Z-PACK Slim UHD connector

1 INTRODUCTION

1.1 Purpose

Test was performed on Z-PACK Slim UHD to determine its conformance to the requirement of Product Specification 108-19353, Revision A.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of Z-PACK Slim UHD performance level 1**.**

1.3 Conclusion

The Z-PACK Slim UHD confirmed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-19353, Revision A.

1.4 Product Description

Z-PACK Slim UHD is an extremely high contact density combined with excellent high speed signal performance. The connector utilizes press-fit terminals on both the male and female connectors.

1.5 Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the following part number were used for test. 3 pcs sample were tested in each test group.

Sample PN	Description
1982738-1	Z-PACK Slim UHD female connector, level 1
2042088-1	Z-PACK Slim UHD male connector, level 1

1.6 Environment Conditions.

Unless otherwise stated. The following environmental condition prevailed during testing.

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

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1.7 **Test Requirements and Procedures Summary**

Test Items	Requirements	Procedures
Examination of product	Meets requirements of product drawing.	IEC 60512-1-1 Visual and dimensional inspection per product drawing.
ELECTRICAL		
Terminal resistance (LLCR)	80 mΩ max. (Initial). ΔR 10 mΩ max. (Final individual). ΔR 5 mΩ max. (Final average).	IEC 60512-2-1 Max. open voltage 20mV. Max. current 100 mA DC. All contacts to be measured.
Insulation Resistance	10000 MΩ Min.	IEC 60512-3-1 Test voltage 100V DC or AC peak. Duration: 1 minute. Measure between adjacent contacts.
Voltage proof	No break-down or flash-over.	IEC 60512-4-1 Test voltage: 500 VAC. Duration 1 minute. Test between adjacent contacts.
MECHANICAL		
Test Items	**Requirements**	**Procedures**
Mating force	n x 0.45 N max. (n = number of positions)	IEC 60512-7-13b Measure force to mate connector pair. Connectors shall align. Speed: 12.7 mm/min.
Unmating force	n x 0.1 N max. (n = number of positions)	IEC 60512-7-13b Measure force to un-mate connector pair. Connectors shall align. Speed: 12.7 mm/min.
Mechanical operation (Durability)	No functional damage	IEC 60512-9-1 Mate and unmate connector pair. Connectors shall align. Operation cycles: 200. Rate: 500 cycles/hour.
Vibration sinusoidal	No physical damage No discontinuity > 1 µs	EIA-364-28E Condition II: 10-500 Hz sinusoidal. Amplitude: 1,52 mm max or acceleration: 98,1 m/s² max (10g) Duration: 2 hours on each of 3 mutually perpendicular axes, total of 8 hrs.

Shock	No physical damage No discontinuity > 1 µs	EIA-364-27B Condition H Pulse shape: half sine. Peak acceleration: 294 m/s2 (30g). Duration of pulse: 11 ms. Apply 3 shocks in each direction of 3 mutual perpendicular axes, total of 18 shocks.
ENVIRONMENTAL		
Test Items	**Requirements**	**Procedures**
Temperature life	No physical damage. ΔR 10 mΩ max. ΔR average 5 mΩ max.	EIA-364-17B Method A Test condition 4 Subject mated specimens to 105°C for 1000 hours. (without electrical load)
Dust	No physical damage. ΔR 10 mΩ max. ΔR average 5 mΩ max.	EIA-364-91A Dust Composition Number 1 (Benign)
Thermal shock	No physical damage. ΔR 10 mΩ max. ΔR average 5 mΩ max.	EIA-364-32E Condition II, -65°C to +105°C Number of cycles: 5cycles
Humidity / Temperature cycling	No physical damage. ΔR 10 mΩ max. ΔR average 5 mΩ max.	EIA-364-31C Method III, +5°C to +85°C Number of cycles: 50 10 hrs = 1 cycle Total exposure time: 500 hrs, RH 90 - 98% Transition time: 2 hrs Recovery: 2 hours at 25°C, RH 90 - 98%
Mixed flowing gas	No physical damage. ΔR 10 mΩ max. ΔR average 5 mΩ max.	EIA-364-65 Class IIIA Gas mixture: NO2 0.200 ppm Cl2 0.020 ppm H2S 0.100 ppm SO2 0.200 ppm RH 70 ±2% Temperature 30 ±1°C Duration: 20 days (first 10 days unmated, remaining 10 days mated) Measure contact resistance after 10 and 20 days of exposure

Fig. 1 (End.)

NOTE: Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Prequalification Test Sequence shown in Figure 2.

1.8 **Qualification Test Sequence**

Test Examination	Test Group			
	1	2	3	4
	Test Sequence(a)			
Visual Examination	1,16	1,17	1,11	1,15
Termination resistance (LLCR)	5,7,9,12	5,7,9,11,13	5,7	4,7,10,12,14
Insulation Resistance	3,14	3,14	3,9	2
Voltage proof	4,15	4,15	4,10	3,8
Mating and Unmating Forces	2,13	2,16	2,8	6
Vibration	10			
Shock	11			
Durability	6[c)]	6[c)]		5[c)],13[d)]
Thermal shock		10		
Temperature Life			6	
Dust	8	8		
Humidity / Temperature cycling		12		
Mixed flowing gas (MFG)				9,11[b)]

NOTE:

(a) Numbers indicate sequence in which tests are performed.
(b) = First 10 days unmated, remaining 10 days mated.
(c) = 100 cycles pre-wear
(d) = 100 remaining cycles

Figure 2

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 of Conformance was issued by Product Assurance. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Test Results

Group	Test Item	Condition	Test Result				Requirement	Judgement
			Min	Max	Avg	Unit		
1	Examination of Product	initial	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	Mating Force	initial	35.83	38.01	37.22	N	43.2N Max.	Meet Spec
	Un-mating Force	initial	20.24	22.54	21.40	N	9.6N Min.	Meet Spec
	Insulation Resistance	initial	6.49	86.9	3.83	$10^{11}\Omega$	$10^{10}\Omega$ Min.	Meet Spec
	Voltage proof	initial	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	LLCR	initial	13.43	32.12	24.21	mΩ	80 mΩ Max.	Meet Spec
	Durability Test	final	No physical damage			N/A	No abnormalities	Meet Spec
	LLCR (ΔR)	final	-1.16	4.54	0.01	mΩ	10 mΩ max. Average 5 mΩ max.	Meet Spec
	Dust	final	No physical damage			NA	No abnormalities	Meet Spec
	LLCR (ΔR)	final	-1.20	2.02	-0.17	mΩ	10 mΩ max. Average 5 mΩ max.	Meet Spec
	Vibration	final	No discontinuities were detected No physical damage			µs	No discontinuity > 1 µs	Meet Spec
	Shock	final	No discontinuities were detected No physical damage			µs	No discontinuity > 1 µs	Meet Spec
	LLCR (ΔR)	final	-1.65	3.50	-0.24	mΩ	10 mΩ max. Average 5 mΩ max.	Meet Spec
	Mating Force	final	35.63	38.36	36.79	N	43.2N Max.	Meet Spec
	Un-mating Force	final	23.06	24.43	23.83	N	9.6N Min.	Meet Spec
	Insulation Resistance	final	130	181	147	$10^{11}\Omega$	$10^{10}\Omega$ Min.	Meet Spec
	Voltage proof	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec

Group	Test Item	Condition	Test Result				Requirement	Judgement
			Min	Max	Avg	Unit		
2	Examination of Product	initial	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	Mating Force	initial	34.33	37.02	35.74	N	43.2N Max.	Meet Spec
	Un-mating Force	initial	20.83	22.11	21.28	N	9.6N Min.	Meet Spec
	Insulation Resistance	initial	14.6	18.7	16.8	$10^{11}\Omega$	$10^{10}\Omega$ Min.	Meet Spec
	Voltage proof	initial	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	LLCR	initial	13.75	34.14	24.35	mΩ	80 mΩ Max.	Meet spec
	Durability Test	final	No physical damage			N/A	No abnormalities	Meet Spec
	LLCR (ΔR)	final	-2.25	2.51	-0.17	mΩ	10 mΩ max. Average 5 mΩ max.	Meet spec
	Dust	final	No physical damage			NA	No abnormalities	Meet Spec
	LLCR (ΔR)	final	-2.42	2.55	-0.21	mΩ	10 mΩ max. Average 5 mΩ max.	Meet spec
	Thermal shock	final	No physical damage			NA	No abnormalities	Meet Spec
	LLCR (ΔR)	final	-1.94	1.86	-0.10	mΩ	10 mΩ max. Average 5 mΩ max.	Meet spec
	Humidity / Temperature cycling	final	No physical damage			NA	No abnormalities	Meet Spec
	LLCR (ΔR)	final	-1.31	5.57	0.30	mΩ	10 mΩ max. Average 5 mΩ max.	Meet spec
	Insulation Resistance	final	62.8	100	81.9	$10^{11}\Omega$	$10^{10}\Omega$ Min.	Meet Spec
	Voltage proof	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Mating Force	final	27.39	32.36	30.50	N	43.2N Max.	Meet Spec
	Un-mating Force	final	19.93	23.62	22.06	N	9.6N Min.	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec

Group	Test Item	Condition	Test Result				Requirement	Judgement
			Max	Min	Avg	Unit		
3	Examination of Product	initial	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	Mating Force	initial	34.38	36.56	32.34	N	43.2N Max.	Meet Spec
	Un-mating Force	initial	23.63	24.91	22.47	N	9.6N Min.	Meet Spec
	Insulation Resistance	initial	7.67	1.46	3.90	$10^{11}\Omega$	$10^{10}\Omega$ Min.	Meet Spec
	Voltage proof	initial	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	LLCR	initial	37.22	18.05	26.68	mΩ	80 mΩ Max.	Meet Spec
	Temperature Life	final	No physical damage			N/A	No abnormalities	Meet Spec
	LLCR (ΔR)	final	7.73	-0.62	1.25	mΩ	10 mΩ max. Average 5 mΩ max.	Meet Spec
	Mating Force	final	29.37	28.00	28.84	N	43.2N Max.	Meet Spec
	Un-mating Force	final	21.07	16.42	18.98	N	9.6N Min.	Meet Spec
	Insulation Resistance	final	12.51	1.04	4.71	$10^{10}\Omega$	$10^{10}\Omega$	Meet Spec
	Voltage proof(Plug)	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec

Group	Test Item	Condition	Test Result				Requirement	Judgement
			Max	Min	Avg	Unit		
4	Examination of Product	initial	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec
	Insulation Resistance	initial	1.83	1.03	1.36	$10^{11}\Omega$	$10^{10}\Omega$ Min.	Meet Spec
	Voltage proof	initial	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	LLCR	initial	37.91	17.67	27.16	mΩ	80 mΩ Max.	Meet Spec
	Durability Test	final	No physical damage			N/A	No abnormalities	Meet Spec
	Mating Force	final	41.45	38.70	40.05	N	43.2N Max.	Meet Spec
	Un-mating Force	final	28.60	24.72	26.92	N	9.6N Min.	Meet Spec
	LLCR (ΔR)	final	4.56	-5.03	-0.52	mΩ	10 mΩ max. Average 5 mΩ max.	Meet Spec
	Voltage proof	final	No breakdown or flashover			N/A	No abnormalities	Meet Spec
	Mixed Flowing Gas	final	No visual change			N/A	No abnormalities	Meet Spec
	LLCR (ΔR)	final	3.94	-4.79	-0.30	mΩ	10 mΩ max. Average 5 mΩ max.	Meet Spec
	Mixed Flowing Gas	final	No visual change			N/A	No abnormalities	Meet Spec
	LLCR (ΔR)	final	7.35	-4.46	-0.19	mΩ	10 mΩ max. Average 5 mΩ max.	Meet Spec
	Durability Test	final	No physical damage			N/A	No abnormalities	Meet Spec
	LLCR (ΔR)	final	5.25	-4.86	-0.40	mΩ	10 mΩ max. Average 5 mΩ max.	Meet Spec
	Examination of Product	final	No physical damage			N/A	Meets requirements of product drawing.	Meet Spec