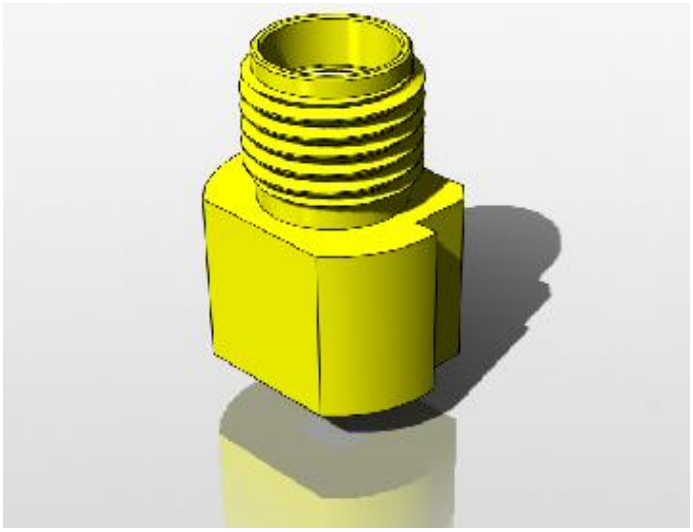
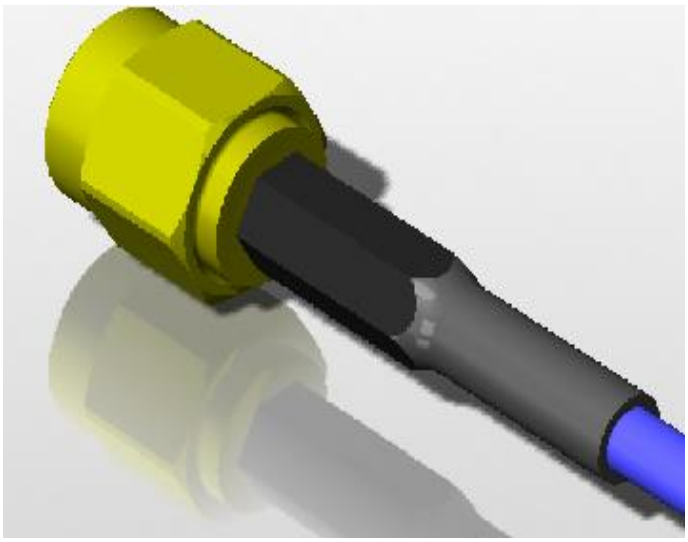
Project Number: Design Qualification Test Report	Tracking Code: 116049_Report_Rev_4			
Requested by: John Liao	Date: 7/8/2015	Product Rev: 0		
Part #:SMA-J-P-H-ST-EM3/RF316-01SP1-01SP1-0700		Lot #: N/A	Tech: Kason He	Eng: Vico Zhao
Part description: SMA/RF316			Qty to test: 40	
Test Start: 12/10/2010	Test Completed: 01/15/2011			





Design Qualification Test Report

SMA/RF316
SMA-J-P-H-ST-EM3/RF316-01SP1-01SP1-0700

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
07/07/2015	**4**	**Updated the test data**	**PC**

CERTIFICATION

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

SCOPE

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

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1) All materials were manufactured in accordance with the applicable product specification.
2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to 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 and DWV/IR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Samtec Test PCBs used: PCB-102873-TST-01A

FLOWCHARTS

Gas Tight

TEST STEP	GROUP A1 9 Signal and 9 ground
01	LLCR-1
02	Gas Tight
03	LLCR-2

Gas Tight = EIA-364-36A

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

IR & DWV

TEST STEP	GROUP A1 2 Mated Sets Break Down Pin-to-Ground	GROUP A2 2 Unmated of Part # Being Tested Break Down Pin-to-Ground	GROUP A3 2 Unmated of Mating Part # Break Down Pin-to-Ground	GROUP B1 2 Mated Sets Pin-to-Ground
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Shock (Mated and Undisturbed)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (Mated and Undisturbed)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

DWV on Group B1 to be performed at Test Voltage

DWV test voltage is equal to 75% of the lowest break down voltage from Groups A1, A2 or A3

Thermal Shock = EIA-364-32, Table II, Test Condition I:

-55°C to +85°C 1/2 hour dwell, 100 cycles

Humidity = EIA-364-31, Test Condition B (240 Hours)

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

ambient pre-condition and delete steps 7a and 7b

IR = EIA-364-21

DWV = EIA-364-20, Test Condition 1

FLOWCHARTS Continued

Durability/Mating/Unmating/Gaps

TEST STEP	GROUP B1 9 points
01	Contact Gaps
02	LLCR-1 (Signal and Ground)
03	Forces - Mating / Unmating (Signal)
04	125 Cycles
05	Forces - Mating / Unmating (Signal)
06	125 Cycles (250 Total)
07	Forces - Mating / Unmating (Signal)
08	125 Cycles (375 Total)
09	Forces - Mating / Unmating (Signal)
10	125 Cycles (500 Total)
11	Forces - Mating / Unmating (Signal)
12	Clean w/Compressed Air
13	Contact Gaps
14	LLCR-2 (Signal and Ground)
15	Thermal Shock (Mated and Undisturbed)
16	LLCR-3 (Signal and Ground)
17	Cyclic Humidity (Mated and Undisturbed)
18	LLCR-4 (Signal and Ground)
19	Forces - Mating / Unmating (Signal)

Thermal Shock = EIA-364-32, Table II, Test Condition I:

-55°C to +85°C 1/2 hour dwell, 100 cycles

Humidity = EIA-364-31, Test Condition B (240 Hours)

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

ambient pre-condition and delete steps 7a and 7b

Mating / Unmating Forces = EIA-364-13

Contact Gaps / Height - No standard method. Usually measured optically.

Gaps to be taken on a minimum of 20% of each part tested

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

FLOWCHARTS Continued

Normal Force

TEST STEP	GROUP A1 Individual Contacts (9 Points)	GROUP A2 Individual Contacts (9 Points)
01	Contact Gaps	Contact Gaps
02	Setup Approved	Thermal Aging (Mated and Undisturbed)
03	Normal Force (in the body and soldered on PCB unless otherwise specified)	Contact Gaps
04		Setup Approved
05		Normal Force (in the body and soldered on PCB unless otherwise specified)

Thermal Aging = EIA-364-17, Test Condition 4 (105°C)

Time Condition 'B' (250 Hours)

Normal Force = EIA-364-04

(Perpendicular) Displacement Force = 12.7 mm/min ± 6 mm/min

Spec is 50 N @ 1 mm displacement

Contact Gaps / Height - No standard method. Usually measured optically

Gaps to be taken on a minimum of 20% of each part tested

FLOWCHARTS Continued

Thermal Aging

TEST STEP	GROUP A1 9 points Thermal Aging (Mated)
01	Contact Gaps
02	Forces - Mating / Unmating (Signal)
03	LLCR-1(Signal and Ground)
04	Thermal Aging (Mated and Undisturbed)
05	LLCR-2(Signal and Ground)
06	Forces - Mating / Unmating (Signal)
07	Contact Gaps

Thermal Aging = EIA-364-17, Test Condition 4 (105°C)

Time Condition 'B' (250 Hours)

Mating / Unmating Forces = EIA-364-13

Contact Gaps / Height - No standard method. Usually measured optically.

Gaps to be taken on a minimum of 20% of each part tested

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

Connector Pull

TEST STEP	GROUP A1 5 Pieces 0°	GROUP B1 5 Pieces 90°
01	Pull test, Continuity	Pull test, Continuity

Monitor continuity and pull; record forces when continuity fails

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

1) EIA-364-32, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors.*
2) Test Condition 1: -55°C to +85°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.

THERMAL:

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
2) Test Condition 4 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.

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.

CONTACT GAPS:

1) Gaps above the surrounding plastic surface were measured before and after stressing the contacts (e.g. thermal aging, mechanical cycling, etc.).
2) Typically, all contacts on the connector are measured.

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.

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 +2000 mOhms: ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure

ATTRIBUTE DEFINITIONS

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 TC^2, computer controlled test stand with a deflection measurement system accuracy of 5 µm (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 ± 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 TC^2 software in order to acquire and record the test data.
14) The permanent set of each contact shall be measured within the TC^2 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.

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. <= +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 +2000 mOhms: ---------- Unstable
    f. >+2000 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^{o} C
        ix. The final LLCR shall be conducted within 1 hour after drying.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

CONNECTOR PULL:

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

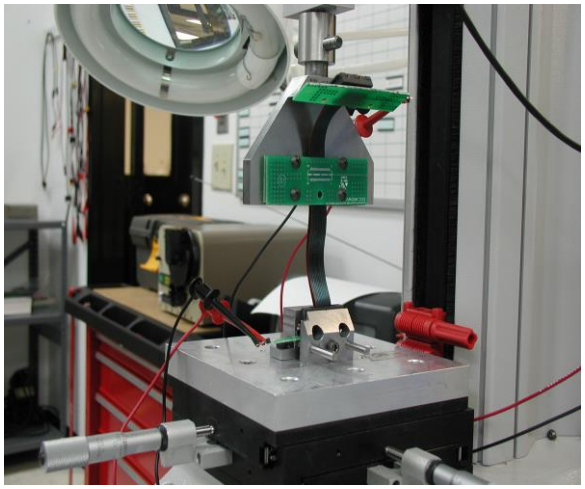


Fig. 1
(Typical set-up, actual part not depicted.)
0° Connector pull, notice the electrical continuity hook-up wires.

RESULTS

Contact Gaps

Durability:

- **Initial**
  - **Min---------- 0.7560 mm**
  - **Max ---------- 0.8140 mm**
- **After 500 Cycles**
  - **Min---------- 0.7600 mm**
  - **Max ---------- 0.8020 mm**

Normal Force Initial:

- **Initial**
  - **Min---------- 0.7640 mm**
  - **Max ---------- 0.8460 mm**

Normal Force after Thermal:

- **Initial**
  - **Min---------- 0.7560 mm**
  - **Max ---------- 0.8040 mm**
- **After thermal**
  - **Min---------- 0.7620 mm**
  - **Max ---------- 0.8120 mm**

Thermal aging:

- **Initial**
  - **Min---------- 0.7540 mm**
  - **Max ---------- 0.8180 mm**
- **After thermal**
  - **Min---------- 0.7740 mm**
  - **Max ---------- 0.8180 mm**

RESULTS Continued

Mating – Unmating Forces

- **Initial**
  - **Mating**
    - **Min ---------- 1.40 Lbs**
    - **Max---------- 2.16 Lbs**
  - **Unmating**
    - **Min ---------- 0.73 Lbs**
    - **Max---------- 1.12 Lbs**
- **After 125 Cycles**
  - **Mating**
    - **Min ---------- 1.27 Lbs**
    - **Max---------- 2.12 Lbs**
  - **Unmating**
    - **Min ---------- 0.82 Lbs**
    - **Max---------- 1.13 Lbs**
- **After 250 Cycles**
  - **Mating**
    - **Min ---------- 1.19 Lbs**
    - **Max---------- 2.12 Lbs**
  - **Unmating**
    - **Min ---------- 0.50 Lbs**
    - **Max---------- 1.27 Lbs**
- **After 375 Cycles**
  - **Mating**
    - **Min ---------- 1.24 Lbs**
    - **Max---------- 1.87 Lbs**
  - **Unmating**
    - **Min ---------- 0.53 Lbs**
    - **Max---------- 0.98 Lb**
- **After 500 Cycles**
  - **Mating**
    - **Min ---------- 1.15 Lbs**
    - **Max---------- 1.64 Lbs**
  - **Unmating**
    - **Min ---------- 0.52 Lbs**
    - **Max---------- 0.84 Lbs**
- **After humdity**
  - **Mating**
    - **Min ---------- 0.85 Lbs**
    - **Max---------- 1.64 Lbs**
  - **Unmating**
    - **Min ---------- 0.46 Lbs**
    - **Max---------- 0.75 Lbs**

RESULTS Continued

Normal Force at 0.065 mm deflection

- **Initial**
  - **Min ---------- 121.68 gf Set ----- 0.0000 mm**
  - **Max ---------- 138.28 gf Set ----- 0.0000 mm**
- **Thermal**
  - **Min ---------- 130.89 gf Set ----- 0.0000 mm**
  - **Max ---------- 149.67 gf Set ----- 0.0040 mm**

Cable Pull Force

SIG 0˚

- **Min ----------29.51 Lbs**
- **Max----------36.45 Lbs**

SIG 90˚

- **Min ----------32.18 Lbs**
- **Max----------34.66 Lbs**

LLCR Thermal aging (9 ground pin LLCR test points and 9 signal pin LLCR test points)

Ground Pin:

- **Initial ----------2.9 mOhms Max**
- **After thermal aging**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

Signal pin:

- **Initial ---------- 16.6 mOhms Max**
- **After thermal aging**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

RESULTS Continued

LLCR Durability (9 ground pin LLCR test points and 9 signal pin LLCR test points)

Ground Pin:

- **Initial ---------- 2.9 mOhms Max**
- **After 500 Cycles**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **After humidity**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Signal Pin:

- **Initial ---------- 16.7 mOhms Max**
- **After 500 Cycles**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **After humidity**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

RESULTS Continued

LLCR Gas Tight (9 ground pin LLCR test points and 9 signal pin LLCR test points)

Ground Pin:

- **Initial ---------- 2.6 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Signal Pin:

- **Initial ---------- 16.6 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 9 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 +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Insulation Resistance minimums, IR

- **Initial**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Thermal**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Humidity**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage ---------- 1350VAC**
  - **Test Voltage ---------- 1013VAC**
  - **Working Voltage ---------- 338VAC**
- **Initial DWV ---------- Passed**
- **Thermal DWV ---------- Passed**
- **Humidity DWV ---------- Passed**

DATA SUMMARIES

CONTACT GAPS:

Durability:

Initial		After 500 Cycles	
Units:	mm	Units:	mm
Minimum	0.7560	***Minimum***	0.7600
Maximum	0.8140	***Maximum***	0.8020
Average	0.7751	***Average***	0.7811
St. Dev.	0.0173	***St. Dev.***	0.0149
Count	9	***Count***	9

Normal Force Initial:

Initial	
Units:	mm
Minimum	0.7460
Maximum	0.8460
Average	0.7702
St. Dev.	0.0332
Count	9

Normal Force after Thermal:

Initial		After Thermal	
Units:	mm	Units:	mm
Minimum	0.7560	***Minimum***	0.7620
Maximum	0.8040	***Maximum***	0.8120
Average	0.7701	***Average***	0.7742
St. Dev.	0.0144	***St. Dev.***	0.0151
Count	9	***Count***	9

Thermal aging:

Initial		After Thermal	
Units:	mm	Units:	mm
Minimum	0.7540	***Minimum***	0.7740
Maximum	0.8180	***Maximum***	0.8180
Average	0.7889	***Average***	0.7964
St. Dev.	0.0240	***St. Dev.***	0.2526
Count	9	***Count***	9

DATA SUMMARIES

MATING/UNMATING:

	Initial				125 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	6.28	1.41	3.24	0.73	5.65	1.27	3.65	0.82
Maximum	9.61	2.16	5.00	1.12	9.43	2.12	5.03	1.13
Average	8.54	**1.92**	4.46	**1.00**	7.76	**1.74**	4.22	**0.95**
St Dev	1.02	0.23	0.55	0.12	1.12	0.25	0.51	0.11
Count	9	9	9	9	9	9	9	9
	250 Cycles				375 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.29	1.19	2.22	0.50	5.52	1.24	2.36	0.53
Maximum	9.43	2.12	5.65	1.27	8.32	1.87	4.36	0.98
Average	7.57	**1.70**	3.55	**0.80**	7.12	**1.60**	3.17	**0.71**
St Dev	1.14	0.26	1.10	0.25	0.82	0.18	0.58	0.13
Count	9	9	9	9	9	9	9	9
	500 Cycles				After Humidity			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.12	1.15	2.31	0.52	3.78	0.85	2.05	0.46
Maximum	7.29	1.64	3.74	0.84	7.29	1.64	3.34	0.75
Average	6.64	**1.49**	2.89	**0.65**	6.00	**1.35**	2.54	**0.57**
St Dev	0.63	0.14	0.45	0.10	1.10	0.25	0.44	0.10
Count	9	9	9	9	9	9	9	9

Connector Pull:

SIG 0° :

	Force (lbs)
Minimum	**29.51**
Maximum	36.45
Average	33.69

SIG 90° :

	Force (lbs)
Minimum	**32.18**
Maximum	34.66
Average	33.36

DATA SUMMARIES Continued

NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):

1) Calibrated force gauges are used along with computer controlled positioning equipment.
2) For Normal force 8-10 measurements are taken and the averages reported.

Initial	Deflections in mm Forces in Grams			
	0.0150	**0.0400**	**0.0650**	***SET***
Averages	32.50	80.71	128.20	0.0000
Min	26.30	73.50	121.68	0.0000
Max	43.10	91.90	138.28	0.0000
St. Dev	5.015	5.234	5.673	0.0000
Count	9	9	9	9

After Thermals	Deflections in mm Forces in Grams			
	0.0150	**0.0400**	**0.0650**	***SET***
Averages	31.44	83.28	137.60	0.0004
Min	28.30	75.50	130.89	0.0000
Max	38.60	91.90	149.67	0.0040
St. Dev	3.092	5.258	5.686	0.0013
Count	9	9	9	9

INSULATION RESISTANCE (IR):

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	**SMA/RF316**	**SMA**	**RF316**
Initial	**10000**	**10000**	**10000**
Thermal	**10000**	**10000**	**10000**
Humidity	**10000**	**10000**	**10000**

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	**SMA/RF316**
Breakdown Voltage	**1350**
Test Voltage	**1013**
Working Voltage	**338**

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

DATA SUMMARIES Continued

LLCR Thermal aging:

1) A total of 18 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 +2000 mOhms ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

Ground Pin:

Date	12/22/2010	1/4/2011
Room Temp C	22	18
RH	48%	43%
Name	Kason He	Kason He
mOhm values	**Actual Initial**	**Delta Thermal Age**
Average	2.2	0.2
St. Dev.	0.4	1.4
Min	1.8	-0.9
Max	2.9	3.9
Count	9	9

How many samples are being tested?	9
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Thermal Age	9	0	0	0	0	0

Signal Pin:

Date	12/22/2010	1/4/2011
Room Temp C	22	18
RH	48%	43%
Name	kason he	kason he
mOhm values	**Actual Initial**	**Delta Thermal Age**
Average	15.8	-0.2
St. Dev.	0.5	0.8
Min	15.4	-1.5
Max	16.6	0.9
Count	9	9

How many samples are being tested?	9
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Thermal Age	9	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Durability:

1) A total of 18 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 +2000 mOhms: ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

Ground Pin:

Date	12/23/2010	12/30/2010	1/4/2011	1/14/2011
Room Temp C	22	21	18	19
RH	47%	42%	42%	45%
Name	kason he	kason he	kason he	kason he
mOhm values	**Actual Initial**	**Delta 500 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	2.3	0.2	-0.1	-0.4
St. Dev.	0.4	0.6	0.9	0.4
Min	1.8	-0.4	-1.0	-1.0
Max	2.9	1.4	2.1	0.3
Count	9	9	9	9

How many samples are being tested?	9
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
500 Cycles	9	0	0	0	0	0
Thermal	9	0	0	0	0	0
Humidity	9	0	0	0	0	0

DATA SUMMARIES Continued

Signal Pin:

Date	12/23/2010	12/30/2010	1/4/2011	1/14/2011
Room Temp C	22	21	18	19
RH	47%	42%	42%	45%
Name	kason he	kason he	kason he	kason he
mOhm values	**Actual Initial**	**Delta 500 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	16.0	0.4	0.2	0.2
St. Dev.	0.5	0.9	0.6	0.6
Min	15.1	-1.1	-0.8	-0.9
Max	16.7	1.5	1.2	1.2
Count	9	9	9	9

How many samples are being tested?	9
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
500 Cycles	9	0	0	0	0	0
Thermal	9	0	0	0	0	0
Humidity	9	0	0	0	0	0

DATA SUMMARIES Continued

LLCR GAS TIGHT:

1) A total of 18 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 +2000 mOhms:---------- Unstable
   f) >+2000 mOhms: ---------- Open Failure

Ground Pin:

Date	12/23/2010	1/6/2011
Room Temp C	20	20
RH	47%	43%
Name	kason	kason
mOhm values	**Actual Initial**	**Delta Gas Tight**
Average	2.1	-0.3
St. Dev.	0.3	0.3
Min	1.7	-0.9
Max	2.6	0.1
Count	9	9

How many samples are being tested?	9
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Gas Tight	9	0	0	0	0	0

DATA SUMMARIES Continued

Signal Pin:

Date	12/23/2010	1/6/2011
Room Temp C	20	20
RH	47%	43%
Name	kason	kason
mOhm values	**Actual Initial**	**Delta Gas Tight**
Average	16.1	-0.5
St. Dev.	0.5	0.6
Min	15.2	-1.3
Max	16.6	0.3
Count	9	9

How many samples are being tested?	9
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Gas Tight	9	0	0	0	0	0

DATA

CONTACT GAPS

GAP Durability:

Initial									
Units: mm									
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**
1	0.8140	0.7660	0.7720	0.7640	0.7560	0.7780	0.7860	0.7780	0.7620
After 500 Cycles									
Units: mm									
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**
1	0.8020	0.7860	0.7660	0.7960	0.7600	0.7960	0.7800	0.7760	0.7680

GAP Normal Force Initial:

Initial									
Units: mm									
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**
1	0.7500	0.8460	0.7580	0.7600	0.7580	0.7480	0.7620	0.7460	0.8040

GAP Normal Force after Thermal:

Initial									
Units: mm									
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**
1	0.7560	0.7800	0.7660	0.7660	0.7580	0.7660	0.7700	0.8040	0.7650
After Thermal									
Units: mm									
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**
1	0.7620	0.7640	0.7440	0.7760	0.7640	0.8120	0.7720	0.7680	0.7760

GAP Thermal aging:

Initial									
Units: mm									
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**
1	0.7540	0.8140	0.8180	0.7660	0.7780	0.8080	0.7740	0.8120	0.7760
After Thermal									
Units: mm									
Pos.#	**B1**	**B2**	**B3**	**B4**	**B5**	**B6**	**B7**	**B8**	**B9**
1	0.7840	0.8140	0.8180	0.7860	0.7740	0.8180	0.7760	0.8180	0.7800

DATA Continued

NORMAL FORCE (FOR CONTACTS TESTED OUTSIDE THE HOUSING):

Initial	Deflections in mm, Forces in Grams			
Sample #	**0.0150**	**0.0400**	**0.0650**	***SET***
1	43.1	78.4	122.2	0.0000
2	30.0	80.0	128.1	0.0000
3	34.9	91.9	138.3	0.0000
4	34.5	80.9	128.2	0.0000
5	26.3	75.9	129.8	0.0000
6	33.3	84.1	134.6	0.0000
7	32.9	81.7	122.4	0.0000
8	30.4	80.0	121.7	0.0000
9	27.1	73.5	128.6	0.0000

After Thermals	Deflections in mm, Forces in Grams			
Sample #	**0.0150**	**0.0400**	**0.0650**	***SET***
1	29.2	77.2	133.1	0.0040
2	38.6	91.9	143.3	0.0000
3	31.6	87.0	135.3	0.0000
4	28.3	75.5	130.9	0.0000
5	30.0	85.0	137.4	0.0000
6	30.4	84.1	149.7	0.0000
7	33.3	85.8	138.1	0.0000
8	29.6	78.4	135.1	0.0000
9	32.0	84.6	135.6	0.0000

INSULATION RESISTANCE (IR):

Initial Insulation Resistance
Measured In Meg Ohms

	Pin to Ground		
	Mated	A Unmated B	
	x	x	x
Sample#	**SMA/RF316**	**SMA**	**RF316**
116049-025	10000	10000	10000
116049-026	10000	10000	10000

DATA Continued

Thermal Insulation Resistance
Measured In Meg Ohms

	Pin to Ground		
	Mated	A Unmated	B
	x	x	x
Sample#	SMA/RF316	SMA	RF316
116049-025	10000	10000	10000
116049-026	10000	10000	10000

Humidity Insulation Resistance
Measured In Meg Ohms

	Pin to Ground		
	Mated	A Unmated	B
	x	x	x
Sample#	SMA/RF316	SMA	RF316
116049-025	10000	10000	10000
116049-026	10000	10000	10000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Initial Breakdown Voltage
Test Voltage *Until Breakdown Occurs*

	Pin to Ground		
	Mated	A Unmated	B
	x		
Sample#	SMA/RF316	SMA	RF316
116049-021	1350	2250	1750
116049-022	1500	2500	1500

DATA Continued

Initial DWV	
Test Voltage=	1013

	Pin to Ground		
	Mated	A Unmated	B
Sample#	SMA/RF316	SMA	RF316
116049-025	1013	1013	1013
116049-026	1013	1013	1013

Thermal Test Voltage	
Test Voltage=	1013

	Pin to Ground		
	Mated	A Unmated	B
Sample#	SMA/RF316	SMA	RF316
116049-025	1013	1013	1013
116049-026	1013	1013	1013

Humidity Test Voltage	
Test Voltage=	1013

	Pin to Ground		
	Mated	A Unmated	B
Sample#	SMA/RF316	SMA	RF316
116049-025	1013	1013	1013
116049-026	1013	1013	1013

DATA continued

MATING/UNMATING:

	Initial		After 125 Cycles		After 250 Cycles		After 375 Cycles	
Sample#	Mating	Unmating	Mating	Unmating	Mating	Unmating	Mating	Unmating
1	1.41	0.73	1.27	0.90	1.19	0.50	1.24	0.64
2	1.96	0.93	1.70	0.85	1.88	0.72	1.75	0.68
3	2.07	0.97	1.70	0.85	2.12	0.65	1.87	0.61
4	2.14	1.10	1.71	0.82	1.61	0.52	1.64	0.53
5	2.16	1.08	2.07	1.13	1.73	0.84	1.52	0.72
6	1.81	1.08	1.60	0.93	1.81	0.77	1.69	0.68
7	1.94	1.04	1.72	0.91	1.52	1.06	1.44	0.83
8	1.98	0.97	1.81	1.09	1.78	0.86	1.67	0.75

	After 500 Cycles		After humidity	
Sample#	Mating	Unmating	Mating	Unmating
1	1.15	0.58	1.31	0.58
2	1.58	0.52	1.23	0.50
3	1.64	0.60	1.61	0.51
4	1.51	0.55	1.43	0.54
5	1.44	0.74	1.17	0.63
6	1.53	0.63	0.85	0.46
7	1.46	0.71	1.64	0.68
8	1.57	0.68	1.37	0.48

Cable Pull Force

SIG 0° :

Sample #	Force (lbs)
1	33.9
2	29.51
3	36.45
4	32.44
5	36.17

SIG 90°

Sample #	Force (lbs)
1	33.57
2	33.69
3	32.72
4	32.18
5	34.66

DATA Continued

LLCR Thermal aging:

Ground Pin:

	mOhm values	Actual	Delta
Board	Position	Initial	Thermal Age
1	P1	2.3	0.2
2	P1	1.9	3.9
3	P1	2.5	-0.7
4	P1	2.0	-0.1
5	P1	2.9	-0.9
6	P1	2.0	-0.2
7	P1	1.8	0.1
8	P1	2.2	-0.3
9	P1	2.1	-0.1

Signal Pin:

	mOhm values	Actual	Delta
Board	Position	Initial	Thermal Age
1	P1	15.7	-0.7
2	P1	15.7	-0.5
3	P1	15.4	-0.1
4	P1	15.4	0.8
5	P1	15.4	0.6
6	P1	16.6	-0.8
7	P1	15.4	0.9
8	P1	16.1	-0.9
9	P1	16.4	-1.5

LLCR Durability:

Ground Pin:

	mOhm values	Actual	Delta	Delta	Delta
Board	Position	Initial	500 Cycles	Thermal	Humidity
1	P1	2.1	1.4	-0.4	-0.4
2	P1	2.2	0.0	-0.3	-0.3
3	P1	2.4	-0.4	-0.6	-0.5
4	P1	2.4	-0.2	-0.5	-0.5
5	P1	2.4	0.2	-0.5	-0.5
6	P1	2.8	-0.4	-1.0	-1.0
7	P1	1.9	0.5	-0.2	-0.2
8	P1	2.9	0.8	2.1	-0.9
9	P1	1.8	0.0	0.3	0.3

DATA Continued

Signal Pin:

Board	mOhm values Position	Actual Initial	Delta 500 Cycles	Delta Thermal	Delta Humidity
1	P1	15.1	1.4	0.0	0.1
2	P1	15.6	0.9	0.6	0.6
3	P1	15.7	0.6	0.6	0.7
4	P1	15.4	1.5	1.2	1.2
5	P1	16.5	0.2	-0.1	0.0
6	P1	16.7	-1.1	-0.1	-0.1
7	P1	16.2	0.4	-0.8	-0.9
8	P1	16.1	0.3	0.1	0.0
9	P1	16.4	-0.9	-0.1	-0.1

LLCR Gas Tight

Ground Pin:

Board	mOhm values Position	Actual Initial	Delta Gas Tight
1	P1	2.6	-0.9
2	P1	2.3	-0.4
3	P1	2.2	-0.4
4	P1	1.7	0.1
5	P1	2.1	-0.4
6	P1	1.9	0.1
7	P1	1.9	-0.1
8	P1	2.0	-0.2
9	P1	2.0	-0.2

Signal Pin:

Board	mOhm values Position	Actual Initial	Delta Gas Tight
1	P1	15.3	0.1
2	P1	16.0	0.3
3	P1	16.4	-0.5
4	P1	15.2	0.1
5	P1	16.2	-0.6
6	P1	16.6	-0.9
7	P1	16.3	-0.4
8	P1	16.5	-1.3
9	P1	16.4	-1.1

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-MO-03
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 580
Serial #: 297288
Accuracy: Last Cal: 2010-9-21, Next Cal: 2011-9-20

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 2010-4-28, Next Cal: 2011-4-27

Equipment #: HZ-OV-01
Description: Oven
Manufacturer: Huida
Model: CS101-1E
Serial #: CS101-1E-B
Accuracy: Last Cal: 2010-12-8, Next Cal: 2011-12-7

Equipment #: HZ-THC-01
Description: Humidity transmitter
Manufacturer: Thermtron
Model: HMM30C
Serial #: D0240037
Accuracy: Last Cal: 2010-6-1, Next Cal: 2011-5-31

Equipment #: HZ-MO-01
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 2700
Serial #: 1199807
Accuracy: Last Cal: 2010-6-1, Next Cal: 2011-5-31

Equipment #: HZ-TSC-01
Description: Thermal Shock transmitter
Manufacturer: Keithley
Model: 10-VT14994
Serial #: VTS-3-6-6-SC/AC
Accuracy: Last Cal: 2010-11-1, Next Cal: 2011-11-1