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

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## **4.3-10 Series Radio Frequency Coaxial Cable Assembly and Connectors**

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### **1 SCOPE**

The 4.3-10 interface is designed to meet the rising performance needs of mobile network equipment by offering unique design, superior electrical performance, a compact size and weight reduction. This specification gives an overview of all relevant specifications or requirements related to 4.3-10 series Cable Assembly and Connectors.

#### **1.1 Content**

This specification covers performance, tests and quality requirements for TE Connectivity (TE) 4.3-10 series RF\_coaxial cable assembly and connectors of nominal characteristic impedance 50 ohms.

#### **1.2 Qualification**

All components for the cable assembly, connectors, over-mold and cable were subject to their individual design objectives and were qualified accordingly.

This document addresses the total cable assembly and connectors.

When tests are performed on the subject product line, procedures specified in table 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 Connectivity (TE) Documents**

- TEC-109-201: Component heat resistance to lead-free reflow soldering.
- 114-32160: Application Specifications as required
- 501-32037: Qualification Test Report (4.3-10 series RF connectors)
- 109-197: Test Specification (TE Test Specification vs EIA and IEC Test Methods)

#### **2.2 Industry Document**

- EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- IEC 60529: Degrees of Protection Provided by Enclosures (IP Code)
- IEC 60169-1: Radio-frequency connectors. Part 1: General requirements and measuring methods
- IEC 60169-54: Interface dimensions specifications
- ISO 21207: Corrosion tests in artificial atmospheres -- Accelerated corrosion tests involving alternate exposure to corrosion-promoting gases, neutral salt-spray and drying
- IEC 60237: Passive RF and microwave devices, intermodulation level measurement

### 3 REQUIREMENTS

#### 3.1 Design and Construction

Product shall be of the design, construction, materials 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

- Temperature Range: -45°C to 85 °C
- Frequency Range: DC to 6 GHz
- Nominal Impedance: 50 ohms
- Insertion Loss:  $<0.05 \times \sqrt{f(\text{GHz})}$
- Return Loss: Max 1.03 (Up to 4GHz)  
Max 1.06 (4GHz to 6GHz)
- Working Voltage: 2500 VAC RMS at sea level
- RF Power Handling: 500W@ 2GHz
- Intermodulation Levels: -160 dBc @ 2X40W(46dBm)

#### 3.4 Interface Description

Three different plug types to include: Screw, Hand Screw, and Push-Pull all meeting IEC 61194-54 industry specifications.



#### 3.5 Performance and Test Description

Products is designed to meet the electrical, mechanical and environmental performance requirements specified in Table 1(See section 3.6). Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.6 Test Requirements and Procedures Summary (Table 1)

Test Description	Requirement	Procedure
Visual Inspection	Meets visual requirements.	EIA-364-18/ IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.1.1; Visual inspection.
Mechanical Compatibility	Meet compatibility requirements.	IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.1.2.2; Use of compatibility gauges is optional. When used, specimens shall accept the gauges
<b>ELECTRICAL</b>		
Low Level Contact Resistance (LLCR).	Center contact: 1.0 milliohms maximum initial 1.5 milliohms maximum after test  Outer Contact: 1.0 milliohms maximum initial 1.5 milliohms maximum after test	EIA-364-23/ IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.2.3; Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 6 and Figure 7.
Insulation Resistance.	5000 mega-ohms minimum(initial) 200 mega-ohms minimum(after test)	EIA-364-21/ IEC 61169-54_46F_326_CDV EIA-364-21/IEC 61169-1:2013 subclause 9.2.5; 500±50 volts DC, 1min±5s hold. Test between adjacent contacts.
Withstanding Voltage.	2500V at sea level 450V at 4,4kPa(Optional)	EIA-364-20, Condition I / IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.2.6; Requested volts AC (rms) at sea level. One minute hold with no breakdown or flashover.
Insertion Loss	$0.05 \times \sqrt{f(\text{GHz})}$ +Cable attenuation Max See detail product drawing	IEC 61169-54_46F_326_CDV IEC 62037-1:2012 Requested all attenuation in figure 4
Return Loss	For Interface: VSWR Max 1.03 (Up to 4GHz) Max 1.06 (4GHz to 6GHz)	EIA-364-108/ IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.2.1; Time domain gated around specimen under test in figure 4
Intermodulation Level	For interface -160 dBc @ 2X40W(46dBm) Frequency bands: 900 /1800/2100MHz	IEC 61169-54_46F_326_CDV IEC 62037-1:2012  0.4 to 4 GHz 2 carriers +46 dBm Dynamic PIM and Static Test in figure 5

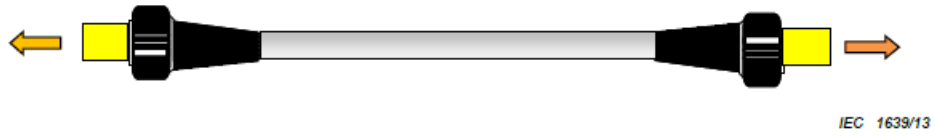
Test Description	Requirement	Procedure
<b>MECHANICAL</b>		
Center Contact Captivation Force	The permanent displacement of the center contact with regard to the connector body shall not exceed the value.  Axial force 30N	IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.5; Maximum displacement of 0.25 mm in axial direction; Free connectors be fit with an appropriate cable
Engagement and Separation force	For Quick Lock type Axial force Engagement: 100N Separation: 80N  For Screw type Torque: 5Nm min	EIA-364-13, Method A/ IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.6; The sliding speed during the engagement and disengagement of the connectors should be 0.1m/s Measure torque necessary to mate/unmate samples.
Gauge Retention Force	Center contact: 1.5N min. Outer contact: 4N min.	IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.4; Resilient contacts, either female (socket) or male (pin) shall be tested in the following manner using the specified gauges.
Mechanical Endurance	100 cycles Min. See Note.	IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.15; Mate and un-mate specimens for 500 cycles at a rate of 12 cycles per minute.
Cable Pulling	Neither the dielectric nor the sheath shall have moved in relation to the cable outlet of the connectors.	IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.8; The force shall be applied between the two connectors along the common axis of the cable and cable outlets for a period of 60s min in figure 1
Cable Torsion	Cable shall neither slip nor rotate in relation to the connectors.	IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.10; An axial torque apply to the cable free end for a duration of 60s min in figure 2
Cable Bending	No visible deterioration of the connector to cable junction.	IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.9; Applied a mass on cable free end for a period of 60s min in figure 3

Test Description	Requirement	Procedure
Tensile Strength of Coupling Mechanism	450N min  No damage shall occur and the coupling mechanism shall not fail.	IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.11; An axial tensile force shall be applied smoothly to the mated connector pairs for a period of 60 s minimum.
Sinus Vibration	No discontinuities of 1 microsecond or longer duration. See Note.	IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.3; Subject mated specimens to 10 G's between 2 to 200 Hz. 20 minutes in each of 3 mutually perpendicular planes.
Random Vibration	No discontinuities of 1 microsecond or longer duration. See Note.	IEC 600068-2-64
Mechanical Shock	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Condition G/ IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.3.14; Subject mated specimens to 100 G's half-sine wave shock pulses of 6 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
<b>ENVIRONMENTAL</b>		
Thermal Shock	See note	EIA-364-32C, Subject mated samples 5 cycles between -45 and +85 C
Temperature Cycle	See note	EIA-364-31B, Condition III Mated specimens were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice while maintaining high humidity.
Corrosion Test/Salt Spray	5% spray for 96 hours, 5% spray for 720hours (optional)	EIA 364-26B Condition A / ISO 21207, test method A, 720hours (optional)
Sealing/Water Proof	IPX8 1m depth, 24 hour	IEC 60529/ IEC 61169-54_46F_326_CDV IEC 61169-1:2013 subclause 9.4.7;

(End of table 1)

3.7 Additional Testing

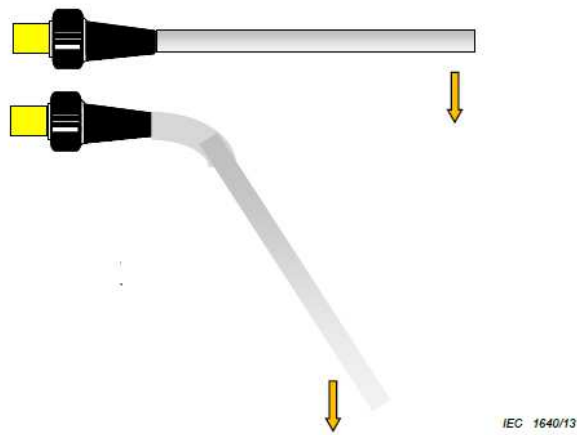
3.7.1 Cable Pulling test (Figure 1)



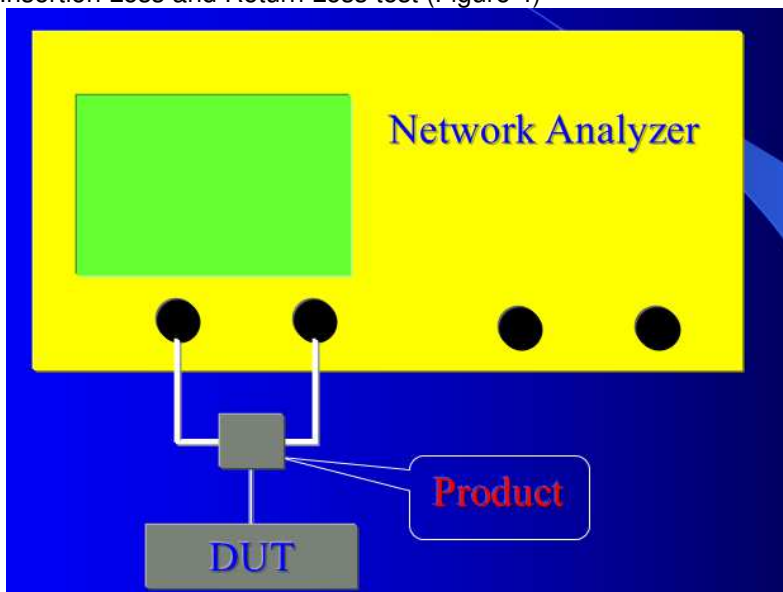
3.7.2 Cable Torsion test (Figure 2)



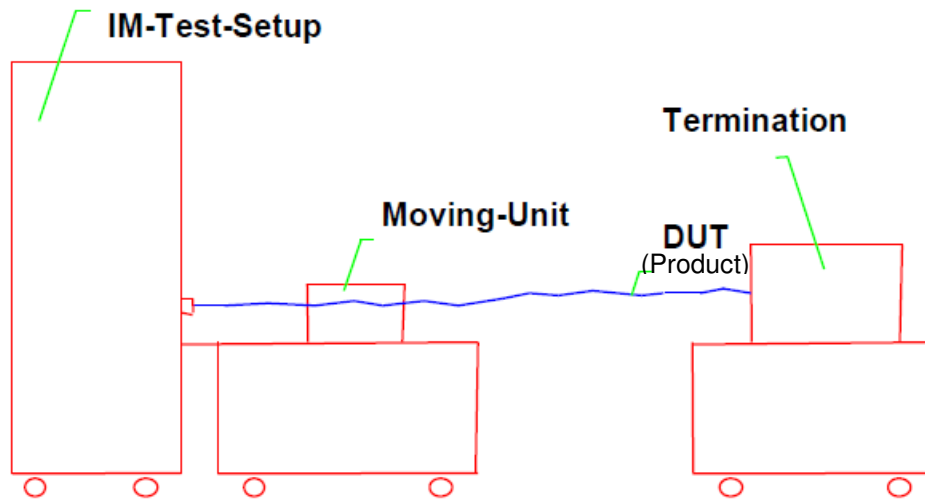
3.7.3 Cable Bending test (Figure 3)



3.7.4 Insertion Loss and Return Loss test (Figure 4)



3.7.5 PIM test (Figure 5)



**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 Table 2 (See section 3.8).

3.8 Product Qualification and Requalification Test Sequence (Table 2)

Test or Examination	Test Group					
	1	2	3	4	5	6
	Test Sequence (b)					
Visual Inspection	1,9,15	1,6,11,16,21	1,9	1,3	1,6	1,13
Mechanical Compatibility	2					
Contact Resistance	3,12	2,7,12,17,22	2,6		2,7	2,10
Withstanding Voltage	4,13	3,8,13,18,23,	3,7		3,8	3,11
Insulation Resistance	5,14	4,9,14,19,24	4,8		4,9	4,12
Center Contact Captivation Force			5			
Gauge Retention force	6,10					
Engagement and Separation force	7,11					
Mechanical Endurance	8					
Cable pulling		5				
Cable Torsion		10				
Cable Bending		15				
Tensile Strength of Coupling Mechanism		20				
Return Loss						14
Insertion Loss						15
Intermodulation Level	16					16
Sealing(Water Proof)					5	
Salt Spray				2		
Sinus Vibration						7
Random Vibration						8
Mechanical Shock						9
Temperature Cycle						5
Thermal Shock						6

(End of table 2)

**NOTE**

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



## 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.

#### 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 resubmitted.

### 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.

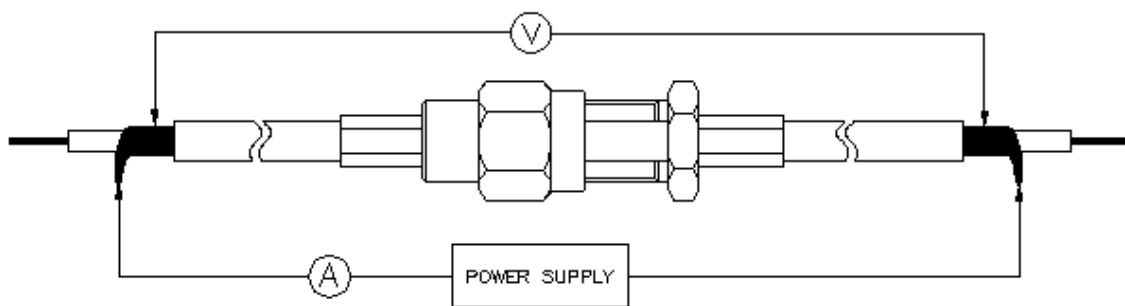


Figure 6  
Typical LLCR Measurement Points (cable end)

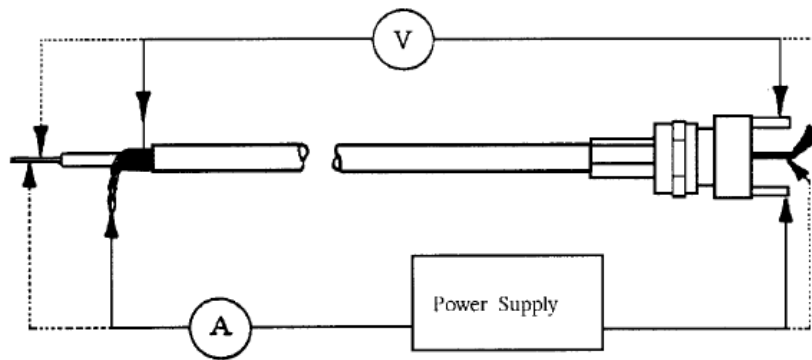


Figure 7  
Typical LLCR Measurement Points (PCB end)

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## Changed list

REV	DATE (DD-MM-YY)	CATEGORY	ADDITIONS, DELETIONS, CHANGES
1	06-FEB-2016	All	Preliminary version
A	16-FEB-2016	All	Released