Stacked Modular Jack with LED's, Category 5e

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) Stacked Modular Jack with LED's, Category 5e designed to be used in networking equipment for office and Internet connections.

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. Qualification Test Results

Successful qualification testing on the subject product line was completed on 03Feb2016. The Qualification Test Report number for this testing is 501-128807. 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

- 109-197: TE Test Specifications vs EIA and IEC Test Methods
- 114-60018 Application Specification.
- 501-128807 Qualification Test Report

2.2. Commercial Standard

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
FCC Part 68 : Connection of Terminal Equipment to the Telephone, Connector Specification
TIA 568-C.2.: Balanced Twisted-Pair Telecommunications Cabling and Components Standards

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: 150 volts AC
- Current: 1.5 A
- Temperature: -40 to 85°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 per EIA-364.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing.	EIA-364-18. Visual and dimensional inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
Low Level Contact resistance	Δ R < 30 m Ω Max.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage.
Insulation resistance	500 Mohm minimum	EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent contacts of unmated specimens not electrically connected.
Withstanding voltage	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. 1500 volts AC at sea level. Test between the shield and contact 1000 volts AC at sea level all Test between adjacent contacts of mated plug and jack.
Crosstalk (FEXT)	See Figure 3.	TIA 568-C.2
Crosstalk (NEXT)	See Figure 3.	TIA 568-C.2
Insertion loss	See Figure 3.	TIA 568-C.2
Return loss	See Figure 3.	TIA 568-C.2
Surge	See note	Subject mated plug and jack adjacent contacts to 5 surges of each polarity at 1 minute intervals. Pulse to have 10/1000 microsecond shape and 1000 volt peak.

Test Description	Requirement	Procedure
	MECHANICAL	
Vibration, random	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, Method H. Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens with the plug locking tab inoperable for 750 cycles at a maximum rate of 600 cycles per hour.
Mating force.	35.56 N [8 lbf] maximum. See Note.	EIA-364-13. Measure force necessary to mate specimens at a maximum rate of 12.7 mm [.5 in] per minute.
Unmating force.	22.23 N [5 lbf] maximum. See Note.	EIA-364-13. Measure force necessary to unmate specimens at a maximum rate of 12.7 mm [.5in] per minute.
Plug retention in jack.	66.67 N [15 lbf] minimum. Show no evidence of physical damage to the jack. Plug shall not disengage from the jack.	EIA-364-98. Apply axial load of 15 lbf to plug housing at a rate of .5 inch per minute with plug mated in jack and latch engaged.
Pull rotational load.	Plug shall remain mated with no evidence of housing damage.	Load cable in mated plug with a 10 lbf pull in axial direction, rotate plug housing 45 degrees from cable axis, remove load.
Press fit insertion force.	44.5N [10 lbf] maximum per pin.	EIA-364-05 Measure force necessary to push the cage into the host board at a maximum rate of 12.7 mm [.5 in] per minute.
Press fit extraction force.	8.9N [2.0 lbf] minimum per pin.	EIA-364-05 Measure force necessary to push the product out of the host board by applying specified force in a vertical direction at a maximum rate of 12.7mm [.5 in] per minute.

Test Description	Requirement	Procedure
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32. Subject specimens to 5 cycles between -40 and 85°C.
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. Subject mated specimens to 115°C for 432 hours.
Mixed flowing gas.	See Note.	EIA-364-65, Class IIA. Subject mated specimens to environmental Class IIA for 14 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	6	7	8	9	
	Test Sequence (b)									
Initial examination of product	1	1	1	1	1	1	1	1	1	
Low level contact resistance	3,7	2,4	2,4				2,4			
Insulation resistance				2,6						
Withstanding voltage				3,7						
Crosstalk (FEXT)						2				
Crosstalk (NEXT)						3				
Insertion loss						4				
Return loss						5				
Surge									2	
Vibration	5									
Mechanical shock	6									
Durability	4									
Mating force	2									
Unmating force	8									
Plug retention in jack					2					
Pull rotational load							3			
Press fit insertion force.								2		
Press fit extraction force.								3		
Thermal shock				4						
Humidity-temperature cycling				5						
Temperature life		3(c)								
Mixed flowing gas			3(c)							
Final examination of product	9	5	5	8	3	6	5	4	3	

NOTE

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

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. Test group 1 shall consist of 3 specimens. Test group 6 shall consist of 1 specimens. Test groups 2, 3, 4, 5, 6, 7, 8 and 9 shall each consist of 5 specimens.

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.

Category 5e, 100 Ohm Twisted Pair

Frequency (MHz)	FEXT Loss (dB)	NEXT Loss (dB)	Insertion Loss (dB)	Return Loss (dB)
1.00	65.0	65.0	0.10	30.0
4.00	63.1	65.0	0.10	30.0
8.00	57.0	64.9	0.11	30.0
10.00	55.1	63.0	0.13	30.0
16.00	51.0	58.9	0.16	30.0
20.00	49.1	57.0	0.18	30.0
25.00	47.1	55.0	0.20	30.0
31.25	45.2	53.1	0.22	30.0
62.50	39.2	47.1	0.32	24.1
100.00	35.1	43.0	0.40	20.0

NOTE *See TIA 568-C.2, Aug. 2009*

Figure 3