
Single Port and Ganged SFP+ Cages, zSFP+ Single Port and Ganged Cages, and SFP+ Copper Direct Attach Cable Assemblies

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) Single Port and Ganged SFP+ Cages, zSFP+ Single Port and Ganged Cages, and SFP+ Copper Direct Attach Cable Assemblies.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing. Successful qualification testing on the subject product line was completed on 21Sep09. Additional testing was completed on 05Mar10. The Qualification Test Report number for this testing is 501-718. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. TE Documents

- [114-13120](#): Application Specification (Small Form-Factor Pluggable (SFP) and SFP+ Surface Mount PT Connectors and Cage Assemblies)
- [501-718](#): Qualification Test Report (Single Port and Ganged SFP+ Cages, zSFP+ Single Port and Ganged Cages, and SFP+ Copper Direct Attach Cable Assemblies)
- [501-134038](#): Qualification Test Report (Single High 1x4 zSFP+ EMI Cages)

2.2. Industry Documents

- EIA-364 Electrical Connector/Socket Test Procedures Including Environmental Classifications
- JEDEC JESD 22-B102 Solderability

2.3. Reference Document

[109-197](#) Test Specification (TE Test Specifications vs EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing.

3.2. Ratings

- Voltage: 120 volts AC
- Current: Signal Application Only
- Temperature: -55 to 105°C for cage assembly

3.3. Test Requirements and Procedures Summary Procedure

Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

Test Description	Requirement	Procedure
Initial examination of product	Meets requirements of product drawing and Application Specification 114-13120.	EIA-364-18 Visual and dimensional (C of C) inspection per product drawing.
Final examination of product	Meets visual requirements	EIA-364-18 Visual inspection.
ELECTRICAL		
Low Level Contact Resistance (LLCR)	35 milliohms maximum initial. AR 10 milliohms maximum. Shield and signal contacts.	EIA-364-23 Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.
MECHANICAL		
Solderability	Solderable areas shall have a minimum of 95% coverage.	JEDEC JESD22-B102D, Method 1 for lead-free solder using a "RA" type flux.
Random vibration	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition VII Condition Letter D. Subject mated specimens to 3.13 G's rms between 20 to 500 Hz. Fifteen minutes in each of 3 mutually perpendicular planes.
Mechanical shock	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Condition H Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along three mutually perpendicular planes, 18 total shocks.
Durability	See Note	EIA-364-9 Mate and unmate specimens for 100 cycles at a maximum rate of 500 cycles per hour with cage latch operable.
Transceiver insertion force, SFP+ module to PCB connector and SFP+ cage.	34 N [7.64 lbf] maximum without heat sink and clip. 45.37 N [10.2 lbf] maximum with heat sink and clip. See Note.	EIA-364-13 Measure force necessary to insert module into connector and cage at a maximum rate of 12.7 mm [.5 in] per minute.
Transceiver extraction force, SFP+ module from PCB connector and SFP+ cage.	12.5 N [2.8 lbf] maximum without heat sink and clip. 14.36 N [3.23 lb] maximum with heat sink and clip. See Note.	EIA-364-13 Measure force necessary to extract module from connector and cage at a maximum rate of 12.7 mm [.5 in] per minute.
Cage latch strength	91.2 N [20.5 lb] minimum. See Note.	EIA 364-98 Apply specified axial load to latch at a maximum rate of 12.7mm [.5 in] per minute and hold for 1 minute to verify cage latch strength.

Figure 1 (cont)

Test Description	Requirement	Procedure
Cage press fit insertion force	44.5 N [10lb] maximum per pin for single port cage. 73 N [16.4 lbf] maximum per pin for ganged cage. See Note.	EIA-364-5 Measure force necessary to push the cage into the host board at a maximum rate of 12.7 mm [.5 in] per minute.
Cage press fit extraction force	8.9 N [2.0lb] minimum for single port cage. 8.9 N [2.0lb] minimum per pin for ganged cage. See Note.	EIA-364-5 Measure force necessary to push the cage out of the host board by applying specified force in a vertical direction at a maximum rate of 12.7 mm [.5 in] per minute.
Rotational cable pull	33.4 N [7.5 lb] minimum. See Note.	Load cable module into a cage assembly mounted to a test board, with attached bezel. Apply axial load at a maximum rate of 12.7 mm [.5 in] per minute, rotate cable 40° toward printed circuit board, and then rotate 360° with the load still applied.
Cable retention force	No discontinuities of one microsecond or longer duration. Shall remain mated. See Note.	EIA-364-98 Apply a force of 80 N [18 lb] in an axial direction and hold for ten minutes.
Cable side load force	No discontinuities of one microsecond Shall remain mated. See Note.	EIA-364-38 Apply a force of 80 N [18 lb] to the cable plug in a plane parallel to the bezel and hold for 10 minutes.
Cable longitudinal force	No discontinuity of one microsecond or longer duration. Shall remain mated. See Note.	EIA-364-38 Apply a force of 100 N [22.5 lb] to the cable plug in a plane perpendicular to the bezel and hold for 10 minutes.

ENVIRONMENTAL

Test Description	Requirement	Procedure
Thermal shock	See Note	EIA-364-32, Test Condition VII. Subject specimens to five cycles between -55° and 105°C with 30 minute dwells at temperature extremes and one minute transition between temperatures.
Humidity/temperature cycling	See Note	EIA-364-31, Method III. Subject specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH.
Temperature life	See Note	EIA-364-17, Method A, Test Condition 4. Subject mated specimens to 105°C for 240 hours.
Mixed flowing gas	See Note	EIA-364-65, Class IIA (4 gas). Subject mated specimens to Environmental Class IIA for 20 days.


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 Figure 2.

Figure 1 (end)

3.4. Product Qualification and Requalification Test Sequence

Test of Examination	Test Group (a)						
	1	2	3	4	5	6(b)	7(b)
	Test Sequence (c)						
Initial examination of product	1	1	1	1	1	1	1
LLCR	3,7		3,6	3,5		2,4	
Solerability					2		
Random vibration	5						
Mechanical shock	6						
Durability	4						
Transceiver insertion force	2						
Transceiver extraction force	8						
Cage latch strength	9						
Cage press fit insertion force			2	2			
Cage press fit extraction force			7	6			
Rotational cable pull		2					
Cable retention force							2
Cable side load force							3
Cable longitudinal force							4
Thermal shock			4(d)				
Humidity/temperature cycling			5(d)				
Temperature life				4(d)(e)			
Mixed flowing gas						3(e)	
Final examination of product	10	3	8	7	3	5	5



NOTE

- (a) Each test group shall consist of a minimum of 5 specimens selected at random from current production.
- (b) Applies to SFP+ direct attach cable assembly product only.
- (c) Numbers indicate sequence in which tests are performed.
- (d) Mated to blank transceivers.
- (e) Precondition specimens with 20 durability cycles.

Figure 2