

National Technical Systems Test Report for Environmental Testing of the DS950

Prepared For

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Prepared By

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A handwritten signature in blue ink, appearing to read "Gagne", written over a horizontal line.

Greg Gagne
Technical Writer

A handwritten signature in blue ink, appearing to read "Robert Polverari", written over a horizontal line.

Robert Polverari
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Revision History

Rev.	Description	Issue Date
0	TR-PR120980	10/29/2020
1	Corrected Section 5.6 Test Date in Table 5.0-1.	10/29/2020
2	Removed incorrect Sections 5.4 and 5.5.	11/03/2020

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1.0 Introduction

This document presents the test procedures used and the results obtained during the performance of an Environmental 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.

- Pro V&V, Inc. Purchase Order(s) 2020-004, dated 07/01/2020
- National Technical Systems (NTS) Quote(s) OP0554725, dated 06/24/2020
- NTS Corporate Quality Policy Manual, Revision 9, dated 9/20/2018
- ISO/IEC 17025:2017(E) *General Requirements for the Competence of Testing and Calibration Laboratories*, dated 11/1/2017
- Test Specification: MIL-STD-810D

3.0 Product Selection and Description

Pro V&V, Inc. selected and provided the test sample(s) to be used as the Equipment Under Test. Details below:

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

Item	Qty.	Name/Description	Part Number	Serial Number
1	2	DS950	DS950	DS9520070515, DS9520070514

3.1 Security Classification

Non-classified

4.0 General Test Requirements

4.1 Test Equipment

NTS-provided equipment is calibrated according to ISO/IEC 17025:2017(E) and calibration is traceable to the National Institute of Standards and Technology (NIST). Calibration records are maintained on file at NTS.

4.2 Notice of Deviation

In accordance with NTS' quality procedures, when the EUT is observed to exceed or display susceptibility, a Notice of Deviation (NOD) document is generated by the technician performing the test. This NOD documents the requirement, how the EUT deviated from the requirement, and allows room for resolution of the deviation.

This document is reviewed and approved by the NTS Program Manager or Engineer and the NTS Quality Assurance Representative, and then forwarded to the customer contact. Once mitigated (or passed over), the steps taken to correct the deviation (or simply instruction from the customer to continue testing) are recorded in the NOD and a copy of the NOD is integrated into the body of the report, in the appropriate location.



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	Low Temperature	MIL-STD-810D	Longmont	09/21/2020 - 09/22/2020	DS950	DS9520070515	Customer Determined
5.2	High Temperature	MIL-STD-810D	Longmont	09/22/2020 - 09/23/2020	DS950	DS9520070515	Customer Determined
5.3	Humidity	MIL-STD-810D	Longmont	09/08/2020 - 09/21/2020	DS950	DS9520070515	Customer Determined
5.4	Temperature/Power Variation	MIL-STD-810D	Longmont	09/28/2020 - 10/01/2020	DS950	DS9520070515, DS9520070514	Customer Determined

*The decision rule used to state compliance is in accordance with the test specification used for testing. Unless otherwise noted, testing was performed in accordance with the latest published version of test specification at time of test.

5.1 Low Temperature

5.1.1 Test Result

Pass/Fail determinations made by Pro V&V.

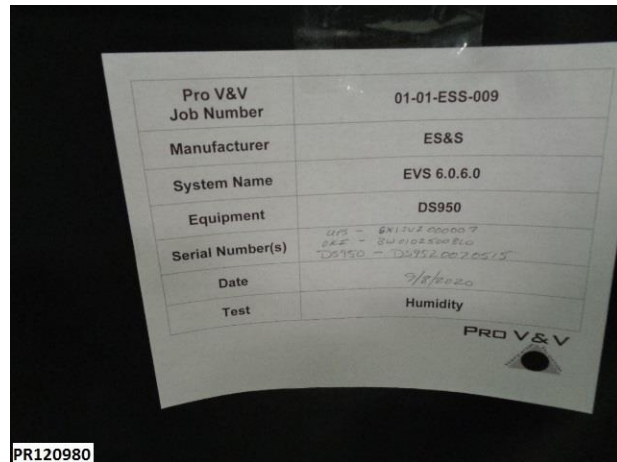
5.1.2 Test Procedure

See below.

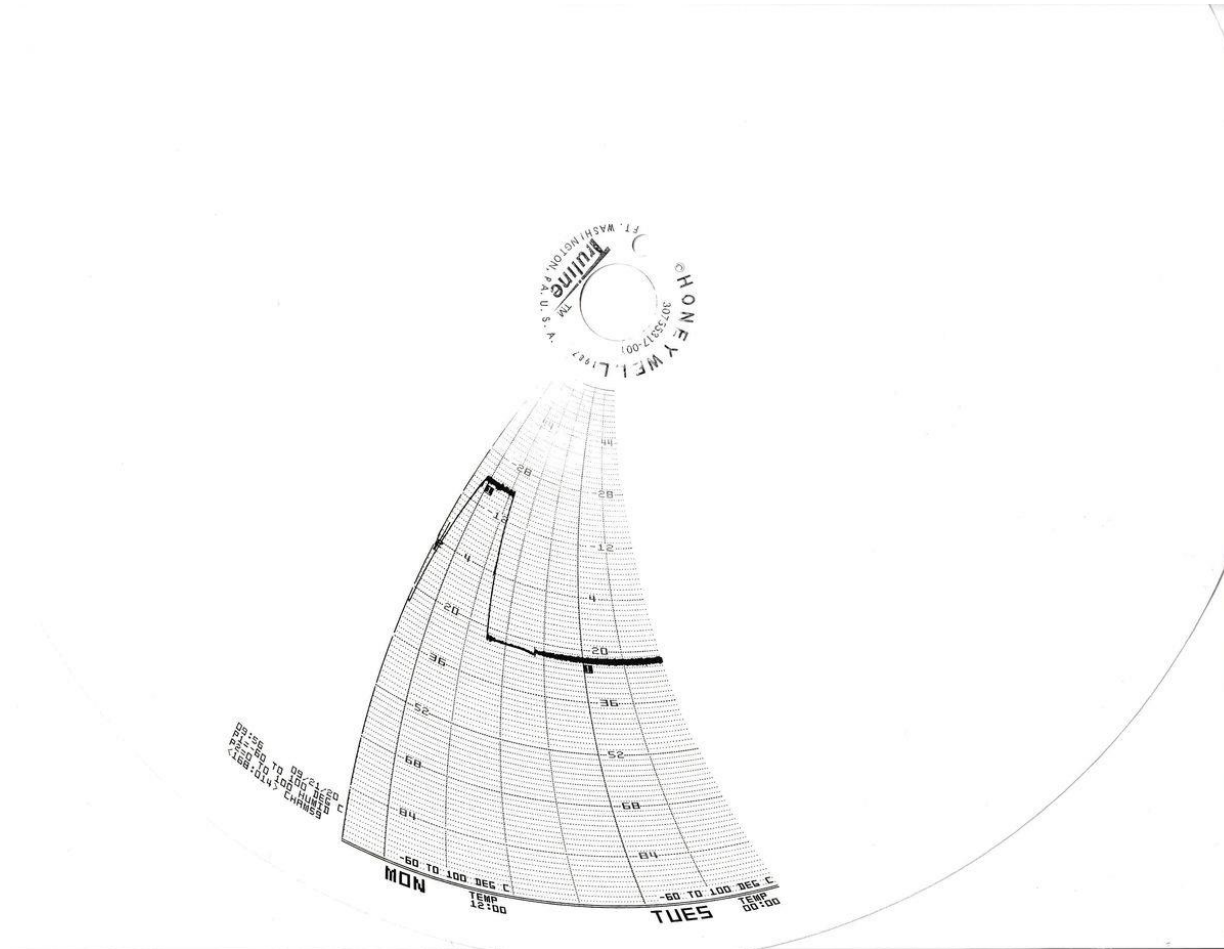
5.1.3 Test Datasheets

Start Date: 09/21/20		End Date: 09/22/20	MJO No: PR120980
Customer: Pro V&V		Test Performed: Cold Temperature Test	Test By: KM
Part Name: DS950		Serial No: DS9520070515	Customer Witness: N/A
Page 1 of 1		Test Specification: MIL-STD_810D	Temp: -20c Humidity: N/A
Date	Time	Remarks	Initials
09/21/20	11:35	Start the following test profile	KM
		Ramp to +23c	
		Ramp to -20c	
		Dwell at -20 for 4hrs	
		Ramp to +23c	
		Customer inspected UUT and performed post-test functional test on UUT	
09/22/20	09:00	Test complete	KM
		Note: All test pass or fail determinations decided by Pro V&V Inc.	

5.1.4 Test Photographs



5.1.5 Test Data



Ch 59_-20c_Graph_Data



5.1.6 Test Equipment List

Table 5.1-1: Low Temperature Test Equipment List

Asset Number	Mfct	Description	M/N	S/N	Range	Start Date	End Date	Last Cal	Cal Interval (Months)	Cal Due	Notes
WC061559	StorageTek	Temp/Hum chamber, CH 59	N/A			09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061560	Watlow	TEMPERATURE CONTROLLER	F4	6165	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061561	Honeywell	CHART RECORDER	DR45AT	'0350Y3 6134090 0004	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required

5.2 High Temperature

5.2.1 Test Result

Pass/Fail determinations made by Pro V&V.

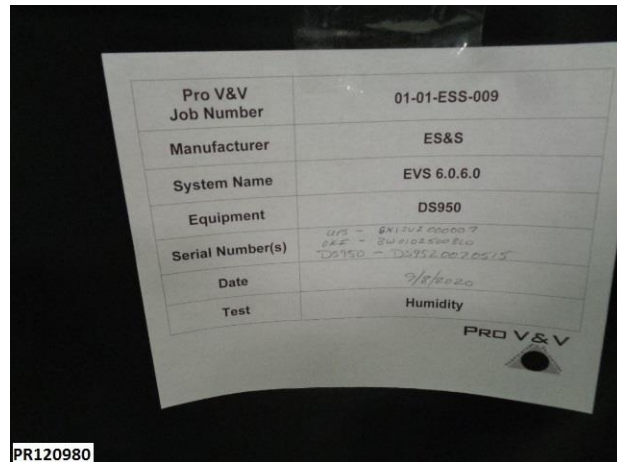
5.2.2 Test Procedure

See below.

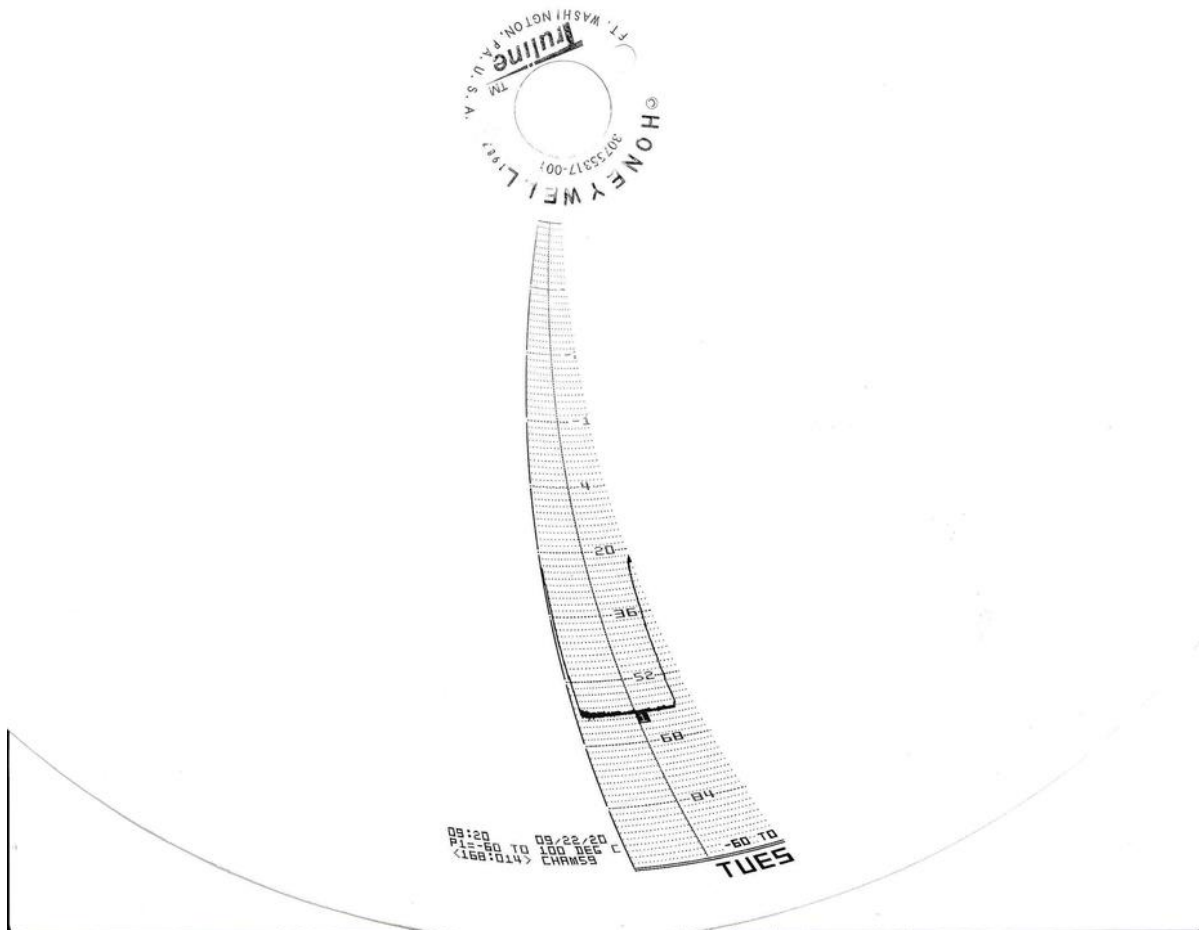
5.2.3 Test Datasheets

Start Date: 09/22/20		End Date: 09/23/20	MJO No: PR120980
Customer: Pro V&V		Test Performed: High Temperature Test	Test By: KM
Part Name: DS950		Serial No: DS9520070515	Customer Witness: N/A
Page 1 of 1		Test Specification: MIL-STD_810D	Temp: +60c Humidity: N/A
Date	Time	Remarks	Initials
09/22/20	09:50	Start the following test profile	KM
		Ramp to +23c	
		Ramp to +60c	
		Dwell at +60 for 4hrs	
		Ramp to +23c	
		Customer inspected UUT and performed post-test functional test on UUT	
09/23/20	09:00	Test complete	KM
		Note: All test pass or fail determinations decided by Pro V&V Inc.	

5.2.4 Test Photographs



5.2.5 Test Data



Ch 59_+60c_Graph_Data



5.2.6 Test Equipment List

Table 5.2-1: High Temperature Test Equipment List

Asset Number	Mfct	Description	M/N	S/N	Range	Start Date	End Date	Last Cal	Cal Interval (Months)	Cal Due	Notes
WC061559	StorageTek	Temp/Hum chamber, CH 59	N/A			09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061560	Watlow	TEMPERATURE CONTROLLER	F4	6165	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061561	Honeywell	CHART RECORDER	DR45AT	'0350Y3 6134090 0004	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required



5.3 Humidity

5.3.1 Test Result

Pass/Fail determinations made by Pro V&V.

5.3.2 Test Procedure

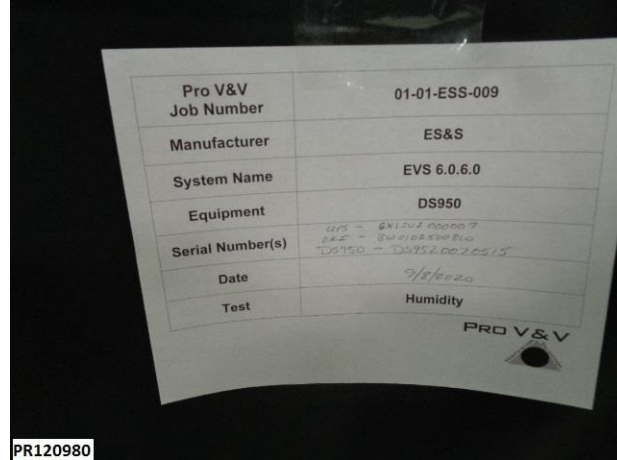
See below.

5.3.3 Test Datasheets

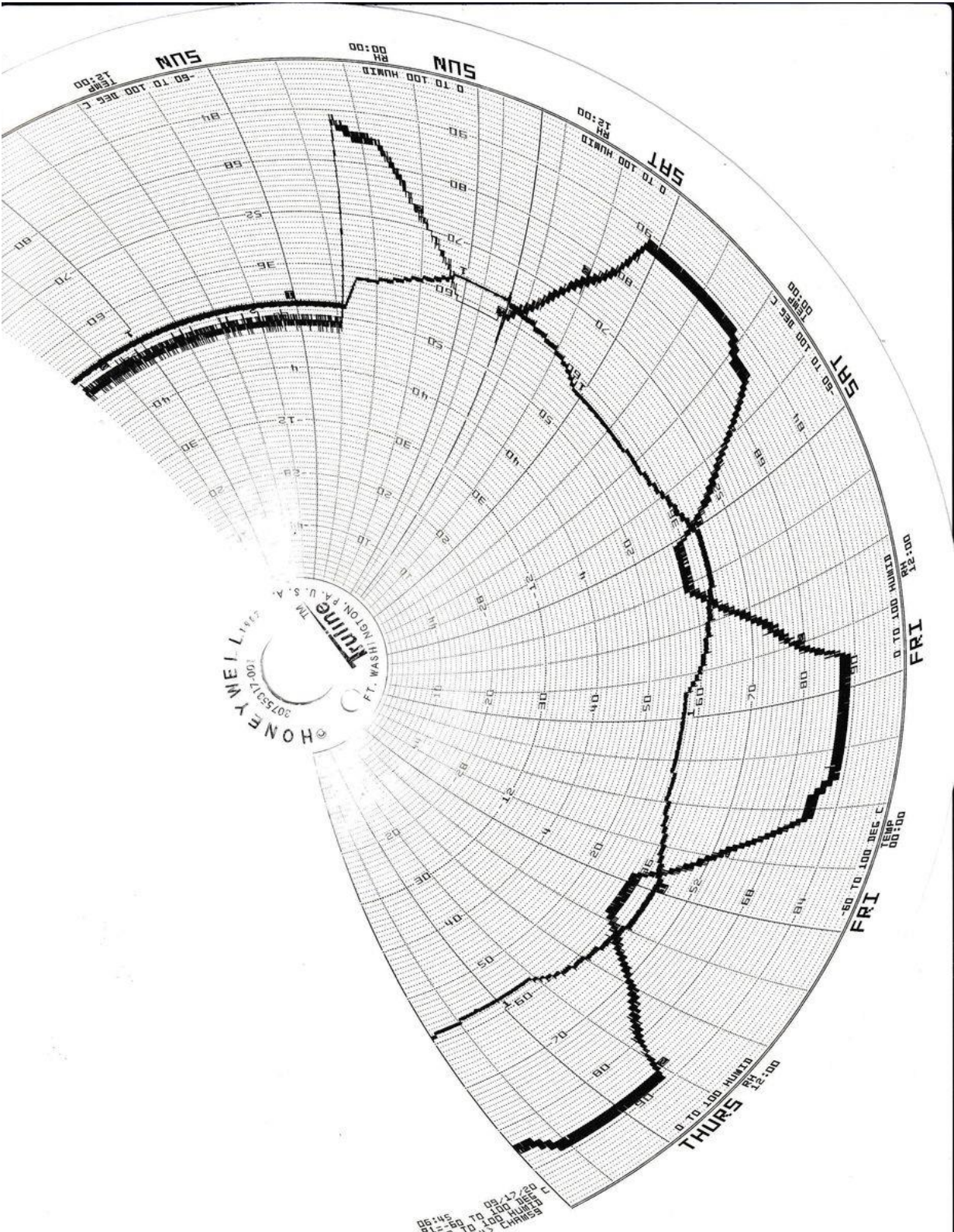
Start Date: 09/08/20		End Date: 09/21/20	MJO No: PR120980
Customer: Pro V&V		Test Performed: 10 Day Temperature/Humidity Test	Test By: KM
Part Name: DS950		Serial No: DS9520070515	Customer Witness: N/A
Page 1 of 1		Test Specification: MIL-STD_810D	Temp: +31c to +41c Humidity: 59% RH to 88% RH
Date	Time	Remarks	Initials
09/08/20	11:15	Customer performed pre-test functional test on UUT	KM
09/08/20	11:30	Install UUT in chamber	KM
09/08/20	12:00	Start test profile mil-810 hot hum 10 day test	KM
		Test has completed mil-810 hot hum 10 day test	
		Chamber at +23c ambient	
		Open chambers doors	
		Customer inspected UUT and performed post-test functional test on UUT	
		Test complete	
		Note: All test pass or fail determinations decided by Pro V&V Inc.	
09/09/20	06:00	Chamber humidity is not working – Waiting for repair	
09/10/20	15:15	Chamber has been repaired	KM
09/10/20	15:40	Restart test profile mil-810 hot hum 10 day test	KM
09/21/20	06:00	Test has completed mil-810 hot hum 10 day test	KM
09/21/20	07:00	Chamber at +23c ambient	KM
09/21/20	07:01	Open chambers doors	KM
09/21/20	09:00	Customer inspected UUT and performed post-test functional test on UUT	KM

09/21/20	10:00	Test complete	KM
		Note: All test pass or fail determinations decided by Pro V&V Inc.	

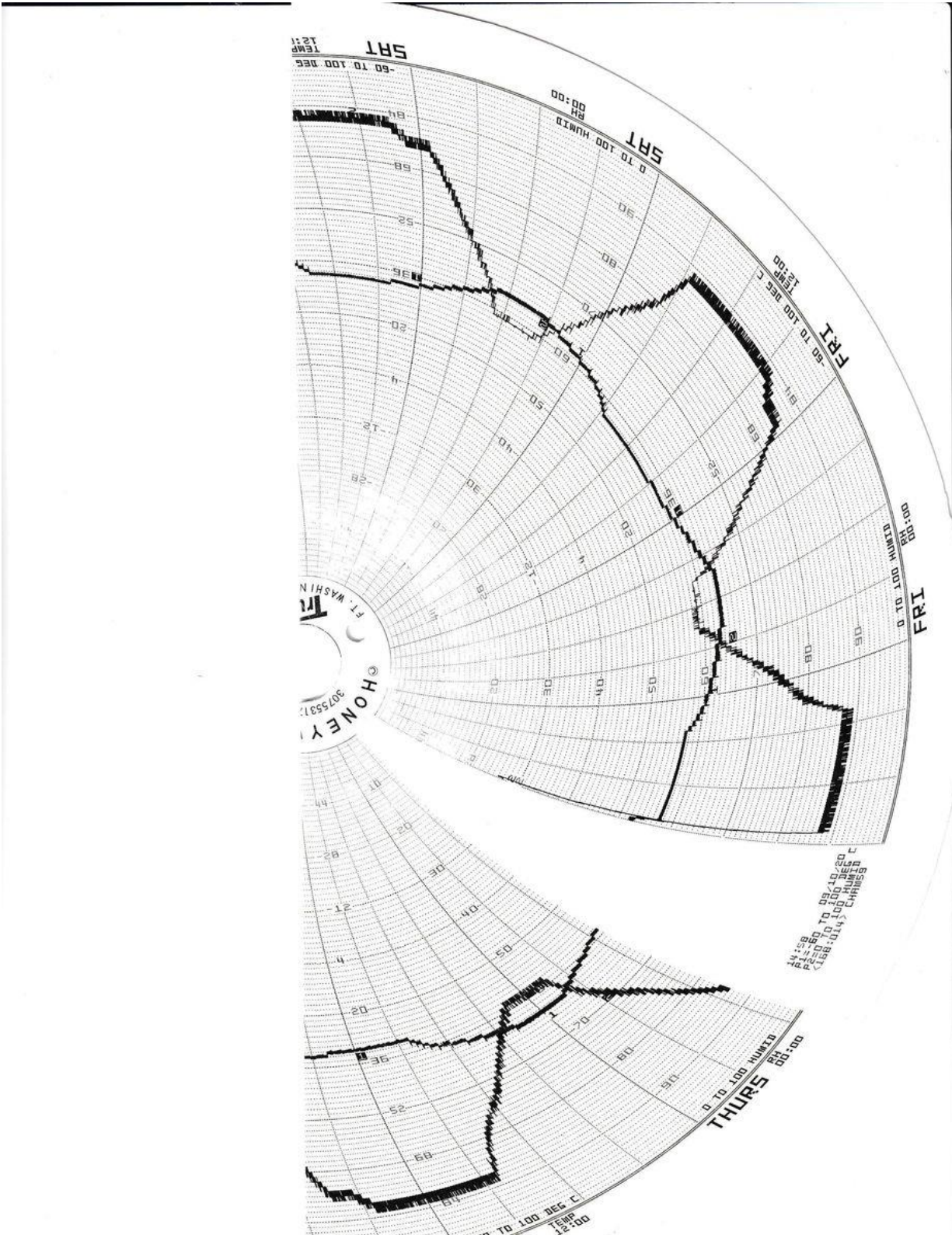
5.3.4 Test Photographs



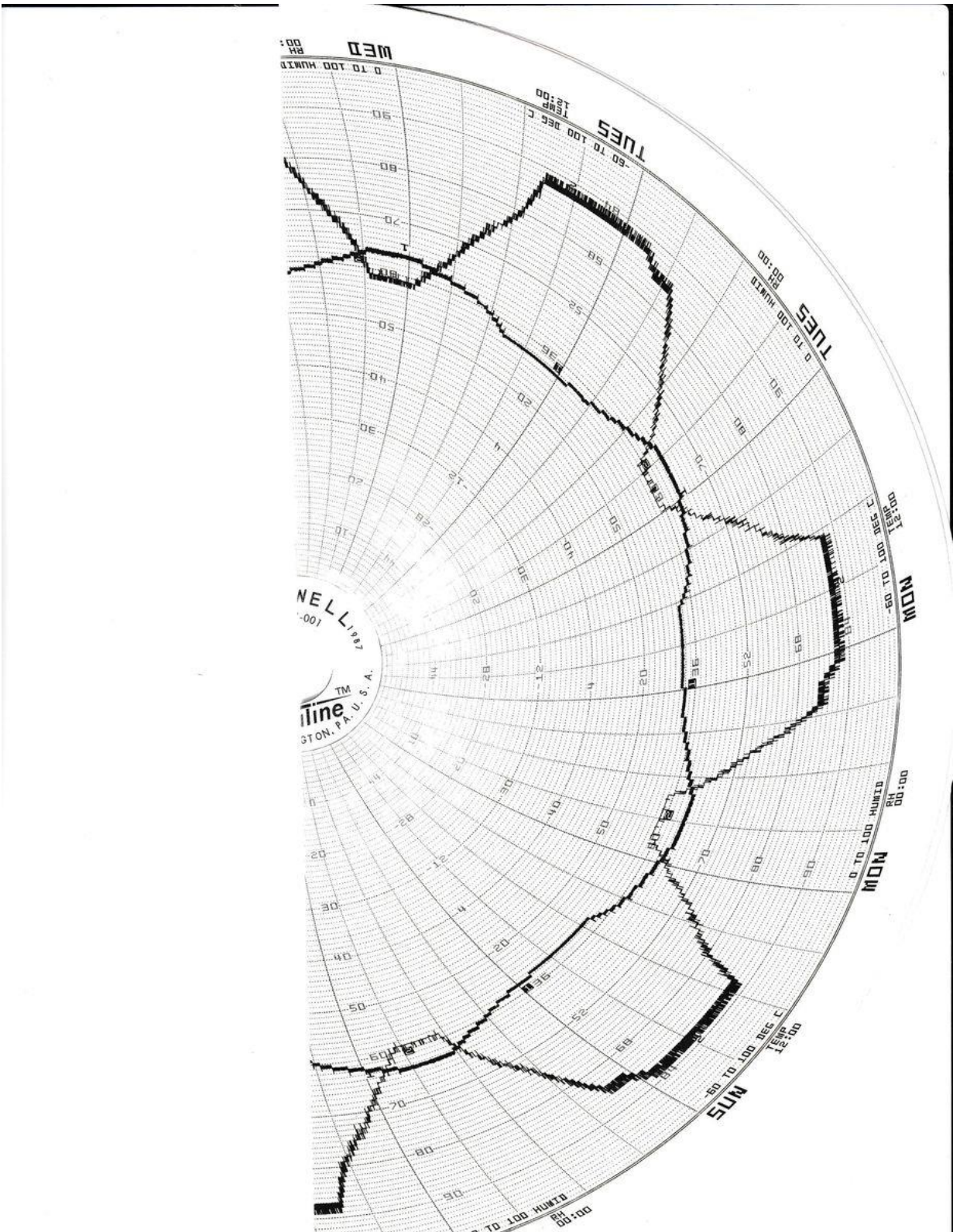
5.3.5 Test Data



3_Cycles_Graph_Data



7_Cycles_Graph_Data_Page_1



7_Cycles_Graph_Data_Page_2



5.3.6 Test Equipment List

Table 5.3-1: Humidity Test Equipment List

Asset Number	Mfct	Description	M/N	S/N	Range	Start Date	End Date	Last Cal	Cal Interval (Months)	Cal Due	Notes
WC061559	StorageTek	Temp/Hum chamber, CH 59	N/A			09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061560	Watlow	TEMPERATURE CONTROLLER	F4	6165	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061561	Honeywell	CHART RECORDER	DR45AT	'0350Y3 6134090 0004	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required



5.4 Temperature/Power Variation

5.4.1 Test Result

Pass/Fail determinations made by Pro V&V.

5.4.2 Test Procedure

See below.

5.4.3 EUT Details/Test Datasheets

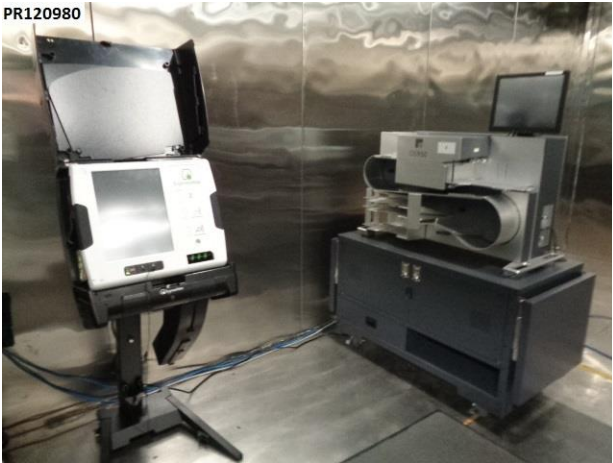
Qty	Part Name	Part Number	Serial Number
1	UPS	N/A	GX1JV2000007
1	UPS	N/A	GX1JV2000012
1	OKI Printer	N/A	BW0102500860
1	OKI Printer	N/A	BW01025006C0
1	DS950	N/A	D559529979515
1	DS950	N/A	D559529979514

Start Date: 09/28/20		End Date: 10/01/20		MJO No: PR120980	
Customer: Pro V&V		Test Performed: Temperature Power Variation Test		Test By: KM	
Part Name: DS950		Serial No & Name: See UUT Details Sheet		Customer Witness: Yes	
Page 1 of 1		Test Specification: MIL-STD_810D		Temp: +10c to +35c Voltage: 105vlts to 129vlts	
Date	Time	Remarks	Initials		
09/28/20	08:00	Set VAC to 117vlts & ramp to +10c	RSP		
09/28/20	08:15	Start dwell at 117vlts & +10c for 4hrs	RSP		
09/28/29	12:15	Lower VAC to 105vlts & dwell for 4hrs	MN		
09/28/20	16:15	Raise VAC to 129vlts & dwell for 4hrs	RSP		
09/28/20	20:15	Lower VAC to 117vlts & Raise temperature to +35c & dwell for 4hrs	KM		
09/29/20	00:15	Lower VAC to 105vlts & dwell for 4hrs	KM		
09/29/20	04:15	Raise VAC to 129vlts & dwell for 4hrs	KM		
09/29/20	08:15	Lower VAC to 117vlts & Lower temperature to +10c & dwell for 4hrs	GM		
09/29/20	12:15	Lower VAC to 105vlts & dwell for 4hrs	GM		
09/29/20	16:15	Raise VAC to 129vlts & dwell for 4hrs	GM		
09/29/20	20:15	Lower VAC to 117vlts & Raise temperature to +35c & dwell for 4hrs	KM		
09/30/20	00:15	Lower VAC to 105vlts & dwell for 4hrs	KM		
09/30/20	04:15	Raise VAC to 129vlts & dwell for 4hrs	KM		

09/30/20	08:15	Lower VAC to 117vlt & ramp to +23c ambient	KM
09/30/20	08:15	Temperature and power variation portion of test has completed	KM
09/30/20	08:15	Test will continue to run at +23c ambient for another 37hrs	KM
10/01/20	22:00	All Testing complete for a total of 85hrs	KM
		Note: All test pass or fail determinations decided by Pro V&V Inc.	

5.4.4 Test Photographs

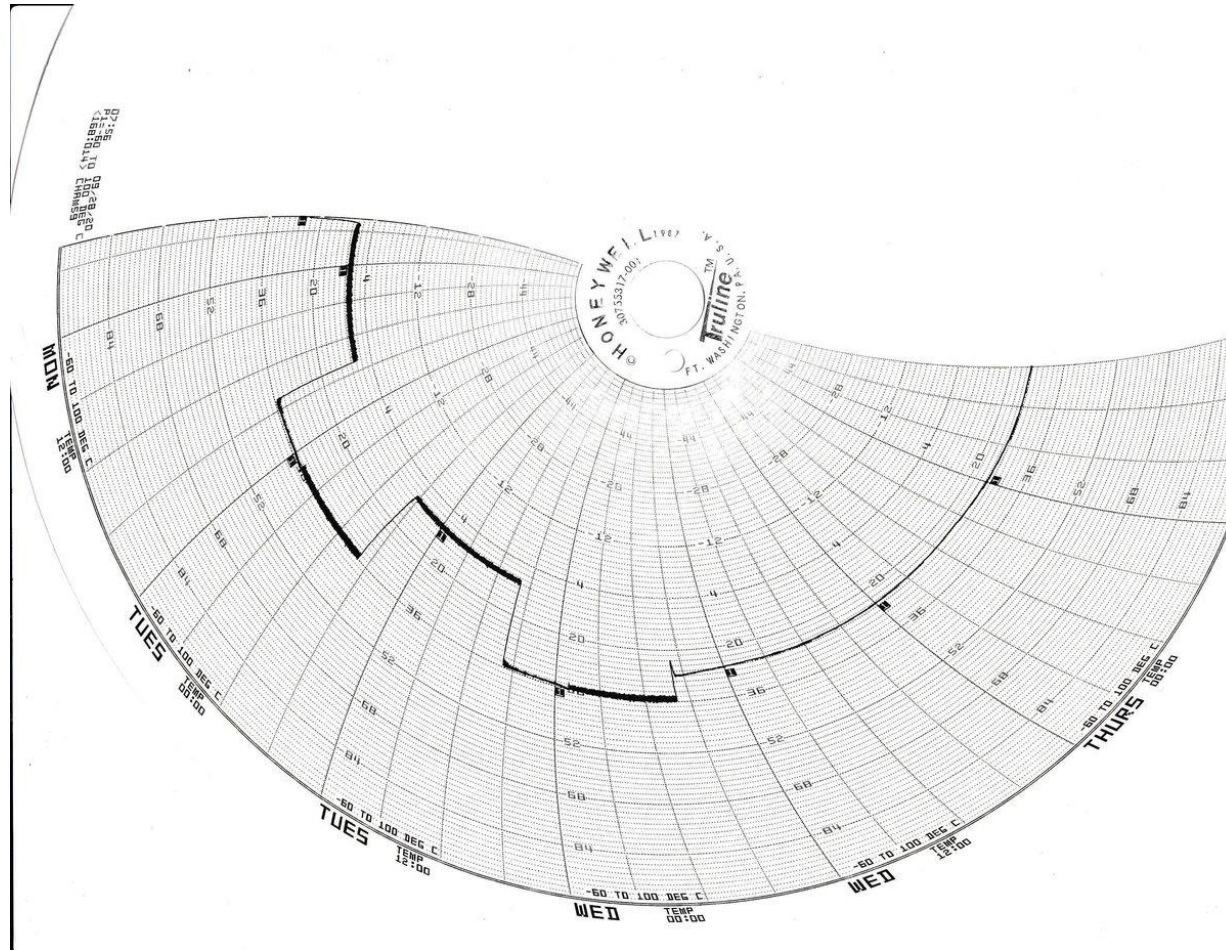
PR120980



PR120980



5.4.5 Test Data



Temp_Pwr_Var_Graph_Data



5.4.6 Test Equipment List

Table 5.4-1: Temperature/Power Variation Test Equipment List

Asset Number	Mfct	Description	M/N	S/N	Range	Start Date	End Date	Last Cal	Cal Interval (Months)	Cal Due	Notes
WC061559	StorageTek	Temp/Hum chamber, CH 59	N/A			09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061560	Watlow	TEMPERATURE CONTROLLER	F4	6165	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	
WC061561	Honeywell	CHART RECORDER	DR45A T	'0350Y3 6134090 0004	Multi / Mfg	09/08/2020	10/02/2020	10/05/2020	12	10/05/2021	

Calibration Abbreviations

CAL: Calibration

NCR: No Calibration Required



End of Report