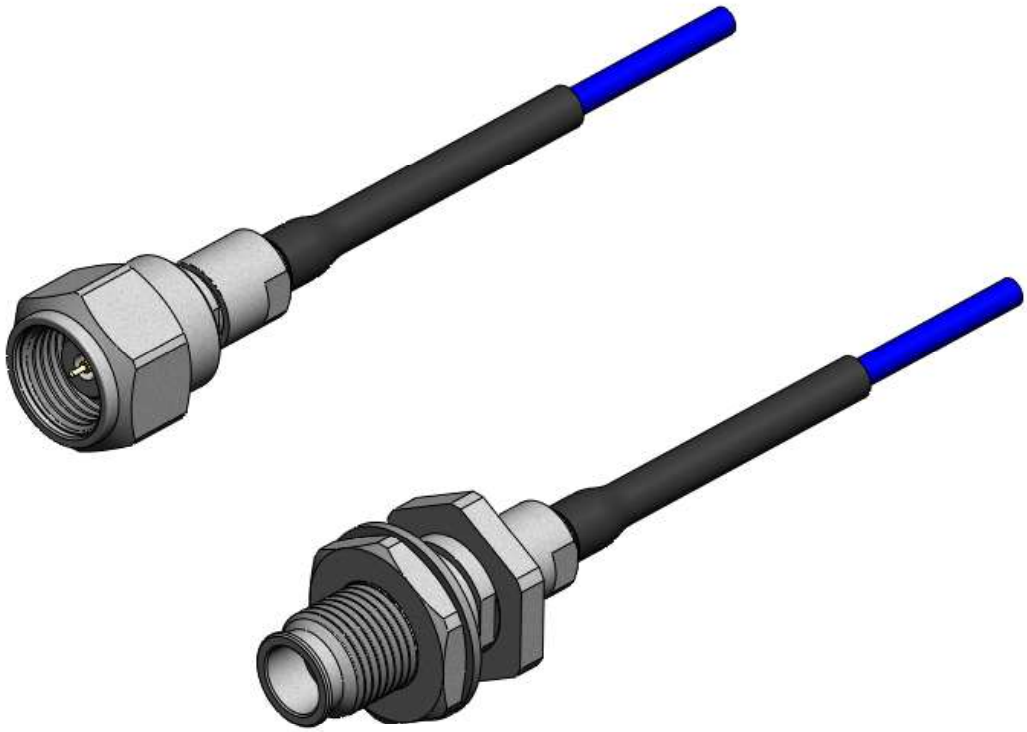
Project Number: Design Qualification Test Report	Tracking Code: CR_697401_Report_Rev_2
Requested by: Tommy Kuhn	Date: 9/8/2022
Part #: RF047-A-13BJ-13BJ-0152/RF047-A-13SP-13SP-0152	
Part description: RF047-13BJ / RF047-13SP	Tech: Keney Chen
Test Start: 7/21/2021	Test Completed: 12/31/2021



DESIGN QUALIFICATION TEST REPORT

RF047-13BJ / RF047-13SP
RF047-A-13BJ-13BJ-0152 /RF047-A-13SP-13SP-0152

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
1/6/2022	**1**	**Initial Issue**	**KC**
9/8/2022	**2**	**Updated the Test Plan**	**KC**

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: MIL-PRF-39012.

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

IR/DWV

Pin-to-Ground

Group 1

RF047-A-13BJ-505050-0152

RF047-A-13SP-505050-0152

4 Assemblies

Note: For STEP 6, please put the following additional cable assemblies in the thermal shock chamber (ride along parts).
Plug & jack versions are mated with dust caps (Yellow) on open ends.
Jack version: RF047-A-13SJ-13SJ-0152 (4 PCS)
Plug version: RF047-A-13SP-13SP-0152 (4 PCS)

Step	Description
1.	Length & Mass
2.	Interface Gaging
3.	IR (2) - Non Standard
4.	DWV at Test Voltage (1) - Non Standard Test Voltage = 500 VAC
5.	LLCR (3) - Non Standard *Note: Signal and ground.*
6.	Thermal Shock (4) - Non Standard
7.	IR (2) - Non Standard
8.	DWV at Test Voltage (1) - Non Standard Test Voltage = 500 VAC
9.	LLCR (3) - Non Standard Max Delta = 15 mOhm *Note: Signal and ground.*
10.	Interface Gaging

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(1) DWV at Test Voltage = Other
Test Condition = 1 (Sea Level) Test voltage applied for 60 seconds
MIL-PRF-39012, Paragraph. 4.6.14 per MIL-STD-202-301

(2) IR = Other
Test Condition = 500V DC, 2 Minutes Max
MIL-PRF-39012, Paragraph 4.6.8 per MIL-STD-202-302

(3) LLCR = Other
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max
MIL-PRF-39012, Paragraph 4.6.13 except current to be 100mA nominal and voltage to be 20 mV maximum.

(4) Thermal Shock = Other
Exposure Time at Temperature Extremes = 1/2 Hour
Test Condition = I (-65°C to +125°C)
Test Duration = test condition B except 10 cycles instead of 5.
MIL-PRF-39012, Paragraph. 4.6.17 per MIL-STD-202-107

FLOWCHARTS Continued

Cable Pull

Group 1
RF047-A-13BJ-505050-0152
2 Assemblies
0 Degrees

Step	Description
1.	Cable Retention (2) - Non Standard *Note: Pull-to-destruct.*

Group 2
RF047-A-13SP-505050-0152
2 Assemblies
0 Degrees

Step	Description
1.	Cable Retention (2) - Non Standard *Note: Pull-to-destruct.*

Group 3
RF047-A-13BJ-505050-0152
RF047-A-13SP-505050-0152
4 Assemblies
0 Degrees

Step	Description
1.	Length & Mass
2.	Interface Gaging
3.	LLCR (3) - Non Standard *Note: Signal and ground.*
4.	Cable Retention (1) - Non Standard *Note: Apply 5 pounds (2.3 kg) for Cable Retention test.*
5.	LLCR (3) - Non Standard *Note: Signal and ground.*
6.	Interface Gaging

(1) Cable Retention = Other
Apply 10 pounds (4.6 kg) for Cable Retention test.
MIL-PRF-39012, Paragraph 4.6.21

(2) Cable Retention = Other
Pull-to-destruct.
MIL-PRF-39012, Paragraph 4.6.21

(3) LLCR = Other
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max
MIL-PRF-39012, Paragraph 4.6.13 except current to be 100mA nominal and voltage to be 20 mV maximum.

FLOWCHARTS Continued

Mating/Unmating/Durability

Group 1 PRF13-J-C-VP-047A-BS-5050 PRF13-P-C-VP-047A-SS-5050 4 Assemblies		Group 2 PRF13-J-C-VP-047A-BS-5050 PRF13-P-C-VP-047A-SS-5050 1 Assemblies	
Step	**Description**	**Step**	**Description**
1.	Length & Mass	1.	Length & Mass
2.	Interface Gaging	2.	Interface Gaging
3.	DWV at Test Voltage(1) - Non Standard DWV = 500 VAC	3.	DWV at Test Voltage(1) - Non Standard DWV = 500 VAC
4.	LLCR (2) - Non Standard *Note: Signal and ground.*	4.	LLCR (2) - Non Standard *Note: Signal and ground.*
5.	Cycles Quantity = 500 Cycles *Note: By hand. Torque each time to 8 in-lbs. Rotate plug coupling nut only. Do not rotate entire assembly. MIL-PRF-39012, Paragraph. 4.6.12*	5.	Cycles Quantity = 2000 Cycles *Note: By hand. Torque each time to 8 in-lbs. Rotate plug coupling nut only. Do not rotate entire assembly. MIL-PRF-39012, Paragraph. 4.6.12*
6.	LLCR (2) - Non Standard Max Delta = 15 mOhm *Note: Signal and ground.*	6.	LLCR (2) - Non Standard Max Delta = 15 mOhm *Note: Signal and ground.*
7.	Interface Gaging	7.	Interface Gaging

(1) DWV at Test Voltage = Other
Test Condition = 1 (Sea Level) Test voltage applied for 60 seconds
MIL-PRF-39012, Paragraph. 4.6.14 per MIL-STD-202-301

(2) LLCR = Other
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max
MIL-PRF-39012, Paragraph 4.6.13 except current to be 100mA nominal and voltage to be 20 mV maximum.

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 +125°C
3) Test Time: ½ hour dwell at each temperature extreme
4) Test Duration: test condition B except 10 cycles instead of 5.
5) All test samples are pre-conditioned at ambient.
6) All test samples are exposed to environmental stressing in the mated condition.

LLCR:

1) MIL-PRF-39012, Paragraph 4.6.13 except current to be 100 mA nominal and voltage to be 20 mV maximum.
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

CABLE RETENTION:

1) Apply 10 pounds (4.6 kg) for cable retention test.
2) Pull to destruct.
3) MIL-PRF-39012, paragraph. 4.6.21.

MATING/UNMATING:

1) MIL-PRF-39012, paragraph. 4.6.12.
2) By hand. Torque each time to 8 in-lbs.

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 1000 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

Cable Pull force

- **0° Pull**

Group 1 RF047-13BJ

- **Min----------12.40 lbs**
- **Max ----------12.79 lbs**

Group 2 RF047-13SP

- **Min----------11.18 lbs**
- **Max ----------11.78 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

- **Minimums**
  - **Test Voltage ----------500 VAC**

Pin to Ground

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

Mating/Unmating Durability Group

- **Minimums**
  - **Test Voltage ----------500 VAC**

Pin to Ground

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

RESULTS Continued

Length & Mass

IR/DWV Group

Length

13SP

- **Min ---------- 155.00 mm**
- **Max ---------- 156.00 mm**

13BJ

- **Min ---------- 152.00 mm**
- **Max ---------- 153.00 mm**

Mass

13SP

- **Min ---------- 4.60 g**
- **Max ---------- 4.60 g**

13BJ

- **Min ---------- 3.60 g**
- **Max ---------- 3.70 g**

Cable Pull Group

Length

13SP

- **Min ---------- 154.00 mm**
- **Max ---------- 156.00 mm**

13BJ

- **Min ---------- 153.00 mm**
- **Max ---------- 154.00 mm**

Mass

13SP

- **Min ---------- 4.60 g**
- **Max ---------- 4.60 g**

13BJ

- **Min ---------- 3.60 g**
- **Max ---------- 3.70 g**

• RESULTS Continued

Durability Group
500 Cycles

Length

13SP

- **Min ---------- 154.00 mm**
- **Max ---------- 155.00 mm**

13BJ

- **Min ---------- 152.00 mm**
- **Max ---------- 153.00 mm**

Mass

13SP

- **Min ---------- 3.58 g**
- **Max ---------- 3.59 g**

13BJ

- **Min ---------- 4.49 g**
- **Max ---------- 4.50 g**

Durability Group
2000 Cycles

Length

13SP

- **Min ---------- 155.00 mm**
- **Max ---------- 155.00 mm**

13BJ

- **Min ---------- 152.00 mm**
- **Max ---------- 152.00 mm**

Mass

13SP

- **Min ---------- 3.57 g**
- **Max ---------- 3.57 g**

13BJ

- **Min ---------- 4.50 g**
- **Max ---------- 4.50 g**

RESULTS Continued

Interface Gaging

IR/DWV Group

13SP

Initial

- **Min ---------- 0.0001inch**
- **Max ---------- 0.0011inch**

After Thermal Shock

- **Min ---------- 0.0009inch**
- **Max ---------- 0.0019inch**

13BJ

Initial

- **Min ---------- 0.0000inch**
- **Max ---------- 0.0014inch**

After Thermal Shock

- **Min ---------- 0.0009inch**
- **Max ---------- 0.0013inch**

Cable Pull Group

13SP

Initial

- **Min ---------- 0.0003inch**
- **Max ---------- 0.0017inch**

After Retention

- **Min ---------- 0.0003inch**
- **Max ---------- 0.0019inch**

13BJ

Initial

- **Min ---------- 0.0003inch**
- **Max ---------- 0.0019inch**

After Retention

- **Min ---------- 0.0004inch**
- **Max ---------- 0.0017inch**

RESULTS Continued

Durability Group
13SP
Initial
- **Min ---------- 0.0000inch**
- **Max ---------- 0.0010inch**

After 500 Cycles
- **Min ---------- 0.0005inch**
- **Max ---------- 0.0015inch**

13BJ
Initial
- **Min ---------- 0.0000inch**
- **Max ---------- 0.0015inch**

After 500 Cycles
- **Min ---------- 0.0005inch**
- **Max ---------- 0.0020inch**

Durability Group
13SP
Initial
- **Min ---------- 0.0005inch**
- **Max ---------- 0.0005inch**

After 2000 Cycles
- **Min ---------- 0.0010inch**
- **Max ---------- 0.0010inch**

13BJ
Initial
- **Min ---------- 0.0000inch**
- **Max ---------- 0.0000inch**

After 2000 Cycles
- **Min ---------- 0.0015inch**
- **Max ---------- 0.0015inch**

RESULTS Continued

LLCR IR/DWV (4 ground and 4 signal LLCR test points)

Ground pin

- **Initial ---------- 31.40 mOhms Max**
- **Thermal Shock**
  - **<= +5.0 mOhms ---------- 4 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 ---------- 84.21 mOhms Max**
- **Thermal Shock**
  - **<= +5.0 mOhms ---------- 0 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 4 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 Cable Pull (4 ground and 4 signal LLCR test points)

Ground pin

- **Initial ---------- 29.10 mOhms Max**
- **After 10lb Retention**
  - **<= +5.0 mOhms ---------- 4 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 ---------- 84.33 mOhms Max**
- **After 10lb Retention**
  - **<= +5.0 mOhms ---------- 4 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 (4 ground and 4 signal LLCR test points)

Ground pin

- **Initial ---------- 34.02 mOhms Max**
- **After 500 Cycles**
  - **<= +5.0 mOhms ---------- 4 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 ---------- 85.46 mOhms Max**
- **After 500 Cycles**
  - **<= +5.0 mOhms ---------- 4 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 ---------- 33.58 mOhms Max**
- **After 2000 Cycles**
  - **<= +5.0 mOhms ---------- 4 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 ---------- 84.36 mOhms Max**
- **After 2000 Cycles**
  - **<= +5.0 mOhms ---------- 4 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):

IR		
Sample #	INITIAL	THER SHOCK
9-BJ	45000	45000
10-BJ	45000	45000
11-BJ	45000	45000
12-BJ	45000	45000
9-SP	45000	45000
10-SP	45000	45000
11-SP	45000	45000
12-SP	45000	45000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

IR/DWV Group

DWV (Test Voltage = 500)		
Sample #	INITIAL	THER SHOCK
9-BJ	500 VAC	PASS
10-BJ	500 VAC	PASS
11-BJ	500 VAC	PASS
12-BJ	500 VAC	PASS
9-SP	500 VAC	PASS
10-SP	500 VAC	PASS
11-SP	500 VAC	PASS
12-SP	500 VAC	PASS

Durability Group

DWV (Test Voltage = 500)		
Sample #	Voltage	PASS/FAIL
1-BJ	500 VAC	PASS
2-BJ	500 VAC	PASS
3-BJ	500 VAC	PASS
4-BJ	500 VAC	PASS
1-SP	500 VAC	PASS
2-SP	500 VAC	PASS
3-SP	500 VAC	PASS
4-SP	500 VAC	PASS

DWV (Test Voltage = 500)		
Sample #	Voltage	PASS/FAIL
5-BJ	500 VAC	PASS
5-SP	500 VAC	PASS

DATA SUMMARIES Continued

Cable Pull Force:

0° Pull

CABLE PULL FORCES GROUP 1-2 Cable Pull TO DESTRUCT	
Sample #	**FORCE**
13-BJ	12.4
14-BJ	12.79
15-SP	11.18
16-SP	11.78

LENGTH & MASS

IR/DWV Group

Interface Gaging GROUP 1 - IR/DWV THERMAL			
Sample #	**Initial**	**THERMAL SHK**	**Deltas**
9-BJ	0.0008	0.0013	0.0005
10-BJ	0.0014	0.0010	0.0004
11-BJ	0.0001	0.0009	0.0008
12-BJ	0.0000	0.0009	0.0009
9-SP	0.0011	0.0010	0.0000
10-SP	0.0007	0.0009	0.0002
11-SP	0.0005	0.0011	0.0006
12-SP	0.0001	0.0019	0.0018

Cable Pull Group

Interface Gaging GROUP 3 - Cable Pull (5.0 lb)			
Sample #	**Initial**	**5.0 lb.**	**Deltas**
17-BJ	0.0011	0.0016	0.0006
18-BJ	0.0019	0.0004	0.0015
19-BJ	0.0010	0.0017	0.0007
20-BJ	0.0003	0.0009	0.0007
17-SP	0.0014	0.0013	0.0002
18-SP	0.0003	0.0003	0.0000
19-SP	0.0017	0.0012	0.0005
20-SP	0.0008	0.0004	0.0005

DATA SUMMARIES Continued

LENGTH & MASS

Durability Group（500Cycles）

13BJ	Length (mm)	Mass (g)
1	153.00	4.49
2	153.00	4.50
3	153.00	4.50
4	152.00	4.49

13SP	Length (mm)	Mass (g)
1	155.00	3.58
2	154.00	3.58
3	155.00	3.59
4	154.00	3.58

Durability Group（2000Cycles）

13BJ	Length (mm)	Mass (g)
1	152.00	4.50

13SP	Length (mm)	Mass (g)
1	155.00	3.57

INTERFACE GAGING

IR/DWV Group

Interface Gaging GROUP 1 - IR/DWV THERMAL			
Sample #	Initial	THERMAL SHK	Deltas
9-BJ	0.0008	0.0013	0.0005
10-BJ	0.0014	0.0010	0.0004
11-BJ	0.0001	0.0009	0.0008
12-BJ	0.0000	0.0009	0.0009
9-SP	0.0011	0.0010	0.0000
10-SP	0.0007	0.0009	0.0002
11-SP	0.0005	0.0011	0.0006
12-SP	0.0001	0.0019	0.0018

DATA SUMMARIES Continued

INTERFACE GAGING

Cable Pull Group

Interface Gaging GROUP 3 - Cable Pull (5.0 lb)			
Sample #	Initial	5.0 lb.	Deltas
17-BJ	0.0011	0.0016	0.0006
18-BJ	0.0019	0.0004	0.0015
19-BJ	0.0010	0.0017	0.0007
20-BJ	0.0003	0.0009	0.0007
17-SP	0.0014	0.0013	0.0002
18-SP	0.0003	0.0003	0.0000
19-SP	0.0017	0.0012	0.0005
20-SP	0.0008	0.0004	0.0005

Durability Group(500 Cycles)

Gaging (0.002/0.000)(inch)			
13BJ	Initial	After Cycles	Delta
1	0.0005	0.00200	0.00150
2	0.0000	0.00150	0.00150
3	0.0005	0.00150	0.00100
4	0.0015	0.00050	0.00100

Gaging (0.002/0.000)(inch)			
13SP	Initial	After Cycles	Delta
1	0.0000	0.0005	0.0005
2	0.0005	0.0010	0.0005
3	0.0010	0.0010	0.0000
4	0.0010	0.0015	0.0005

Durability Group(2000 Cycles)

Gaging (0.002/0.000)(inch)			
PRF13-J	Initial	After Cycles	Delta
1	0.0000	0.00150	0.00150
Gaging (0.002/0.000)(inch)			
PRF13-P	Initial	After Cycles	Delta
1	0.0005	0.0010	0.0005

DATA SUMMARIES Continued

LLCR IR/DWV:

1) A total of 4 signal and 4 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	7/20/2021	7/22/2021				
Room Temp (Deg C)	22	22				
Rel Humidity (%)	51	51				
Technician	Scott Rollefstad	Scott Rollefstad				
mOhm values	**Actual**	**Delta**				
	Initial	**THER SHK**				
	Pin Type 1: Signal					
Average	84.05	0.41				
Min	83.98	0.04				
Max	84.21	0.98				
Summary Count	4	4				
Total Count	4	4				
	Pin Type 2: Ground					
Average	30.86	8.51				
Min	30.20	7.52				
Max	31.40	9.43				
Summary Count	4	4				
Total Count	4	4				

LLCR Delta Count by Category					
mOhms	**Stable**	**Minor**	**Acceptable**	**Unstable**	**Open**
	<=5	**>5 & <=10**	**>10 & <=15**	**>15**	**>1000**
THER SHK	**4**	**4**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Cable Pull:

1) A total of 4 signal and 4 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	7/20/2021	7/22/2021				
Room Temp (Deg C)	22	22				
Rel Humidity (%)	51	51				
Technician	Scott Rollefstad	Scott Rollefstad				
mOhm values	**Actual**	**Delta**				
	Initial	**CABLE RET.**				
	Pin Type 1: Signal					
Average	83.70	0.33				
Min	83.15	0.10				
Max	84.33	0.59				
Summary Count	4	4				
Total Count	4	4				
	Pin Type 2: Ground					
Average	28.73	0.52				
Min	28.21	0.02				
Max	29.10	1.28				
Summary Count	4	4				
Total Count	4	4				

LLCR Delta Count by Category					
mOhms	**Stable**	**Minor**	**Acceptable**	**Unstable**	**Open**
	<=5	**>5 & <=10**	**>10 & <=15**	**>15**	**>1000**
CABLE RET.	**8**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Mating/Unmating Durability:

1) A total of 4 signal and 4 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	12/25/2021	12/31/2021		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	50	50		
Technician	Keney Chen	Keney Chen		
mOhm values	Actual **Initial**	**Delta** **500 Cycles**		
	Pin Type: Signal 1			
Average	84.59	0.63		
St. Dev.	0.77	0.32		
Min	83.94	0.40		
Max	85.46	1.09		
Summary Count	4	4		
Total Count	4	4		
	Pin Type: GND 1			
Average	33.31	0.52		
St. Dev.	0.94	0.56		
Min	31.95	0.04		
Max	34.02	1.20		
Summary Count	4	4		
Total Count	4	4		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
500 Cycles	**8**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

	LLCR Measurement Summaries by Pin Type			
Date	12/25/2021	12/31/2021		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	50	50		
Technician	Keney Chen	Keney Chen		
mOhm values	Actual **Initial**	**Delta** **2000 Cycles**		
	Pin Type: Signal 1			
Average	84.36	0.32		
St. Dev.	0.00	0.00		
Min	84.36	0.32		
Max	84.36	0.32		
Summary Count	1	1		
Total Count	1	1		
	Pin Type: GND 1			
Average	33.58	3.69		
St. Dev.	0.00	0.00		
Min	33.58	3.69		
Max	33.58	3.69		
Summary Count	1	1		
Total Count	1	1		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
2000 Cycles	**2**	**0**	**0**	**0**	**0**	**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: 3/4/2021, Next Cal: 3/3/2022

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: 04/16/2021, Next Cal: 04/15/2022

Equipment #: DG-HPT-01
Description: Hipot Safety Tester
Manufacturer: Vitrek
Model: V73
Serial #: 025866
Accuracy:
… Last Cal: 04/16/2021, Next Cal: 04/15/2022

Equipment #: HZ-MO-05
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 3706
Serial #: 1285188
Accuracy: Last Cal: 12/17/2021, Next Cal: 12/16/2022

Equipment #: HPM-01
Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 11/24/2021, Next Cal: 02/24/2022

Equipment #: MO-10
Description: Model 2750 Multimeter/Switch System (Integra Series)
Manufacturer: Keithley
Model: 2750
Serial #: 1215161
Accuracy: See Manual
… Last Cal: 10/18/2021, Next Cal: 10/18/2022

EQUIPMENT AND CALIBRATION SCHEDULES Continued

Equipment #: HPM-01
Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 11/24/2021, Next Cal: 02/24/2022