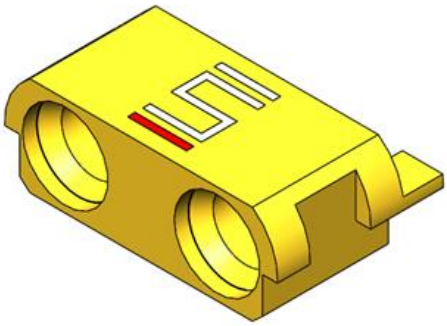
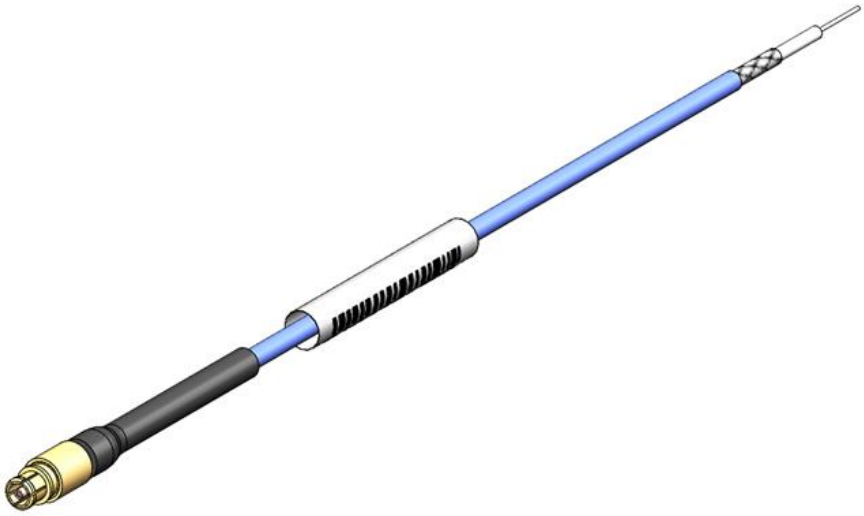
Project Number: Design Qualification Test Report	Tracking Code: 2451235_Report_Rev_1
Requested by: Ross Pritchett	Date: 5/19/2021
Part #: GPPB-PF-1-02-EG-ST-EM-2N/RF047A-M0SJ-505050-0305	
Part description: GPPB/RF047A	Tech: Tony Wagoner
Test Start: 8/20/2020	Test Completed: 11/6/2020





DESIGN QUALIFICATION TEST REPORT

GPPB/RF047A
GPPB-PF-1-02-EG-ST-EM-2N/RF047A-M0SJ-505050-0305

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
5/19/2021	**1**	**Initial Issue**	**KH**

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

SCOPE

To perform the following tests: Design Qualification test. Please see test plan.

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to CO-SC-WI-3029.
4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
5) The automated procedure is used with aqueous compatible soldering materials.
6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead Free
9) Samtec Test PCBs used: PCB-1110836-TST/PCB-110837-TST

FLOWCHARTS

IR/DWV

Pin-to-Ground

Group 1

GPPB-PF-1-02-EG-ST-EM-2N
RF047A-M0SJ-505050-0305
5 Assemblies

Note: Use 2 parts for initial breakdown and remaining 3 parts for IR/DWV. Note: CONNECTORS TESTED AFTER SOLDERED TO BOARD

Step	Description
1.	DWV Breakdown (2) - Non Standard
2.	DWV at Test Voltage (1) - Non Standard Test Voltage = 325 V
3.	IR (3) - Non Standard

Group 2

GPPB-PF-1-02-EG-ST-EM-2N
RF047A-M0SJ-505050-0305
6 Assemblies

Note: CONNECTORS TESTED AFTER SOLDERED TO BOARD

Step	Description
1.	LLCR (4) - Non Standard
2.	Cycles Quantity = 100 Cycles *Note: PER DSCC 10019*
3.	LLCR (4) - Non Standard MAX DELTA = 15 mOhm
4.	Connector Pull *Note: Record failure force (data only). 3 Samples.*
5.	Connector Shear *Note: Record failure force (data only). 3 Samples.*

Group 3

GPPB-PF-1-02-EG-ST-EM-2N
RF047A-M0SJ-505050-0305
5 Assemblies

Note: CONNECTORS TESTED WITHOUT BOARD

Step	Description
1.	INTERFACE GAGING *Note: Prior to Center Contact Retention take a baseline interface reading, record the measurement.*
2.	CENTER CONTACT RETENTION RETENTION FORCE = 1.5 lbs *Note: 1.5 pounds (24 oz.) (.002 max. contact movement). Contact movement change can be measured from any body reference surface (delta = before - after).*
3.	INTERFACE GAGING *Note: After Center Contact Retention remeasure interface, record measurement.*

(1) DWV at Test Voltage = Other
325 Vrms min. at sea level per DSCC 10019.
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds. PER DSCC-10019 AND MIL-PRF-39012 (PARA 4.6.14)

(2) DWV Breakdown = Other
Record breakdown voltage. (Data only)
MIL-PRF-39012, Para 4.6.14

(3) IR = Other
5000 megohms min per DSCC 10019 and MIL-STD-202-302.
MIL-PRF-39012, Para 4.6.8

(4) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

FLOWCHARTS Continued

Mechanical Shock/Random Vibration/Event Detection

Group 1

GPPB-PF-1-02-EG-ST-EM-2N

RF047A-M0SJ-505050-0305

5 Assemblies

Note: CONNECTORS TESTED AFTER SOLDERED TO BOARD

Step	Description
1.	LLCR (1)
2.	Mechanical Shock *Note: MIL-STD-202, Method 213, Test Condition H. EXCEPTION - 50 ns max. electrical interruption.*
3.	Nanosecond Event Detection (Mechanical Shock) (2) - Non Standard
4.	High Frequency Vibration *Note: MIL-STD-202-204, Test Condition D per DSCC 10019. EXCEPTION - 50 ns max. electrical interruption.*
5.	Nanosecond Event Detection (Random Vibration) (3) - Non Standard
6.	LLCR (1) MAX DELTA = 15 mOhm

(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Nanosecond Event Detection (Mechanical Shock) = Other
Test condition H per DSCC 10019 (75 g). EXCEPTION: 50 ns max. electrical interruption.
MIL-STD-202-213

(3) Nanosecond Event Detection (Random Vibration) = Other
MIL-STD-202-204
Test condition D per DSCC 10019 (15 minutes min.). EXCEPTION - 50 ns max. electrical interruption.

FLOWCHARTS Continued

THERMAL SHOCK/CONTACT RESISTANCE

Group 1
GPPB-PF-1-02-EG-ST-EM-2N
RF047A-M0SJ-505050-0305
5 Assemblies

Note: CONNECTORS TESTED AFTER SOLDERED TO BOARD

Step	Description
1.	LLCR (1) - Non Standard
2.	Thermal Shock (2) - Non Standard
3.	LLCR (1) - Non Standard MAX DELTA = 15 mOhm

(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Thermal Shock = Other
MIL-STD-202-107
Test condition B per DSCC 10019. Exception - high temperature to be +165°C. Visual inspection for damage.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

1) MIL-STD-202-107, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors*.
2) Test Condition B per DSCC 10019. Exception – high temperature to be +165° C. Visual inspection for damage.
3) All test samples are pre-conditioned at ambient.
4) All test samples are exposed to environmental stressing in the mated condition.

MECHANICAL SHOCK (Specified Pulse):

1) Reference document: MIL-STD-202, *Mechanical Shock Test Procedure for Electrical Connectors*
2) Test Condition: MIL-STD-202, Method 213 Cond. I.

VIBRATION:

1) Reference document: MIL-STD-202, *Vibration Test Procedure for Electrical Connectors*
2) Test Condition: MIL-STD-202-204, Condition D per DSCC 10019.

NANOSECOND-EVENT DETECTION (Mechanical Shock):

1) Reference document: MIL-STD-202-213, *Nanosecond-Event Detection for Electrical Connectors*
2) Test condition H per DSCC 10019(75g).
3) Prior to test, the samples were characterized to assure the low nanosecond event being monitored will trigger the detector.
4) After characterization it was determined the test samples could be monitored for 50 nanosecond events

NANOSECOND-EVENT DETECTION (Random Vibration):

1) Reference document: MIL-STD-202-204, *Nanosecond-Event Detection for Electrical Connectors*
2) Test condition D per DSCC 10019(15 minutes min).
3) Prior to test, the samples were characterized to assure the low nanosecond event being monitored will trigger the detector.
4) After characterization it was determined the test samples could be monitored for 50 nanosecond events

LLCR:

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ----------Stable
    b. +5.1 to +10.0 mOhms:----------Minor
    c. +10.1 to +15.0 mOhms: ----------Acceptable
    d. +15.1 to +50.0 mOhms: ----------Marginal
    e. +50.1 to +1000 mOhms: ----------Unstable
    f. >+1000 mOhms:----------Open Failure

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

INSULATION RESISTANCE (IR):

To determine the resistance of insulation materials to leakage of current through or on the surface of these materials when a DC potential is applied.
5000 megohms min per DSCC 10019 and MIL-STD-202-302. MIL-PRF-39012, Para 4.6.8.

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

To determine if the sockets can operate at its rated voltage and withstand momentary over potentials due to switching, surges, and other similar phenomenon. Separate samples are used to evaluate the effect of environmental stresses so not to influence the readings from arcing that occurs during the measurement process.

1) Breakdown:
   Record breakdown voltage. (Data only). MIL-PRF-39012, para 4.6.14
2) Test Voltage
   a. 325 Vrms min. at sea level per DSCC 10019.
   b. DWV test voltage is equal to 75% of the lowest breakdown voltage.
   c. Test voltage applied for 60 seconds. Per DSCC-10019 and MIL-PRF-39012, PARA 4.6.14.

RESULTS

Push & Shear Force:

IR/DWV Group 2

Push force

- **Min ---------- 8.14 lbs**
- **Max ---------- 8.24 lbs**

Shear force

- **Min ----------47.49 lbs**
- **Max ----------52.67 lbs**

Interface Gaging & Mass

IR/DWV Group 3

Mass

- **Min ---------- 0.74139 g**
- **Max ---------- 0.74497 g**

Interface Gaging

Initial

- **Min ---------- 0.05619 inch**
- **Max ---------- 0.05740 inch**

After retention (1.5 lbs)

- **Min ---------- 0.05570 inch**
- **Max ---------- 0.05711 inch**

Insulation Resistance minimums, IR

IR/DWV Group 1

Pin to Ground

- **Initial**
  - **Mated ---------- 9200 Meg Ω ---------- Passed**
  - **Unmated ----------45000 Meg Ω ---------- Passed**

Dielectric Withstanding Voltage minimums, DWV

IR/DWV Group 1

Pin to Ground

- **Breakdown Voltage ----------689 VAC**
- **Test Voltage ----------517 VAC**
- **Working Voltage ----------172 VAC**

- **Test Voltage ----------325 VAC**

IR/DWV Group 1

Pin to Ground

- **Initial DWV ----------Passed**

RESULTS Continued

LLCR IR/DWV Group (12 signal and 6 ground LLCR test points)

Signal

- **Initial ---------- 7.87 mOhms Max**
- **After 100 cycles**
  - **<= +5.0 mOhms ---------- 12 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

Ground

- **Initial ---------- 0.55 mOhms Max**
- **After 100 cycles**
  - **<= +5.0 mOhms ---------- 6 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Thermal Shock (10 signal and 5 ground LLCR test points)

Signal

- **Initial ---------- 7.44 mOhms Max**
- **After Thermal Shock**
  - **<= +5.0 mOhms ---------- 10 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

Ground

- **Initial ---------- 0.44 mOhms Max**
- **After Thermal Shock**
  - **<= +5.0 mOhms ---------- 5 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+1000 mOhms ---------- 0 Points ---------- Open Failure**

RESULTS Continued

LLCR Shock & Vibration Group (10 signal and 5 ground LLCR test points)

Signal Pin

- **Initial ---------- 88.13 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms---------- 10 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms----------0 Points ---------- Unstable**
  - **>+1000 mOhms----------0 Points ---------- Open Failure**

Ground Pin

- **Initial ----------0.47 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms----------5 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms----------0 Points ---------- Unstable**
  - **>+1000 mOhms----------0 Points ---------- Open Failure**

Mechanical Shock & Random Vibration:

- **Shock**
  - **No Damage---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**
- **Vibration**
  - **No Damage---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**

DATA SUMMARIES

Push & Shear Force:

IR/DWV Group 2

Push force

	Force (lbs)
Minimum	**8.14**
Maximum	8.24
Average	8.18

Shear force

	Force (lbs)
Minimum	**47.49**
Maximum	52.67
Average	49.90

DATA SUMMARIES Continued

Interface Gaging & Mass

IR/DWV Group 3

Mass

Sample	Mass (g)
1	0.7424
2	0.74497
3	0.74338
4	0.7431
5	0.74139
Min	0.74139
Max	0.74497
Avg	0.74305
St. Dev.	0.00132
Count	5

Interface Gaging

Interface Gaging (0.072 inch)			
	Initial	1.5 Push Force	Delta
Sample 1	0.05659	0.05570	0.00089
	0.05619	0.05608	0.00011
Sample 2	0.05717	0.05711	0.00006
	0.05651	0.05621	0.00030
Sample 3	0.05740	0.05679	0.00061
	0.05624	0.05614	0.00010
Sample 4	0.05624	0.05592	0.00032
	0.05714	0.05707	0.00007
Sample 5	0.05629	0.05618	0.00011
	0.05629	0.05624	0.00005
Min	0.05619	0.05570	0.00005
Max	0.05740	0.05711	0.00089
Avg	0.05661	0.05634	0.00026

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

IR/DWV Group 1

	Pin to Ground
	Mated
	GPPB / RF047A
	IR
Minimum	9200
Maximum	45000
Average	31240

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

IR/DWV Group 1

Breakdown

Voltage Rating Summary	
Minimum	GPPB/RF047A
Break Down Voltage	689
Test Voltage	517
Working Voltage	172

DWV

	Pin to Ground
	Mated
	GPPB / RF047A
	DWV
Minimum	325
Maximum	325
Average	325

DATA SUMMARIES Continued

LLCR IR/DWV:

1) A total of 12 signal and 6 ground points were measured.
2) EIA-364-23, Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.
3) A computer program, LLCR 221.exe, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:----------Stable
   b. +5.1 to +10.0 mOhms: ----------Minor
   c. +10.1 to +15.0 mOhms:----------Acceptable
   d. +15.1 to +50.0 mOhms:----------Marginal
   e. +50.1 to +1000 mOhms----------Unstable
   f. >+1000 mOhms:----------Open Failure

	LLCR Measurement Summaries by Pin Type			
Date	2020/9/21	2020/9/30		
Room Temp (Deg C)	22	23		
Rel Humidity (%)	40	41		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual **Initial**	**After 100 Cycles**		
	Pin Type: Signal 1			
Average	7.13	0.22		
St. Dev.	0.47	0.13		
Min	6.28	0		
Max	7.87	0.43		
Summary Count	12	12		
Total Count	12	12		
	Pin Type: GND 1			
Average	0.47	0.03		
St. Dev.	0.06	0.02		
Min	0.4	0		
Max	0.55	0.05		
Summary Count	6	6		
Total Count	6	6		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
100 Cycles	18	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Thermal Shock/Contact Resistance:

1) A total of 10 signal and 5 ground points were measured.
2) EIA-364-23, Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.
3) A computer program, LLCR 221.exe, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:----------Stable
   b. +5.1 to +10.0 mOhms: ----------Minor
   c. +10.1 to +15.0 mOhms:----------Acceptable
   d. +15.1 to +50.0 mOhms:----------Marginal
   e. +50.1 to +1000 mOhms----------Unstable
   f. >+1000 mOhms:----------Open Failure

LLCR Measurement Summaries by Pin Type				
Date	2020/9/21	2020/9/30		
Room Temp (Deg C)	22	23		
Rel Humidity (%)	40	41		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual**	**Delta**		
	Initial	**Thermal Shock**		
Pin Type: Signal 1				
Average	6.84	0.19		
St. Dev.	0.43	0.1		
Min	6.27	0.02		
Max	7.44	0.33		
Summary Count	10	10		
Total Count	10	10		
Pin Type: GND 1				
Average	0.39	0.02		
St. Dev.	0.04	0.01		
Min	0.34	0.01		
Max	0.44	0.03		
Summary Count	5	5		
Total Count	5	5		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal Shock	**15**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock &Vibration Group:

1) A total of 10 signal and 5 ground points were measured.
2) EIA-364-23, Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.
3) A computer program, LLCR 221.exe, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:----------Stable
   b. +5.1 to +10.0 mOhms: ----------Minor
   c. +10.1 to +15.0 mOhms:----------Acceptable
   d. +15.1 to +50.0 mOhms:----------Marginal
   e. +50.1 to +1000 mOhms----------Unstable
   f. >+1000 mOhms:----------Open Failure

LLCR Measurement Summaries by Pin Type				
Date	9/22/2020	1/19/2021		
Room Temp (Deg C)	22	23		
Rel Humidity (%)	44	36		
Technician	Tony Wagoner	John Crawford		
mOhm values	Actual	**Delta**		
	Initial	**Shock-Vib**		
Pin Type: Signal 1				
Average	86.49	0.87		
St. Dev.	0.87	0.64		
Min	85.23	0.05		
Max	88.13	1.96		
Summary Count	10	10		
Total Count	10	10		
Pin Type: GND 2				
Average	0.43	0.03		
St. Dev.	0.04	0.03		
Min	0.39	0.01		
Max	0.47	0.08		
Summary Count	5	5		
Total Count	5	5		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**15**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	10
Test Condition	MIL-STD-202, Method 213 Cond. I
Shock Events	0
Test Condition	MIL-STD-202-204, Condition D
Vibration Events	0
Total Events	0

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: TCT-04
Description: Dillon Quantrol TC21 25-1000 mm/min series test stand
Manufacturer: Dillon Quantrol
Model: TC2 I series test stand
Serial #: 04-1041-04
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;
… Last Cal: 05/29/2020, Next Cal: 05/29/2021

Equipment #: MO-11
Description: Switch/Multimeter
Manufacturer: Keithley
Model: 3706
Serial #: 120169
Accuracy: See Manual
… Last Cal: 09/11/2020, Next Cal: 09/11/2021

Equipment #: TSC-01
Description: Vertical Thermal Shock Chamber
Manufacturer: Cincinnati Sub Zero
Model: VTS-3-6-6-SC/AC
Serial #: 10-VT14993
Accuracy: See Manual
… Last Cal: 06/30/2020, Next Cal: 06/30/2021

Equipment #: HPT-01
Description: Hipot Safety Tester
Manufacturer: Vitrek
Model: V73
Serial #: 019808
Accuracy:
… Last Cal: 05/15/2020, Next Cal: 05/15/2021

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 09/11/2020, Next Cal: 09/11/2021

Equipment #: PS-02
Description: Power Supply
Manufacturer: Hewlett-Packer
Model: 6033A
Serial #: N/A
Accuracy: See Manual
… Last Cal: NOT CALIBRATED

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 04/22/2020, Next Cal: 04/22/2021

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/18/2020, Next Cal: 07/18/2021

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 10/31/2020, Next Cal: 10/31/2021