



## RF Multi-Coaxial Solution Connector

### 1 SCOPE

#### 1.1 Content

This specification covers performance, tests and quality requirements for TE Connectivity (TE) RF Multi-Coaxial Solution Connector. This connector is designed include one straddle PCB connector and one cable side connector.

This connector achieves the application as ATE (Auto Test Equipment) market, Multi-channels connection with one connector between PCB and Cable side.

#### 1.2 Qualification

When tests are performed on the subject product line, procedures specified in this Product Specification shall be used. All inspections shall be performed using 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.
- 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 60512: Electromechanical Components for Electronic Equipment; Basic Testing Procedures and Measuring Methods Part 1: General
- IEC 60169-1: Radio-frequency connectors. Part 1: General requirements and measuring methods
- IEC 60068: Basic Environmental Testing Procedures for Electric Components and Electronic Equipment

### 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: -40°C to +85 °C
- Frequency Range : DC to 3.2 GHz (SI version)
- Nominal Impedance: 50 ohms
- Insertion Loss (Not including board): SI version
  - <0.5 dB (up to 1.6GHz)
  - <1 dB (1.6GHz to 3.2GHz)
- Return Loss (Not including board): SI version
  - < -20dB (Up to 1.6GHz)
  - < -15dB (1.6GHz to 3.2GHz)
- Working Voltage: 40 VAC RMS at sea level
- Voltage withstanding: 270 Vrms
- Insulation resistance: >500 MΩ
- Crosstalk:
  - <-30dB 0~1.6GHz
  - <-20dB 1.6~3.2GHz

### 3.4 Characteristic Values

- PNs included:
  - For PN 2081996-1: MULTI-CHANNEL RF CONNECTOR 64 CHANNELS, STRADDLE TYPE
  - For PN 2016745-x: SI version CA,128P LIF-M TO 2X64P COAX-M
  - For PN 2016746-x: POWER version CA,128P LIF-M TO 2X64P COAX-M  
(x: Different length of cable)

### 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 61169-1:2013 sub-clause 9.1.1; Visual inspection.
<b>ELECTRICAL</b>		
Low Level Contact Resistance (LLCR).	With Gold/Silver-plated target board:  Center contact: <=30 milliohms after 30 cycles <=50 milliohms after 300 cycles  Outer Contact: <=20 milliohms after 30 cycles <=30 milliohms after 300 cycles	EIA-364-23/ IEC 61169-1:2013 subclause 9.2.3; Subject specimens to 30 mA maximum and 20 mV maximum open circuit voltage. See Figure 1
Insulation Resistance.	500 MΩ minimum (initial)	EIA-364-21/ EIA-364-21/IEC 61169-1:2013 sub-clause 9.2.5;

Test Description	Requirement	Procedure
Withstanding Voltage.	270V at sea level	EIA-364-20, Condition I / IEC 61169-1:2013 sub-clause 9.2.6; Requested volts AC (rms) at sea level. One minute hold with no breakdown or flashover.
Insertion Loss	<0.5 dB (Up to 1.6GHz) <1.0 dB (1.6GHz to 3.2GHz) (In accordance with 3.3)	IEC 62037-1:2012 See Figure 2-1
Return loss	< -20dB (Up to 1.6GHz) < -15dB (1.6GHz to 3.2GHz) (In accordance with 3.3)	EIA-364-108/ IEC 61169-1:2013 sub-clause 9.2.1; See Figure 2-1
Crosstalk	<-30dB 0~1.6GHz <-20dB 1.6~3.2GHz	
<b>MECHANICAL</b>		
Mechanical Endurance	300 cycles Meet the requirement of normal force No damage to parts	IEC 61169-1:2013 sub-clause 9.3.15; Mate and un-mate specimens for 30/150/300 cycles at a rate of 12 cycles per minute.
Sinus Vibration	No electrical discontinuity greater than 1 $\mu$ s.	Sinus Freq. 10-150-10Hz, 20 sweep each axel and 40m/s <sup>2</sup> amplitude for 2h.
Mechanical Shock	No electrical discontinuity greater than 1 $\mu$ s	Mated Conn. (10 G) Waveform: Half sin Curve Duration: 11 m sec. Number of Drops: 3 drops each to normal and reversed directions of X, Y and Z axes, totally 18 drops
Mating and Un-mating force(Interface)	Insertion force: 25N max Extraction force: 25N max	
<b>ENVIRONMENTAL</b>		
Thermal Shock	No damage to parts	EIA-264-32D Method A test condition I or equivalent
Temperature and humidity Cycle	No damage to parts	EIA-364-31B, Condition III Mated specimens were exposed to 10 cycles of humiditytemperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice while maintaining high humidity.
Salt Spray or MFG	48H salt spray, Without corrosion	EIA-364-26 Condition B or EIA-364-65B class IIA
Temperature life	No damage to parts	125°C, 250h

(End of table 1)

### 3.7 Additional Test and measuring details

#### 3.7.1 Contact resistance

Multi-RF Conductor

Note: The testing channels will be provided by PDE.

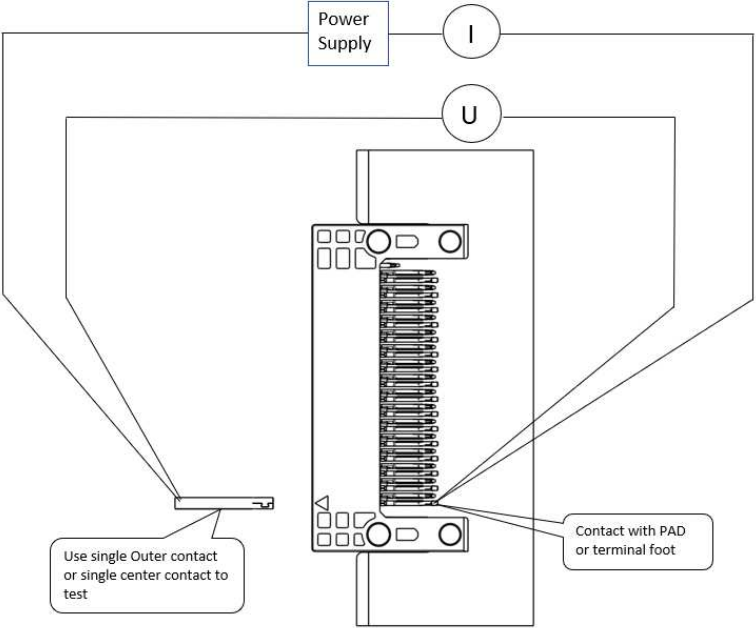


Figure 1

3.7.2 Insertion Loss and Return Loss test (Figure 2-1)

- Calibration method:
- Actual frequency range on Network Analyzer:
- Power: 10dBm
- Number of measurement points:
- Calibration planes: A, B
- Full 2 port calibration: open, short, load, thru,
- Note: 12 Channels of this connector will be tested in purple box showed in Figure 2-2.**

Measurement method:

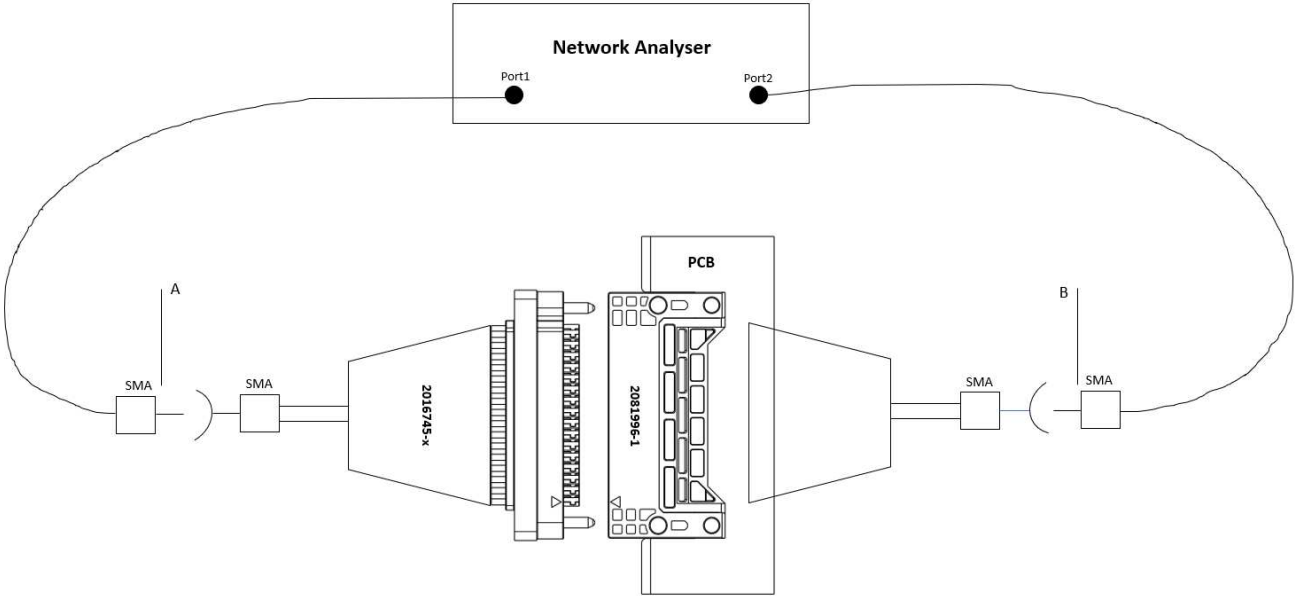


Figure 2-1

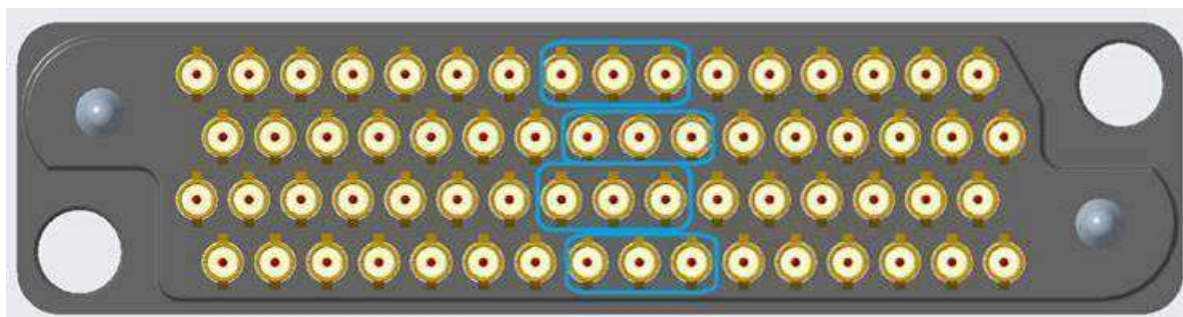


Figure 2-2

Return loss: Measurement without gating.

Insertion loss: Subtract 50 ohms line of reference board as shown in the following figure to isolate the share of the device under test.

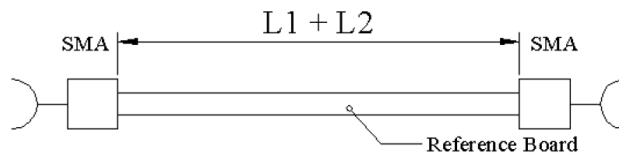


Figure 3

### 3.8 Product Qualification and Requalification Test Sequence (Table 2)

Test or Examination	Test Method	Test Group				
		1	2	3	4	5
		Test Sequences				
Visual Inspection	EIA-364-18/ IEC 61169-1:2013 sub-clause 9.1.1	2,6,9	2,7	2,8	2,6	1,5
Contact Resistance	EIA-364-23/ IEC 61169-1:2013 subclause 9.2.3	3,7,10	3,6	3,5,7	3,5	2,4
Insulation Resistance	EIA-364-21/ EIA-364-21/IEC 61169-1:2013 sub-clause 9.2.5	12				
Withstanding Voltage	EIA-364-20, Condition I / IEC 61169-1:2013 sub-clause 9.2.6	13				
Mechanical Endurance	IEC 61169-1:2013 sub-clause 9.3.15 Mate and un-mate specimens for 30/150/300 cycles at a rate of 12 cycles per minute.	5,8,11				
Mating force		4,14				
SI performance & Crosstalk	0~3.2GHz	1,15	1,8	1,9	1,7	
Sinus Vibration	Sinus Freq. 10-150-10Hz, 20 sweep each axel and 40m/s <sup>2</sup> amplitude for 2h.		4			
Mechanical shock	Pulse shape half sine, peak acceleration 10G, pulse 11ms, 3shocks in both directions in X-Y-Z axis (18 shocks)		5			
Thermal Shock	EIA-264-32D Method A test condition I or equivalent			4		
Temperature humidity cycle	EIA-364-31B, Condition III Mated specimens were exposed to 10 cycles of humiditytemperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice while maintaining high humidity.			6		
Temperature life	125°C, 250h				4	
Salt Spray / MFG	EIA-364-26 Condition B / EIA-364-65B class IIA					3

(End of table 2)

**NOTE**

- (a) See paragraph 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.
- (c) For Power version, SI performance & Crosstalk aren't need to test.

All test groups are performed with specimens fixed on PCB's.

Test-group 1: Nominal  
Test-group 2: Nominal, mated status.  
Test-group 3: Nominal, mated status.  
Test-group 4: Nominal, mated status.  
Test-group 5: Nominal, mated status for salt spray test or follow spec for MFG test.

## **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 2 Specimens.

#### **B. Test Sequence**

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

# Changed list

REV	DATE (DD-MM-YY)	CATEGORY	ADDITIONS, DELETIONS, CHANGES
1	06-JAN-2022	All	Preliminary version
2	27-MAY-2024	All	GTP version