SFP Copper Module Direct Attach Cable Assembly

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics SFP Copper Module Direct Attach Cable Assembly.

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.

1.3.

Successful qualification testing on the subject product line was completed on 07Jul09. The Qualification Test Report number for this testing is 501-706. 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. Tyco Electronics Documents

- 114-13017: Application Specification (Small Form-Factor Pluggable (SFP) Connector and Cage Assembly)
- 501-706: Qualification Test Report (SFP Copper Module Direct Attach Cable Assembly)

2.2. Industry Document

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications

2.3. Reference Document

109-197: Test Specification (AMP Test Specifications vs EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- Voltage: 3.13 to 3.46 volts DC (VCC 3 pins per SFP MSA, pins 15 and 16)
- Current: Signal application only
- Temperature: -10 to 70˚C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing and Application Specification 114-13017.	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. ΔR 10 milliohms maximum. Shield and signal contacts.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.
MECHANICAL		
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 3.10 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 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	EIA-364-9. Manually mate and unmate the SFP module to the PCB connector interface of each test specimen for 100 cycles with the latches enabled.
Unmating force, SFP module from PCB connector and SFP cage.	11.5 N [2.59 lbf] maximum. See Note.	EIA-364-13. Measure force necessary to unmate specimens with latches disabled at a maximum rate of 12.7 mm [.5 in] per minute.

Figure 1 (continued)

Test Description	Requirement	Procedure
Cable retention force.	No discontinuities of 1 microsecond or longer duration. Shall remain mated. See Note.	EIA-364-38. Apply a force of 75 N [16.9 lbf] in an axial direction and hold for 10 minutes.
Cable side load force.	No discontinuities of 1 microsecond or longer duration. Shall remain mated. See Note.	EIA-364-38. Apply a force of 75 N [16.9 lbf] to the cable plug in a plane parallel to the bezel and hold for 10 minutes.
Cable longitudinal force.	No discontinuities of 1 microsecond or longer duration. Shall remain mated. See Note.	EIA-364-38. Apply a force of 75 N [16.9 lbf] to the cable plug in a plane perpendicular to the bezel and hold for 10 minutes.
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32. Subject mated specimens to 5 cycles between -10 and 70˚C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity/temperature cycling.	See Note.	EIA-364-31, Method III. Subject mated 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 2, Test Time Condition C. Subject mated specimens to 70˚C for 500 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)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)				
	1	2	3	4	5
	Test Sequence (b)				
Initial examination of product	1	1	1	1	1
LLCR	2,6	2,5	2,4		2,4
Random vibration	4				
Mechanical shock	5				
Durability	3				
Unmating force, SFP module from PCB connector and SFP cage	7				
Cable retention force	8			2	
Cable side load force				3	
Cable longitudinal force				4	
Thermal shock		3			
Humidity/temperature cycling		4			
Temperature life			3(c)		
Mixed flowing gas					3(c)
Final examination of product	9	6	5	5	5

NOTE

(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Precondition specimens with 10 durability cycles.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Each test group shall consist of a minimum of 5 specimens. SFP cable assemblies with test board part number 60-1042244-1 shall be used for test groups 2, and 4. SFP cable assemblies with feed-through board part number 1928178-2 shall be used for test groups 1, 3 and 5.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.