



## Adapter In-series / Between Series

### 1 SCOPE

#### 1.1 Content

This specification covers performance, tests and quality requirements for TE Connectivity (TE) 3.5mm series, 2.92mm series, 2.4mm series, 1.85mm series, 1.35mm series, 1.0mm series , SMA 27GHz adapters.

#### 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

- 109-1: General Requirement for Test Specification.
- 109-197: Test Specification (TE Test Specification vs EIA and IEC Test Methods)
- 109 Series: Test Specifications as indicated in Table 2

#### 2.2 Industry Document

- MIL-PRF-39012: Performance Specification for Radio Frequency Coaxial Connectors
- MIL-STD-202H: Test Method Standard Electronic and Electrical Component Parts
- IEC-169-23: Radio-frequency Connector-Part 23: Pin and socket connector for use with 3,5mm rigid precision coaxial lines with inner diameter of outer conductor 3,5 mm (0,1378 in)
- IEC 61169-35: Radio-frequency Connector-Part 35: Sectional specification for 2.92 Series RF Connectors
- IEC 61169-40: Radio-frequency Connector-Part 40: Sectional specification for 2.4 Series RF Connectors
- IEC 61169-32: Radio-frequency Connector-Part 32: RF coaxial connectors with inner diameter of outer conductor 1.85mm (0.072in) with screw coupling – Characteristic impedance 50 ohms (type 1.85)
- IEC-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- IEC 61169-31: RF coaxial connectors with inner diameter of outer conductor 1.0mm (0.039in) with screw coupling – Characteristic impedance 50 ohms (type 1.0)
- IEC 61169-65: RF coaxial connectors with inner diameter of outer conductor 1.35mm (0.053in) with screw coupling – Characteristic impedance 50 ohms (type 1.35)
- IEC 61169-15: RF coaxial connectors with inner diameter of outer conductor 4,13 mm (0,163 in)

with threaded coupling - Characteristic impedance 50 Ω (type SMA)

### 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 (Table 1)

- Temperature Range: -55°C to +135 °C
- Nominal Impedance: 50 ohms

Test Description		Requirement						
		1.0mm Series	1.35mm Series	1.85mm Series	2.40mm Series	2.92mm Series	3.50mm Series	SMA Series
Frequency Range (GHz)		DC~110	DC~90	DC~67	DC~50	DC~40	DC~32	DC-27
Contact Resistance [after conditioning] (mΩ)	Center contact	4.0 [5]	4.0 [6]	4.0 [10.0]	4.0 [10.0]	3.0 [4.0]	3.0 [4.0]	3.0 [4.0]
	Outer Contact	1 [3]	1.5 [4]	2.5 [7.5]	2.5 [7.5]	2.0 [3.0]	2.0 [3.0]	2.0 [3.0]
Insulation Resistance [after conditioning] (MΩ)		5000 [200]	5000 [200]	5000 [200]	5000 [200]	5000 [200]	5000 [200]	5000 [200]
Withstanding Voltage (V)		500	500	500	500	750	1000	1000
Insertion Loss (dB)		0.05*SQRT(f)	0.05*SQRT(f)	0.05*SQRT(f)	0.05*SQRT(f)	0.04*SQRT(f)	0.03*SQRT(f)	0.03*SQRT(f)
Return loss (dB)		16.5	16	20	23	23	25	25
RF Leakage (dB)		90@1GHz	90@1GHz	100@1GHz	100@1GHz	100@1GHz	100@1GHz	100@1GHz
Center contact captivation (N)		10	10	20	20	20	27	27
Mating characteristics Withdrawal force (N)		NA	NA	0.25	0.25	0.4	0.4	0.4
Coupling mechanism retention force (N)		200	300	450	450	270	270	270

Table 1:

#### 3.4 Performance and Test Description

Products is designed to meet the electrical, mechanical and environmental performance requirements specified in Table 2(See section 3.5). Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

#### 3.5 Test Requirements and Procedures Summary (Table 2)

Test Description	Requirement	Procedure
Initial examination of product	Meets requirements of product drawing	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing
Final examination of product	Meets visual requirements	EIA-364-18. Visual inspection
<b>ELECTRICAL</b>		
Contact Resistance	Center contact: ≤ refer to Table 1 Outer Contact: ≤ refer to Table 1	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage..
Insulation Resistance	≥ refer to Table 1 initial	EIA-364-21/ 500 volts DC, 2 minutes hold. Test between adjacent contacts;
Withstanding Voltage (rms)	refer to Table 1	EIA-364-20, Condition I / Requested volts AC (rms) at sea level. One minute hold with no breakdown or flashover.
Insertion Loss	refer to Table 1	EIA-364-108 Measure RF insertion loss
Return loss/ VSWR	≤ refer to Table 1	EIA-364-108 Measure RF VSWR
RF Leakage	≥100dB up to 1 GHz ≥90dB up to 1 GHz(Type 1.0 & 1.35)	
<b>MECHANICAL</b>		
Durability	500 cycles	EIA-364-9. Mate and unmate specimens for 500 cycles at a maximum rate of 600 cycles per hour.
Vibration	No discontinuities of 0.1 microsecond or longer duration.	MIL-STD-202, METH. 204, COND D Subject mated samples to 20G's between 10-2000-10 Hz traversed in 20 minutes. 12 times cycle performed in each of 3 mutually perpendicular planes. IEC 61169-1:2013 Subclause 9.3.3 (for type 1.0 & 1.35) 9.8 m/s <sup>2</sup> 10 Hz to 2000 Hz
Shock	No discontinuities of 0.1 microsecond or longer duration. See Note.	MIL-STD-202, METH. 213, COND I. Subject mated samples to 100 G's sawtooth shock pulses of 6 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular axes, 18 total shocks IEC 61169-1:2013 Subclause 9.3.14 (for type 1.0 & 1.35) 490 m/s <sup>2</sup> ½ sin 11 ms.

Test Description	Requirement	Procedure
Center contact captivation - axial force  - torque	≥ refer to Table 1  N/A ≥ 0.9 N m & ±0.1 N m ( type 1.0 & 1.35)	Apply specified axial force to the center contact at a maximum rate of 4.45N per second and hold for 5 seconds. Maximum displacement 0,076 mm in each direction IEC 61169-1:2013 Subclause 9.3.5 (for type 1.0 & 1.35) Apply specified radial torque to the center contact and hold for 10 seconds. IEC 61169-1:2013 Subclause 9.3.6 (for type 1.0 & 1.35)
Coupling mechanism retention force	≥ refer to Table 1	Apply specified axial force to the coupling nut of the mated specimen and hold for 1 minute.
<b>ENVIRONMENTAL</b>		
Thermal Shock	-55°C ~ +135°C	MIL-STD-202, METH. 107, COND A Subject mated samples 5 cycles between -55°C and +135°C exposure time: 15 minutes
Moisture resistance	No physical damage	MIL-STD-202, METH. 106, Subject mated samples 10 cycles between 25 °C and 65 °C at 95% RH
Corrosion Test/Salt Spray	5% spray for 96 hours,	MIL-STD-202, METH. 101, COND A

(End of table 2)

### 3.6 Product Qualification and Requalification Test Sequence (Table 3)

Test or Examination	Test Group (a)		
	1	2	3
Initial examination of product	1	1	1
LLCR	2,7	2,4	2,11,
Insulation Resistance	3,8		3,15,
Withstanding Voltage	4,9		4,12,16,
Durability		3	
Vibration			5
Shock			7
Center contact captivation	5		
Coupling mechanism retention force			17

Thermal Shock			9,
Moisture resistance			13,
Corrosion Test/Salt Spray	6		
Final examination of product	10	5	6,8,10,14,18

(End of table 3)

**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. All test groups shall each consist of a minimum of 5 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 table 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 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.

REV	DATE (DD-MM-YY)	CATEGORY	ADDITIONS, DELETIONS, CHANGES
1	20-AUG-2020	All	Preliminary version
2	10-MAR-2021		Add Type 1.0mm; 1.35mm & SMA 27GHz series

**Changed list**