

# National Technical Systems Test Report for Environmental and Dynamics Testing of the Electric Components

**Prepared For**

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**Performed By**

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### Revision History

Rev.	Description	Issue Date
0	Initial Release	05/24/2022
1	Table 3.0-1: Added P/Ns for Items 1 and 2. Added additional description information and S/Ns for Item 6.  Table 5.0-1: Added P/Ns for Sections 5.1 through 5.5. Added additional S/Ns for Section 5.6.  Section 5.6.3: Data sheets replaced to add additional test item identification information.	05/27/2022
2	Corrected part numbers in table 5.0.  Corrected Touch Writer serial numbers in section 5.6.3	5/27/2022
3	Corrected printer serial numbers in section 5.6.3	5/27/2022

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## 1.0 Introduction

This document presents the test procedures used and the results obtained during the performance of an Environmental/Dynamics test program. The test program was conducted to assess the ability of the specified Equipment Under Test (EUT) to successfully satisfy the requirements listed in Section 2.0.

## 2.0 References

The following references listed below form a part of this document to the extent specified herein.

- Test Specification: See Table 5.0-1
- SLI Compliance Purchase Order(s) 20220211-04, dated 02/11/2022
- National Technical Systems (NTS) Quote(s) OP0607689, dated 02/07/2022
- ISO/IEC 17025:2017(E) *General Requirements for the Competence of Testing and Calibration Laboratories*, dated 11/1/2017

## 3.0 Product Selection and Description

SLI Compliance selected and provided the test sample(s) to be used as the Equipment Under Test.

**Table 3.0-1: Product Identification - Equipment Under Test (EUT)**

Item	Qty.	Name/Description	Part Number	Serial Number
1	2	Config. A: Verity Controller w/ 1 Touch Write	3006085	B1903101010, C2115161506
2	2	Config. B: Verity Controller w/ 1 Touch Write	3006070	C2115161406, B2013730601
3	2	Verity Controller	3006085	C2115161506, C2115161406
4	2	Verity Touch Writer Duo	3006070	B1903101010, B2013730601
5	2	Verity Scan	3006080	S2115228806, S2115227906
6	2	Touch Writer w / Brother Laser Printer HL-L6400DWVS	3006090	W2014374311, W2014395311 / U64185J1N427134, U64185J1N427136
7	2	Verity Reader	None	R2115230606, R2115230806

## 3.1 Security Classification

## 4.0 General Test Requirements

### 4.1 Test Equipment

The instrumentation used in the performance of these tests is periodically calibrated and standardized within manufacturer's rated accuracies and are traceable to the National Institute of Standards and Technology. The calibration procedures and practices are in accordance with ISO 17025:2017. Certification of calibration is on file subject to inspection by authorized personnel.

## 5.0 Test Descriptions and Results

**Table 5.0-1: Summary of Test Information & Results**

Section	Test	Specification	Test Facility	Test Date	Part #	Serial #	Test Result
5.1	Humidity	MIL-STD_810D, Method 507.2	Longmont	02/16/2022 - 02/24/2022	3006085 & 3006070	B1903101010 C2115161506	No damage or anomalies noted.
5.2	Low Temperature Storage	MIL-STD-810D, Method 502.2	Longmont	02/28/2022 - 03/01/2022	3006085 & 3006070	B2013730601 C2115161406	No damage or anomalies noted.
5.3	High Temperature Storage	MIL-STD-810D, Method 501.2	Longmont	03/01/2022 - 03/02/2022	3006085 & 3006070	B2013730601 C2115161406	No damage or anomalies noted.
5.4	Bench Handling	MIL-STD-810D, Method 516.3, Procedure VI	Longmont	03/02/2022 - 03/02/2022	3006085 & 3006070	B2013730601 C2115161406	No damage or anomalies noted.
5.5	Transportation Vibration	MIL-810D, Method 514.3, Category 1	Longmont	03/02/2022 - 03/02/2022	3006085 & 3006070	B2013730601 C2115161406	No damage or anomalies noted.
5.6	Temperature/ Power Variation	MIL-STD-810D, Methods 501.2 and 502.2	Longmont	04/25/2022 - 04/29/2022	3006085 3006090 3006080 3006070 None	C2115161506 C2115161406 W2014374311 W2014395311 U64185J1N427134 U64185J1N427136 S2115228806 S2115227906 B1903101010 B2013730601 R2115230606 R2115230806	See NOD 1



## 5.1 Humidity

### 5.1.1 Test Procedure

## MIL-STD 810D Method 507.2

### 5.1.2 Test Result

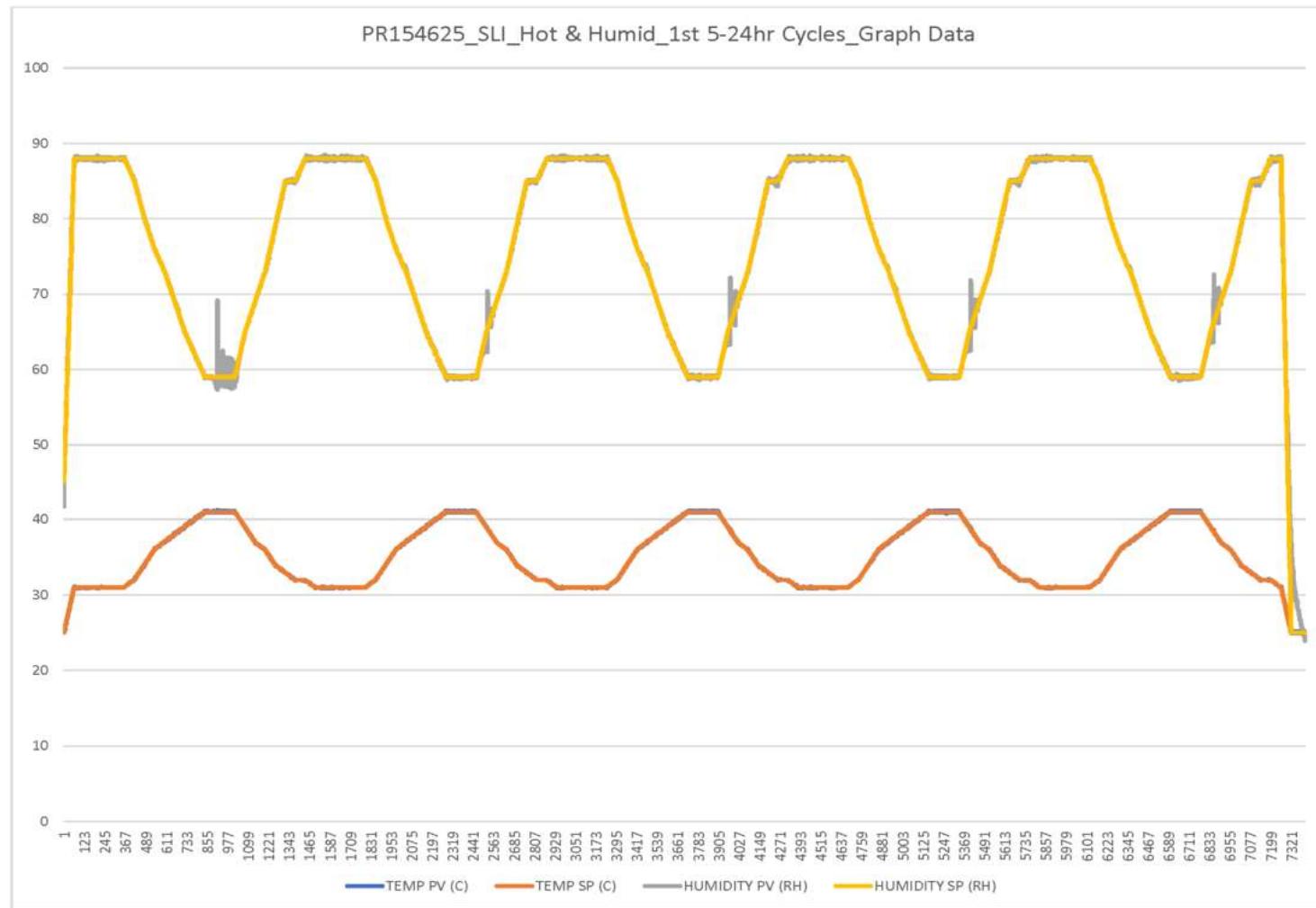
No visible evidence of damage or anomalies were noted as a result of the test.

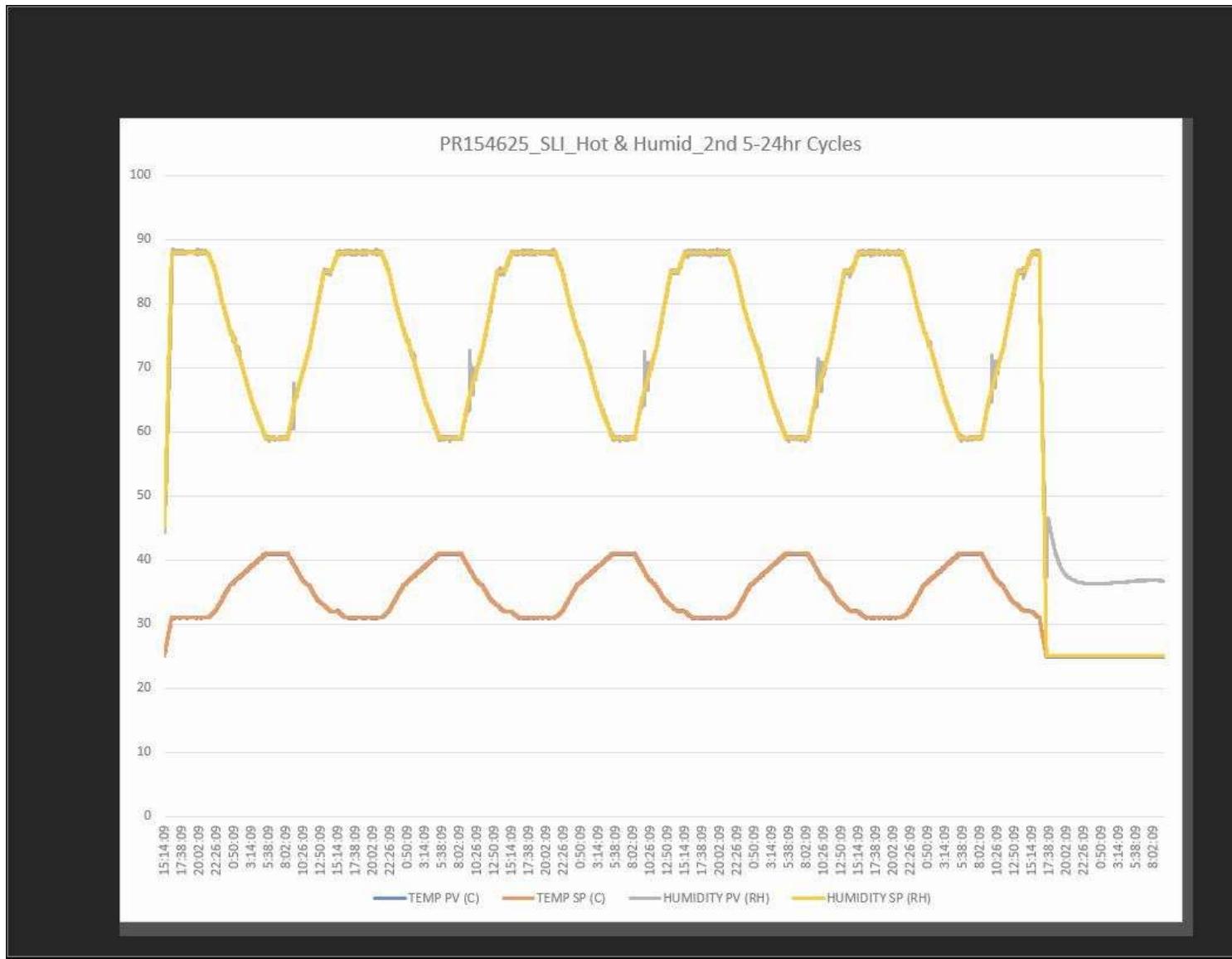
### 5.1.3 Test Datasheets

**5.1.4 Test Photographs**

Temperature Humidity Test

### 5.1.5 Test Data





### 5.1.6 Test Equipment List

**Table 5.1-1: Humidity Test Equipment List**

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC061626	Chamber (Temperature/Humidity)	Envirotronics	SH16 C	03/18/2022	03/18/2023
WC070559	Controller (Temperature)	Future Design Controls	FDC-9300	03/18/2022	03/18/2023

**Calibration Abbreviations**

CAL: Calibration

NCR: No Calibration Required



## 5.2 Low Temperature Storage

### 5.2.1 Test Procedure

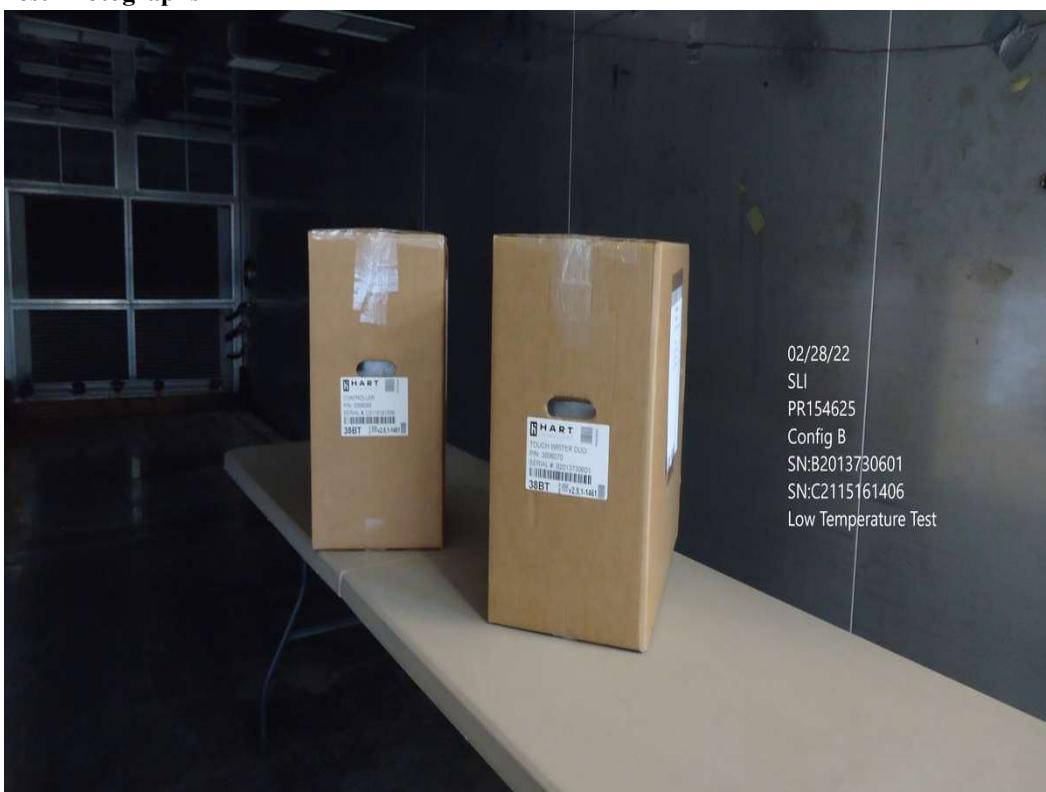
## MIL-STD-810D, Method 502.2

### 5.2.2 Test Result

No visible evidence of damage or anomalies were noted as a result of the test.

### 5.2.3 Test Datasheets

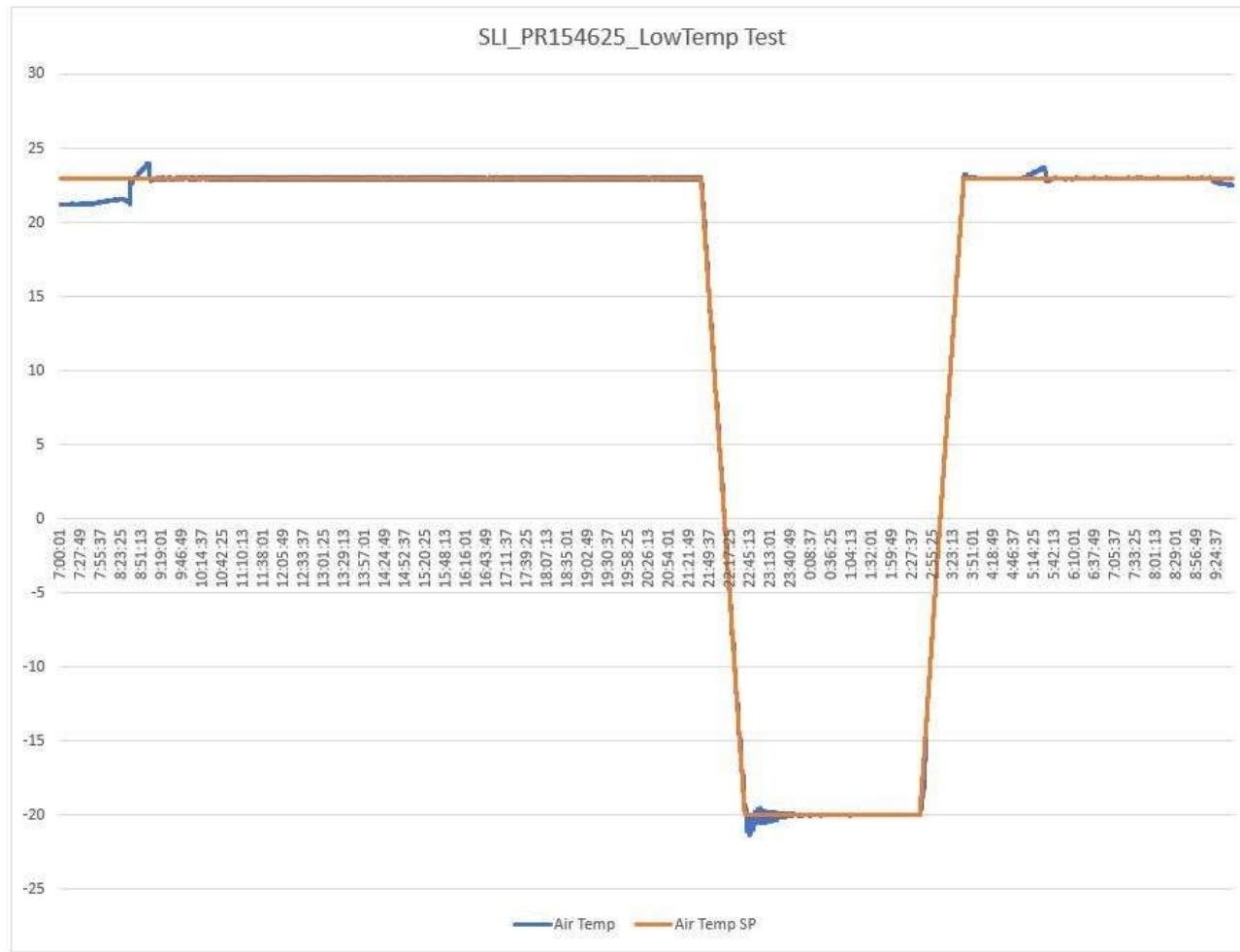
#### 5.2.4 Test Photographs



Low Temperature Test

## 5.2.5 Test Data

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## 5.2.6 Test Equipment List

**Table 5.2-1: Low Temperature Storage Test Equipment List**

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC061603	Chamber (Temperature/Humidity)	Thermotron	WS-1372-CH-(5) 25-25	09/29/2021	09/29/2022
WC061604	Controller (Temperature)	Thermotron	8800	09/29/2021	09/29/2022

### Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required



### **5.3 High Temperature Storage**

### 5.3.1 Test Procedure

MIL-STD-810D, Method 501.2

### 5.3.2 Test Result

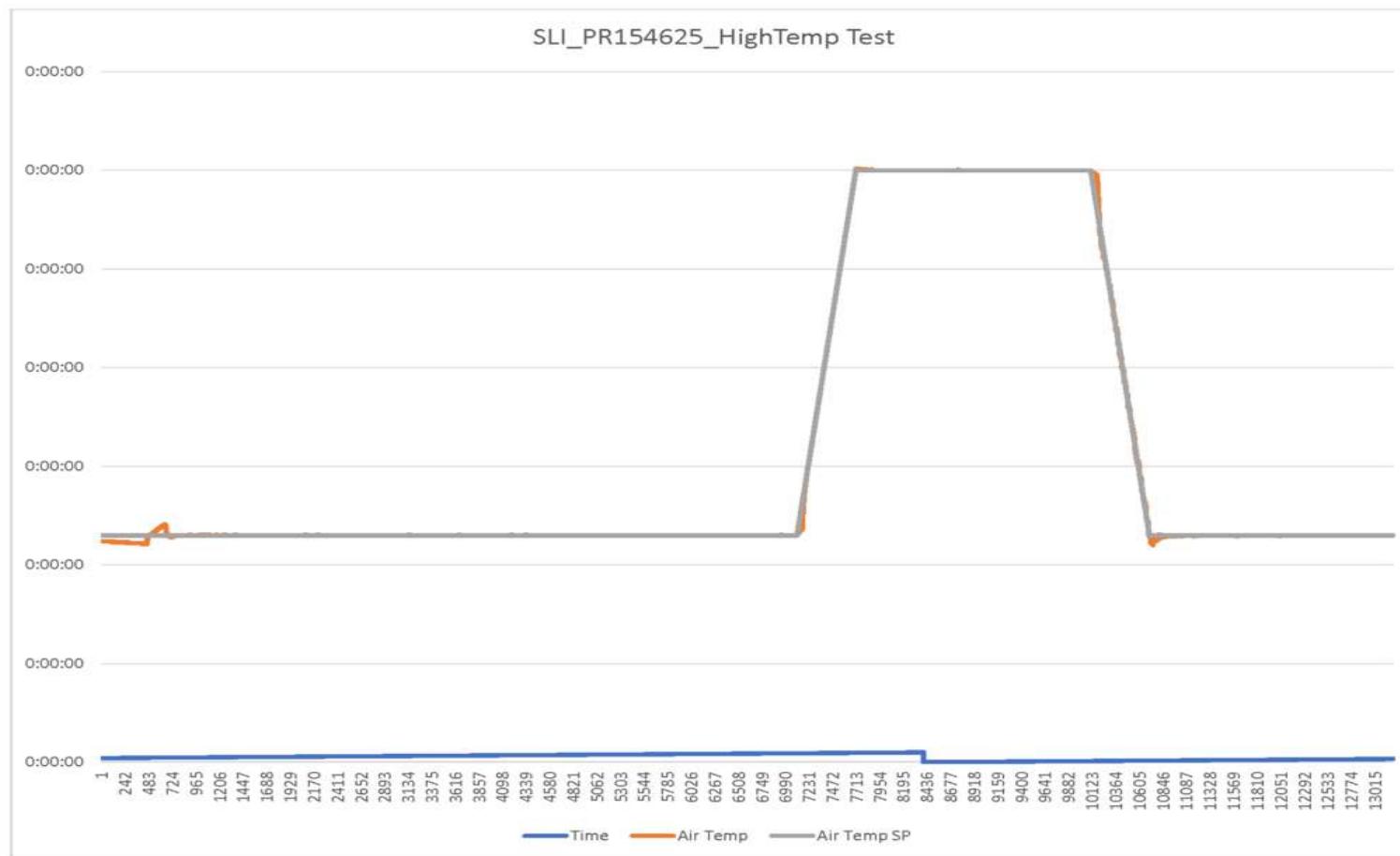
No visible evidence of damage or anomalies were noted as a result of the test.

### 5.3.3 Test Datasheets

### 5.3.4 Test Photographs



### 5.3.5 Test Data



### 5.3.6 Test Equipment List

**Table 5.3-1: High Temperature Storage Test Equipment List**

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC061603	Chamber (Temperature/Humidity)	Thermotron	WS-1372-CH-(5) 25-25	09/29/2021	09/29/2022
WC061604	Controller (Temperature)	Thermotron	8800	09/29/2021	09/29/2022

#### Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required



#### **5.4 Bench Handling**

### 5.4.1 Test Procedure

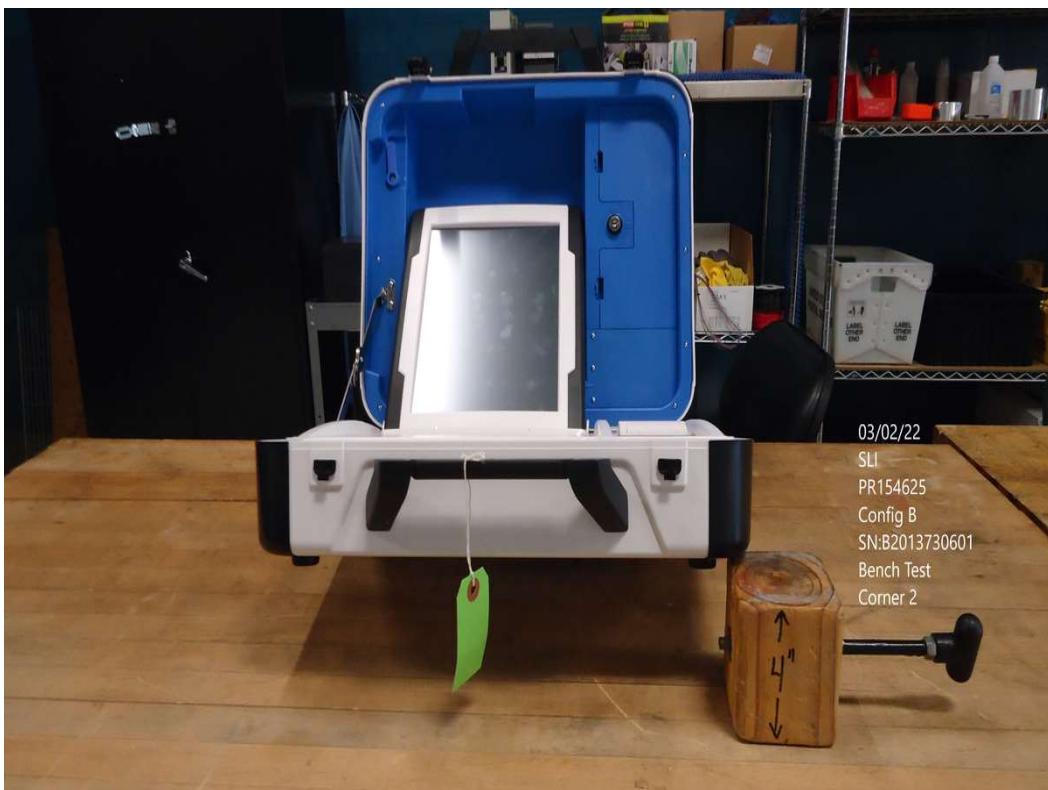
MIL-STD-810D, Method 516.3, Procedure VI

### 5.4.2 Test Result

No visible evidence of damage or anomalies were noted as a result of the test.

### 5.4.3 Test Datasheets

#### 5.4.4 Test Photographs









## 5.4.5 Test Equipment List

**Table 5.4-1: Bench Handling Test Equipment List**

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC078513	Measurement Tools (Rule)	StorageTek	4 Inch Block	NCR	NCR

### Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required



## 5.5 Transportation Vibration

### 5.5.1 Test Procedure

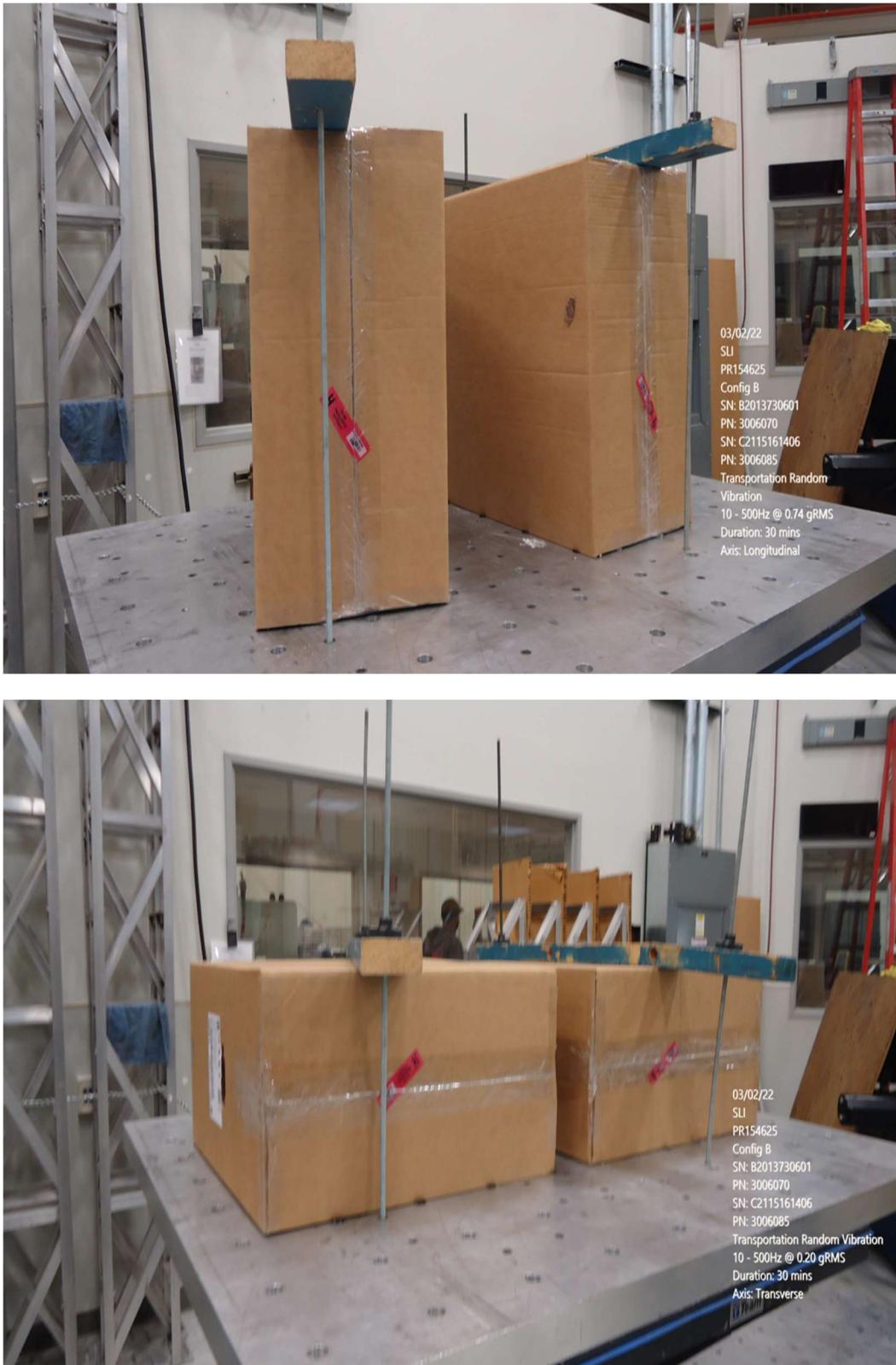
MIL-810D, Method 514.3, Category 1

### 5.5.2 Test Result

No visible evidence of damage or anomalies were noted as a result of the test

### 5.5.3 Test Datasheets

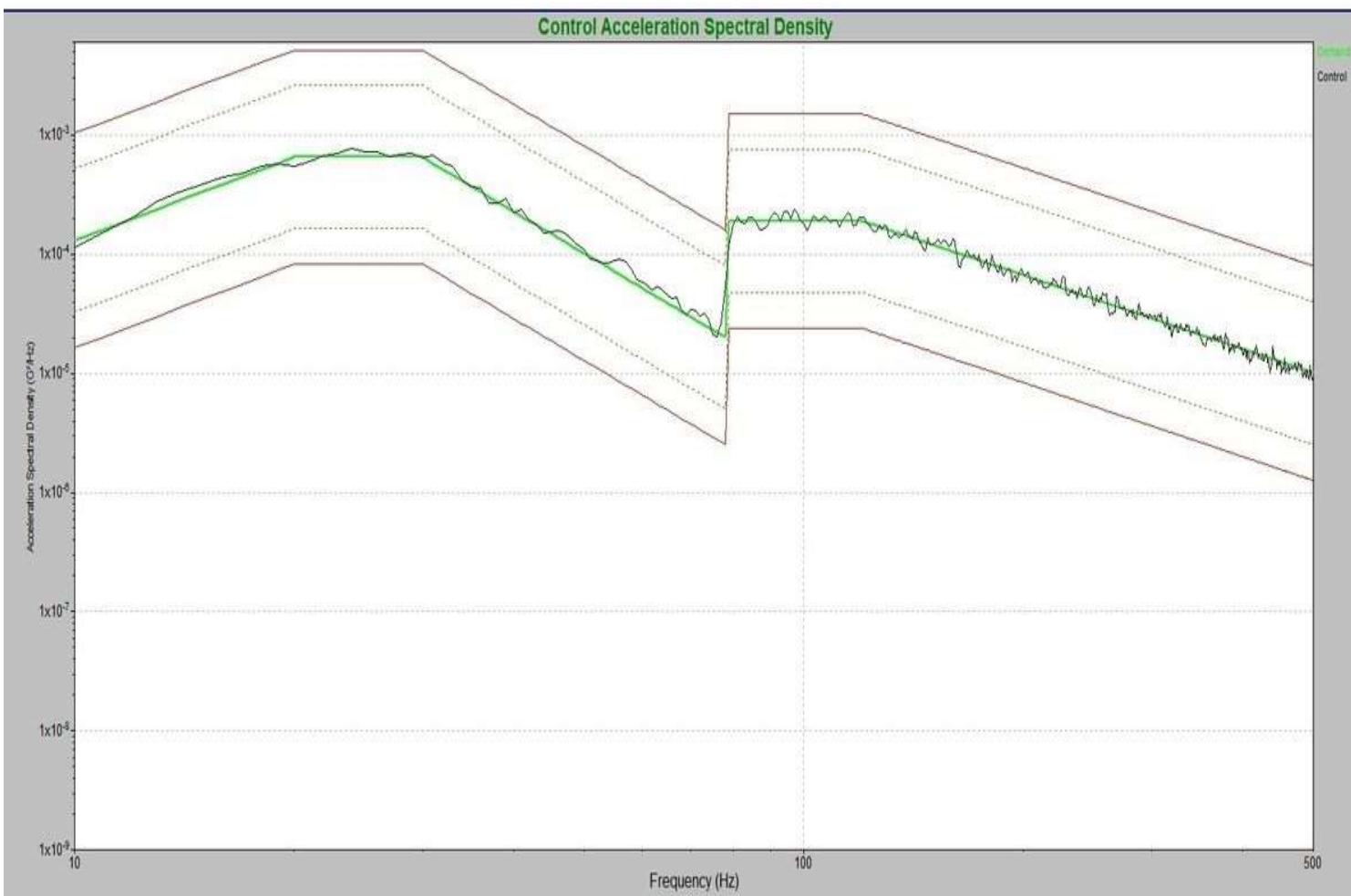
#### 5.5.4 Test Photographs





### 5.5.5 Test Data

NTS Longmont, CO	Level Time: 0:30:00	Demand: 0.2038 G RMS	SLI
Job#: PR154625	Total Time: 0:30:11	Control: 0.2072 G RMS	UUT: Config B
Mar 02, 2022 12:04:44	Run 1	Test Axis: Transverse	SN: B2013730601 & C2115161406



NTS Longmont, CO

Level Time: 0:30:00

Demand: 0.7428 G RMS

SLI

Job#: PR154625

Total Time: 0:30:11

Control: 0.7583 G RMS

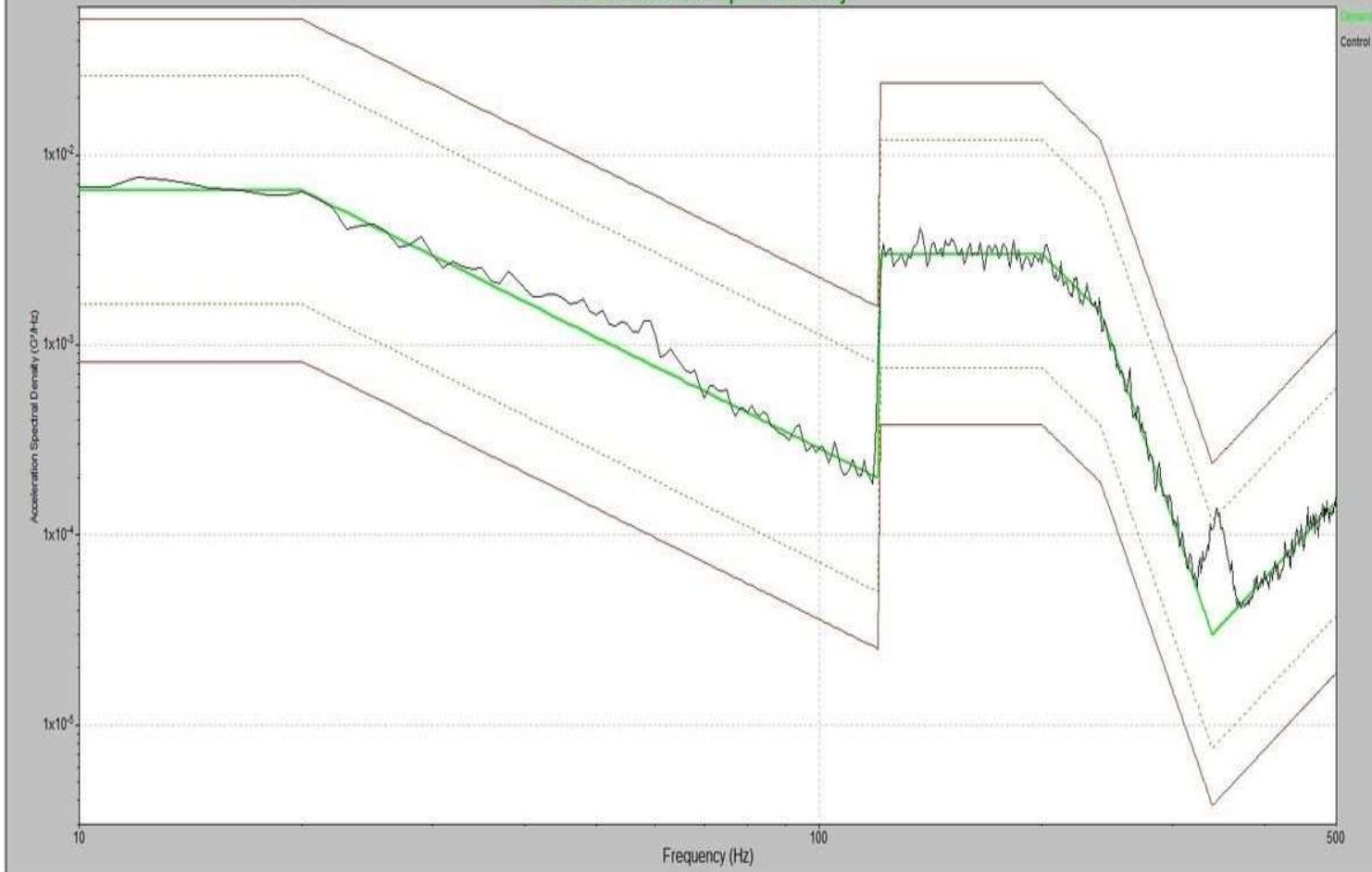
UUT: Config B

Mar 02, 2022 12:54:54

Run 2

Test Axis: Longitudinal

SN: B2013730601 &amp; C2115161406

**Control Acceleration Spectral Density**

NTS Longmont, CO

Level Time: 0:30:00

Demand: 1.047 G RMS

SLI

Job#: PR154625

Total Time: 0:30:10

Control: 1.046 G RMS

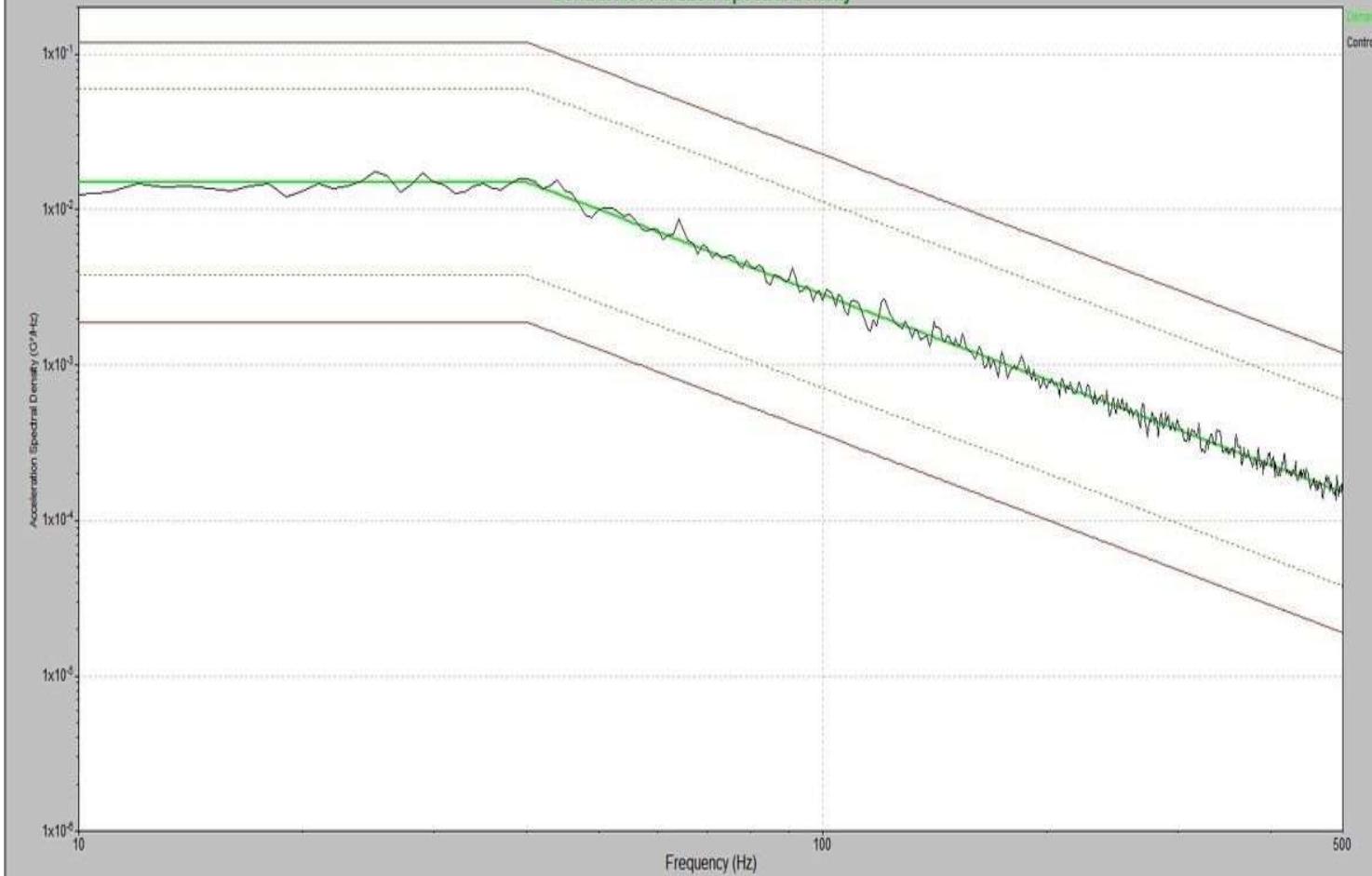
UUT: Config B

Mar 02, 2022 13:33:49

Run 3

Test Axis: Vertical

SN: B2013730601 &amp; C2115161406

**Control Acceleration Spectral Density**

## 5.5.6 Test Equipment List

**Table 5.5-1: Transportation Vibration Test Equipment List**

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC061429	Shaker (Hydraulic)	Team Corporation	80/10.5	NCR	NCR
WC059875	Computer (Vibration Controller)	Vibration Research	VR9500	05/03/2022	05/03/2023
WC061505	Accelerometer (Vibration)	PCB Piezotronics	353B32	05/19/2021	05/19/2022
WC070243	Accelerometer (Vibration)	PCB Piezotronics	353B32	05/19/2021	05/19/2022
WC070466	Meter (Hygrometer)	Fluke	971	04/19/2021	04/19/2022

### Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

## 5.6 Temperature/Power Variation

### 5.6.1 Test Procedure

MIL-STD-810D, Methods 501.2 and 502.2

### 5.6.2 Test Result

The test chamber lost cooling approximately 2 hours into testing (see NOD 1). No visible evidence of damage or other anomalies were reported as a result of the test.

### 5.6.3 Test Datasheets

Test Log				
MJO No: PR154652		Customer: SLI	MIL-STD-810D Meth 501.2 & 502.2	Temp Power Var Test
Date	Time	Log Entry		Tech
<b>Test Log Chamber 42</b>				
4/25/2022	13:00	<b>No visible evidence of damage before testing.</b>		KM
4/26/2022	7:50	Set VAC to 117vlt & ramp to +10c		NP
4/26/2022	8:00	Start dwell at 117vlt & +10c for 4hrs		NP
4/26/22	10:00	Chamber cooling has failed at 2hrs into test		NP
4/26/22	11:30	Move UUT's Verity Controller S/N: C2115161506 with Touch Writer Duo S/N: B1903101010 Verity Controller S/N: C2115161406 with Touch Writer Duo S/N: B2013730601 Verity Scan S/N's S2115228806 & S2115227906 Verity Touch Writer (3006090) S/N's W2014395311, W2014374311 with Brother Laser Printer attached S/N's U64185J1N427134, U64185J1N427136 Verity Reader S/N's R2115230606 & R2115230806 To Chamber 59 to continue test and NOD has been completed		

Test Log				
MJO No: PR154652		Customer: SLI	MIL-STD-810D Meth 501.2 & 502.2	Temp Power Var Test
Date	Time	Log Entry		Tech
<b>Test Log Chamber 59</b>				
4/25/2022	13:00	<b>No visible evidence of damage before testing.</b>		KM
4/26/2022	7:50	Set VAC to 117vlt & ramp to +10c		NP
4/26/2022	8:00	Start dwell at 117vlt & +10c for 4hrs		NP
4/26/2022	12:00	Lower VAC to 105vlt & dwell for 4hrs		NP
4/26/2022	16:00	Raise VAC to 129vlt & dwell for 4hrs		KM
4/26/2022	20:00	Lower VAC to 117vlt & Raise temperature to +35c & dwell for 4hrs		KM
4/27/2022	0:00	Lower VAC to 105vlt & dwell for 4hrs		KM
4/27/2022	4:00	Raise VAC to 129vlt & dwell for 4hrs		KM
4/27/2022	8:00	Lower VAC to 117vlt & Lower temperature to +10c & dwell for 4hrs		KM
4/27/2022	12:00	Lower VAC to 105vlt & dwell for 4hrs		KM
4/27/2022	16:00	Raise VAC to 129vlt & dwell for 4hrs		KM
4/27/2022	20:00	Lower VAC to 117vlt & Raise temperature to +35c & dwell for 4hrs		KM
4/28/2022	0:00	Lower VAC to 105vlt & dwell for 4hrs		KM
4/28/2022	4:00	Raise VAC to 129vlt & dwell for 4hrs		KM
4/28/2022	8:00	Lower VAC to 117vlt & ramp to +23c ambient		KM
4/28/2022	8:00	Temperature and power variation portion of test has completed		KM
4/28/2022	8:00	Test will continue to run at +23c ambient for another 37hrs		KM
4/29/2022	0:00	All Testing complete for a total of 87hrs		KM



#### 5.6.4 Notice of Deviation (NOD)



#### NOTICE OF DEVIATION

Client:	SLI	Job #:	PR154625	NOD #:	1
P. O. #:	N/A	Date of Deviation:	4/26/2022	CAR #:	N/A
Notification Made To:	Derrick Forester <i>(Client Contact)</i>	Notification Made By:	KM		
If notification was not made, provide justification:	N/A				
Date:	4/26/2022	Via:	Verbal		
Test:	Temp Pwr Var	Test Item:	Verity 2.7		
Specification:	MIL-STD-810D Methods 501.2 and 502.2	Model or P/N:	Multiple		
Revision/Date:	N/A	Serial Number:	Multiple		

#### REQUIREMENTS: (Reference paragraph or section of specification)

Temperature Power Verification Test per MIL-STD-810D Methods 501.2 and 502.2

#### DESCRIPTION OF DEVIATION

Chamber 42 lost cooling at 2hrs into 4hr test at +10c and 117vts

#### DISPOSITIONS/COMMENTS/RECOMMENDATIONS:

Moved UUT's to Chamber 59 to continue test

Client Disposition Authorization

5-3-22

Date

NTS Project Manager

5/3/22

Date

NTS Quality Representative

5-3-22

Date

Government QAR (if applicable)

Date

NOTE: IT IS THE CLIENT'S RESPONSIBILITY TO ANALYZE AND DISPOSITION DEVIATIONS ON CLIENT TEST PROGRAMS.

FOR NTS QA USE:	Tracking Code: 3
	Risk Level: Medium

#### Tracking Codes:

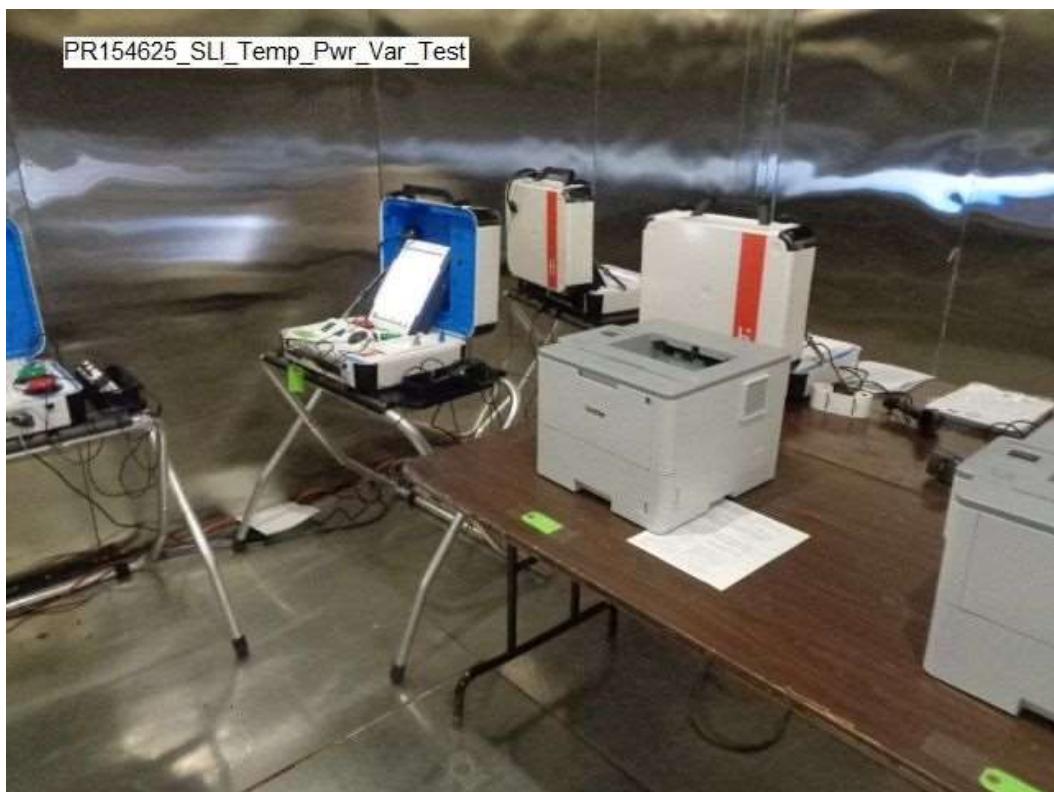
1. Employee Error - Training    2. Employee Error - Process    3. Test Equipment Problem    4. Equipment Limitations    5. Customer Item Problem    6. Other

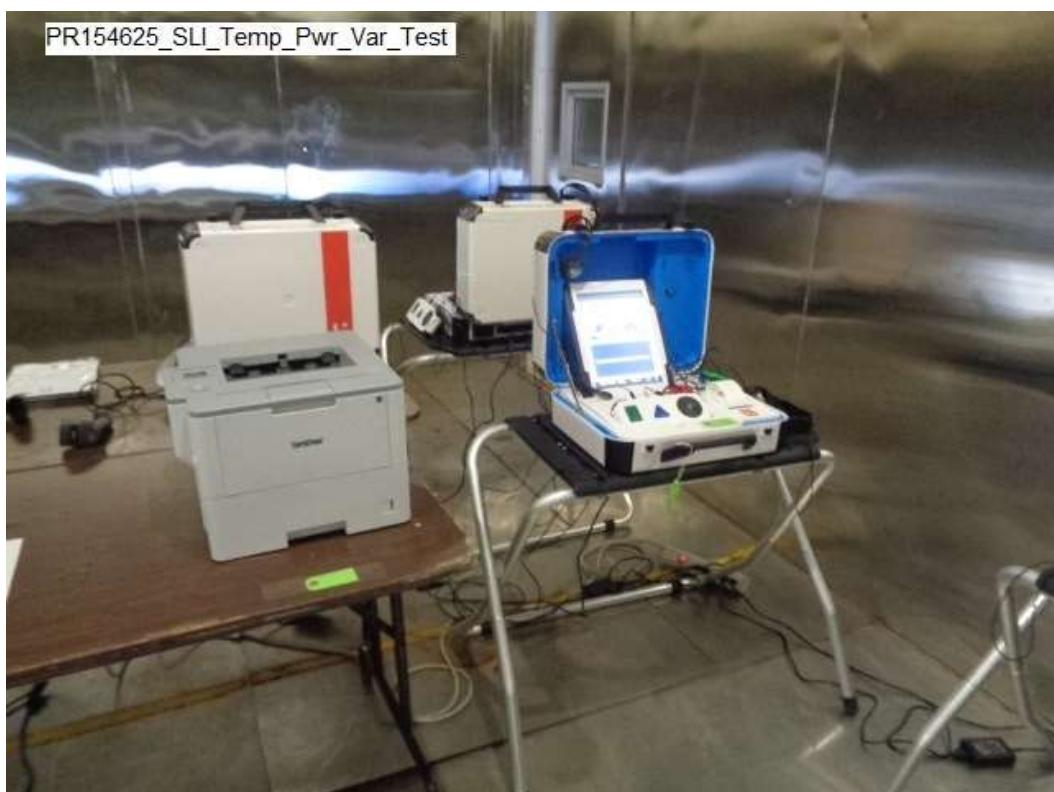
#### Risk Levels:

Low    Medium    High

### 5.6.5 Test Photographs

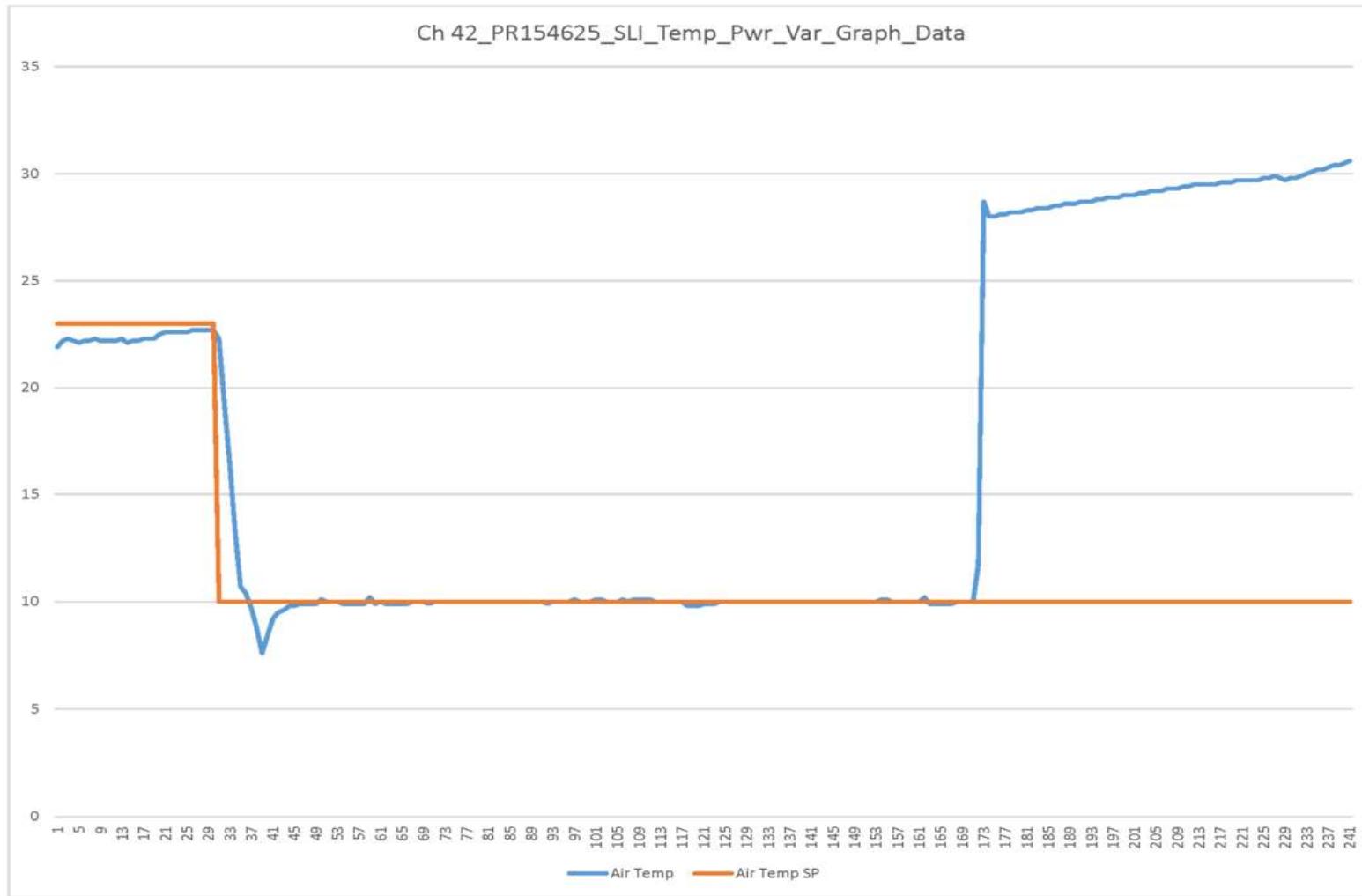


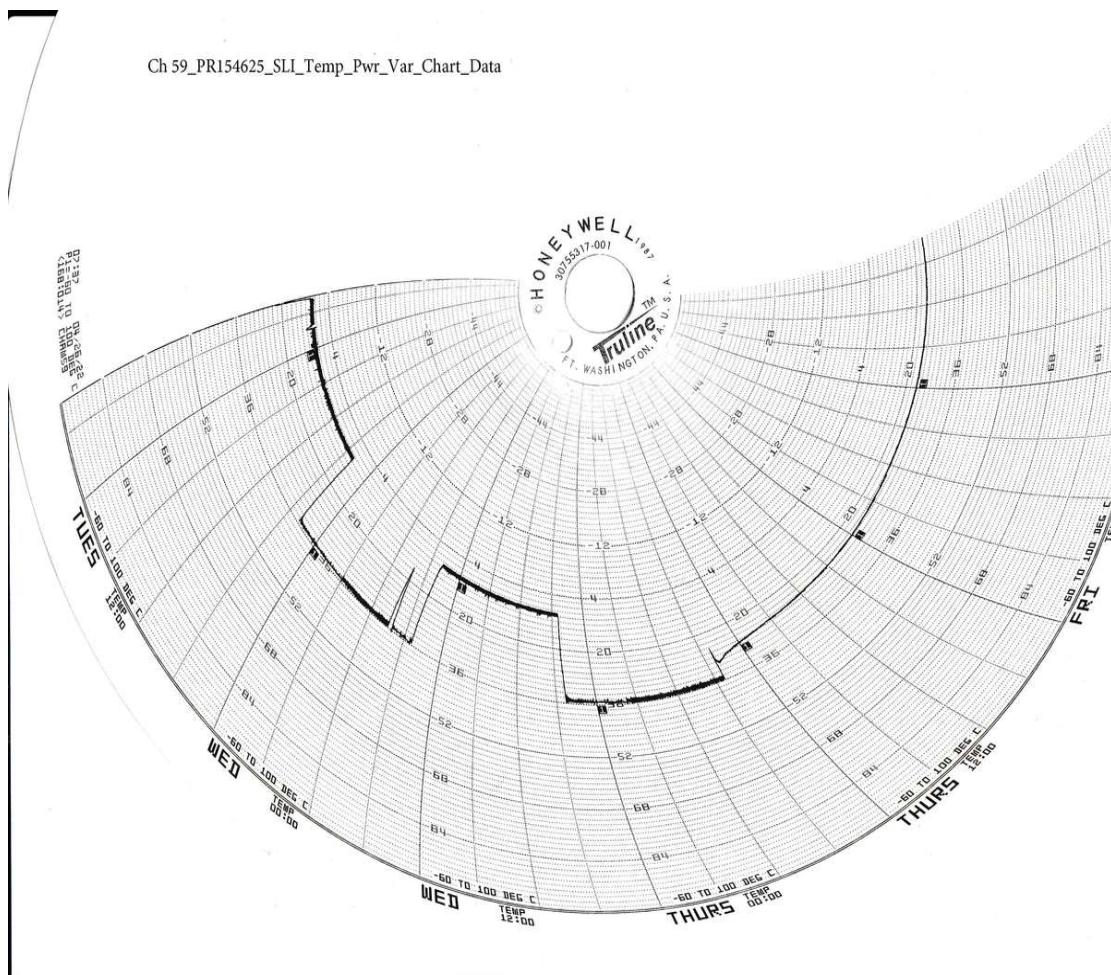






### 5.6.6 Test Data





## 5.6.7 Test Equipment List

**Table 5.6-1: Temperature/ Power Variation - Test Equipment List**

Asset Number	Asset Type	Manufacturer	Model	Calibrated	Due
WC061559	Chamber (Temperature/Humidity)	StorageTek	Large Walk In	09/29/2021	09/29/2022
WC061603	Chamber (Temperature/Humidity)	Thermotron	WS-1372-CH-(5) 25-25	09/29/2021	09/29/2022
WC061560	Controller (Temperature)	Watlow	F4	09/29/2021	09/29/2022
WC061561	Recorder (Chart)	Honeywell	DR45AT	09/29/2021	09/29/2022
WC061604	Controller (Temperature)	Thermotron	8800	09/29/2021	09/29/2022

### Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

**End of Test Report**