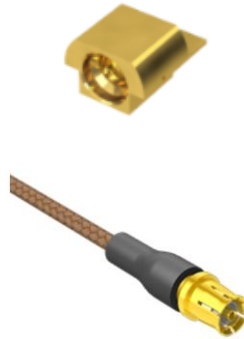




Project Number: Design Qualification Test Report	Tracking Code: 1783506_Report_Rev_2
Requested by: Tim Clare	Date: 11/21/2019
Part #: SMPM-PF-P-HG-ST-EM-1/RF047-A-M0SJ-303030-0153	
Part description: SMPM/RF047-A	Tech: Tony Wagoner
Test Start: 1/9/2019	Test Completed: 2/8/2019



DESIGN QUALIFICATION TEST REPORT
SMPM/RF047-A
SMPM-PF-P-HG-ST-EM-1/RF047-A-M0SJ-303030-0153

Tracking Code: 1783506_Report_Rev_2	Part #: SMPM-PF-P-HG-ST-EM-1/RF047-A-M0SJ-303030-0153
Part description: SMPM/RF047-A	

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
6/18/2019	1	Initial Issue	KH
11/21/2019	2	Updated the mating-unmating force	KH

CERTIFICATION

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

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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 testing were cleaned according to TLWI-0001.
- 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 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-109894-TST

FLOWCHARTS

Gas Tight

Note: check LLCR on signal and ground.

Group 1

SMPM-PF-P-HG-ST-EM-1
RF047A-M0SJ-303030-0153
8 Assemblies

Step Description

1. LLCR ⁽²⁾
2. Gas Tight ⁽¹⁾
3. LLCR ⁽²⁾
Max Delta = 15 mOhm

(1) Gas Tight = EIA-364-36

(2) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

Normal Force

Group 1

PRFM0-J-047A-SK-001-2H

8 Contacts Minimum
Signal Without Thermals

Step Description

1. Contact Gaps
2. Normal Force ⁽¹⁾
Deflection = 0.0016 "
Expected Force at Max Deflection = 450 g

Group 2

PRFM0-J-BY-002-2G

8 Contacts Minimum
Ground Without Thermals

Step Description

1. Contact Gaps
2. Normal Force ⁽¹⁾
Deflection = 0.0037 "
Expected Force at Max Deflection = 902 g

Group 3

PRFM0-J-047A-SK-001-2H

8 Contacts Minimum
Signal With Thermals

Step Description

1. Contact Gaps
2. Thermal Age ⁽²⁾
3. Contact Gaps
4. Normal Force ⁽¹⁾
Deflection = 0.0016 "
Expected Force at Max Deflection = 450 g

Group 4

PRFM0-J-BY-002-2G

8 Contacts Minimum
Ground With Thermals

Step Description

1. Contact Gaps
2. Thermal Age ⁽²⁾
3. Contact Gaps
4. Normal Force ⁽¹⁾
Deflection = 0.0037 "
Expected Force at Max Deflection = 902 g

Group 5

PRFM0-J-047A-SK-001-2H

8 Contacts Minimum
Rear Socket Without Thermals

Step Description

1. Contact Gaps
2. Normal Force ⁽¹⁾
Deflection = 0.0014 "
Expected Force at Max Deflection = 264 g

Group 6

PRFM0-J-047A-SK-001-2H

8 Contacts Minimum
Rear Socket With Thermals

Step Description

1. Contact Gaps
2. Thermal Age ⁽²⁾
3. Contact Gaps
4. Normal Force ⁽¹⁾
Deflection = 0.0014 "
Expected Force at Max Deflection = 264 g

(1) Normal Force = EIA-364-04

(2) Thermal Age = EIA-364-17

Test Condition = 4 (105°C)
Time Condition = B (250 Hours)

FLOWCHARTS Continued**Thermal Aging**

Note: Check signal and ground LLCR.

Note: Expect 4.5 lbs mating and 6.5 lbs unmating forces.

Group 1

SMPM-PF-P-HG-ST-EM-1

RF047A-M0SJ-303030-0153

8 Assemblies

Step Description

1. Contact Gaps
2. Mating/Unmating Force ⁽²⁾
Note: Expected 4.5 lbs mating, 6.6 lbs unmating.
3. LLCR ⁽¹⁾
4. Thermal Age ⁽³⁾
5. LLCR ⁽¹⁾
Max Delta = 15 mOhm
6. Mating/Unmating Force ⁽²⁾
Note: Expect 4.5 lbs mating and 6.5 lbs unmating.
7. Contact Gaps

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

(2) Mating/Unmating Force = EIA-364-13

(3) Thermal Age = EIA-364-17

Test Condition = 4 (105°C)

Time Condition = B (250 Hours)

FLOWCHARTS Continued**Mating/Unmating/Durability***Note: Check signal and ground LLCR.*

<u>Group 1</u>		<u>Group 2</u>		<u>Group 3</u>		
SMPM-PF-P-HG-ST-EM-1		SMPM-PS-P-HG-ST-EM-1		RF047A-M0SP-303030-0153		
RF047A-M0SJ-303030-0153				RF047A-M0SJ-303030-0153		
8 Assemblies		8 Assemblies		8 Assemblies		
FD PCB To Cable		SB PCB To Cable		FD Cable To Cable		
Step	Description	Step	Description	Step	Description	
1.	Contact Gaps	1.	Contact Gaps	1.	Contact Gaps	
2.	LLCR (2)	2.	Mating/Unmating Force (3)	2.	Mating/Unmating Force (3)	
3.	Mating/Unmating Force (3)	3.	Cycles	3.	Cycles	
4.	Cycles	Quantity = 100 Cycles	4.	Mating/Unmating Force (3)	4.	Mating/Unmating Force (3)
5.	Mating/Unmating Force (3)	5.	Cycles	5.	Cycles	
6.	Cycles	Quantity = 150 Cycles	6.	Mating/Unmating Force (3)	6.	Mating/Unmating Force (3)
7.	Mating/Unmating Force (3)	7.	Cycles	7.	Cycles	
8.	Cycles	Quantity = 150 Cycles	8.	Mating/Unmating Force (3)	8.	Mating/Unmating Force (3)
9.	Mating/Unmating Force (3)	9.	Cycles	9.	Cycles	
10.	Cycles	Quantity = 100 Cycles	10.	Mating/Unmating Force (3)	10.	Mating/Unmating Force (3)
11.	Mating/Unmating Force (3)					
12.	Contact Gaps					
13.	LLCR (2)					
	Max Delta = 15 mOhm					
14.	Thermal Shock (4) - Non Standard					
15.	LLCR (2)					
	Max Delta = 15 mOhm					
16.	Humidity (1)					
17.	LLCR (2)					
	Max Delta = 15 mOhm					
18.	Mating/Unmating Force (3)					

(1) Humidity = EIA-364-31

Test Condition = B (240 Hours)

Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)

Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(2) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

(3) Mating/Unmating Force = EIA-364-13

(4) Thermal Shock = Other

Exposure Time at Temperature Extremes = 1/2 Hour

Method A, Test Condition = I (-55°C to +125°C)

Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued**IR/DWV***Note: 5000 megaohms min IR***Pin-to-Ground****Group 1**

SMPM-PF-P-HG-ST-EM-1
RF047A-M0SJ-303030-0153
2 Assemblies

Group 2

SMPM-PF-P-HG-ST-EM-1
2 Assemblies

Group 3

RF047A-M0SJ-303030-0153
2 Assemblies

Group 4

SMPM-PF-P-HG-ST-EM-1
RF047A-M0SJ-303030-0153
2 Assemblies

Step Description

1. DWV Breakdown (2)

Step Description

1. DWV Breakdown (2)

Step Description

1. DWV Breakdown (2)

Step Description

1. IR (4)
2. DWV at Test Voltage (1)
3. Thermal Shock (5) - Non Standard
4. IR (4)
5. DWV at Test Voltage (1)
6. Humidity (3)
7. IR (4)
8. DWV at Test Voltage (1)

(1) DWV at Test Voltage = EIA-364-20

Test Condition = 1 (Sea Level)

DWV test voltage is equal to 75% of the lowest breakdown voltage

Test voltage applied for 60 seconds

(2) DWV Breakdown = EIA-364-20

Test Condition = 1 (Sea Level)

DWV test voltage is equal to 75% of the lowest breakdown voltage

Test voltage applied for 60 seconds

(3) Humidity = EIA-364-31

Test Condition = B (240 Hours)

Test Method = III (+25°C to +65°C @ 90% RH to 98% RH)

Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(4) IR = EIA-364-21

Test Condition = 500 Vdc, 2 Minutes Max

(5) Thermal Shock = Other

Exposure Time at Temperature Extremes = 1/2 Hour

Method A, Test Condition = I (-55°C to +125°C)

Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued**Mechanical Shock/Random Vibration/LLCR***Note: Check signal and ground LLCR.***Group 1**

SMPM-PF-P-HG-ST-EM-1

RF047A-M0SJ-303030-0153

8 Assemblies

Step Description

1. LLCR (1)
2. Mechanical Shock (2) - Non Standard
3. Random Vibration (3)
4. LLCR (1)
Max Delta = 15 mOhm

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

(2) Mechanical Shock = Other

Test Condition = G (100 G Peak, 6 milliseconds, Sawtooth, 3 shocks per axis)

EIA-364-27

(3) Random Vibration = EIA-364-28

Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

Mechanical Shock/Random Vibration/Event Detection**Group 1**

SMPM-PF-P-HG-ST-EM-1

RF047A-M0SJ-303030-0153

60 Points

Step Description

1. Nanosecond Event Detection
(Mechanical Shock) (1) - Non Standard
2. Nanosecond Event Detection
(Random Vibration) (2)

(1) Nanosecond Event Detection (Mechanical Shock) = Other

Use EIA-364-87 for Nanosecond Event Detection:

Test Condition = F (50 nanoseconds at 10 ohms)

Use EIA-364-27 for Mechanical Shock:

Test Condition = G (100 G Peak, 6 milliseconds, Sawtooth, 3 shocks per axis)

(2) Nanosecond Event Detection (Random Vibration)

Use EIA-364-87 for Nanosecond Event Detection:

Test Condition = F (50 nanoseconds at 10 ohms)

Use EIA-364-28 for Random Vibration:

Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

FLOWCHARTS Continued**Cable Pull***Note: Monitor signal and ground for loss of signal.*Group 1

SMPM-PF-P-HG-ST-EM-1
RF047A-M0SJ-303030-0153
5 Assemblies
0 Degrees

Step Description

1. Cable Pull ⁽¹⁾

Group 2

SMPM-PF-P-HG-ST-EM-1
RF047A-M0SJ-303030-0153
5 Assemblies
90 Degrees

Step Description

1. Cable Pull ⁽¹⁾

Group 3

SMPM-PS-P-HG-ST-EM-1
5 Assemblies
0 Degrees

Step Description

1. Cable Pull ⁽¹⁾

(1) Cable Pull = EIA-364-38

Measure and Record Force Required to Failure

Failure = Discontinuity >1 microsecond at 10 ohms

Cable FlexGroup 1

SMPM-PF-P-HG-ST-EM-1
RF047A-M0SJ-303030-0153
8 Assemblies
Circular Cable

Step Description

1. IR ⁽³⁾
2. DWV at Test Voltage ⁽²⁾
3. Cable Flex ⁽¹⁾
4. Visual Inspection
5. IR ⁽³⁾
6. DWV at Test Voltage ⁽²⁾

(1) Cable Flex = EIA-364-41

Circular Jacket Cable - to be tested 90° each direction (180° total)

Flat Cable - to be tested 70° each direction (140° total)

Monitor continuity during flex testing

Failure = Discontinuity >1 microsecond at 10 ohms

(2) DWV at Test Voltage = EIA-364-20

Test Condition = 1 (Sea Level)

DWV test voltage is equal to 75% of the lowest breakdown voltage

Test voltage applied for 60 seconds

(3) IR = EIA-364-21

Test Condition = 500 Vdc, 2 Minutes Max

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL:

- 1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors*.
- 2) Test Condition at 105° C.
- 3) Test Time Condition B for 250 hours.
- 4) All test samples are pre-conditioned at ambient.
- 5) All test samples are exposed to environmental stressing in the mated condition.

THERMAL SHOCK:

- 1) EIA-364-32, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors*.
- 2) Test Condition I: -55°C to +125°C
- 3) Test Time: ½ hour dwell at each temperature extreme
- 4) Number of Cycles: 100
- 5) All test samples are pre-conditioned at ambient.
- 6) All test samples are exposed to environmental stressing in the mated condition.

HUMIDITY:

- 1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors*.
- 2) Test Condition B, 240 Hours.
- 3) Method III, +25° C to + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
- 4) All samples are pre-conditioned at ambient.
- 5) All test samples are exposed to environmental stressing in the mated condition.

MECHANICAL SHOCK (Specified Pulse):

- 1) Reference document: EIA-364-27, *Mechanical Shock Test Procedure for Electrical Connectors*
- 2) Test Condition G
- 3) Peak Value: 100 G
- 4) Duration: 6 Milliseconds
- 5) Wave Form: Sawtooth
- 6) Velocity: 12.3 ft/s
- 7) Number of Shocks: 3 Shocks / Direction, 3 Axis (18 Total)

VIBRATION:

- 1) Reference document: EIA-364-28, *Vibration Test Procedure for Electrical Connectors*
- 2) Test Condition V, Letter B
- 3) Power Spectral Density: 0.04 G² / Hz
- 4) G 'RMS': 7.56
- 5) Frequency: 50 to 2000 Hz
- 6) Duration: 2.0 Hours per axis (3 axis total)

NANOSECOND-EVENT DETECTION:

- 1) Reference document: EIA-364-87, *Nanosecond-Event Detection for Electrical Connectors*
- 2) Prior to test, the samples were characterized to assure the low nanosecond event being monitored will trigger the detector.
- 3) After characterization it was determined the test samples could be monitored for 50 nanosecond events

MATING/UNMATING:

- 1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
- 2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
- 3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):

- 1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
- 2) The contacts shall be tested in the loose state, *not* inserted in connector housing.
- 3) The contacts shall be prepared to allow access to the spring member at the same attitude and deflection level as would occur in actual use.
- 4) In the event that portions of the contact prevent insertion of the test probe and/or deflection of the spring member under evaluation, said material shall be removed leaving the appropriate contact surfaces exposed.
- 5) In the case of multi-tine contacts, each tine shall be tested independently on separate samples as required.
- 6) The connector housing shall be simulated, if required, in order to provide an accurate representation of the actual contact system performance.
- 7) A holding fixture shall be fashioned to allow the contact to be properly deflected.
- 8) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC², computer controlled test stand with a deflection measurement system accuracy of 5 μ m (0.0002").
- 9) The probe shall be attached to a Dillon P/N 49761-0105, 5 N (1.1 Lb) load cell providing an accuracy of $\pm$ 0.2%.
- 10) The nominal deflection rate shall be 5 mm (0.2")/minute.
- 11) Unless otherwise noted a minimum of five contacts shall be tested.
- 12) The force/deflection characteristic to load and unload each contact shall be repeated five times.
- 13) The system shall utilize the TC² software in order to acquire and record the test data.
- 14) The permanent set of each contact shall be measured within the TC² software.
- 15) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis and a print out will be stored with the Tracking Code paperwork.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

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. $\leq +5.0$ 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

GAS TIGHT:

To provide method for evaluating the ability of the contacting surfaces in preventing penetration of harsh vapors which might lead to oxide formation that may degrade the electrical performance of the contact system.

- 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. $\leq +5.0$ 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
- 4) Procedure:
 - a. Reference document: EIA-364-36, *Test Procedure for Determination of Gas-Tight Characteristics for Electrical Connectors, Sockets and/or Contact Systems*.
 - b. Test Conditions:
 - i. Class II--- Mated pairs of contacts assembled to their plastic housings.
 - ii. Reagent grade Nitric Acid shall be used of sufficient volume to saturate the test chamber
 - iii. The ratio of the volume of the test chamber to the surface area of the acid shall be 10:1.
 - iv. The chamber shall be saturated with the vapor for at least 15 minutes before samples are added.
 - v. Exposure time, 55 to 65 minutes.
 - vi. The samples shall be no closer to the chamber walls than 1 inches and no closer to the surface of the acid than 3 inches.
 - vii. The samples shall be dried after exposure for a minimum of 1 hour.
 - viii. Drying temperature 50° C
 - ix. The final LLCR shall be conducted within 1 hour after drying.

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.

- 1) PROCEDURE:
 - a. Reference document: EIA-364-21, *Insulation Resistance Test Procedure for Electrical Connectors*.
 - b. Test Conditions:
 - i. Between Adjacent Contacts or Signal-to-Ground
 - ii. Electrification Time 2.0 minutes
 - iii. Test Voltage (500 VDC) corresponds to calibration settings for measuring resistances.
- 2) MEASUREMENTS:
- 3) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 5000 megohms.

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) PROCEDURE:
 - a. Reference document: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
 - b. Test Conditions:
 - i. Between Adjacent Contacts or Signal-to-Ground
 - ii. Barometric Test Condition 1
 - iii. Rate of Application 500 V/Sec
 - iv. Test Voltage (VAC) until breakdown occurs
- 2) MEASUREMENTS/CALCULATIONS
 - a. The breakdown voltage shall be measured and recorded.
 - b. The dielectric withstanding voltage shall be recorded as 75% of the minimum breakdown voltage.
 - c. The working voltage shall be recorded as one-third (1/3) of the dielectric withstanding voltage (one-fourth of the breakdown voltage).

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

CABLE PULL:

- 1) Secure cable near center and pull on connector
 - a. At 0°, in-line with cable
 - b. At 90°, in-line with cable

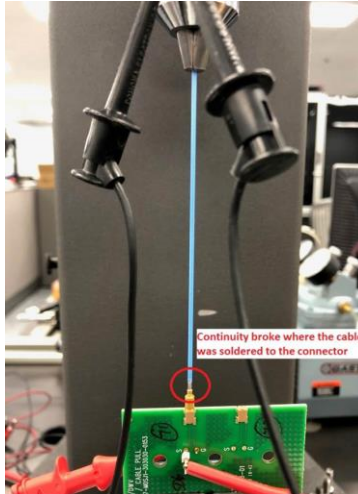


Fig. 1

0° Connector pull, notice the electrical continuity hook-up wires.

CABLE DURABILITY:

- 1) Oscillate and monitor electrical continuity for open circuit indication.
 - a. $\pm 90^\circ$ Flex Mode, bend up to 100 cycles. load on cable end.

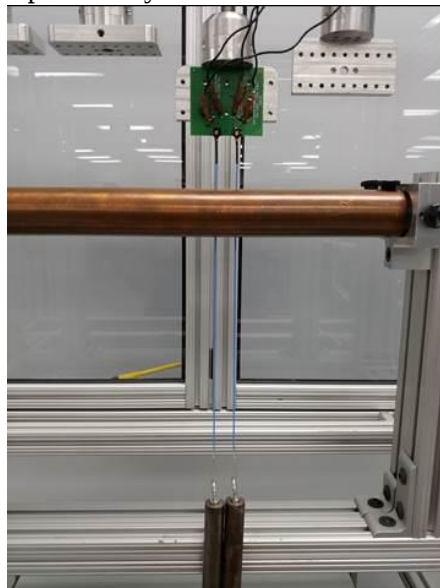


Fig. 2
(Setup picture)

RESULTS

Mating – Unmating Forces

Mating/Unmating Durability Group

Group 1 SMPM-PF-P-HG-ST-EM-1/RF047-A-M0SJ-303030-0153(FD PCB To Cable)

- Initial
 - Mating
 - Min ----- 5.04 lbs
 - Max ----- 6.12 lbs
 - Unmating
 - Min ----- 3.98 lbs
 - Max ----- 5.44 lbs
- After 25 Cycles
 - Mating
 - Min ----- 5.50 lbs
 - Max ----- 6.82 lbs
 - Unmating
 - Min ----- 4.79 lbs
 - Max ----- 5.76 lbs
- After 50 Cycles
 - Mating
 - Min ----- 6.78 lbs
 - Max ----- 8.55 lbs
 - Unmating
 - Min ----- 5.46 lbs
 - Max ----- 6.62 lbs
- After 75 Cycles
 - Mating
 - Min ----- 7.54 lbs
 - Max ----- 9.43 lbs
 - Unmating
 - Min ----- 5.58 lbs
 - Max ----- 6.85 lbs
- After 100 Cycles
 - Mating
 - Min ----- 5.95 lbs
 - Max ----- 7.03 lbs
 - Unmating
 - Min ----- 8.05 lbs
 - Max ----- 10.11 lbs
- After Humidity
 - Mating
 - Min ----- 3.53 lbs
 - Max ----- 4.44 lbs
 - Unmating
 - Min ----- 3.09 lbs
 - Max ----- 4.36 lbs

RESULTS Continued**Mating/Unmating Durability****Group 2 SMPM-PS-P-HG-ST-EM-1(SB PCB To Cable)**

- **Initial**
 - **Mating**
 - **Min** ----- 1.71 lbs
 - **Max** ----- 2.57 lbs
 - **Unmating**
 - **Min** ----- 1.84 lbs
 - **Max** ----- 2.61 lbs
- **After 100 Cycles**
 - **Mating**
 - **Min** ----- 2.97 lbs
 - **Max** ----- 3.85 lbs
 - **Unmating**
 - **Min** ----- 2.80 lbs
 - **Max** ----- 3.34 lbs
- **After 200 Cycles**
 - **Mating**
 - **Min** ----- 2.77 lbs
 - **Max** ----- 3.39 lbs
 - **Unmating**
 - **Min** ----- 2.47 lbs
 - **Max** ----- 3.11 lbs
- **After 300 Cycles**
 - **Mating**
 - **Min** ----- 2.58 lbs
 - **Max** ----- 3.14 lbs
 - **Unmating**
 - **Min** ----- 2.25 lbs
 - **Max** ----- 2.87 lbs
- **After 400 Cycles**
 - **Mating**
 - **Min** ----- 1.97 lbs
 - **Max** ----- 2.85 lbs
 - **Unmating**
 - **Min** ----- 2.31 lbs
 - **Max** ----- 3.04 lbs
- **After 500 Cycles**
 - **Mating**
 - **Min** ----- 2.32 lbs
 - **Max** ----- 3.08 lbs
 - **Unmating**
 - **Min** ----- 2.05 lbs
 - **Max** ----- 2.86 lbs

RESULTS Continued**Mating/Unmating Durability****Group 3 RF047A-M0SP-303030-0153/RF047-A-M0SJ-303030-0153(FD Cable To Cable)**

- **Initial**
 - **Mating**
 - **Min** ----- 5.98 lbs
 - **Max** ----- 8.51 lbs
 - **Unmating**
 - **Min** ----- 5.03 lbs
 - **Max** ----- 12.42 lbs
- **After 25 Cycles**
 - **Mating**
 - **Min** ----- 3.72 lbs
 - **Max** ----- 5.52 lbs
 - **Unmating**
 - **Min** ----- 5.04 lbs
 - **Max** ----- 11.08 lbs
- **After 50 Cycles**
 - **Mating**
 - **Min** ----- 4.01 lbs
 - **Max** ----- 6.20 lbs
 - **Unmating**
 - **Min** ----- 5.26 lbs
 - **Max** ----- 10.57 lbs
- **After 75 Cycles**
 - **Mating**
 - **Min** ----- 4.20 lbs
 - **Max** ----- 6.64 lbs
 - **Unmating**
 - **Min** ----- 5.32 lbs
 - **Max** ----- 10.11 lbs
- **After 100 Cycles**
 - **Mating**
 - **Min** ----- 4.63 lbs
 - **Max** ----- 6.97 lbs
 - **Unmating**
 - **Min** ----- 5.84 lbs
 - **Max** ----- 9.52 lbs

RESULTS Continued**Normal Force at 0.0016 inches deflection Signal pin**

- **Initial**
 - **Min**-----198.20 gf **Set** ---- 0.0000 inch
 - **Max**-----269.90 gf **Set** ---- 0.0001 inch
- **Thermal**
 - **Min**----- 184.20 gf **Set**---- 0.0000 inch
 - **Max**-----238.10 gf **Set**---- 0.0002 inch

Normal Force at 0.0014 inches deflection Rear Socket

- **Initial**
 - **Min**-----67.70 gf **Set** ---- 0.0000 inch
 - **Max**-----112.40 gf **Set** ---- 0.0001 inch
- **Thermal**
 - **Min**----- 54.50 gf **Set**---- 0.0000 inch
 - **Max**-----102.10 gf **Set**---- 0.0001 inch

Normal Force at 0.0016 inches deflection Ground pin

- **Initial**
 - **Min**-----1070.80 gf **Set** ---- 0.0001 inch
 - **Max**-----1230.70 gf **Set** ---- 0.0002 inch
- **Thermal**
 - **Min**-----1029.20 gf **Set**---- 0.0005 inch
 - **Max**-----1123.30 gf **Set**---- 0.0007 inch

RESULTS Continued**Insulation Resistance minimums, IR****Pin to Ground**

- **Initial**
 - Mated-----45000 Meg Ω ----- Passed
 - Unmated -----45000 Meg Ω ----- Passed
- **Thermal Shock**
 - Mated-----45000 Meg Ω ----- Passed
 - Unmated -----45000 Meg Ω ----- Passed
- **Humidity**
 - Mated-----24500 Meg Ω ----- Passed
 - Unmated -----10800 Meg Ω ----- Passed

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
 - Breakdown Voltage-----718 VAC
 - Test Voltage -----539 VAC
 - Working Voltage -----180 VAC

Pin to Ground

- **Initial DWV** -----Passed
- **Thermal DWV** -----Passed
- **Humidity DWV** -----Passed

Cable Pull force

- **Group 1 0° Pull (SMPM-PF-P-HG-ST-EM-1/RF047-A-M0SJ-303030-0153)**
 - Min-----11.60 lbs
 - Max -----13.12 lbs
- **Group 2 90° Pull (SMPM-PF-P-HG-ST-EM-1/RF047-A-M0SJ-303030-0153)**
 - Min-----1.26 lbs
 - Max -----1.72 lbs
- **Group 3 0° Pull (SMPM-PF-P-HG-ST-EM-1)**
 - Min-----1.97 lbs
 - Max -----2.84 lbs

Cable Flex:**Insulation Resistance minimums, IR****Pin to Ground**

- **Initial**
 - Mated-----7400 Meg Ω ----- Passed
- **After 100 flex cycles**
 - Mated-----7900 Meg Ω ----- Passed

Dielectric Withstanding Voltage minimums, DWV

- Test Voltage -----539 VAC

Pin to Ground

- **Initial DWV** -----Passed
- **After 100 Flex cycles DWV** -----Passed

RESULTS Continued**LLCR Gas Tight (8 signal and 8 ground LLCR test points)****Signal Pin**

- **Initial** ----- 45.56 mOhms Max
- **Gas-Tight**
 - <= +5.0 mOhms ----- 8 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** ----- 16.85 mOhms Max
- **Thermal Aging**
 - <= +5.0 mOhms ----- 8 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 Aging (8 signal and 8 ground LLCR test points)**Signal Pin**

- **Initial** ----- 45.73 mOhms Max
- **Thermal Aging**
 - <= +5.0 mOhms ----- 8 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** ----- 16.51 mOhms Max
- **Thermal Aging**
 - <= +5.0 mOhms ----- 8 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 Durability (8 signal and 8 ground LLCR test points)****Signal Pin**

- **Initial** ----- 46.16 mOhms Max
 - **Durability, 100 Cycles**
 - <= +5.0 mOhms ----- 8 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
 - **Thermal**
 - <= +5.0 mOhms ----- 7 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
- Note: **the center conductor of the cable was pulled out from the opposite end from the connector****
- **Humidity**
 - <= +5.0 mOhms ----- 7 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
- Note: **the center conductor of the cable was pulled out from the opposite end from the connector****

Ground Pin

- **Initial** ----- 16.92 mOhms Max
- **Durability, 100 Cycles**
 - <= +5.0 mOhms ----- 8 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
- **Thermal**
 - <= +5.0 mOhms ----- 8 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
- **Humidity**
 - <= +5.0 mOhms ----- 8 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 (8 signal and 8 ground LLCR test points)****Signal Pin**

- **Initial** ----- 45.90 mOhms Max
- **Shock & Vibration**
 - **<= +5.0 mOhms**-----8 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** ----- 16.45 mOhms Max
- **Shock & Vibration**
 - **<= +5.0 mOhms**-----8 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**MATING/UNMATING:****Mating/Unmating Durability Group****Group 1 SMPM-PF-P-HG-ST-EM-1/RF047-A-M0SJ-303030-0153(FD PCB To Cable)**

	Initial				25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	22.42	5.04	17.70	3.98	24.46	5.50	21.31	4.79
Maximum	27.22	6.12	24.20	5.44	30.34	6.82	25.62	5.76
Average	25.34	5.70	20.73	4.66	27.50	6.18	23.96	5.39
St Dev	1.89	0.43	2.51	0.56	2.31	0.52	1.50	0.34
Count	8	8	8	8	8	8	8	8
	50 Cycles				75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	30.16	6.78	24.29	5.46	33.54	7.54	24.82	5.58
Maximum	38.03	8.55	29.45	6.62	41.94	9.43	30.47	6.85
Average	33.88	7.62	27.09	6.09	38.07	8.56	27.66	6.22
St Dev	2.80	0.63	1.45	0.33	3.45	0.78	2.03	0.46
Count	8	8	8	8	8	8	8	8
	100 Cycles				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	26.47	5.95	35.81	8.05	15.70	3.53	13.74	3.09
Maximum	31.27	7.03	44.97	10.11	19.75	4.44	19.39	4.36
Average	29.35	6.60	41.11	9.24	17.18	3.86	16.22	3.65
St Dev	1.97	0.44	3.02	0.68	1.46	0.33	2.07	0.47
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued**Mating/Unmating Durability Group****Group 2 SMPM-PS-P-HG-ST-EM-1(SB PCB To Cable)**

	Initial				100 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	7.61	1.71	8.18	1.84	13.21	2.97	12.45	2.80
Maximum	11.43	2.57	11.61	2.61	17.12	3.85	14.86	3.34
Average	10.04	2.26	9.84	2.21	14.68	3.30	13.63	3.07
St Dev	1.25	0.28	1.24	0.28	1.37	0.31	0.91	0.20
Count	8	8	8	8	8	8	8	8
	250 Cycles				300 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	12.32	2.77	10.99	2.47	11.48	2.58	10.01	2.25
Maximum	15.08	3.39	13.83	3.11	13.97	3.14	12.77	2.87
Average	13.69	3.08	12.72	2.86	12.53	2.82	11.52	2.59
St Dev	0.91	0.20	0.91	0.20	0.82	0.18	1.05	0.24
Count	8	8	8	8	8	8	8	8
	400 Cycles				500 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	8.76	1.97	10.27	2.31	10.32	2.32	9.12	2.05
Maximum	12.68	2.85	13.52	3.04	13.70	3.08	12.72	2.86
Average	10.96	2.47	11.98	2.69	11.77	2.65	10.60	2.38
St Dev	1.32	0.30	1.05	0.24	1.14	0.26	1.31	0.30
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued**Mating/Unmating Durability Group****Group 3 RF047-M0SP-3030303-0153/RF047-A-M0SJ-3030303-0153(FD Cable To Cable)**

	Initial				25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	26.60	5.98	22.37	5.03	16.55	3.72	22.42	5.04
Maximum	37.85	8.51	55.24	12.42	24.55	5.52	49.28	11.08
Average	32.63	7.34	42.81	9.63	20.48	4.61	39.86	8.96
St Dev	3.93	0.88	12.90	2.90	2.99	0.67	10.91	2.45
Count	8	8	8	8	8	8	8	8
	50 Cycles				75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	17.84	4.01	23.40	5.26	18.68	4.20	23.66	5.32
Maximum	27.58	6.20	47.02	10.57	29.53	6.64	44.97	10.11
Average	22.48	5.06	38.91	8.75	23.75	5.34	37.99	8.54
St Dev	3.63	0.82	9.57	2.15	3.94	0.89	8.55	1.92
Count	8	8	8	8	8	8	8	8
	100 Cycles							
	Mating		Unmating					
	Newtons	Force (Lbs)	Newtons	Force (Lbs)				
Minimum	20.59	4.63	25.98	5.84				
Maximum	31.00	6.97	42.34	9.52				
Average	25.60	5.76	37.12	8.35				
St Dev	4.15	0.93	6.48	1.46				
Count	8	8	8	8				

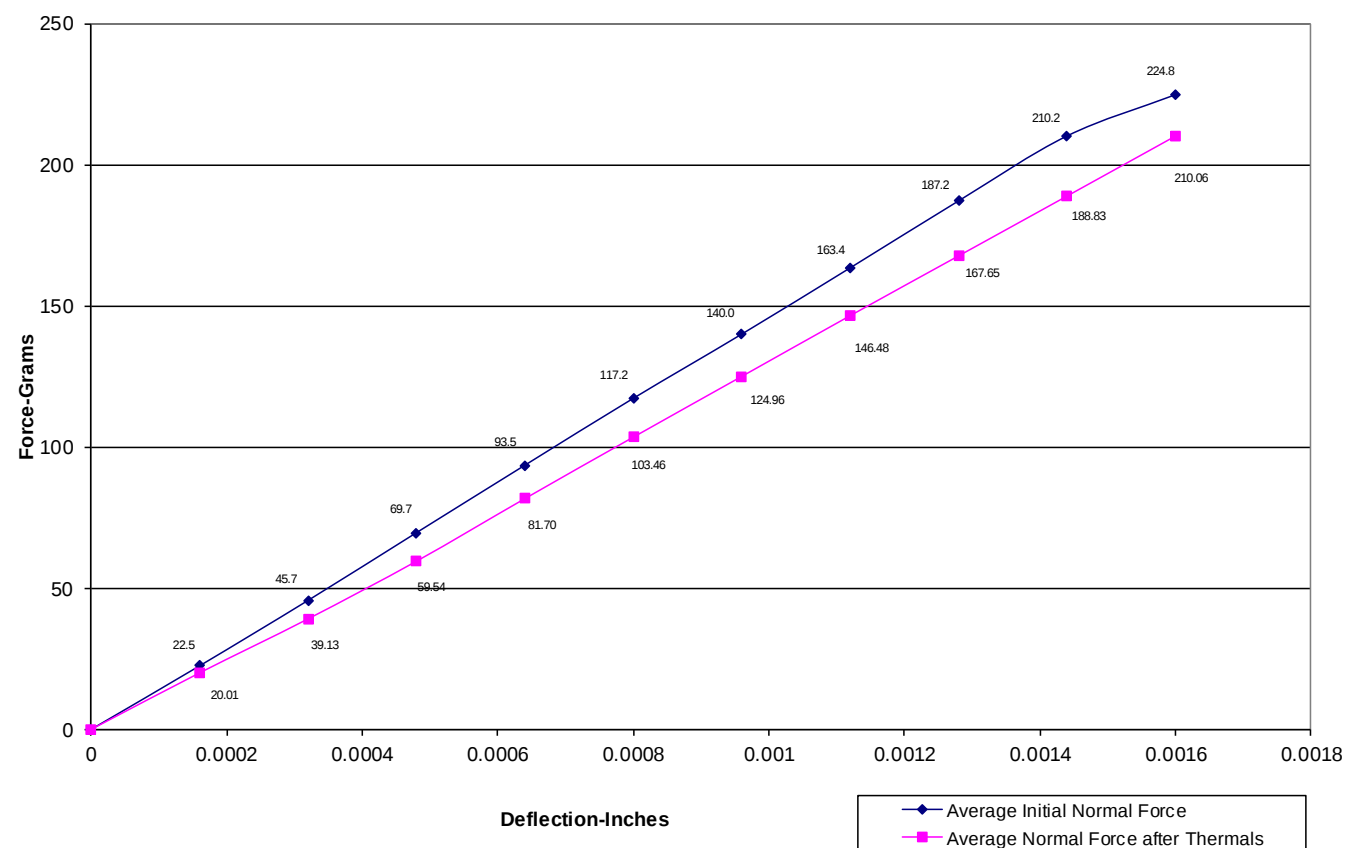
DATA SUMMARIES Continued**NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):**

- 1) Calibrated force gauges are used along with computer controlled positioning equipment.
- 2) Typically, 8-10 readings are taken and the averages reported.

Signal Pin

Initial	Deflections in inches Forces in Grams										
	0.0002	0.0003	0.0005	0.0006	0.0008	0.0010	0.0011	0.0013	0.0014	0.0016	SET
Averages	22.50	45.66	69.65	93.54	117.24	139.98	163.44	187.16	210.15	224.78	0.0000
Min	18.40	38.50	59.70	79.00	99.60	116.00	137.20	158.80	180.10	198.20	0.0000
Max	24.20	50.90	79.20	109.50	138.50	165.90	192.20	219.90	245.90	269.90	0.0001
St. Dev	1.994	4.333	7.045	11.066	14.242	17.970	19.079	21.258	23.418	23.217	0.0000
Count	8	8	8	8	8	8	8	8	8	8	8

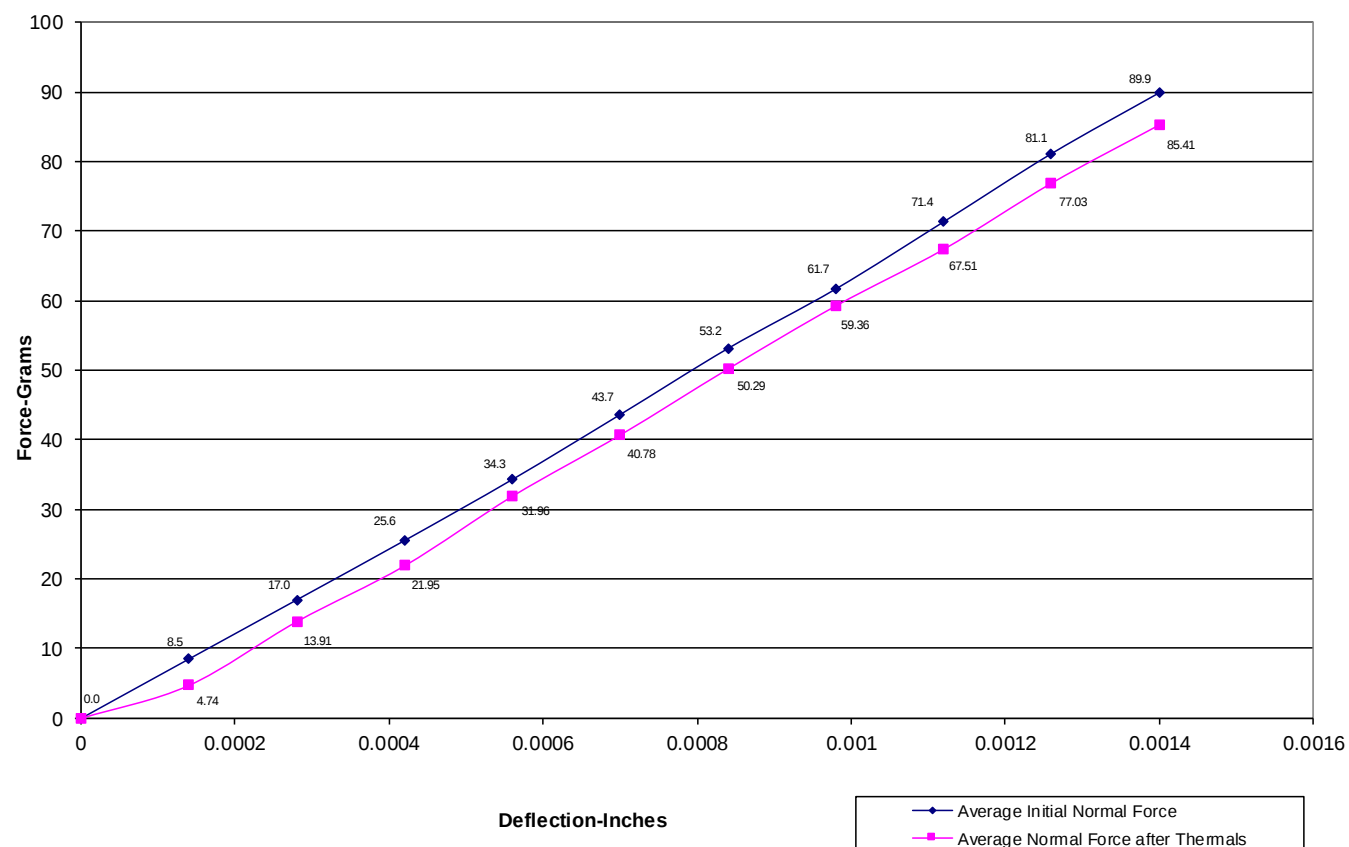
After Thermals	Deflections in inches Forces in Grams										
	0.0002	0.0003	0.0005	0.0006	0.0008	0.0010	0.0011	0.0013	0.0014	0.0016	SET
Averages	20.01	39.13	59.54	81.70	103.46	124.96	146.48	167.65	188.83	210.06	0.0001
Min	15.20	30.50	53.70	73.80	93.80	114.30	133.40	153.60	168.40	184.20	0.0000
Max	23.90	46.90	70.10	94.90	119.60	142.60	165.60	189.10	214.50	238.10	0.0002
St. Dev	2.710	4.828	5.196	5.961	7.590	9.573	11.491	13.288	17.485	20.130	0.0001
Count	8	8	8	8	8	8	8	8	8	8	8

Normal Force - Average Initial vs Average Thermal

DATA SUMMARIES Continued**Rear Socket**

Initial	Deflections in inches Forces in Grams										
	<u>0.0001</u>	<u>0.0003</u>	<u>0.0004</u>	<u>0.0006</u>	<u>0.0007</u>	<u>0.0008</u>	<u>0.0010</u>	<u>0.0011</u>	<u>0.0013</u>	<u>0.0014</u>	<i>SET</i>
Averages	8.53	17.03	25.55	34.33	43.65	53.15	61.70	71.35	81.14	89.89	0.0001
Min	4.90	9.90	16.40	21.60	28.70	37.30	44.30	53.10	60.50	67.70	0.0000
Max	11.20	22.70	32.20	42.10	52.20	64.10	76.90	87.90	97.90	112.40	0.0001
St. Dev	2.656	4.541	6.169	7.415	8.979	10.315	11.811	12.840	14.252	15.810	0.0001
Count	8	8	8	8	8	8	8	8	8	8	8

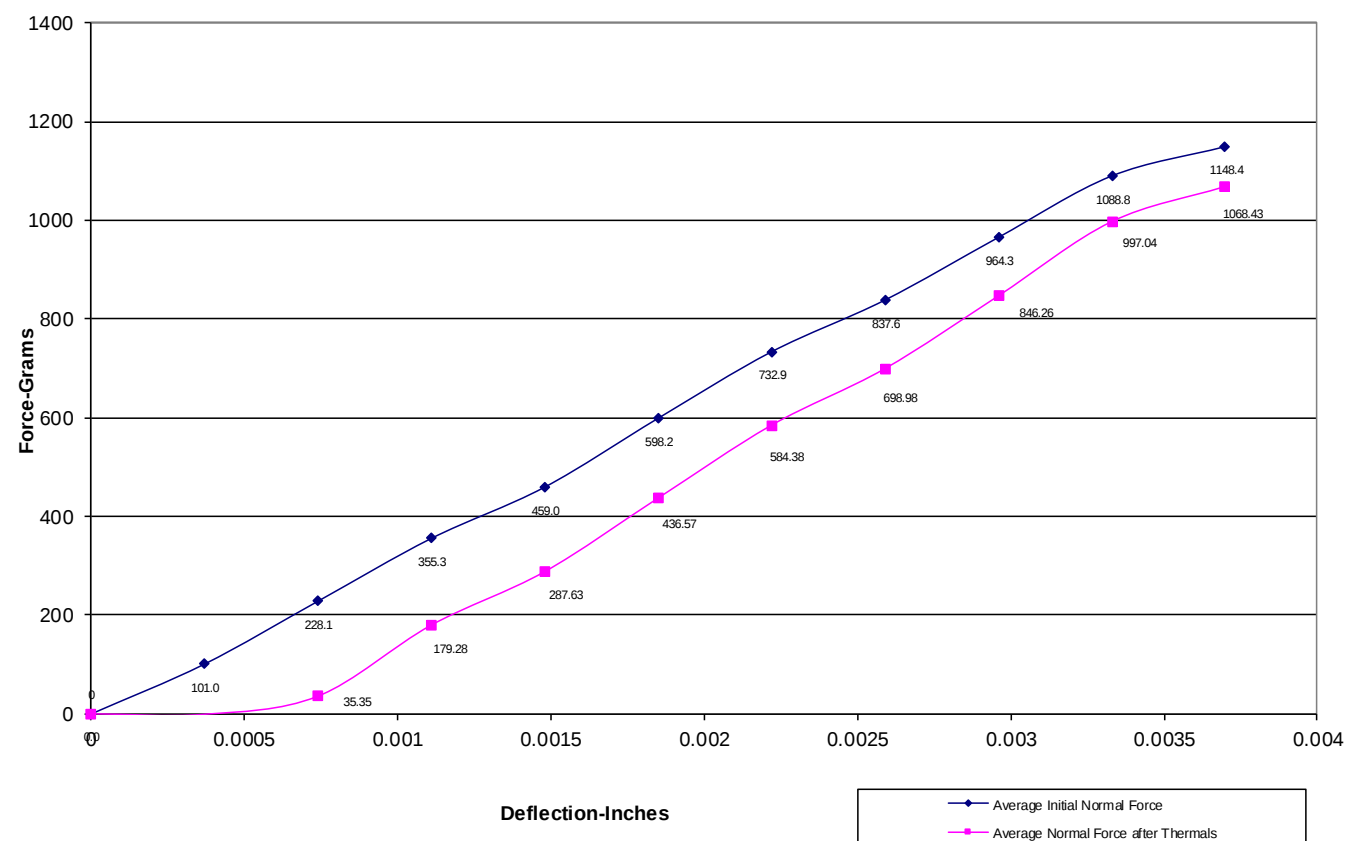
After Thermals	Deflections in inches Forces in Grams										
	<u>0.0001</u>	<u>0.0003</u>	<u>0.0004</u>	<u>0.0006</u>	<u>0.0007</u>	<u>0.0008</u>	<u>0.0010</u>	<u>0.0011</u>	<u>0.0013</u>	<u>0.0014</u>	<i>SET</i>
Averages	4.74	13.91	21.95	31.96	40.78	50.29	59.36	67.51	77.03	85.41	0.0001
Min	0.10	9.70	12.00	21.10	25.70	32.50	36.10	40.80	47.80	54.50	0.0000
Max	8.80	18.30	28.30	39.00	47.40	58.00	70.80	81.70	94.20	102.10	0.0001
St. Dev	3.190	3.313	5.143	5.792	7.271	9.151	12.001	14.070	15.378	16.633	0.0000
Count	8	8	8	8	8	8	8	8	8	8	8

Normal Force - Average Initial vs Average Thermal

DATA SUMMARIES Continued**Ground Pin**

Initial	Deflections in inches Forces in Grams										
	<u>0.0004</u>	<u>0.0007</u>	<u>0.0011</u>	<u>0.0015</u>	<u>0.0019</u>	<u>0.0022</u>	<u>0.0026</u>	<u>0.0030</u>	<u>0.0033</u>	<u>0.0037</u>	<i>SET</i>
Averages	100.95	228.05	355.26	459.03	598.23	732.86	837.60	964.26	1088.81	1148.43	0.0001
Min	82.70	193.40	297.60	386.40	518.40	651.60	756.20	874.40	1000.70	1070.80	0.0001
Max	153.50	308.80	425.20	535.00	683.80	818.20	924.90	1054.70	1170.00	1230.70	0.0002
St. Dev	20.350	35.650	41.024	46.335	50.455	51.037	49.409	51.887	48.556	45.483	0.0000
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflections in inches Forces in Grams										
	<u>0.0004</u>	<u>0.0007</u>	<u>0.0011</u>	<u>0.0015</u>	<u>0.0019</u>	<u>0.0022</u>	<u>0.0026</u>	<u>0.0030</u>	<u>0.0033</u>	<u>0.0037</u>	<i>SET</i>
Averages	-1.07	35.35	179.28	287.63	436.57	584.38	698.98	846.26	997.04	1068.43	0.0007
Min	-1.40	11.40	146.80	248.00	381.40	541.30	660.40	812.80	954.90	1029.20	0.0005
Max	-0.30	68.80	224.10	326.00	488.80	636.90	762.00	902.40	1045.90	1123.30	0.0007
St. Dev	0.296	17.111	26.293	25.251	32.384	31.584	32.936	31.131	29.868	31.709	0.0001
Count	12	12	12	12	12	12	12	12	12	12	12

Normal Force - Average Initial vs Average Thermal

DATA SUMMARIES Continued**INSULATION RESISTANCE (IR):**

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	SMPM/RF047	SMPM	RF047
Initial	45000	45000	45000
Thermal	45000	45000	45000
Humidity	24500	45000	10800

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	SMPM/RF047
Break Down Voltage	718
Test Voltage	539
Working Voltage	180

Pin to Ground	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

Cable Pull Force:**Group 1 0° Pull (SMPM-PF-P-HG-ST-EM-1/RF047-A-M0SJ-303030-0153)**

	Force (lbs)
Minimum	11.60
Maximum	13.12
Average	12.37

Group 2 90° Pull (SMPM-PF-P-HG-ST-EM-1/RF047-A-M0SJ-303030-0153)

	Force (lbs)
Minimum	1.26
Maximum	1.72
Average	1.42

Group 3 0° Pull (SMPM-PF-P-HG-ST-EM-1)

	Force (lbs)
Minimum	1.97
Maximum	2.84
Average	2.36

DATA SUMMARIES Continued**Cable Flex:****Insulation Resistance minimums, IR**

Pin to Ground	
Mated	
Minimum	
Initial	7400
After 100 Flex Cycles	7900

Dielectric Withstanding Voltage minimums, DWV

Voltage Rating Summary	
Minimum	SMPM/RF047
Break Down Voltage	718
Test Voltage	539
Working Voltage	180

Pin to Ground	
Initial Test Voltage	Passed
After 100 Flex Cycles Test Voltage	Passed

DATA SUMMARIES Continued**LLCR Durability:**

- 1) A total of 8 signal and 8 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. $\leq +5.0$ 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	1/9/2019	1/14/2019	1/21/2019	2/8/2019
Room Temp (Deg C)	23	22	22	23
Rel Humidity (%)	33	35	33	45
Technician	Tony Wagoner	Tony Wagoner	Tony Wagoner	Tony Wagoner
mOhm values	Actual Initial	Delta 100 Cycles	Delta Therm Shck	Delta Humidity
Pin Type 1: Ground				
Average	16.19	1.26	3.57	3.26
St. Dev.	0.37	0.43	0.31	0.25
Min	15.71	0.39	3.07	2.90
Max	16.92	1.82	3.98	3.72
Summary Count	8	8	8	8
Total Count	8	8	8	8
Pin Type 2: Signal				
Average	45.67	0.91	0.72	1.68
St. Dev.	0.34	0.35	0.97	1.73
Min	45.13	0.46	0.14	0.16
Max	46.19	1.48	2.85	4.83
Summary Count	8	8	7	7
Total Count	8	8	7	7

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	>1000
100 Cycles	16	0	0	0	0	0
Therm Shck	15	0	0	0	0	0
Humidity	15	0	0	0	0	0

Note: **the center conductor of the cable was pulled out from the opposite end from the connector**

DATA SUMMARIES Continued**LLCR Thermal Aging:**

- 1) A total of 8 signal and 8 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. $\leq +5.0$ 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	1/9/2019	1/21/2019		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	33	33		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual Initial	Delta Thermal	Delta	Delta
Pin Type 1: Ground				
Average	15.84	2.98		
St. Dev.	0.33	0.32		
Min	15.58	2.64		
Max	16.51	3.51		
Summary Count	8	8		
Total Count	8	8		
Pin Type 2: Signal				
Average	45.25	1.12		
St. Dev.	0.24	1.27		
Min	44.93	0.05		
Max	45.73	4.16		
Summary Count	8	8		
Total Count	8	8		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	>5 & ≤ 10	>10 & ≤ 15	>15 & ≤ 50	>50 & ≤ 1000	>1000
Thermal	16	0	0	0	0	0

DATA SUMMARIES Continued**LLCR Gas Tight:**

- 1) A total of 8 signal and 8 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. $\leq +5.0$ 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	12/13/2018	12/14/2018		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	37	38		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual Initial	Delta Acid Vapor	Delta	Delta
Pin Type 1: Ground				
Average	15.97	0.19		
St. Dev.	0.57	0.10		
Min	15.28	0.05		
Max	16.85	0.32		
Summary Count	8	8		
Total Count	8	8		
Pin Type 2: Signal				
Average	45.24	0.38		
St. Dev.	0.27	0.26		
Min	44.67	0.16		
Max	45.56	1.04		
Summary Count	8	8		
Total Count	8	8		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	>1000
Acid Vapor	16	0	0	0	0	0

DATA SUMMARIES Continued**LLCR Shock & Vibration:**

- 1). A total of 8 signal and 8 ground points were measured.
- 2). EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3). The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +5.0$ 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	12/13/2018	12/17/2018		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	37	36		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual Initial	Delta Shock-Vib	Delta	Delta
Pin Type 1: Ground				
Average	15.97	0.74		
St. Dev.	0.41	0.44		
Min	15.35	0.18		
Max	16.45	1.40		
Summary Count	8	8		
Total Count	8	8		
Pin Type 2: Signal				
Average	45.42	0.55		
St. Dev.	0.39	0.34		
Min	44.94	0.06		
Max	45.90	1.18		
Summary Count	8	8		
Total Count	8	8		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	>1000
Shock-Vib	16	0	0	0	0	0

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	16
Test Condition	C, 100g's, 6ms, Sawtooth
Shock Events	0
Test Condition	V-B, 7.56 rms g
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: 05/29/2019, Next Cal: 05/29/2020

Equipment #: MO-11**Description:** Switch/Multimeter**Manufacturer:** Keithley**Model:** 3706**Serial #:** 120169**Accuracy:** See Manual

... Last Cal: 09/11/2018, Next Cal: 09/11/2019

Equipment #: THC-05**Description:** Temperature/Humidity Chamber (Chamber Room)**Manufacturer:** Thermotron**Model:** SM-8-3800**Serial #:** 05 23 00 02**Accuracy:** See Manual

... Last Cal: 11/14/2017, Next Cal: 11/14/2018

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: 06/30/2018, Next Cal: 06/30/2019

Equipment #: HPT-01**Description:** Hipot Safety Tester**Manufacturer:** Vitrek**Model:** V73**Serial #:** 019808**Accuracy:**

... Last Cal: 05/15/2019, Next Cal: 05/15/2020

Equipment #: PS-02**Description:** Power Supply**Manufacturer:** Hewlett-Packard**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: 04/22/2019, Next Cal: 04/22/2020

Equipment #: ACLM-01**Description:** Accelerometer**Manufacturer:** PCB Piezotronics**Model:** 352C03**Serial #:** 115819**Accuracy:** See Manual

... Last Cal: 07/18/2018, Next Cal: 07/18/2019

Equipment #: ED-03**Description:** Event Detector**Manufacturer:** Analysis Tech**Model:** 32EHD**Serial #:** 1100604**Accuracy:** See Manual

... Last Cal: 10/31/2018, Next Cal: 10/31/2019

Equipment #: MO-04**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0798688**Accuracy:** See Manual

... Last Cal: 09/11/2018, Next Cal: 09/11/2019