Test Description	Requirement	Procedure
	ENVIRONMENTAL	
Thermal shock.	SAE/USCAR-2, 5.6.1.4. (omit B). See Note.	SAE/USCAR-2, 5.6.1.3. -40 to 85°C for RG-58 and RG-174 cable. -40 to 100°C for RG-316 cable.
Temperature/humidity cycling.	SAE/USCAR-2, 5.6.2.4. (omit B and E). See Note.	SAE/USCAR-2, 5.6.2.3. -40 to 85°C for RG-58 and RG-174 cable. -40 to 100°C for RG-316 cable.
High temperature exposure.	SAE/USCAR-2, 5.6.3.4. (omit B and D). See Note.	SAE/USCAR-2, 5.6.3.3. 85°C for RG-58 and RG-174 cable. 100°C for RG-316 cable.

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)

3.2. Materials

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

3.3. Ratings

- Voltage: 335 volts AC
- Current: 1 ampere maximum
- Temperature: -40 to 100°C or rating of coax cable, whichever is lowest (80°C for RG-174 cable or 175°C for RG-316 cable)
- Characteristic Impedance: 50 ohms
- Frequency Range: 0 to 3000 MHz (cable dependent)

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
Visual inspection.	SAE/USCAR-2, 5.1.6.4.	SAE/USCAR-2, 5.1.6.3.
ELECTRICAL		
Contact resistance.	SAE/USCAR-17, 4.2.1.3. 40 milliohms maximum for signal contact. 40 milliohms maximum for ground contact.	SAE/USCAR-17, 4.2.1.2.
Voltage standing wave ratio.	SAE/USCAR-17, 4.3.2.3. 1.40 for 0 to 2 GHz 1.50 for 2 to 3 GHz	SAE/USCAR-17, 4.3.2.2.
Insolation resistance.	SAE/USCAR-17, 4.3.1.3. 100 megohms minimum.	SAE/USCAR-17, 4.3.1.2.
Dielectric withstanding voltage.	SAE/USCAR-17, 4.2.1.7. 1000 volts AC at sea level.	SAE/USCAR-17, 4.2.1.6.
Shielding effectiveness.	30 dB minimum at 1 GHz.	EN 50289-1-6. Measure shielding effectiveness between 0 and 1.0 GHz. Specimen length shall be 5.0 cm.

Figure 1 (cont)

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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.

FAKRA 180 Degree Wire Plug and Wire Jack

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The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore Tyco Electronics makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, Tyco Electronics may change these requirements based on the results of additional testing and evaluation. Contact Tyco Electronics Engineering for further details.

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics 180 degree wire plug and wire jack designed to comply with the requirements of ISO TC 22/WG 5 N 44 (commonly referred to as FAKRA). This product uses an IDC termination to the outer shield and 4 screw machined center contact.

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. Tyco Electronics Documents

- 109-197: AMP Test Specifications vs EIA and IEC Test Methods
- 114- : Application Specification
- 501- : Qualification Test Report

2.2. Commercial Standards

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- EN50289-1-6: Electromagnetic Testing; Communication Cables
- ISO TC 22/WG 5 N 44: Road Vehicles - Radio Frequency Interface - Dimensions and Electrical Requirements (FAKRA)
- SAE/USCAR-2: Performance Standard For Automotive Electrical Connection Systems - April 2001
- SAE/USCAR-17: Performance Standard For Automotive RF Electrical Connection Systems Draft - July 2001

3. REQUIREMENTS

3.1. Design and Construction

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

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* Trademark
I Indicates change

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)									
	1	2	3	4	5	6(b)	7(c)	8(c)	9(b)	10
	Test Sequence (d)									
Visual inspection	1,3	1,3	1,3	1,3	1,3	1,8	1,10	1,10	1,8	1,4
Contact resistance						2,5	2,6	2,6	2,5	
Voltage standing wave ratio						7	9	9	7	
Insolation resistance							3,7	3,7		
Dielectric withstanding voltage						3,6	4,8	4,8	3,6	
Shielding effectiveness										3
RF insertion loss										2
Vibration/mechanical shock						4				
Connector-connector mating/unmating force			2							
Terminal bend resistance		2								
Terminal-to-terminal engage/disengage force	2									
Polarization feature effectiveness				2						
Cable retention					2					
Thermal shock							5			
Temperature/humidity cycling								5		
High temperature exposure									4	

NOTE

(a) See paragraph 4.1.A.

(b) Specimens used for testing withstanding voltage shall not be used for testing voltage standing wave ratio.

(c) Specimens used for testing withstanding voltage and insulation resistance shall not be used for testing voltage standing wave ratio.

(d) 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. Test groups 1 and 2 shall each consist of 15 pin contacts and 15 socket contacts. Test group 3 shall consist of 30 plugs and 30 jacks of the same key. Test group 4 shall consist of 15 plugs and 15 jacks of mis-keyed combinations. Key Z shall not be used. Test groups 5, 8 and 9 shall each consist of 16 plugs and 16 jacks. Test groups 6 and 7 shall each consist of 24 plugs and 24 jacks.

B. Test Sequence

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

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Test Description	Requirement	Procedure
RF insertion loss.	SAE/USCAR-17, 4.3.2.3. Straight Product: 0.30 dB maximum at 1 GHz for RG-174 cable. 0.30 dB maximum at 3 GHz for RG-316 cable. Right Angle Product: 0.60 dB maximum at 1 GHz for RG-174 cable. 0.60 dB maximum at 3 GHz for RG-316 cable.	SAE/USCAR-17, 4.3.2.2.
MECHANICAL		
Vibration/mechanical shock.	SAE/USCAR-2, 5.4.5.4. (omit 2 and 3). No discontinuities of 1 microsecond or longer duration (signal contact only). See Note.	SAE/USCAR-2. 5.4.5.3. Use not coupled to engine profile.
Connector-connector mating/unmating force.	SAE/USCAR-2, 5.4.2.4. (omit 4). Mating force: ≤75 N. Unmating force: ≤75 N with lock disabled. ≥110 N with lock enabled.	SAE/USCAR-2, 5.4.2.3.
Terminal bend resistance.	SAE/USCAR-2, 5.2.2.4. Thickness: 0.20 mm maximum = 4.0 N minimum. 0.30 mm maximum = 10.0 N minimum. 0.40 mm maximum = 15.0 N minimum. > 0.40 mm = 20.0 N minimum.	SAE/USCAR-2, 5.2.2.3.
Miscellaneous component terminal-to-terminal engage/disengage force.	SAE/USCAR-2, 5.4.4.4.	SAE/USCAR-2, 5.4.4.3.
Polarization feature effectiveness.	SAE/USCAR-2, 5.4.3.4. 220 N minimum mismating force.	SAE/USCAR-2, 5.4.3.3.
Cable retention.	TBD	EIA-364-8B. 25 ± 6 mm per minute crosshead speed.

Figure 1 (cont)

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