Multi-beam CE Power Card Edge Connector

1. INTRODUCTION

1.1 Purpose

Testing was performed on TE connectivity Multi-beam CE Power Card Edge Connector to determine its conformance to requirements of Product Specification 108-32043, Revision A.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of TE connectivity Multi-beam CE Power Card Edge Connector. Testing was performed at the Engineering Assurance Product Testing Laboratory between 22Dec2014 and 21May2015.

1.3. Conclusion

The TE connectivity Multi-beam CE Power Card Edge Connector conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-32043, Revision A.

1.4. Environmental Conditions

Unless otherwise stated. The following environmental conditions prevailed during testing

Temperature: 15 to 35°C
Relative Humidity: 25 to 75%

1.5. Product Qualification and Requalification Test Sequence

Test Description	Test group					
	1	2	3	4	5	6
	Test sequence (a)					
Initial examination of product	1	1	1	1	1	1
Lowe level contact resistance	3,7	2,6				2,5
contact resistance(for power contact)		3,7				3,6
Insulation resistance			2,6			
Dielectric withstanding voltage			3,7			
Temperature rise vs current		4,8				
Vibration, random	5					
Mechanical shock	6					
Durability	4					
Mating force	2					
Un-mating force	8					
Contact retention force					2	
Complaint pin insertion				2		
Complaint pin retention				3		
Thermal shock			4			
Humidity, steady state			5			
Temperature life						4(b)
Mixed flowing gas		5(b)				
Final examination gas	9	9	8	4	3	7

| Indicates Change

(a) Numbers indicate sequence in which tests are performed.

(b) Precondition specimens with 10 durability cycles

1.6. Test Specimens

The specimens were representative of normal production lots.

Test Group	Quantity	Part Number	Description
1,2,3,6	3 each	2212115-1	MBCE Connector assembly, 2x13Power+2x24Signal
1,2,3,	3 each	2212078-1	MBCE Connector assembly, 2x13Power+2x24Signal
4,5,	3 each	2214913-1	MBCE Connector assembly, 2x13Power+2x24Signal
1,2,6	3 each	60-1824488-1	Printed circuit test board, Revision A
1,2	3 each	60-1824487-1	Printed circuit test board, Revision A
4,5,	3 each	60-1824509-1	Printed circuit test board, Revision A
1,2,6	6 each (3 for group 6)	60-1824486-1	Daughter card, Revision A

2. SUMMARY OF TESTING

2.1. Initial Examination of Product – All Test Groups

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

2.2. Low Level Contact Resistance – Test Groups 1, 2 and 6.

All low level contact resistance measurements taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 30 milliohms for signal contacts, and less than 1.5 milliohms for power contacts.

Test Group	Test Sequence	Termination Resistance (mΩ)			
		Min	Max	Mean	Contact Type
1	3	11.80	25.39	18.21	Signal
		0.33	0.65	0.52	Power
	7	12.29	27.03	18.84	Signal
		0.37	0.73	0.55	Power
2	2	9.66	24.68	17.35	Signal
		0.25	0.64	0.50	Power
	6	11.89	24.95	17.81	Signal
		0.26	1.33	0.60	Power
6	2	12.73	27.06	18.58	Signal
		0.44	0.67	0.52	Power
	5	14.48	29.63	21.38	Signal
		0.65	1.35	0.89	Power

2.3. Contact resistance (for power contact) – Test Group 2 and 6.

All contact resistance measurements were less than 1 mΩ.

Test Group	Test Sequence	Contact Resistance(mΩ)		
		Min	Max	Mean
2	3	0.32	0.89	0.62
	7	0.44	0.77	0.53
6	3	0.61	0.85	0.72
	6	0.76	0.95	0.88

2.4. Insulation resistance – Test Group 3.

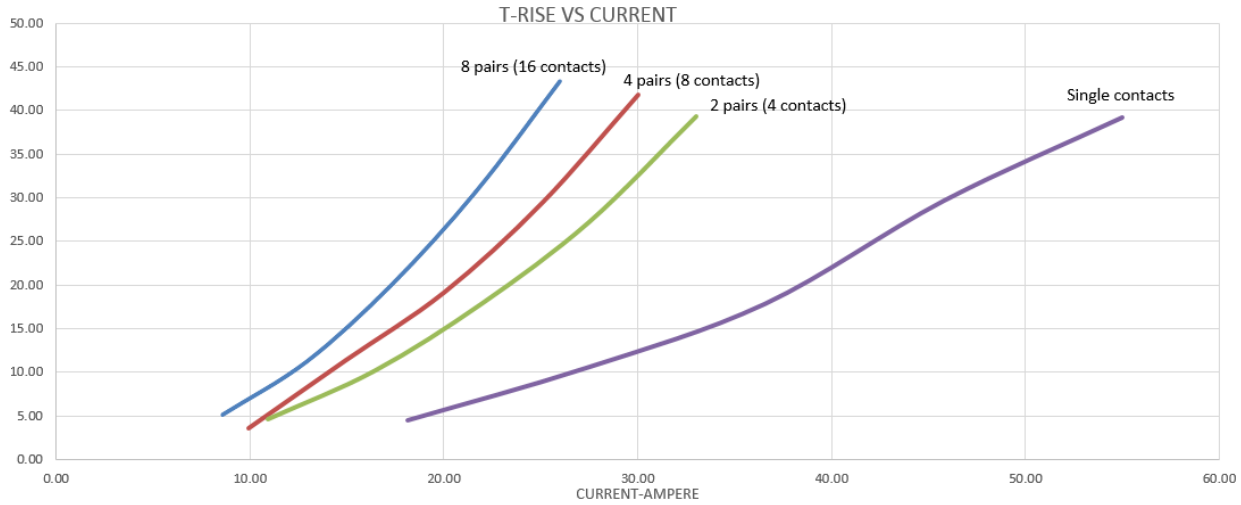
All insulation resistance measurements for power were greater than 5000 megohms, and all insulation resistance measurements for signal were greater than 500 megohms.

2.5. Dielectric withstanding voltage – Test Group 3.

No dielectric breakdown or flashover occurred.

2.6. Temperature rise vs current – Test Group 2.

The data for power was taken from specimens mounted on 2 ounce copper 2 layers power printed circuit boards.



All the temperature rise for signal contact at designated rated current was lower than 30℃.

2.7. Vibration, random – 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 as a result of mating and unmating the specimens 200 times.

2.10. Mating force / unmating forces – Test Group 1.

Testing was performed on entire connector and the test result shows as follows.

Test Group	Test Sequence	Force (N)		
		Min	Max	Mean
1	2 - Mating	62.13	86.79	66.80
	8 - Unmating	29.05	40.08	37.93

2.11. Contact retention force – Test Group 5.

All retention force measurements were more than 3N per contact.

2.12. Complaint pin insertion and retention – Test Group 4.

All insertion force measurements were less than 111.2N per pin and retention force measurements were more than 6.7N per pin.

Test Group	Test Sequence	Force per pin (N)			
		Min	Max	Mean	Contact type
4	2	13.17	14.10	13.64	Signal
		36.42	37.41	36.92	Power
	3	11.10	11.37	11.24	Signal
		27.36	29.12	28.24	Power

** Notes: One power contact have three pins.*

2.13. Thermal shock – Test Group 3.

No evidence of physical damage was visible as a result of exposure to thermal shock.

2.14. Humidity, Steady State - Test Group 3

No evidence of physical damage was visible as a result of exposure to steady state humidity.

2.15. Temperature Life - Test Group 6

No evidence of physical damage was visible as a result of exposure to temperature life.

2.16. Mixed Flowing Gas -Test Group 2

No evidence of physical damage was visible as a result of exposure to the pollutants of mixed flowing gas.

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 43A for power, 1milliohms 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 400V for signal contact at sea level. Test between adjacent contacts.
Temperature rise vs current	Temperature rise: 30℃ 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℃ See Table 2 and Figure 1
MECHANICAL		
Random Vibration	No discontinuities of 1 microsecond or longer duration. See Note	EIA-364-28, Test Condition VII, Test Condition Letter D. Subject mated speciments to 3.10 G's rms between 20 to 500 HZ. Fifteen minutes in 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	6N max—Power contact pair 1.15N max—Signal contact pair	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	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
Compliant pin insertion.	111.2 N [25 lbf] maximum per pin.	EIA-364-5. Measure force necessary to correctly apply a specimen to a printed circuit board at a maximum rate of 12.7 mm [.5 in] per minute.
Compliant pin retention.	6.7 N [1.5 lbf] minimum per pin.	EIA-364-29. Measure force necessary to remove a correctly applied specimen from its printed circuit board at a maximum rate of 12.7 mm [.5 in] per minute.
Contact retention force	3N minimum per pin.	EIA-364-29 Measure force necessary to remove individual contact froem 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℃ with 30 minute dwells at temperature extremes and 1 minute maximum transition between temperatures
Humidity, steady state	See note	EIA-364-31, Method II, Test Condition A. Subject specimens to 40℃ and 90 to 95% RH for 96 hours
Temperature life	See Note	EIA-364-17,Method A, Test condition 4, Test condition C. Subject mated specimens to 105℃ for 500 hours
Mixed flowing gas	See Note	EIA-364-65, Class IIA (4 gas). ** Subject mated specimens to environmental Class IIA for 14 days—(7 days mated,7 days un-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 shown in 1.5.*

*** Except without the use of copper coupon. Gas levels monitored throughout testing to ensure correct concentrations within the test chamber*.

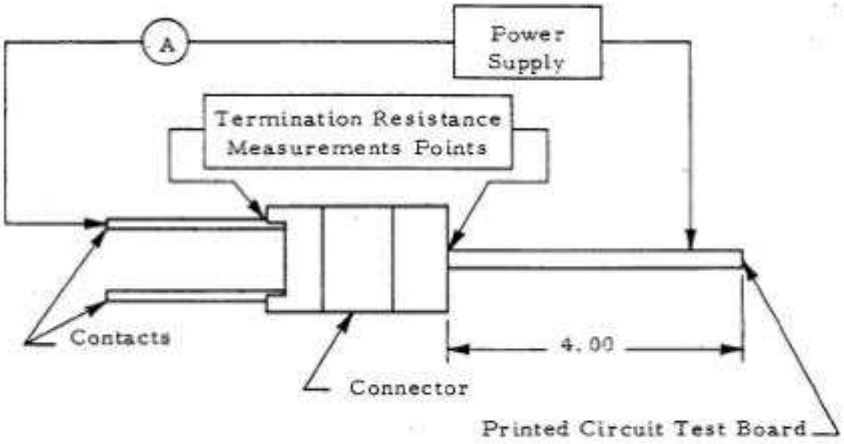


Figure 2
LLCR Measurement Points

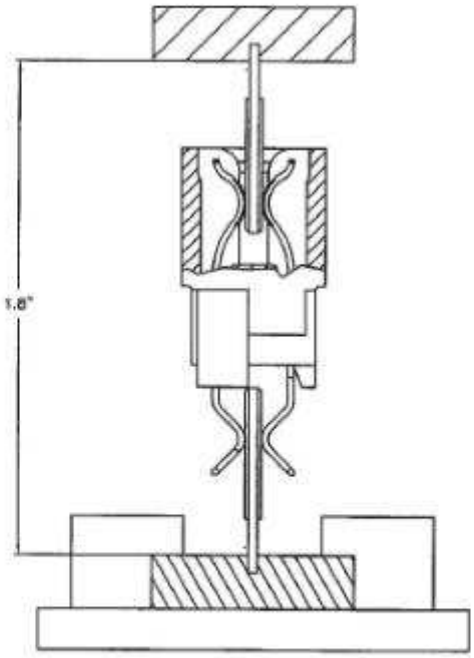


Figure 3
Vibration & Mechanical Shock Mounting Fixture