TEST DATA

wyle laboratories

DATA SHEET

Job No.: T71013.01
Start Date: 22 Jul 13

Customer: ES&S
EUT: DS200
Model No.: DS200
Serial No.: DS0313350009

Temperature: 21.9° C
Humidity: 53.6%
Measurement Point: See Comments Below
Interference Signal: Test Signal Applied @ 1.2/50uS
Frequency Range: See Test Frequencies Below

Test Title EN 61000-4-5 (Lightning Surge Test)

Test Frequency	Meets Limit		Susceptibility Threshold Level	Maximum Signal Applied	Comments
(X)kHz ( )MHz ( )GHz	Yes	No	( )A ( )V (X)kV ( )V/m ( )Vrms ( )dBµA ( )dBµV ( )dBµV/m ( )dBpT		
.060	X		>.5	.5	Line to Neutral @ 0°, 90°, 180°, and 270°
.060	↓		↓	↓	Line to Ground @ 0°, 90°, 180°, and 270°
.060	X		>.5	.5	Neutral to Ground @ 0°, 90°, 180°, and 270°
.060	X		>1	1	Line to Neutral @ 0°, 90°, 180°, and 270°
.060	↓		↓	↓	Line to Ground @ 0°, 90°, 180°, and 270°
.060	X		>1	1	Neutral to Ground @ 0°, 90°, 180°, and 270°
.060	X		>2	2	Line to Neutral @ 0°, 90°, 180°, and 270°
.060	↓		↓	↓	Line to Ground @ 0°, 90°, 180°, and 270°
.060	X		>2	2	Neutral to Ground @ 0°, 90°, 180°, and 270°

Notice of Anomaly: NOA: 1 & 2

Witness: Lynn A Clark 07/22/2013

Tested By: _____ **Date:** 07/22/13
Technician

Approved: Lynn A Clark **Date:** 07/22/2013
Project Engineer

Page 1 **of** 1

WH-1432, Rev. Dec. 2004

CONDUCTED RF IMMUNITY TEST DATA

wyle laboratories

DATA SHEET

Job No.: T71013.01
Start Date: 29 Jul 13

Customer: ES&S
EUT: DS200
Model No.: DS200
Serial No.: DS0313350009

Temperature: 22.4° C
Humidity: 44.5%
Measurement Point: See Comments Below
Interference Signal: 1Khz @ 80% AM
Frequency Range: 150Khz to 80Mhz

Test Title EN 61000-4-6 (Conducted RF Immunity)

Test Frequency	Meets Limit		Susceptibility Threshold Level	Maximum Signal Applied	Comments
( )kHz (X)MHz ( )GHz	Yes	No	( )A (X)V ( )kV ( )V/m ( )Vrms ( )dBµA ( )dBµV ( )dBµV/m ( )dBpT		
.150	X		>10	10	AC Input
↓	↓		↓	↓	↓
80	X		>10	10	AC Input

Notice of Anomaly: ϕ

Witness: N/A

Tested By: _____ (Technician) **Date:** 07/29/13

Approved: Lynn D. Cleveland (Project Engineer) **Date:** 07/29/2013

Page 1 **of** 1

WH-1432, Rev. Dec. 2004

MAGNETIC FIELDS IMMUNITY TEST DATA

wyle laboratories

DATA SHEET

Job No.: T71013.01
Start Date: 29 Jul 13

Customer: ES&S
EUT: DS200
Model No.: DS200
Serial No.: DS0313350009

Temperature: 22.1° C
Humidity: 49.9%
Measurement Point: See Comments Below
Interference Signal: CW for a Period of 5 Minutes
Frequency Range: See Test Frequencies Below

Test Title EN 61000-4-8 (Magnetic Field Immunity)

Test Frequency	Meets Limit		Susceptibility Threshold Level	Maximum Signal Applied	Comments
(X)kHz ( )MHz ( )GHz	Yes	No	(X)A ( )V ( )kV ( )V/m ( )Vrms ( )dBµA ( )dBµV ( )dBµV/m ( )dBpT		
.060	X		>30 A/m	30 A/m	EUT on X, Y, and Z Axis

Notice of Anomaly: Ø

Witness: N/A

Tested By: _____ Technician **Date:** 07/29/13

Approved: _____ Project Engineer **Date:** 07/29/2013

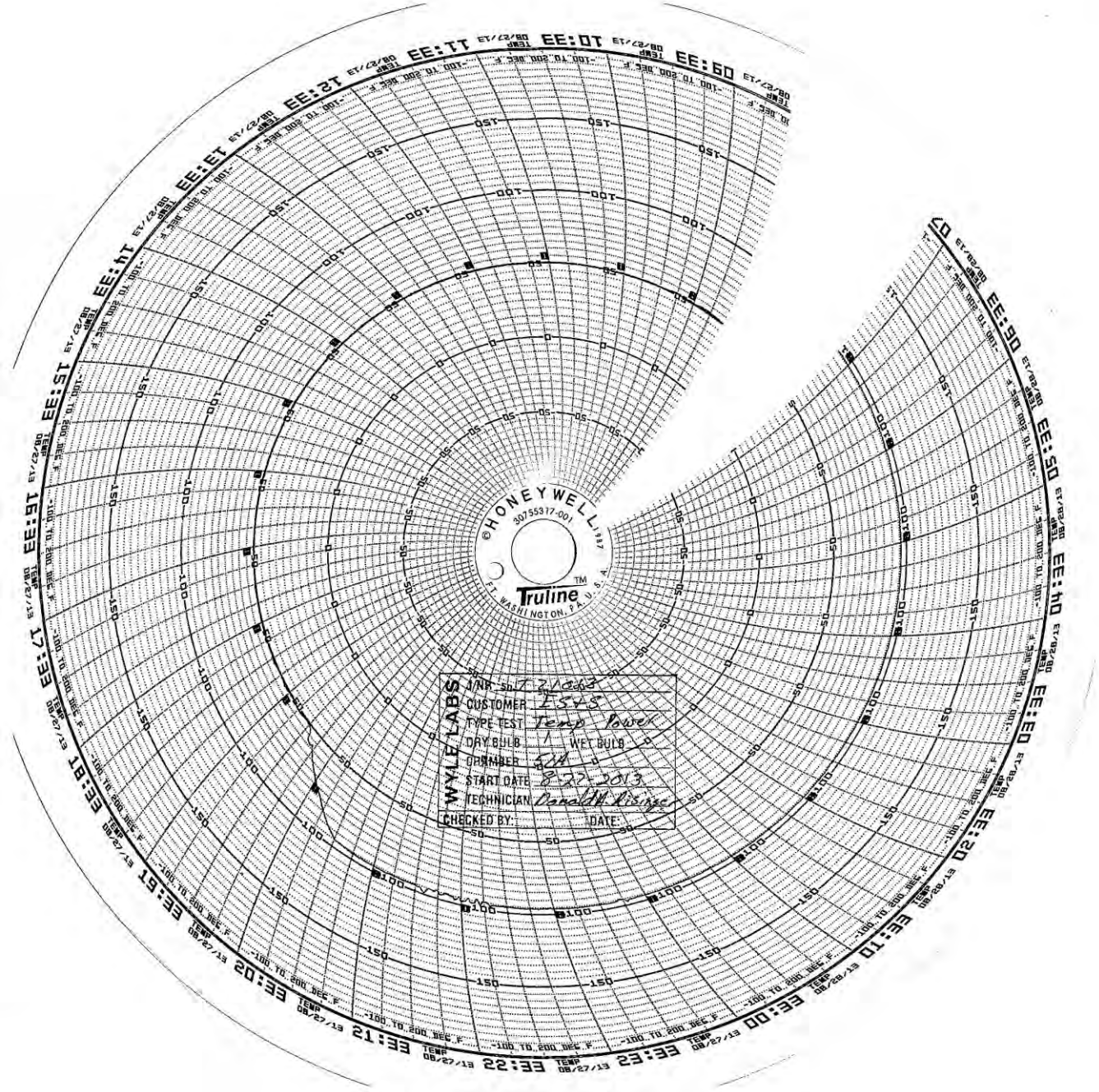
Page ___ of ___

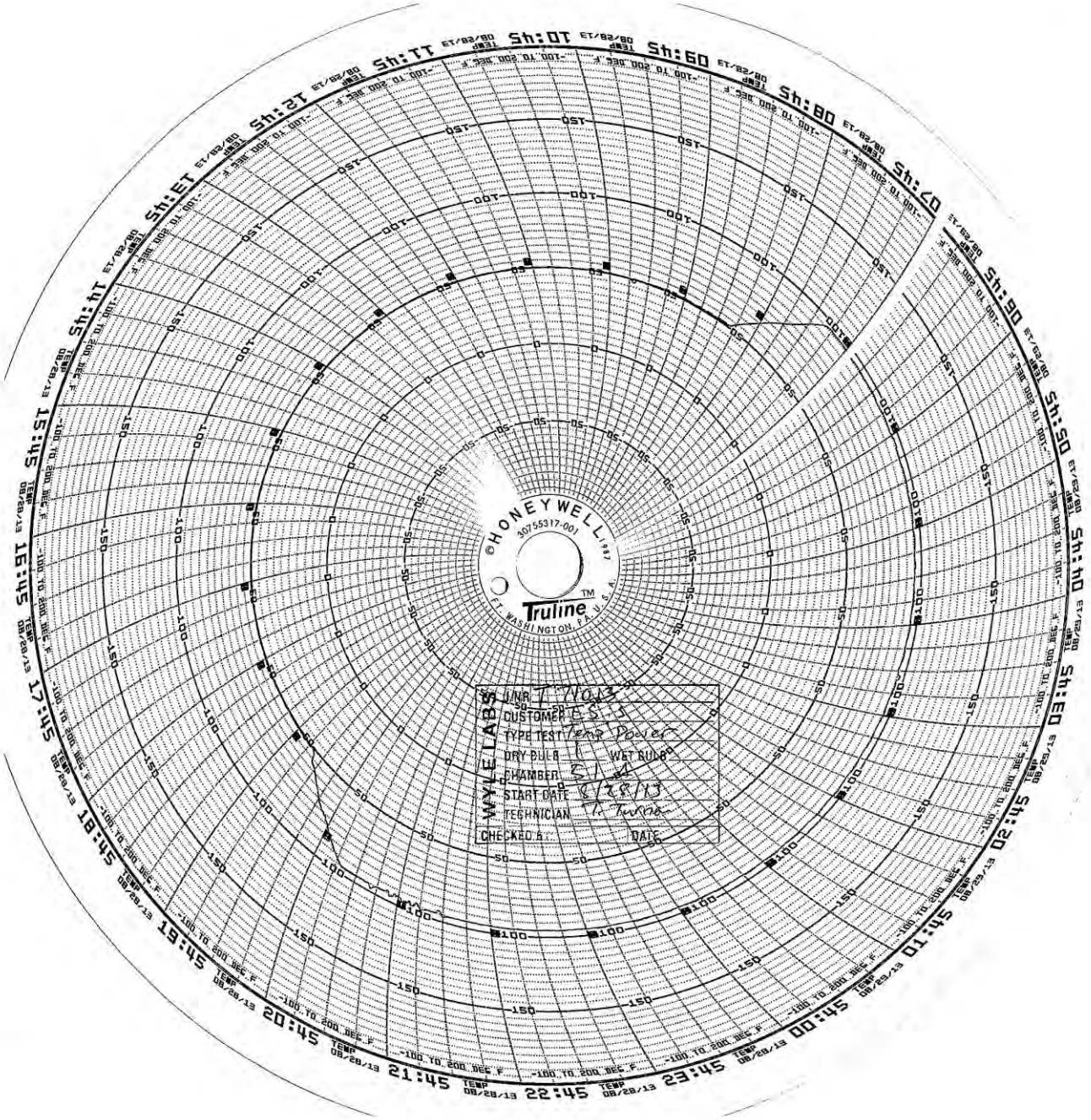
WH-1432, Rev. Dec. 2004

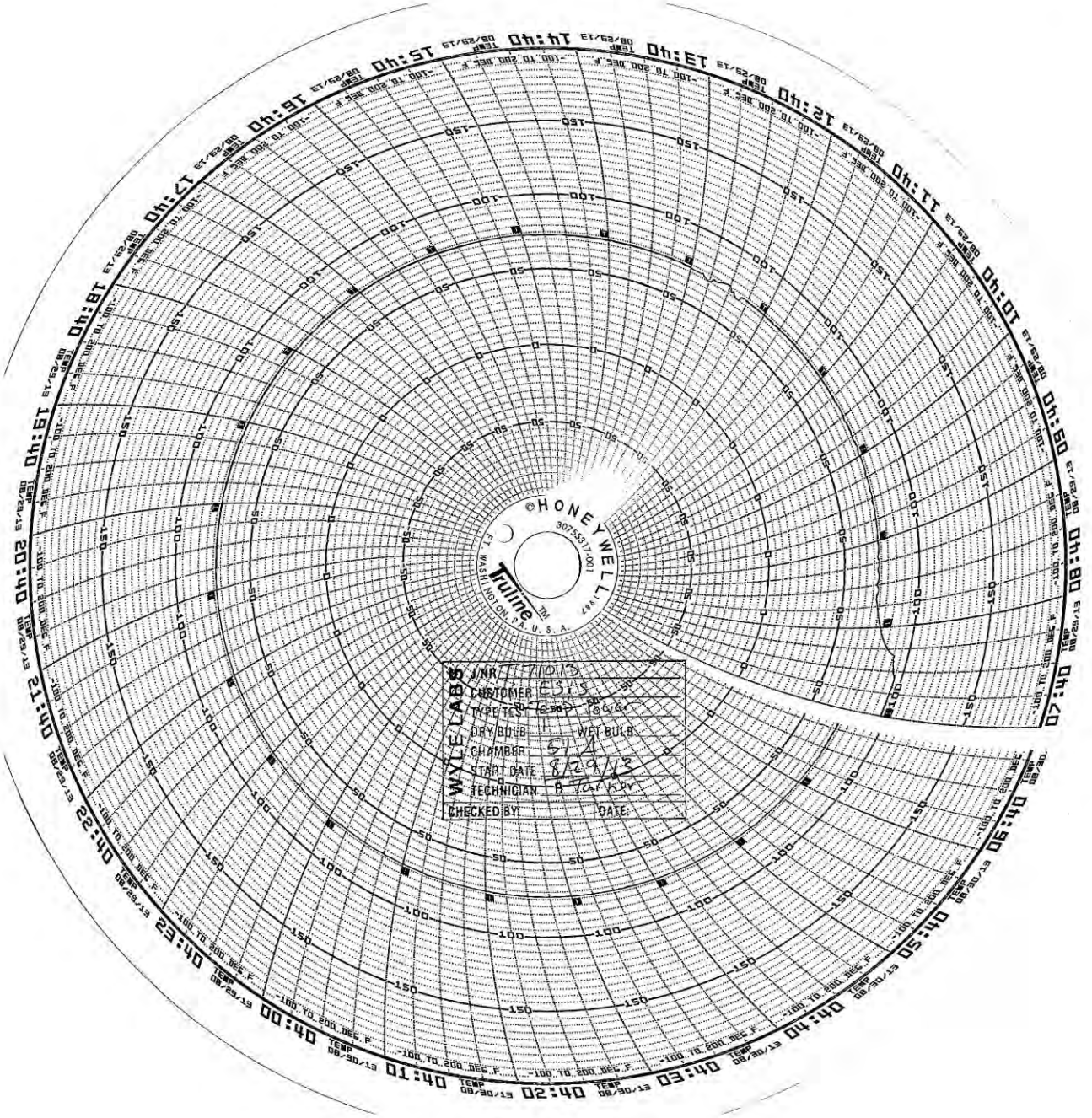
ATTACHMENT E

OPERATING ENVIRONMENTAL TEST DATA

TEMPERATURE/POWER VARIATION TEST DATA


HONEYWELL
307553I7-001
Truline
FT WASHINGTON, PA. U.S.A.
WYLE LABS
A/NR sh T 2/1363
CUSTOMER ESYS
TYPE TEST Temp Power
DRY BULB 1 WET BULB
CHAMBER SEM
START DATE 8-27-2013
TECHNICIAN Donald W. Risner
CHECKED BY: DATE:


HONEYWELL
307553317-001
Truline
FT. WASHINGTON, PA. U.S.A.
WYLE LAB
S/N: T-70043
CUSTOMER: ESS
TYPE TEST: Temp Power
DRY BULB: WET BULB:
CHAMBER: S1-4
START DATE: 8/28/13
TECHNICIAN: A. Turner
CHECKED BY: DATE:


WYLE LABS
J/NR 71013
CUSTOMER ESIS
TYPE TEST Temp Cycle
DRY BULB WET BULB
CHAMBER S1
START DATE 8/29/13
TECHNICIAN B Parker
CHECKED BY DATE
©HONEYWELL 1987
3075837-001
Truline
MINNEAPOLIS, MINNESOTA, U.S.A.

ATTACHMENT F

PRODUCT SAFETY CERTIFICATE OF CONFORMANCE

wyle laboratories

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

CERTIFICATE OF CONFORMANCE

Product Safety Review

Wyle Project No. T71013-05
Customer PO ES&S-MSA-TA029
Issue Date 17 September 2013

The device exhibited below has been reviewed in accordance with the particular requirements of applicable sections of UL60950-1, Standard for Safety for Information Technology Equipment, Second Edition, and the Recommended Practice for Unlabeled Electrical Equipment Evaluation, First Edition, (developed by the American Council for Electrical Safety), and has been found to be in compliance.

Product Identification	
Device Description	Voting Scanner/Tabulator
Manufacturer	Election Systems & Software
Device Model No.	DS200
Device Serial No.	DS0313350009
Electrical Ratings	Input 24 VDC – 2A - 80W Max.
Hardware Revision	1.3
Power Supply	
Power Supply Description	ITE Power Supply
Manufacturer	Power-Win Technology Corporation
Model No.	PW080A2-1Y24AP
Input	100-240 VAC – 2A
Output	24 VDC – 3.34A (80W max)
UL Listed ITE PS	UL File No. E156513

This report is valid for the equipment model and serial indicated in the product identification table above. Wyle makes no endorsement of the equipment reviewed, nor does this evaluation constitute approval of similar equipment. This evaluation does not constitute an product listing.

Brian Coppock 9/17/13
Brian Coppock NCT, Product Safety Supervisor
iNARTE Certified Product Safety Technician No. PS-00438-NCT

Robert Hardy 9/17/13
Robert D. Hardy, Department Manager
EMI/EMC/FCC, Product Safety, Election Systems, & Packaging

A2LA ACCREDITED
Cert. No. 845.01

1.

ATTACHMENT G

INSTRUMENTATION EQUIPMENT SHEETS

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 7/31/2013 JOB NUMBER: T71013 TYPE OF TEST VVSG 4.1.2.11 CRFI

TECHNICIAN: R.CHAMBERS CUSTOMER: ES&S TEST AREA: EMI CHAMBER 3

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	AMPLIFIER	AR	2500A225	0342861	03485	MFG	NCR	7/24/2013	7/24/2020
2	ATTEN	BIRD	25-T-MN	0129	03142	50 OHMS 25 W.	MFG	6/24/2013	6/24/2014
3	ATTENUATOR	NARDA	769-6	03180	04860	DC to 6GHz	MFG	3/25/2013	3/25/2014
4	DATALOGGER	EXTECH	42280	9051859	04926	-4°F to 144°F/0-	±1°F / ±3%RH	5/14/2013	5/14/2014
5	DIR COUPLER	AMP RESEARCH	DC3010	304022	117208	.01-1000MHz	±0.8dB	5/15/2013	5/15/2014
6	DMM	FLUKE	87V	18290046	01474	4VDC	±0.1%+1	12/6/2012	12/6/2013
7	PASS IMP ADAPT	FISHER CC	FCC-801-150-50-CDI	9784	116854	150KHz-230MH	MFG	6/24/2013	6/24/2014
8	PASSIVE	FISHER CC	FCC-801-150-50-CDI	04049/04050	110405	150KHZ - 230M	MFG	7/20/2012	7/20/2014
9	SIG GEN	MARCONI	2023	112224/092	L12224	9kHz-1.2GHz	±0.8dB	2/11/2013	2/11/2014
10	SPEC ANAL	AGILENT	E446A/H70	US44020335	03123	MFG	MFG	5/10/2013	5/10/2014
11	SPEC ANAL	HP	E4446a	US44020311	04447	44GHz	MFG	8/6/2012	8/6/2013
12	TAPE MEASURER	LUFKIN	HV1048CME	NSN	02708	8meters	±1mm	4/24/2012	4/24/2014

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 7/31/13 CHECKED & RECEIVED BY: 07/31/2013

QA.: 7/31/13

WH-1029A,REV,APR'99

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 7/30/2013 JOB NUMBER: T71013 TYPE OF TEST VVSG 4.1.2.8 ESD

TECHNICIAN: J.GALEONE CUSTOMER: ES&S TEST AREA: ESD TEST LAB

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	DISCHARGE	EMC-PARTNER	ESD3000DM1	049	03229	150pF	MFG	7/30/2013	7/30/2014
2	DMM	FLUKE	87V	18290046	01474	4VDC	±0.1%+1	12/6/2012	12/6/2013
3	ESD GUN	EMC-PARTNER	ESD3000	059	04446	16.5 KV	±10%	10/1/2012	10/1/2013
4	ESD TARGET	HAEFELY TRENCI	2520311	152461	110794	15KV	±5%	12/6/2011	12/6/2013
5	OSCILLOSCOPE	TEKTRONIX	DPO5104	C012091	01737	MFG	MFG	10/23/2012	10/23/2013
6	TAPE MEASURER	LUFKIN	HV1048CME	NSN	02708	8meters	±1mm	4/24/2012	4/24/2014
7	TEMP/HUM/BAR	EXTECH	SD700	Q590477	01539	MULTI	MFG	2/27/2013	2/27/2014

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 7/30/13 CHECKED & RECEIVED BY: 07/30/2013

Q.A.: 7/30/13

WH-1029A,REV,APR'99

Page 1 of 1

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 7/24/2013 JOB NUMBER: T71013 TYPE OF TEST VVSG SECTION 4.1.2.6

TECHNICIAN: R.CHAMBERS CUSTOMER: ES&S TEST AREA: EMI LAB - CHAMBER 3

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	ATTEN	HAEFELY TRENCI	2520111/00	153823 15380	04590	MFG	MFG	3/14/2012	3/14/2014
2	DMM	FLUKE	87V	18290046	01474	4VDC	±0.1%+1	12/6/2012	12/6/2013
3	EFT JUNIOR TSTR	HAEFELY TRENCI	093204.1	83762-14	112575	5NS/50NS	30%	12/28/2012	12/28/2014
4	OSCILLOSCOPE	TEKTRONIX	DPO5104	C012091	01737	MFG	MFG	10/23/2012	10/23/2013
5	TAPE MEASURER	LUFKIN	HV1048CME	NSN	02708	8meters	±1mm	4/24/2012	4/24/2014

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 7/24/13 CHECKED & RECEIVED BY: 07/24/2013

Q.A.: 7/24/13

WH-1029A,REV,APR'99

Page 1 of 1

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 7/30/2013 JOB NUMBER: T71013 TYPE OF TEST FCC PART 15

TECHNICIAN: J.SMITH CUSTOMER: ES&S TEST AREA: OATS 2

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	ATTENUATOR	NARDA	766-20	740582	01444	DC-4 GHz	MFG	3/25/2012	3/25/2014
2	DMM	FLUKE	87	64440152	112518	MULTI	±0.1%+1	6/14/2013	6/14/2014
3	EMI TEST RCVR	ROHDE SCHWARZ	ESCI	100386	117803	MULTI	MFG	4/1/2013	4/1/2014
4	LISN	SOLAR	21107-50-TS-50-N	1125266	01686	MFG	MFG	8/7/2012	8/7/2014
5	LISN	SOLAR	21107-50-TS-50-N	1125267	01687	MFG	MFG	8/7/2012	8/7/2014
6	TAPE MEASURER	LUFKIN	EL15SI	116893	116893	15meter	±1mm	7/12/2011	7/12/2014

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 7/30/2013 CHECKED & RECEIVED BY: 7/30/13

Q.A.: 7/30/13

WH-1029A,REV,APR'99

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wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 7/29/2013 JOB NUMBER: T71013 TYPE OF TEST VVSG 4.1.2.12 MFI

TECHNICIAN: J.GALEONE CUSTOMER: ES&S TEST AREA: CHAMBER 3

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	AMPLIFIER	TECHRON	7560	015075	04566	600W	NCR	7/8/2008	7/8/2020
2	DMM	FLUKE	87V	18290046	01474	4VDC	±0.1%+1	12/6/2012	12/6/2013
3	METER	HOLADAY	HOL-HI3604	76285	117549	30-2KHz	MFG	2/24/2012	2/24/2014
4	STOP WATCH	HANHART	STRATOS1	110131	110131	10HR	5 sec/day	6/24/2013	6/24/2014
5	TAPE MEASURER	LUFKIN	HV1048CME	NSN	02708	8meters	±1mm	4/24/2012	4/24/2014
6	WAVE GEN	AGILENT	33250A	SG40007026	014181	MULTI	CERT	12/18/2012	12/28/2013

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 7/29/13 CHECKED & RECEIVED BY: 07/29/2013

Q.A.: 7/29/13

WH-1029A,REV,APR'99

Page 1 of 1

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 7/25/2013 JOB NUMBER: T71013 TYPE OF TEST VVSG SEC.4.1.2.5 EPD

TECHNICIAN: R.CHAMBERS CUSTOMER: ES&S TEST AREA: EMI LAB - CHAMBER 3

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	DATALOGGER	EXTECH	42280	9051859	04926	-4°F to 144°F/0-	±1°F / ±3%RH	5/14/2013	5/14/2014
2	DMM	FLUKE	87V	18290046	01474	4VDC	±0.1%+1	12/6/2012	12/6/2013
3	POWER SOURCE	CALIFORNIA INST	1251RP/IF	L06361	117347	0-270VAC RMS	1%	2/20/2013	2/20/2014
4	TAPE MEASURER	LUFKIN	HV1048CME	NSN	02708	8meters	±1mm	4/24/2012	4/24/2014

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 7/25/13 CHECKED & RECEIVED BY: 07/25/2013

Q.A.: 7/25/13

WH-1029A,REV,APR'99

Page 1 of 1

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 8/19/2013 JOB NUMBER: T71013 TYPE OF TEST VVSG4.1.2.10 EST WOP11

TECHNICIAN: R.CHAMBERS CUSTOMER: ES&S TEST AREA: EMI CHAMBER#3

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	AMPLIFIER	AMP RESEARCH	500W1000A	25361	03141	80MHz to 1GHz	NCR	8/22/2012	8/22/2013
2	DATALOGGER	EXTECH	42280	9051859	04926	-4°F to 144°F/0-	±1°F / ±3%RH	5/14/2013	5/14/2014
3	DIR COUPLER	AMP RESEARCH	DC3010	304022	117208	.01-1000MHz	±0.8dB	5/15/2013	5/15/2014
4	ISOTROPIC PROBE	AMP RESEARCH	FP2000	17657	L17657	10 KHz - 1 GHz	±0.7 dB	11/8/2012	11/8/2013
5	SIG GEN	AEROFLEX	2023A	202306/068	R20230	9KHz-1.2GHz	MFG	10/23/2012	10/23/2013
6	SPEC ANAL	AGILENT	E4446A	US42070108	110948	44 GHz	CERT	7/8/2013	7/8/2014
7	TAPE MEASURER	LUFKIN	HV1048CME	NSN	02708	8meters	±1mm	4/24/2012	4/24/2014

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 8/19/13 CHECKED & RECEIVED BY: 08/19/2013

Q.A.: 8/19/2013

WH-1029A,REV.APR'99

Page 1 of 1

wyle laboratories

INSTRUMENTATION EQUIPMENT SHEET

DATE: 7/22/2013 JOB NUMBER: T71013 TYPE OF TEST VVSG SECTION 4.1.2.7

TECHNICIAN: J.GALEONE CUSTOMER: ES&S TEST AREA: EMI LAB - CHAMBER 3

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	COUPL NETWK	HAEFELY TRENCI	PCD100	149869	R90540	MFG	MFG	7/10/2013	7/10/2015
2	DATALOGGER	EXTECH	42280	9051859	04926	-4°F to 144°F/0-	±1°F / ±3%RH	5/14/2013	5/14/2014
3	IMPULSE MODULE	HAEFELY TRENCI	PIM100	1103	R90538	6kV	MFG	7/10/2013	7/10/2015
4	OSCILLOSCOPE	TEKTRONIX	DPO5104	C012091	01737	MFG	MFG	10/23/2012	10/23/2013
5	STOP WATCH	HANHART	STRATOS1	110131	110131	10HR	5 sec/day	6/24/2013	6/24/2014
6	SURGE TSTR	HAEFELY TRENCI	PSURGE8000	150270	R90537	MULTI	MFG	7/10/2013	7/10/2015

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 7/22/13 CHECKED & RECEIVED BY: 7/22/13

Q.A.: Brenda Mae 7/22/13

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INSTRUMENTATION EQUIPMENT SHEET

DATE: 8/23/2013 JOB NUMBER: T71013 TYPE OF TEST VIBRATION

TECHNICIAN: D. MEDLEY CUSTOMER: ES&S VOTING SYSTEMS TEST AREA: DYNAMICS

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	ACCELEROMETER	ENDEVCO	7704A-50	13073	02600	50 pC/g / 20-5kH	±5%	8/14/2013	2/14/2014
2	ACCELEROMETER	ENDEVCO	7704A-50	12605	04867	50pC/g	±5%	8/14/2013	2/14/2014
3	CHARGE	ENDEVCO	2775A	EE24	112652	GAIN	1.5%	8/20/2013	2/16/2014
4	CHARGE	ENDEVCO	2775A	ED75	112653	GAIN	1.5%	8/20/2013	2/16/2014
5	DMM	FLUKE	45	5095170	114297	MULTI	CERT	6/25/2013	6/25/2014
6	DYN SIG	DATA PHYSICS CC	70499	10004048	02760	MULTI	MFG	9/12/2012	9/12/2013

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: D. Medley 8/23/13 CHECKED & RECEIVED BY: Michael L Walker 8/23/13

Q.A.: Brenda Mann 8/23/13

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INSTRUMENTATION EQUIPMENT SHEET

DATE: 8/19/2013 JOB NUMBER: T71013 TYPE OF TEST TEMP

TECHNICIAN: T TURNER CUSTOMER: ES&S TEST AREA: CHAMBER 16

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	CHART RECORDER	HONEYWELL	DRT45AT-1111	0549Y5689060	110980	32 TO 131°F	0.5% FS	8/8/2013	8/8/2014
2	TEMP ALARM	THERMOTRON	THERM-ALARM	nsn	03379	TYPE T	±1°C	8/8/2013	8/8/2014
3	TEMP	THERMOTRON	4800	nsn	03378	-125-375°F	.25%	8/8/2013	8/8/2014

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: Terance Turner 8/19/13 CHECKED & RECEIVED BY: 08/19/2013

Q.A.: 8/19/2013

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INSTRUMENTATION EQUIPMENT SHEET

DATE: 8/21/2013 JOB NUMBER: T71013.01 TYPE OF TEST COLD TEMP

TECHNICIAN: T.J.PARCUS CUSTOMER: ES&S TEST AREA: CHAMBER#16

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	CHART RECORDER	HONEYWELL	DRT45AT-1111	0549Y5689060	110980	32 TO 131°F	0.5% FS	8/8/2013	8/8/2014
2	TEMP ALARM	THERMOTRON	THERM-ALARM	nsn	03379	TYPE T	±1°C	8/8/2013	8/8/2014
3	TEMP	THERMOTRON	4800	nsn	03378	-125-375°F	.25%	8/8/2013	8/8/2014

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 8/21/2013 CHECKED & RECEIVED BY: 8/21/13

Q.A.: 8/21/2013

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INSTRUMENTATION EQUIPMENT SHEET

DATE: 8/7/2013 JOB NUMBER: T71013 TYPE OF TEST TEMP-HUM

TECHNICIAN: T.J.PARCUS CUSTOMER: ES&S TEST AREA: CHAMBER#2

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	HUMIDITY\TEMP	VAISALA	HMT315	H1410005	01610	MULTI	MFG	3/4/2013	9/4/2013
2	TEMP	THERMOTRON	SE12005	28417	114758	-70-180°C	0.3°C	3/13/2013	3/13/2014
3	TEMP RECORDER	HONEYWELL	DR4500A	9829Y836982(	114837	-184-371°C	.35°C	3/13/2013	3/13/2014

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: 8-7-2013 CHECKED & RECEIVED BY: 8/7/2013

Q.A.: 8/7/13

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INSTRUMENTATION EQUIPMENT SHEET

DATE: 8/26/2013 JOB NUMBER: T71013 TYPE OF TEST TEMP POWER

TECHNICIAN: LARRY IVEY CUSTOMER: ES&S TEST AREA: ENV CHAMBER 51A

No.	Description	Manufacturer	Model	Serial #	WYLE #	RANGE	ACCURACY	Cal Date	Cal Due
1	POWER SOURCE	CALIFORNIA INST	1251RP/IF	L06361	117347	0-270VAC RMS	1%	2/20/2013	2/20/2014
2	TEMP	MICRISTAR	828-B11	10033	108416	-400-700°F	.1%FS	12/5/2012	12/5/2013
3	TEMP IND	NEWPORT	Q2001TC	N/A	116533	TYPE T	±1.5%	12/5/2012	12/5/2013
4	TEMP RECORDER	HONEYWELL	DR450T	924488505000	109830	-200-600°F	.4°F	12/5/2012	12/5/2013

This is to certify that the above instruments were calibrated using state-of-the-art techniques with standards whose calibration is traceable to the National Institute of Standards and Technology.

INSTRUMENTATION: Larry Ivey 8/26/13 CHECKED & RECEIVED BY: Michael L Walker 8/26/13

Q.A.: [signature] 8/26/13

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