



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.

4.3-10 Series RF Coaxial Connectors and Cable Assembly

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
- 501-115191: 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
3.6.1 Visual Inspection	Meets visual requirements.	EIA-364-18/ IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.1.1; Visual inspection.
3.6.2 Mechanical Compatibility	Meet compatibility requirements.	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.1.2.2; Use of compatibility gauges is optional. When used, specimens shall accept the gauges
ELECTRICAL		
3.6.3 Nominal impedance	50Ω	IEC 61169-54_2016
3.6.4 Frequency range	DC to 6 GHz Or upper frequency limit of cable	IEC 61169-54_2016
3.6.5 Return Loss	For Interface and adaptor: VSWR Max 1.03 (Up to 4GHz) Max 1.06 (4GHz to 6GHz) For connector, see detail drawing	EIA-364-108/ IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.2.1; Time domain gated around specimen under test in figure 5
3.6.6 Insertion Loss	For connector < 0.05 x √ f(GHz) in dB For C/A and special connector, see detail drawing	IEC 61169-54_2016 IEC 62037-1:2012 Requested all attenuation in figure 5
3.6.7 Low Level Contact Resistance (LLCR).	Center contact: Initial: 1.0 milli-ohms max. After test: 1.5 milli-ohms max. Outer Contact: Initial: 1.0 milli-ohms max. After test: 1.5 milli-ohms max.	EIA-364-23/ IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.2.3; Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 7 and Figure 8.
3.6.8 Insulation Resistance.	Initial: 5000 mega-ohms min. After test: 200 mega-ohms min.	IEC 61169-54_2016 EIA-364-21/IEC 61169-1:2013 subclause 9.2.5; 500±50 volts DC, 1min±5s hold. Test between adjacent contacts.
3.6.9 Withstanding Voltage.	For standard connectors and the one with ½" spiral cable 2500V at sea level 450V at 4,4kPa For other cables, see detail drawing	EIA-364-20, Condition I / IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.2.6; Requested volts AC (rms) at sea level. One minute hold with no breakdown or flashover.



Test Description	Requirement	Procedure
3.6.10 Intermodulation Level	For interface: -160 dBc @ 2X40W(46dBm) Frequency bands: 900 /1800/2100MHz For connector, see detail product drawing For C/A, depends on the cable used	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.2.9; 0.4 to 4 GHz 2 carriers +46 dBm Dynamic PIM and Static Test in figure 6
MECHANICAL		
3.6.11 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_2016 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
3.6.12 Engagement and Separation force	For Quick Lock type Axial force Engagement: Typ. 100N Separation: Typ. 80N For Screw type (coupling torque) Torque: 5Nm min	EIA-364-13, Method A/ IEC 61169-54_2016 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.
3.6.13 Gauge Retention Force	Center contact: 1.5N min. Outer contact: 4N min.	IEC 61169-54_2016 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.
3.6.14 cable rotation (nutation)	After the test, the cable and connector and junction between them shall not show any sign of deterioration. See detail drawing	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.3.7;
3.6.15 Cable Pulling	Neither the dielectric nor the sheath shall have moved in relation to the cable outlet of the connectors. See detail drawing	IEC 61169-54_2016 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 2
3.6.16 Cable Torsion	Cable shall neither slip nor rotate in relation to the connectors. See detail drawing	IEC 61169-54_2016 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 3



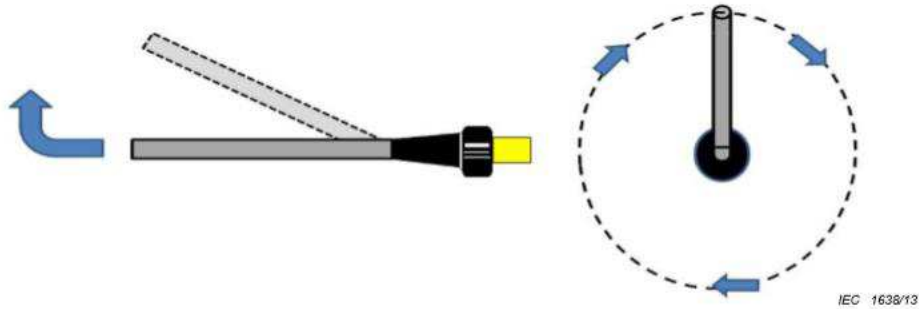
Test Description	Requirement	Procedure
3.6.17 Cable Bending	No visible deterioration of the connector to cable junction. See detail drawing	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.3.9; Applied a mass on cable free end for a period of 60s min in figure 4
3.6.18 Tensile Strength of Coupling Mechanism	450N min No damage shall occur and the coupling mechanism shall not fail.	IEC 61169-54_2016 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.
3.6.19 Vibration	100 m/s ² 2Hz to 200Hz No discontinuities of 1 microsecond or longer duration. See Note 1.	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.3.3; Subject mated specimens to 10 G's between 2 to 200 Hz.
3.6.20 Shock	981 m/s ² Half-sine wave 6ms No discontinuities of 1 microsecond or longer duration. See Note 1.	IEC 61169-54_2016 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.
ENDURANCE		
3.6.21 Mechanical Endurance	100 cycles Min. See Note 1.	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.3.15; Mate and un-mate specimens for 500 cycles at a rate of 12 cycles per minute.
3.6.22 High temperature endurance	250h at 85°C	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.4.5;
ENVIRONMENTAL		
3.6.23 Climatic sequence -storage	40/85/21	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.4.2;
3.6.24 Sealing/Water Proof	For interface only (mated) IPX8 (1m, 24 hour) For connector and C/A, see detail drawing	IEC 60529/ IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.4.7;
3.6.25 Corrosion Test/Salt Spray	5% spray for 48 hours, 5% spray for 96/720hours (optional) See detail drawing	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.4.10; EIA 364-26B Condition A / ISO 21207, test method A, 720hours (optional)

Test Description	Requirement	Procedure
3.6.26 Change of temperature	-40°C to +85°C 5 cycles See Note 1.	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.4.4;
3.6.27 Damp heat	21days/40°C/93%RH See Note 1.	IEC 61169-54_2016 IEC 61169-1:2013 subclause 9.4.3;

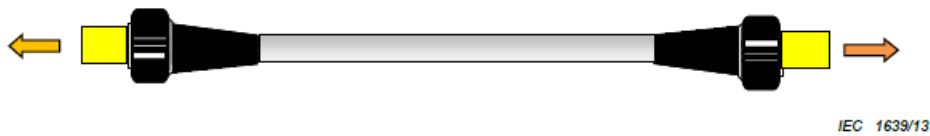
(End of table 1)

3.7 Additional Testing

3.7.1 Cable rotation (nutating) test (Figure 1)



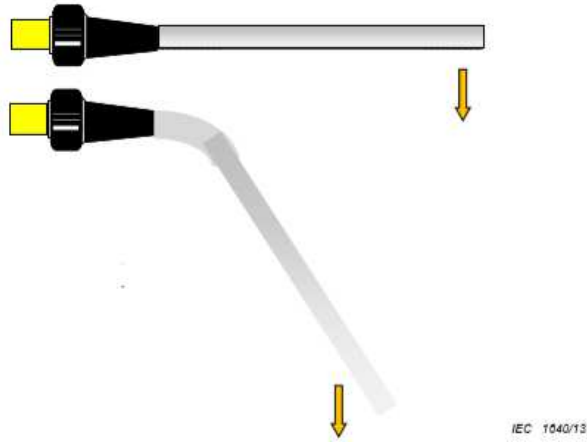
3.7.2 Cable Pulling test (Figure 2)



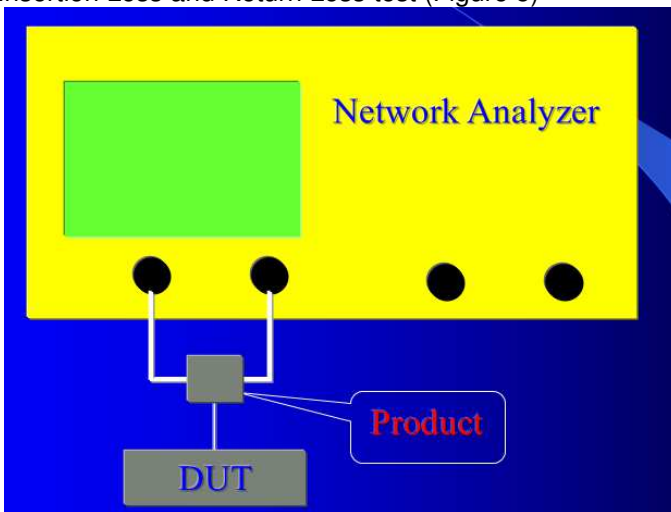
3.7.2 Cable Torsion test (Figure 3)



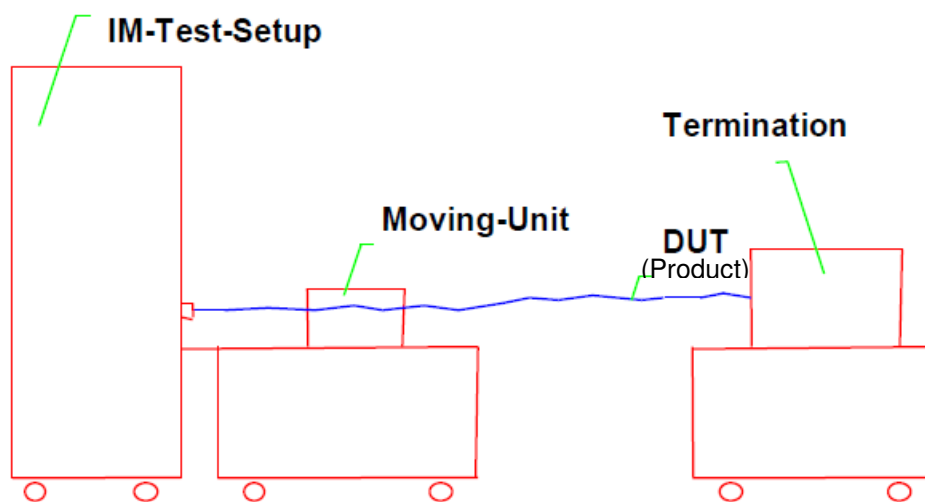
3.7.3 Cable Bending (Figure 4)



3.7.4 Insertion Loss and Return Loss test (Figure 5)



3.7.5 PIM test (Figure 6)



NOTE 1. 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	7	8	9	10	11
	Test Sequence (b)										
Visual Inspection	1	1,6,11,16 ,21,26	1,8	1,3	1,3	1	1	1,5	1,4	1,5	1,5
Mechanical Compatibility	2										
Return Loss	6										
Insertion Loss	7										
Contact Resistance	3	2,7,12,17 ,22,27	2			3	3		3	3	3
Insulation Resistance	4	3,8,13,18 ,23,28					4	3		6(unm ated)	6(unm ated)
Withstanding Voltage	5	4,9,14,19 ,24,29				4	5	4		4	4
Screening effectiveness			6								
Intermodulation Level	8										
RF-Power handling			7								
Center Contact Captivation Force			3								
Engagement and Separation force			4			5		6			
Gauge Retention force			5			6					
Cable rotation (nutation)		5									
Cable pulling		10									
Cable Torsion		15									
Cable Bending		20									
Tensile Strength of Coupling Mechanism		25									
Vibration				2							
Shock					2						
Mechanical Endurance						2					
High temperature endurance							2				
Sealing(Water Proof) interface						7	6			7(unm ated)	
Sealing(Water Proof) flange/CA	9	30									
Salt Spray								2			
Sulphur dioxide test									2		
Change of Temperature										2	
Damp heat											2

(End of table 2)

NOTE

- 2 (a) See paragraph 4.1.A.
 (b) Numbers indicate sequence in which tests are performed.
 (c) The sequence is preferred and for reference. All the test should be followed according to IEC 61169-1 at least and approved by TE.

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 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 the requirements of Figure 2. 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.

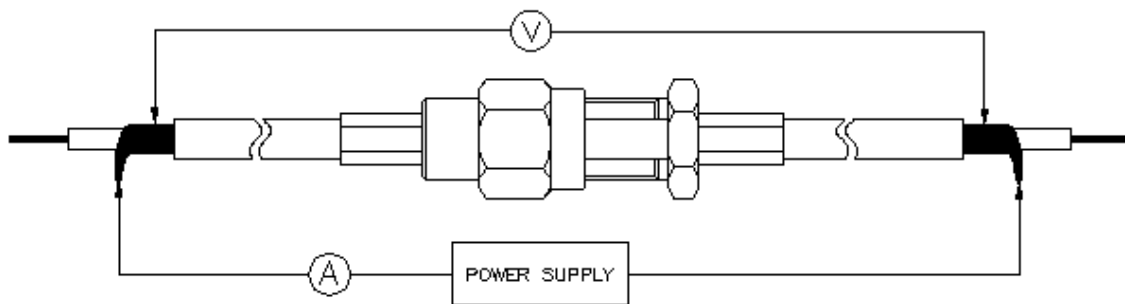


Figure 7
Typical LLCR Measurement Points (cable end)

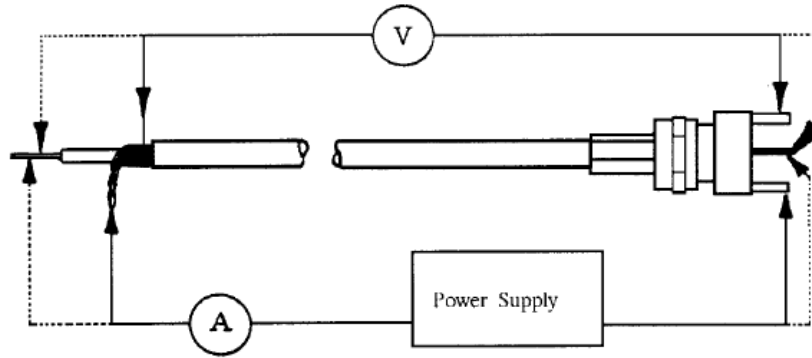


Figure 8
Typical LLCR Measurement Points (PCB end)

Change list

REV	DATE (DD-MM-YY)	ADDITIONS, DELETIONS, CHANGES
1	03-Mar-2020	Released
A	30-Jun-2020	Update some details