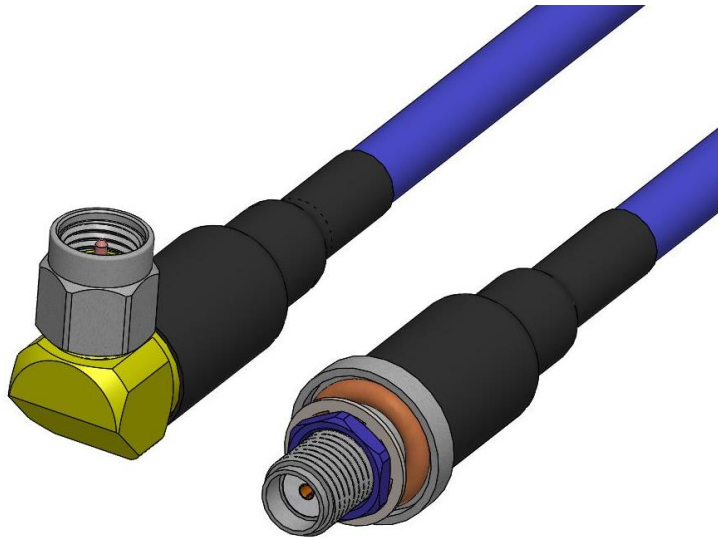




Project Number: Design Qualification Test Report	Tracking Code: 2697053_Report_Rev_1
Requested by: Alvin Wang	Date: 4/21/2021
Part #: RF180-01RP-505050-0152 /RF180-01BJ-505050-0152	
Part description: RF180-01RP / RF180-01BJ	Tech: Peter Chen
Test Start: 3/1/2021	Test Completed: 3/20/2021



DESIGN QUALIFICATION TEST REPORT
RF180-01RP / RF180-01BJ
RF180-01RP-505050-0152 /RF180-01BJ-505050-0152

Tracking Code: 2697053_Report_Rev_1	Part #: RF180-01SP-505050-0152 /RF180-01SJ-505050-0152
Part description: RF180-01RP / RF180-01BJ	

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
4/20/2021	1	Initial Issue	PC

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, 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**

RF180-01RP-505050-0152

RF180-01BJ-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 (Brown) on open ends.

Plug version: RF180-01RP-01RP-1000 (4 PCS)

Jack version: RF180-01BJ-01BJ-1000 (4PCS)

Step	Description
1.	Length & Mass
2.	Interface Gaging
3.	IR (2) - Non Standard
4.	DWV at Test Voltage (1) - Non Standard Test Voltage = 500 V
5.	LLCR (3) - Non Standard <i>Note: Signal and ground.</i>
6.	Thermal Shock (4) - Non Standard
7.	IR (2) - Non Standard
8.	DWV at Test Voltage (1) - Non Standard Test Voltage = 500 V
9.	LLCR (3) - Non Standard <i>Note: Signal and ground.</i>
10.	Interface Gaging

(1) DWV at Test Voltage = Other

Test Condition = 1 (Sea Level) Test voltage applied for 60 seconds
MIL-PRF-39012, Paragraph 4.6.8 per MIL-STD-202-302

(2) IR = Other

Test Condition = 500 Vdc, 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
Method A, Test Condition = I (-55°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
RF180-01RP-505050-0152

2 Assemblies
0 Degrees

Step	Description
1.	Cable Retention (2) - Non Standard <i>Note: Pull-to-destruct.</i>

Group 2
RF180-01BJ-505050-0152

2 Assemblies
0 Degrees

Step	Description
1.	Cable Retention (2) - Non Standard <i>Note: Pull-to-destruct.</i>

Group 3
RF180-01RP-505050-0152
RF180-01BJ-505050-0152

4 Assemblies
0 Degrees

Step	Description
1.	Length & Mass
2.	Interface Gaging
3.	LLCR (3) - Non Standard <i>Note: Signal and ground.</i>
4.	Cable Retention (1) - Non Standard <i>Note: Apply 20 pounds (9.2kg) for Cable Retention test.</i>
5.	LLCR (3) - Non Standard <i>Note: Signal and ground.</i>
6.	Interface Gaging

(1) Cable Retention = Other

Apply 20 pounds (9.26kg) for Cable Retention test.
MIL-PRF-30192, Paragraph 4.6.21

(2) Cable Retention = Other

Pull-to-destruct.
MIL-PRF-30192, 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.

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: -55°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. $\leq +5.0$ 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

CABLE RETENTION:

- 1) Apply 20 pounds (9.2 kg) for cable retention test.
- 2) Pull to destruct.
- 3) MIL-PRF-30192, paragraph. 4.6.21.

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 RF180-01SJ-505050-0152
 - Min----- 127.05 lbs
 - Max ----- 128.90 lbs
 - Group 2 RF180-01SP-505050-0152
 - Min----- 129.41 lbs
 - Max ----- 134.00 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

Pin to Ground

- Initial DWV -----Passed

RESULTS Continued**Length & Mass****IR/DWV Group****Length****01RP**

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

01BJ

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

Mass**01RP**

- **Min**----- **21.35 g**
- **Max**----- **21.39 g**

01BJ

- **Min**----- **16.86 g**
- **Max**----- **17.04 g**

Cable Pull Group**Length****01RP**

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

01BJ

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

Mass**01RP**

- **Min**----- **9.65 g**
- **Max**----- **9.69 g**

01BJ

- **Min**----- **8.42 g**
- **Max**----- **8.47 g**

RESULTS Continued**Interface Gaging****IR/DWV Group****01RP****Initial**

- **Min**----- **0.0094 mm**
- **Max**----- **0.0343 mm**

After Thermal Shock

- **Min**----- **0.0129 mm**
- **Max**----- **0.0272 mm**

01BJ**Initial**

- **Min**----- **0.0094 mm**
- **Max**----- **0.0314 mm**

After Thermal Shock

- **Min**----- **0.0178 mm**
- **Max**----- **0.0304 mm**

Cable Pull Group**01RP****Initial**

- **Min**----- **0.0143 mm**
- **Max**----- **0.0405 mm**

After Retention

- **Min**----- **0.0139 mm**
- **Max**----- **0.0276 mm**

01BJ**Initial**

- **Min**----- **0.0166 mm**
- **Max**----- **0.0399 mm**

After Retention

- **Min**----- **0.0076 mm**
- **Max**----- **0.0161 mm**

RESULTS Continued**LLCR IR/DWV (4 ground and 4 signal LLCR test points)****Ground pin**

- **Initial** -----6.51 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** -----6.98 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

LLCR Cable Pull (4 ground and 4 signal LLCR test points)**Ground pin**

- **Initial** -----6.44 mOhms Max
- **After 20lb 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** -----5.57 mOhms Max
- **After 20lb 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

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

Pin to Ground	
	Mated
Minimum	RF180-01RP/RF180-01BJ
Initial	45000
Thermal Shock	45000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	RF180-01RP/RF180-01BJ
Test Voltage	500

Pin to Ground	
Initial Test Voltage	Pass
After Thermal Shock Test Voltage	Pass

Mating/Unmating Durability Group

Pin to Ground	
Initial Test Voltage	Pass

Cable Pull Force:**0° Pull****Group 1 RF180-01RP-505050-0152**

	Force (lbs)
Minimum	127.05
Maximum	128.90
Average	127.98

Group 2 RF180-01BJ-505050-0152

	Force (lbs)
Minimum	129.41
Maximum	134.00
Average	131.70

DATA SUMMARIES Continued**LENGTH & MASS****IR/DWV Group**

01RP	Length (mm)	Mass (g)
1	156.00	21.39
2	156.00	21.36
3	156.00	21.35
4	156.00	21.39

01BJ	Length (mm)	Mass (g)
1	156.00	16.94
2	156.00	16.84
3	156.00	16.86
4	156.00	17.04

Cable Pull Group

Group 3		
01RP	Length (mm)	Mass (g)
1	154.0	9.650
2	154.0	9.660
3	154.0	9.670
4	154.0	9.690

Group 3		
01BJ	Length (mm)	Mass (g)
1	154.0	8.470
2	154.0	8.470
3	154.0	8.460
4	154.0	8.420

DATA SUMMARIES Continued**INTERFACE GAGING****IR/DWV Group**

Gaging (0.08 /-0.00) (mm)			
01RP	Initial	Post Ther Shock	Delta
1	0.0269	0.01290	0.01400
2	0.0094	0.02720	0.01780
3	0.0343	0.01450	0.01980
4	0.0187	0.02060	0.00190

Gaging (0.08 /-0.00) (mm)			
01BJ	Initial	Post Ther Shock	Delta
1	0.0094	0.0304	0.0210
2	0.0163	0.0282	0.0119
3	0.0184	0.0229	0.0045
4	0.0314	0.0178	0.0136

Cable Pull Group

Gaging (0.08 /-0.00) (mm)			
01RP	Initial	Retention	Delta
1	0.0184	0.013900	0.0045
2	0.0143	0.016900	0.0026
3	0.0405	0.022100	0.0184
4	0.0284	0.0276	0.0008

Gaging (0.08 /-0.00) (mm)			
01BJ	Initial	Retention	Delta
1	0.0167	0.007600	0.0091
2	0.0247	0.001400	0.0233
3	0.0116	0.016100	0.0045
4	0.0399	0.0114	0.0285

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. $\leq +5.0$ 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	3/1/021	3/3/021		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	50	50		
Technician	Peter Chen	Peter Chen		
mOhm values	Actual	Delta		
	Initial	Thermal Shock		
Pin Type: Signal 1				
Average	6.185	0.1425		
St. Dev.	0.2281	0.0888		
Min	5.98	0.06		
Max	6.51	0.26		
Summary Count	4	4		
Total Count	4	4		
Pin Type: GND 1				
Average	7.42	0.54		
St. Dev.	0.5297	0.4036		
Min	6.98	0.14		
Max	8.1	1		
Summary Count	4	4		
Total Count	4	4		

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	8	0	0	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. $\leq +5.0$ 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	3/19/2021	3/19/2021		
Room Temp (Deg C)	20	20		
Rel Humidity (%)	50	50		
Technician	Peter Chen	Peter Chen		
mOhm values	Actual	Delta		
	Initial	5lb Retention		
Pin Type: Signal 1				
Average	6.24	0.16		
St. Dev.	0.16	0.14		
Min	6.07	0.05		
Max	6.44	0.32		
Summary Count	4	4		
Total Count	4	4		
Pin Type: GND 1				
Average	5.52	0.99		
St. Dev.	0.06	0.86		
Min	5.46	0.03		
Max	5.57	1.67		
Summary Count	4	4		
Total Count	4	4		

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 5lb Retention	8	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: 12/17/2020, Next Cal: 12/16/2021