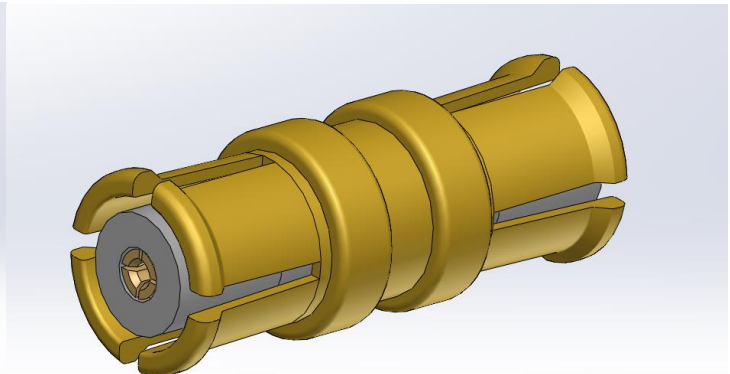
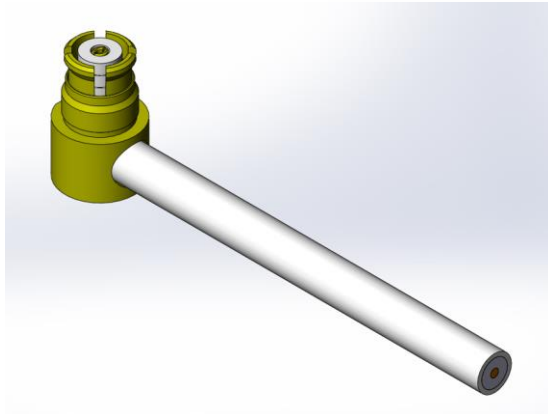
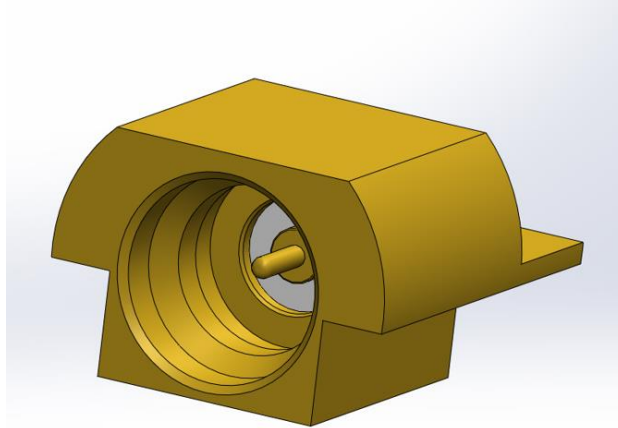


Project Number: Design Qualification Test Report	Tracking Code: CR-856101_Report_Rev_4
Requested by: Ryan Lai	Date: 11/20/2023
Part #: SMP-PF-P-HG-ST-EM	Mating part: RF405-00RJ7-505050-0152\ SMP-J-B-HG-ST-0896
Part description: SMP Edge Mount	Tech: Keney Chen
Test Start: 12/1/2022	Test Completed: 7/1/2023



DESIGN QUALIFICATION TEST REPORT

Part #:
SMP-PF-P-HG-ST-EM

Mating parts:
RF405-00RJ7-505050-0152
SMP-J-B-HG-ST-0896

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
1/18/2023	1	Initial Issue	KC
7/13/2023	2	Using the CR-939810 Test Data Instead the MUD Group Test Data	KC
9/18/2023	3	Updated the Part Number and Test Plan	KC
11/20/2023	4	Deleted the Mating and Un-mating Force Data and Test Plan	KC

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.

All contents contained herein are the property of Samtec. No portion of this report, in part or in full shall be reproduced without prior written approval of Samtec.

SCOPE

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

APPLICABLE DOCUMENTS

Standards: MIL-PRF-39012, 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) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
- 4) Any additional preparation will be noted in the individual test sequences.

FLOWCHARTS

Mating/Unmating/Durability

<u>Group 1</u>		<u>Group 2</u>		<u>Group 3</u>	
SMP-PF-P-HG-ST-EM SMP-J-B-HG-ST-0896 5 Assemblies		SMP-PL-P-HG-ST-EM SMP-J-B-HG-ST-0896 5 Assemblies		SMP-PS-P-HG-ST-EM SMP-J-B-HG-ST-0896 5 Assemblies	
Step	Description	Step	Description	Step	Description
1.	Interface Gaging <i>Note: Measure and record center contact recess from interface reference plane</i>	1.	Interface Gaging <i>Note: Measure and record center contact recess from interface reference plane</i>	1.	Interface Gaging <i>Note: Measure and record center contact recess from interface reference plane</i>
2.	LLCR (1) <i>Note: Signal and Ground</i>	2.	LLCR (1) <i>Note: Signal and Ground</i>	2.	LLCR (1) <i>Note: Signal and Ground</i>
3.	Cycles Quantity = 100 Cycles	3.	Cycles Quantity = 500 Cycles	3.	Cycles Quantity = 1000 Cycles
4.	Interface Gaging <i>Note: Measure and record center contact recess from interface reference plane</i>	4.	Interface Gaging <i>Note: Measure and record center contact recess from interface reference plane</i>	4.	Interface Gaging <i>Note: Measure and record center contact recess from interface reference plane</i>
5.	LLCR (1) Max Delta = 15 mOhm <i>Note: Signal and Ground</i>	5.	LLCR (1) Max Delta = 15 mOhm <i>Note: Signal and Ground</i>	5.	LLCR (1) Max Delta = 15 mOhm <i>Note: Signal and Ground</i>

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

FLOWCHARTS Continued**IR/DWV***Note: CONNECTORS TESTED AFTER SOLDERED TO BOARD***Pin-to-Ground**Group 1

SMP-PF-P-HG-ST-EM
RF405-00RJ7-505050-0152
2 Assemblies

Step Description

1. DWV Breakdown (2) - Non Standard

Group 2

SMP-PF-P-HG-ST-EM
RF405-00RJ7-505050-0152
8 Assemblies

Step Description

1. IR (3) - Non Standard
2. DWV at Test Voltage⁽¹⁾ - Non Standard
Test Voltage = 500 V
3. LLCR (4)
Note: Signal and ground
4. Thermal Shock (5) - Non Standard
5. IR (3) - Non Standard
6. DWV at Test Voltage⁽¹⁾ - Non Standard
Test Voltage = 500 V
7. LLCR (4)
Max Delta = 15 mOhm
Note: Signal and ground

(1) DWV at Test Voltage = Other

500 Vrms min. at sea level per DSCC 94008

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

Test voltage applied for 60 seconds per DSCC-94008

(2) DWV Breakdown = Other

Record breakdown voltage. (Data only)

(3) IR = Other

5000 megohms min per DSCC 94008

MIL-PRF-39012

(4) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

(5) Thermal Shock = Other

MIL-STD-202-107

Test condition B per DSCC 94008. Exception - high temperature to be +165°C. Visual inspection for damage.

FLOWCHARTS Continued**Mechanical Shock/Random Vibration/Event Detection***Note: CONNECTORS TESTED AFTER SOLDERED TO BOARD*Group 1

SMP-PF-P-HG-ST-EM

RF405-00RJ7-505050-0152

8 Assemblies

Step	Description
1.	LLCR (1) - Non Standard
2.	Mechanical Shock <i>Note: MIL-STD-202, Method 213, Test Condition I. EXCEPTION - 50 ns max. electrical interruption.</i>
3.	Nanosecond Event Detection (Mechanical Shock) (2) - Non Standard
4.	High Frequency Vibration <i>Note: MIL-STD-202 Method 204, Test Condition D(20g peak) per DSCC 94008. EXCPETION - 50 ns max. electrical interruption.</i>
5.	Nanosecond Event Detection (Random Vibration) (3) - Non Standard
6.	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) Nanosecond Event Detection (Mechanical Shock) = Other

Test condition I per DSCC 94008 (100g). EXCEPTION: 50 ns max. electrical interruption.
MIL-STD-202-213

(3) Nanosecond Event Detection (Random Vibration) = Other

Test condition D(20g peak) per DSCC 94008(15 minutes min.). EXCEPTION - 50 ns max. electrical interruption.
MIL-STD-202 Method 204

FLOWCHARTS Continued**Pull/Shear***Note: CONNECTORS TESTED AFTER SOLDERED TO BOARD*

<u>Group 1</u> SMP-PF-P-HG-ST-EM 5 Assemblies		<u>Group 2</u> SMP-PF-P-HG-ST-EM 5 Assemblies	
Step	Description	Step	Description
1.	Connector Pull <i>Note: PULL TO DESTRICT, AXIALLY AWAY FROM BOARD. Record failure force (data only).</i>	1.	Connector Shear <i>Note: SHEAR TO DESTRICT, PARALLEL TO BOARD. Record failure force (data only).</i>

Center Contact Retention

<u>Group 1</u> SMP-PF-P-HG-ST-EM 5 Assemblies <i>Note: Minimum Force</i>		<u>Group 2</u> SMP-PF-P-HG-ST-EM 5 Assemblies <i>Note: Push Out Force</i>	
Step	Description	Step	Description
1.	Interface Gaging <i>Note: Measure and record center contact recess from interface reference plane</i>	1.	Apply Push Out Force <i>Note: Push the bottom of contact toward the interface until it was pushed out. Record maximum force. Crosshead speed range 0.5–5.0 mm/min will be sufficient.</i>
2.	Apply Minimum Force <i>Note: Push the bottom of contact toward the interface. Minimum Force = 1.5 pounds per DSCC 94008</i>		
3.	Interface Gaging <i>Note: Measure and record center contact recess from interface reference plane</i>		

Insulator Retention

<u>Group 1</u> SMP-PF-P-HG-ST-EM 5 Assemblies <i>Note: Push Out Force</i>	
Step	Description
1.	Apply Push Out Force <i>Note: Push the bottom of insulator toward the interface until it was pushed out. Record maximum force. Crosshead speed range 0.5–5.0 mm/min will be sufficient.</i>

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

- 1) MIL-PRF-39012, paragraph. 4.6.17 per MIL-STD-202-107.
- 2) Test Condition I: -65°C to +165°C
- 3) Test Time: ½ hour dwell at each temperature extreme
- 4) Test Duration: test condition B per DSCC 94008. Exception-High temperature to be +165°C.
- 5) All test samples are pre-conditioned at ambient.
- 6) All test samples are exposed to environmental stressing in the mated condition.

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

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.

Center Contact Retention:

- 1) Apply 1.5 pounds force push the bottom of contact toward the interface

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: MIL-PRF-39012, paragraph. 4.6.8 per MIL-STD-202-302.
 - 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: MIL-PRF-39012, paragraph. 4.6.14 per MIL-STD-202-301.
 - b. Test Conditions:
 - i. Between Adjacent Contacts or Signal-to-Ground
 - ii. Barometric Test Condition 1(Sea Level) Test voltage applied for 60 seconds.
 - 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).

RESULTS

Insulator Retention

- Min -----14.84 lbs
- Max -----15.42 lbs

Center Contact Retention

- Min ----- 4.70 lbs
- Max ----- 5.49 lbs

Center Contact Retention

Connector Pull Ground

- Min -----21.58 lbs
- Max -----33.68 lbs

Connector Shear Ground

- Min ----- 195.26 lbs
- Max ----- 211.58 lbs

Insulation Resistance minimums, IR

Pin to Ground

- **Initial**
 - Mated -----45000 Meg Ω ----- Passed
- **Thermal Shock**
 - Mated -----45000 Meg Ω ----- Passed

Dielectric Withstanding Voltage minimums, DWV

- Test Voltage -----500 VAC

Pin to Ground

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

RESULTS Continued**Interface Gaging****MUD Group****SMP-PF****Initial**

- **Min** ----- 0.0520 inch (1.32mm)
- **Max** ----- 0.0530 inch (1.35mm)

After 100 Cycles

- **Min** ----- 0.0530 inch (1.35mm)
- **Max** ----- 0.0530 inch (1.35mm)

SMP-PL**Initial**

- **Min** ----- 0.0520 inch (1.32mm)
- **Max** ----- 0.0530 inch (1.35mm)

After 500 Cycles

- **Min** ----- 0.0530 inch (1.35mm)
- **Max** ----- 0.0530 inch (1.35mm)

SMP-PS**Initial**

- **Min** ----- 0.0525 inch (1.33mm)
- **Max** ----- 0.0530 inch (1.35mm)

After 1000 Cycles

- **Min** ----- 0.0520 inch (1.32mm)
- **Max** ----- 0.0530 inch (1.35mm)

Center Contact Retention Group**Initial**

- **Min** ----- 0.0520 inch (1.32mm)
- **Max** ----- 0.0550 inch (1.40mm)

After Retention

- **Min** ----- 0.0525 inch (1.33mm)
- **Max** ----- 0.0540 inch (1.37mm)

RESULTS Continued

LLCR IR/DWV (8 ground and 8 signal LLCR test points)

- Ground pin**
- **Initial** ----- 17.45 mOhms Max
 - **Thermal Shock**
 - <= +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
- Signal pin**
- **Initial** ----- 48.33 mOhms Max
 - **Thermal Shock**
 - <= +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 Shock & Vibration (8 ground and 8 signal LLCR test points)

- Ground pin**
- **Initial** ----- 21.39 mOhms Max
 - **Thermal Shock**
 - <= +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
- Signal pin**
- **Initial** ----- 46.74 mOhms Max
 - **Thermal Shock**
 - <= +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**Mating/Unmating Durability (5 ground and 5 signal LLCR test points)****SMP-PF-P-HG-ST-EM/SMP-J-B-HG-ST-0896****Ground pin**

- **Initial** -----1.23 mOhms Max
- **After 100 Cycles**
 - **<= +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

Signal pin

- **Initial** -----7.59 mOhms Max
- **After 100 Cycles**
 - **<= +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

SMP-PL-P-HG-ST-EM-1/SMP-J-B-GF-ST-1450**Ground pin**

- **Initial** -----0.85 mOhms Max
- **After 500 Cycles**
 - **<= +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

Signal pin

- **Initial** -----6.15 mOhms Max
- **After 500 Cycles**
 - **<= +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

Mating/Unmating Durability (5 ground and 5 signal LLCR test points)

SMP-PF-P-HG-ST-EM/SMP-J-B-HG-ST-0896

Ground pin

- **Initial** -----0.82 mOhms Max
- **After 1000 Cycles**
 - **<= +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

Signal pin

- **Initial** -----6.23 mOhms Max
- **After 1000 Cycles**
 - **<= +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

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

Pin to Ground	
	Mated
Minimum	SMP/RF405
Initial	45000
Thermal Shock	45000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):**IR/DWV Group**

Voltage Rating Summary	
Minimum	SMP/RF405
Test Voltage	500
Pin to Ground	
Initial Test Voltage	Pass
After Thermal Shock Test Voltage	Pass

Pull & Shear Force:**Pull Force**

	Force (lbs)	Force (N)
Minimum	21.58	95.98
Maximum	33.68	149.81
Average	25.95	115.44

Shear Force

	Force (lbs)	Force (N)
Minimum	195.26	868.53
Maximum	211.58	941.10
Average	201.12	894.60

Center Contact Force:

	Force (lbs)	Force (N)
Minimum	4.70	20.90
Maximum	5.49	24.44

Insulator Retention Force:

	Force (lbs)	Force (N)
Minimum	14.84	66.02
Maximum	15.42	68.58
Average	15.16	67.45

DATA SUMMARIES Continued

LLCR IR/DWV:

- 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	12/1/2022	12/13/2022		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	50	50		
Technician	Keney Chen	Keney Chen		
mOhm values	Actual	Delta Thermal Shock		
	Initial			
Pin Type: Signal 1				
Average	46.95	0.57		
St. Dev.	0.84	0.40		
Min	45.79	0.02		
Max	48.33	0.98		
Summary Count	8	8		
Total Count	8	8		
Pin Type: GND 1				
Average	16.80	0.28		
St. Dev.	0.28	0.17		
Min	16.53	0.05		
Max	17.45	0.54		
Summary Count	8	8		
Total Count	8	8		

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

DATA SUMMARIES Continued

LLCR Mating/Unmating Durability (SMP-PF):

- 1) A total of 5 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. $\leq +5.0$ 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	6/27/2023	6/30/2023		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	54	54		
Technician	Peter Chen	Peter Chen		
mOhm values	Actual	Delta	Delta	Delta
	Initial	Cycles	Therm Shck	Humidity
Pin Type: Signal 1				
Average	6.82	0.41		
St. Dev.	0.44	0.37		
Min	6.5	0.05		
Max	7.59	1		
Summary Count	5	5		
Total Count	5	5		
Pin Type: GND 1				
Average	1.05	0.15		
St. Dev.	0.1	0.1		
Min	0.98	0.01		
Max	1.23	0.27		
Summary Count	5	5		
Total Count	5	5		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \ \& \ \leq 10$	$>10 \ \& \ \leq 15$	$>15 \ \& \ \leq 50$	$>50 \ \& \ \leq 1000$	>1000
After 100 Cycles	10	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Mating/Unmating Durability (SMP-PL):

- 1) A total of 5 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. $\leq +5.0$ 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	6/27/2023	6/30/2023		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	54	54		
Technician	Peter Chen	Peter Chen		
mOhm values	Actual	Delta	Delta	Delta
	Initial	Cycles	Therm Shck	Humidity
Pin Type: Signal 1				
Average	5.88	0.79		
St. Dev.	0.31	0.29		
Min	5.43	0.55		
Max	6.15	1.25		
Summary Count	5	5		
Total Count	5	5		
Pin Type: GND 1				
Average	0.78	0.16		
St. Dev.	0.06	0.07		
Min	0.69	0.09		
Max	0.85	0.27		
Summary Count	5	5		
Total Count	5	5		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \ \& \ \leq 10$	$>10 \ \& \ \leq 15$	$>15 \ \& \ \leq 50$	$>50 \ \& \ \leq 1000$	>1000
After 500 Cycles	10	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Mating/Unmating Durability (SMP-PS):

- 1) A total of 5 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. $\leq +5.0$ 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	6/27/2023	6/30/2023		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	54	54		
Technician	Peter Chen	Peter Chen		
mOhm values	Actual	Delta	Delta	Delta
	Initial	Cycles	Therm Shck	Humidity
Pin Type: Signal 1				
Average	6.08	0.87		
St. Dev.	0.22	0.62		
Min	5.69	0.32		
Max	6.23	1.68		
Summary Count	5	5		
Total Count	5	5		
Pin Type: GND 1				
Average	0.77	0.22		
St. Dev.	0.05	0.08		
Min	0.68	0.12		
Max	0.82	0.33		
Summary Count	5	5		
Total Count	5	5		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \ \& \ \leq 10$	$>10 \ \& \ \leq 15$	$>15 \ \& \ \leq 50$	$>50 \ \& \ \leq 1000$	>1000
After 1000 Cycles	10	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Shock & Vibration Group

- 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	1/12/2023	1/17/2023		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	46	43		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual	Delta		
	Initial	Shock-Vib		
Pin Type: Signal 1				
Average	45.86	0.94		
St. Dev.	0.63	0.93		
Min	45.08	0.02		
Max	46.74	2.4		
Summary Count	8	8		
Total Count	8	8		
Pin Type: GND 1				
Average	20.21	0.56		
St. Dev.	0.68	0.52		
Min	19.62	0		
Max	21.39	1.34		
Summary Count	8	8		
Total Count	8	8		

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

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	16
Test Condition	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 #:** HZ-TCT-01**Description:** Normal force analyzer**Manufacturer:** Mecmesin Multitester**Model:** Mecmesin Multitester 2.5-i**Serial #:** 08-1049-04**Accuracy:** Last Cal: 3/4/2023, Next Cal: 3/3/2024**Equipment #:** HZ-TSC-01**Description:** Vertical Thermal Shock Chamber**Manufacturer:** Cincinnatti Sub Zero**Model:** VTS-3-6-6-SC/AC**Serial #:** 10-VT14994**Accuracy:** See Manual

... Last Cal: 04/16/2023, Next Cal: 04/15/2024

Equipment #: DG-HPT-01**Description:** Hipot Safety Tester**Manufacturer:** Vitrek**Model:** V73**Serial #:** 025866**Accuracy:**

... Last Cal: 04/16/2023, Next Cal: 04/15/2024

Equipment #: HZ-MO-05**Description:** Micro-ohmmeter**Manufacturer:** Keithley**Model:** 3706**Serial #:** 1285188**Accuracy:** Last Cal: 12/17/2022, Next Cal: 12/16/2023**Equipment #:** MO-11**Description:** Switch/Multimeter**Manufacturer:** Keithley**Model:** 3706**Serial #:** 120169**Accuracy:** See Manual

... Last Cal: 08/21/2022, Next Cal: 08/21/2023

Equipment #: SVC-01**Description:** Shock & Vibration Table**Manufacturer:** Data Physics**Model:** LE-DSA-10-20K**Serial #:** 10037**Accuracy:** See Manual

... Last Cal: 11/31/2022, Next Cal: 11/31/2023

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

... Last Cal: 07/09/2023, Next Cal: 07/09/2024

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

... Last Cal: 06/04/2023, Next Cal: 06/04/2024