
LC Duplex Adapter For LC Cutouts

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the Tyco Electronics LC Duplex Adapter for panels with LC cutouts.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 2 shall be used. All inspections shall be performed using the applicable inspection plan(s) and product drawing(s).

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 21May08. The Qualification Test Report number for this testing is 501-683. 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 requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between requirements of this specification and referenced documents, this specification shall take precedence.

2.1. Tyco Electronics Documents

- 102-952: Quality Specification (Qualification of Fiber Optic Connectors and Cable Assemblies)
- 501-683: Qualification Test Report (LC Duplex Adapter for LC Cutouts)

2.2. Commercial Standards

- TIA/EIA-455-B: Standard Test Procedure for Fiber Optic Fibers, Cables, Transducers, Sensors, Connecting and Terminating Devices, and Other Fiber Optic Components
- GR-326-CORE, Issue 3: Telcordia Technologies Generic Requirements for Singlemode Optical Connectors and Jumpers; Small Form Factor Connector Requirements
- IEC 61300: Fibre Optic Interconnecting Devices and Passive Components - Basic Test and Measurement Procedures

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Optical Power Source

The optical power source wavelength shall be 1310 ± 30 nm and 1550 ± 30 nm or as stated in the Test Report.

3.3. Ratings

Performance	Value	Units
Durability	200	Cycles

Figure 1

3.4. Performance and Test Description

Product is designed to meet the mechanical, environmental and optical transmittance performance requirements specified in Figure 2. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Visual and mechanical inspection.	Meets requirements of product drawing.	TIA/EIA-455-13A. Visual, dimensional and functional per applicable quality inspection plan.
Loss with reference leads.	Maximum value for any single specimen shall be 0.40 dB. Maximum average loss for the group shall be 0.20 dB. See Note.	TIA/EIA-455-171A, Method D3 for SM. Mate reference quality launch and receive leads together using a specimen adapter. Record loss and reflectance.
Reflectance with reference leads.	Maximum reflectance for any single specimen shall be -40dB See Note.	TIA/EIA-455-107A, Method A for SM. Mate reference quality launch and receive leads together using a specimen adapter. Record reflectance.
Vibration.	Maximum loss for any single specimen shall be 0.50 dB after test. Maximum loss increase for any single specimen shall be 0.30 dB after test. Maximum average loss for the group shall be 0.30 dB after test. Maximum reflectance for any single specimen shall be -40 dB after test. Maximum increase in reflectance for any single specimen shall be 5 dB after test. See Note.	GR-326-CORE, 4.4.3.1. Subject mated specimens to sinusoidal vibration, 10 to 55 to 10 Hz, at a rate of 45 Hz per minute for 2 hours in each of the 3 mutually perpendicular directions (6 hours total). The amplitude shall be 1.5 mm [.06 in] peak-to-peak. Measure loss and reflectance before and after exposure in each plane, as well as the beginning and end of the test.

Figure 2

Test Description	Requirement	Procedure
Flex.	<p>Maximum loss for any single specimen shall be 0.50 dB after test.</p> <p>Maximum loss increase for any single specimen shall be 0.30 dB after test.</p> <p>Maximum average loss for the group shall be 0.30 dB after test.</p> <p>Maximum reflectance for any single specimen shall be -40 dB after test.</p> <p>Maximum increase in reflectance for any single specimen shall be 5 dB after test.</p> <p>See Note.</p>	<p>GR-326-CORE, 4.4.3.2.</p> <p>Using a 7.5 cm [3 in] mandrel located 22 to 28 cm [9 to 11 in] behind the connector strain relief, apply a 0.6 kgf [1.3 lbf] tensile load per Small Form Factor Connector requirements. Flex the loaded side ± 90 degrees per cycle at a maximum rate of 30 cycles per minute. Measure insertion loss and reflectance before and after test with the load removed.</p>
Twist.	<p>Maximum loss for any single specimen shall be 0.50 dB after test.</p> <p>Maximum loss increase for any single specimen shall be 0.30 dB after test.</p> <p>Maximum average loss for the group shall be 0.30 dB after test.</p> <p>Maximum reflectance for any single specimen shall be -40 dB after test.</p> <p>Maximum increase in reflectance for any single specimen shall be 5 dB after test.</p> <p>See Note.</p>	<p>GR-326-CORE, 4.4.3.3.</p> <p>Using a 7.5 cm [3 in] mandrel located 22 to 28 cm [9 to 11 in] behind the connector strain relief, apply a 1.35 kgf [3.0 lbf] tensile load for Media Type I. Rotate the loaded side ± 2.5 revolutions per cycle at a maximum rate of 30 cycles per minute. Measure insertion loss and reflectance before and after test with the load removed.</p>
Proof.	<p>Requirement values after each load application, and after test:</p> <p>Maximum loss for any single specimen shall be 0.50 dB after test.</p> <p>Maximum loss increase for any single specimen shall be 0.30 dB after test.</p> <p>Maximum average loss for the group shall be 0.30 dB after test.</p> <p>Maximum reflectance for any single specimen shall be -40 dB after test.</p> <p>Maximum increase in reflectance for any single specimen shall be 5 dB after test.</p> <p>See Note.</p>	<p>GR-326-CORE, 4.4.3.4.</p> <p>(EIA/TIA-455-6B) or IEC 61300-2-4.</p> <p>Straight pull:</p> <p>Using a 7.5 cm [3 in] minimum diameter mandrel located 22 to 28 cm [9 to 11 in] behind the strain relief, apply a 4.5 kgf [10 lbf] load to the cable at 0 degrees for 5 seconds. Measure insertion loss and reflectance before test and a minimum of 10 seconds after load is removed.</p> <p>90 degree side pull:</p> <p>Using a 7.5 cm [3 in] minimum diameter mandrel located 22 to 28 cm [9 to 11 in] behind the strain relief, apply a 1.5 kgf [3.3 lbf] load to the cable at 90 degrees for 5 seconds. For the Small Form Factor Connector 90 degree applied tensile load, measure insertion loss and reflectance before test and a minimum of 20 seconds after load is removed.</p>

Figure 2 (continued)

Test Description	Requirement	Procedure
Transmission with applied tensile load.	Requirement values during and after any load/angle combination: Maximum loss increase for any single specimen shall be 0.50 dB during test. Maximum reflectance for any single specimen shall be -40 dB during test. Maximum increase in reflectance for any single specimen shall be 5 dB during test. After completion of all load/angle combinations: Maximum loss for any single specimen shall be 0.50 dB after test. Maximum average loss for the group shall be 0.30 dB after test. Maximum reflectance for any single specimen shall be -40 dB after test. Maximum increase in reflectance for any single specimen shall be 5 dB after test. See Note.	GR-326-CORE, 4.4.3.5. (EIA/TIA-455-6B) or IEC 61300-2-4. Using a 7.5 cm [3 in] minimum diameter mandrel located 22 to 28 cm [9 to 11 in] behind the strain relief, apply a 0.25 kgf [0.55 lbf] load to the cable at 0 degrees for a minimum of 10 seconds. Record optical measurements, and then apply the next load/angle combination per Table 4-10 in GR-326-CORE. Measure insertion loss and reflectance before test, a minimum of 10 seconds (or until stability has been reached) after applying each load and angle combination, and a minimum of 20 seconds after each load has been removed. Repeat test until all load/angle combinations have been applied, except for the 135 degree load application. Requirement level loads only.

Figure 2 (continued)

Test Description	Requirement	Procedure
Durability.	<p>Requirement values applicable after a cleaning interval:</p> <p>Maximum loss for any single specimen shall be 0.50 dB during and after test.</p> <p>Maximum loss increase for any single specimen shall be 0.30 dB during and after test.</p> <p>Maximum average loss for the group shall be 0.30 dB during and after test.</p> <p>Maximum reflectance for any single specimen shall be -40 dB during and after test.</p> <p>Maximum increase in reflectance for any single specimen shall be 5 dB during and after test.</p> <p>100% must meet the above criteria after test. 90% must meet the above criteria after 1 sided or 2 sided cleanings.</p> <p>See Note.</p>	<p>GR-326-CORE, 4.4.3.8. (EIA-455-21A) or IEC 61300-2-2.</p> <p>Mount specimens at 1.8 m [6 ft], 1.4 m [4.5 ft] and 0.9 m [3 ft] above the floor. Clean specimens per paragraph 5.1 and record initial insertion loss and reflectance.</p> <p>Starting with specimen 1, disconnect and reconnect each specimen 1 time per the following sequence: 1.8, 1.4, 0.9, 0.9, 1.4 and 1.8 m. Repeat until each specimen has been disconnected and reconnected 200 times. Record insertion loss and reflectance for information purposes without cleaning the optical interface at 24, 49, 74 and 99 cycles, continuing every 25 cycles up to 199. Measure insertion loss and reflectance after one sided cleaning at 25, 75, 125 and 175 cycles. Measure insertion loss and reflectance after two sided cleaning at 50, 100, 150 and 200 cycles. If specimens do not meet optical criteria after any cleaning schedule, additional cleanings of the reference quality test leads are permitted. Operator shall stand at ground level for cycling and cleaning.</p>

NOTE *Shall meet visual requirements, show no physical damage, and shall meet the requirements of additional tests as specified in the Product Qualification Test Sequence in Figure 3.*

Figure 2 (end)

3.6. Product Qualification Test Sequence

Test or Examination	Test Group (a)
	1
	Test Sequence (b)
Visual and mechanical inspection	1
Loss (attenuation)	2,10
Reflectance	3,11
Vibration	4
Flex	5
Twist	6
Proof	7
Transmission with applied load	8
Durability	9

NOTE

- (a) See paragraph 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.

Figure 3

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Test specimens shall be prepared in accordance with applicable drawings produced using standard production methods and be representative of current production per Figure 4. Specimen shall be defined as a complete adapter assembly. Cable assemblies used for qualification shall be of type and length specified in Figure 4.

Component Description	Test Group 1
Adapter Type	LC Duplex Sr/Jr Singlemode
Adapter PN	1985150-1
Test Cable Assembly PN (see Note)	1695474-1
Test Cable Length (m)	10
Test Specimens Required	15
Test Cables Required	30
Control Cables Required (Y/N)	No

NOTE

Test cable assemblies were of reference quality.

Figure 4

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 3.

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 requirements of Figure 2. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. When 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 will 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.

5. SPECIAL INSTRUCTIONS

5.1. Cleaning

If at any time, a connector specimen is uncoupled during qualification testing, the optical interfaces shall be cleaned according to the applicable Instruction Sheet prior to any subsequent optical measurements. Additional cleaning techniques deemed necessary by Product Engineering shall be described in the Test Report. If, after cleaning the connector as prescribed, loss performance exceeds the specified limit, or, if the operator suspects the presence of debris at the optical interface, perform the cleaning procedure a second time. If the resultant optical reading still exceeds the specification, clean the interface a third time and accept that reading.

5.2. Control Cables

Control cables shall be subjected to climatic environmental tests. Transmittance shall be recorded each time a specimen transmittance is made. Changes in control cable power of less than 0.05 dB may be neglected in the test specimen power and loss calculations. If control cable power changes by more than 0.05 dB during the duration of the test or sequence of tests, change in control cable power shall be included in power and loss calculations per TIA/EIA-455-20A.