



1. INTRODUCTION

1.1 Purpose

Testing was performed on Super Card Edge Connector system to determine its conformance to requirements of design objective 108-128052, Revision A.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the Super Card Edge Connector system. Testing was performed at the Engineering Assurance Product Testing Laboratory between 04-Apr-2017 and 19-May-2017.

1.3 Conclusion

The Super Card Edge Connector system listed in paragraph 1.4, conformed to the electrical, mechanical, and environmental performance requirements of design objective 108-128052, Revision A.

1.4 Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
#1,2,5,6,7	15 (3 ea)	2204798-1	Super Card Edge Connector
	15 (3 ea)	2204882-1	Mating side PCB, Multi layers,5oZ each layer
	15 (3 ea)	2204883-1	Mounting side PCB, Multi layers,5oZ each layer
#3,4	3	2204798-1	Super Card Edge Connector
#2	3	2204798-1	Super Card Edge Connector
	3	2204901-1	Mating side PCB, Multi layers,2oZ each layer
	3	2204902-1	Mounting side PCB, Multi layers,2oZ each layer

* Notes: Group 2 was tested with both 2oZ and 5oZ test PCB.

1.5 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:
Temperature: 15°C to 35°C Relative Humidity 25% to 75%

1.6 Qualification Test Sequence

Test Description	Test group						
	1	2	3	4	5	6	7
	Test sequence (a)						
Initial examination of product	1	1	1	1	1	1	1
Low level contact resistance	3,7	2,6			2,5	2,5	
Contact resistance (for power contact)		3,7			3,6		2,4
Insulation resistance			2,6				
Dielectric Withstanding Voltage			3,7				
Temperature rise vs current		4					
*Hot Swap							3(b)
Vibration, sinusoidal	5						
Mechanical shock	6						
Durability	4						
Mating force	2						
Un-mating force	8						
contact retention force				2			
Thermal shock			4			3	
Humidity/temperature cycling.			5			4	
Temperature life					4(c)		
Mixed flowing gas		5(c)					
Final examination	9	8	8	3	7	6	5

(a) Numbers indicate sequence in which tests are performed

(b) Executed by the customer

2. SUMMARY OF TESTING

2.1 Initial examination– All Test Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by Product Assurance. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 Low Level Contact Resistance- Test Group 1, 2, 5, 6.

Test Group	Test Condition	LLCR (unit: mΩ)		Spec	Jud.
		AVG	MAX		
#1	Signal	Initial	11.73	Signal contact: 30 mΩ max.	OK
		Final	11.63		OK

	Power	Initial	0.40	0.47	Power contact: 1.5 mΩ max.	OK
		Final	0.42	0.57		OK
#2	Signal	Initial	11.73	12.63		OK
		Final	12.58	14.25		OK
	Power	Initial	0.41	0.47		OK
		Final	0.44	0.53		OK
#5	Signal	Initial	10.86	13.00		OK
		Final	11.38	13.67		OK
	Power	Initial	0.39	0.59	OK	
		Final	0.54	0.72	OK	
#6	Signal	Initial	11.39	13.18	OK	
		Final	11.38	13.69	OK	
	Power	Initial	0.43	0.57	OK	
		Final	0.52	0.66	OK	

2.3 Contact resistance – Test Group 2,5.

Test Group	Test Condition	CR (mΩ)		Spec	Jud.	
		AVG	MAX			
#2	Power	Initial	0.433	0.514	1.0 mΩ max.	OK
		Final	0.436	0.512		OK
#5	Power	Initial	0.520	0.670		OK
		Final	0.410	0.550		OK

2.4 Insulation resistance– Test Group 3

All insulation resistance measurements for power were greater than 5000 megohms, and all insulation resistance measurements for signal were greater than 500 megohms.

2.5 Dielectric Withstanding Voltage – Test Group 3

No dielectric breakdown or flashover occurred.

2.6 Temperature rise vs current – Test Group 2

At the max current load (14 power contacts charged with 24A per contact) the temp rise is within the requirement of $\Delta t_{max} = 30^{\circ}\text{C}$,
The measured values range from 21.64°C to 24.01°C with 5oZ multi-layer test PCB, and range from 23.99°C to 27.2°C with 2oZ multi-layer test PCB.

- 2.7 Vibration, sinusoidal – Test Group 1
No discontinuity greater than 1microsecond were detected; No physical damage.
- 2.8 Mechanical shock – Test Group 1
No discontinuity greater than 1microsecond were detected; No physical damage.
- 2.9 Durability – Test Group 1
No physical damage occurred to the specimens as a result of mating and unmating the specimens 200 times.
- 2.10 Mating force and Unmating force – Test Group 1
Mating force measurements of all specimens were less than 40N, with average 32.23N. and Unmating force measurements of all specimens were more than 10N, with average 15.27N
- 2.11 Contact retention force – Test Group 4
All retention force measurements for power contact were more than 5N per contact.
All retention force measurements for Signal contact were more than 3N per contact.
- 2.12 Thermal shock – Test Group 3, 6
No evidence of physical damage was visible as a result of exposure to thermal shock.
- 2.13 Humidity-temperature cycling – Test Group 3, 6
No evidence of physical damage was visible as a result of exposure to Humidity-temperature cycling
- 2.14 Temperature life– Test Group 5
No evidence of physical damage was visible as a result of exposure to 250hours at 105°C temperature life.
- 2.15 Mixed flowing gas– Test Group 2
No evidence of physical damage was visible as a result of the Class IIA MFG exposure for 20days.
- 2.17 Final examination of product – All Test Groups
Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST REQUIREMENTS AND PROCEDURES SUMMARY

Test Description	Requirement	Procedure
Initial examination of product	Meets requirements of product-drawing and applicable instructions on customer drawing, and application specification.	EIA-364-18 Visual examination and dimensional inspection per product drawings.
Final examination of product	Meets visual requirements	EIA-364-18 Visual examination

ELECTRICAL		
Low Level Contact Resistance	Signal contact: 30 milliohms max. Power contact: 1.5 milliohms max.	EIA-364-23 Subject specimens to 100 mA maximum and 20 mV maximum open circuit voltage
Contact resistance (power contact)	At 24A for power, 1 milliohms maximum	EIA-364-06
Insulation resistance	500 MΩ min for signal contact 5000 MΩ min for power contact	EIA-364-21 500+/-10% VDC, 2 minutes hold. Test between adjacent contacts
Dielectric Withstanding Voltage	One minute hold with no breakdown or flashover	EIA-364-20, Condition I. 1500 V for power contact and 500V for signal contact at sea level. Test between adjacent contacts.
Hot Swap	Contact resistance change < 5 MΩ	48V DC, 30A, 30 cycles. Test setup defined by customer.
Temperature rise vs current	Temperature rise: 30°C maximum over ambient temperature	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C

MECHANICAL		
Vibration, sinusoidal	No discontinuities of 1 microsecond or longer duration. See Note	EIA-364-28, Test condition I, Subject mated specimens to 10-55-10 Hz Traversed in 1 minutes at 1.52mm amplitude 2 hours each of 3 mutually perpendicular planes; See figure 3
Mechanical shock	No discontinuities of 1 microsecond or longer duration. See Note	EIA-364-27, Test Condition A. Subject mated specimens to 50 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks See Figure 3
Mating force	14N max—Power contact pair 1.2N max—Signal contact pair Total mating force for 2204798-1: 110N max.	EIA-364-13, Method A. Measure force necessary to mate specimens at a maximum rate of 12.7 mm per minute
Un-mating force	0.75N min—Power contact pair 0.15N min—Signal contact pair Total un-mating for 2204798-1: 10N min.	EIA-364-13, Method A. Measure force necessary to mate specimens at a maximum rate of 12.7 mm per minute
Durability	See Note	EIA-364-9 Mate and un-mate specimens for 200 cycles at a maximum rate of 500 cycles per hour
Contact retention force	5N minimum per power pin. 3N minimum per signal pin	EIA-364-29 Measure force necessary to remove individual contact from the housing at a maximum rate of 12.7mm per minute

ENVIRONMENTAL		
Thermal shock	See Note	EIA-364-32, Method A, Test condition I, Subject specimens to 5cycles between -55 and 85°C with 30 minute dwells at temperature extremes and 1 minute maximum transition between temperatures
Temperature life	See Note	EIA-364-17, Method A, Test condition 4, Test condition C. Subject mated specimens to 105°C for 250 hours
Humidity/temperature cycling.	See Note	EIA-364-31, Method III. Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 90 to 95% RH.
Mixed flowing gas	See Note	EIA-364-65, Class IIA (4 gas). Subject mated specimens to environmental Class IIA for 20 days—(10 days unmated, LLCR, followed by 10 days mated)

NOTE

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence