
**Quad Small Form-Factor Pluggable (QSFP) 28-Gbps Copper
Module Direct Attach Cable Assembly**

1. SCOPE**1.1. Content**

This specification defines performance, tests, and quality requirements for QSFP 28-Gbps 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.

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

108-2286	QSFP Copper Module Direct Attach Cable Assembly and Cage
109-197	TE Connectivity Test Specifications vs EIA and IEC Test Methods
501-60067	QSFP Copper Module Direct Attach Cable Assembly and Cage

2.2. Industry Documents

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

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: 3.5 V DC (max) per SFF-8679
Current: 500 mA (max) per SFF-8679
Temperature: 0 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-TBD	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		
High-Speed Test (Sdd21, SDDXX, SCDXX, SCCXX, SCD21-SDD21, ICN versus IL at 12.89 GHz)	Per IEEE 802.3bj	EIA-364-108
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 rms vibration between 20 to 500 Hz. Fifteen minutes in each of 3 mutually perpendicular planes.
Cable Flex	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-41, Test Condition I Mandrel diameter to be 7 times the maximum cable diameter.
Axial Cable Retention	No evidence of damage or cable pull out from connector.	EIA-364-38 Method A Secure module and apply 140 N of axial force to cable for 5 minutes.
Module Retention	No module damage when 90 N extraction force is applied.	EIA-364-13 Apply 90 N to cable module with latches enabled.
Cable Lateral Force	No discontinuities of 1 microsecond or longer duration. Shall remain mated. See Note.	EIA-364-38 Apply force of 75 N [16.9 lbf] to the cable module parallel to the test board and perpendicular to the cage in either direction for 10 minutes.
Cable Longitudinal Force	No discontinuities of 1 microsecond or longer duration. Shall remain mated. See Note.	EIA-364-38 Apply force of 75 N [16.9 lbf] to the cable module perpendicular to the test board and downward for 10 minutes.
Environmental		
Thermal Shock	See Note.	EIA-364-32, Test Condition VII Subject mated specimens to 10 cycles between -40 and +85°C
Temperature Life	See Note.	EIA-364-17, Method A. Subject mated specimens to 85°C for 500 hours.



NOTE

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the product qualification and re-qualification test sequence given in Figure 2.

Figure 1

3.6. Product Qualification and Re-Qualification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)		
	1	2	3
	TEST SEQUENCE (b)		
Initial Examination of Product	1	1	1
High-Speed Test		2,4,8	2,7
Cable Flex			5
Axial Cable Retention	4	3,7	
Module Retention			6
Cable Lateral Force			3
Cable Longitudinal Force			4
Thermal Shock	2	5	
Temperature Life	3	6	
Final Examination of Product	5	9	8

(a) See paragraph 4.1.A.

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

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.

B. Test Sequence

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

4.2. Re-Qualification Testing

If changes that significantly affecting form, fit, or function are made to the product or manufacturing process, product assurance shall coordinate re-qualification 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 re-submitted for qualification. Testing to confirm corrective action is required before re-submittal.

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.