SMA For Flexible Cable RF Connector

1. INTRODUCTION

1.1. Purpose

Tests were performed on various Tyco Electronics SMA RF Coaxial Connectors with Flexible Cable to determine its conformance to the requirement of Product Specification 108-112002.

1.2. Scope

This report covers the electrical and mechanical performance of SMA for flexible cable RF coaxial connector .Testing was performed at Shanghai Engineer Center Laboratory from 7 Sep 2009 to 3 Nov 2009.And test file numbers for these testing are TR-60165-I .This documentation are is file at and available from the Shanghai Engineer Center Laboratory.

1.3 Conclusion

The tested connectors conformed to the electrical and mechanical performance requirements of Product Specification 108-112002.

1.4 Test Specimens

Test specimens were representative of normal production lots. Specimens indentified with the following part numbers were used for test:

Description	Part Number	Quantity
SMA Straight Jack connector with RG188 cable	1051942-1	46
SMA Straight Jack connector with RG188 cable	1051942-3	46
SMA Straight Plug connector with RG188 cable	1051643-1	26
SMA Straight Plug connector with RG188 cable	1051643-3	26
SMA R/A Plug connector with RG188 cable	1052067-1	26
SMA R/A Plug connector with RG188 cable	1052067-3	26

Figure 1

1.5 Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing.

Temperature: 15℃ to 35℃
Relative Humidity:25% to 75%

1.6 Qualification Test Sequence

Test or Examination	Test Group (a)				
	1	2	3	4	5
	Test Sequence (b)				
Initial examination of product	1	1	1	1	1
LLCR	3,7	2,4	2,4		
Insulation resistance				2,6	
Withstanding voltage				3,7	
RF insertion loss					2
Voltage standing wave ratio					3
Sinusoidal vibration	5				
Mechanical shock	6				
Durability	4				
Mating torque	2				
Unmating torque	8				
Thermal shock				4	
Humidity-temperature cycling				5	
Temperature life		3			
Mixed flowing gas			3		
Final examination of product	9	5	5	8	4

NOTE

(a) See paragraph 1.4
(b) Numbers indicate sequence in which tests are performed.

Figure 2

2. SUMMARY OF TESTING

2.1 Initial Examination of Product-All Test Groups

All specimens submitted for testing were representative of normal production lots. A certificate of conformance was issued by Product Assurance. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2 Low Level Contact Resistance (LLCR)-Test Group 1, 2 and 3.

Taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage for LLCR measurement, the resistance were less than 3 milliohms for center contact and 2 milliohm for outer contact initially and had a maximum increase in resistance (△R) of less than 2 milliohms.

2.3 Insulation Resistance-Test Group 4.

All insulation resistance measurements were greater than 5000 megohms.

2.4 Withstanding Voltage-Test Group 4.

No breakdown or flashover occurred.

2.5 RF Insertion Loss (For connectors with RG174, RG188 or RG316 cables)-Test Group 5.

All insertion loss results were less than 0.06 $\sqrt{f(GHz)}$ db maximum at 3 GHz for straight plugs and jacks. All insertion loss results were less than 0.15 $\sqrt{f(GHz)}$ db maximum at 3 GHz for right angle plugs and jacks

2.6 Voltage Standing Wave Ratio (For connectors with RG174, RG188 or RG316 cables)-Test Group 5.

All voltage standing wave ratio were less than the requirement of 1.15+.02f(GHz) maximun for straight type and 1.18+.02f(GHz) maximum for right angle type

2.7 Sinusoidal Vibration-Test Group 1

No discontinuities were detected during vibration testing. Following vibration testing, no cracks, breaks, or loose parts on specimens were visible.

2.8 Mechanical Shock -Test Group 1

No discontinuities were detected during mechanical shock testing. Following mechanical shock testing, no cracks, breaks, or loose parts on specimens were visible

2.9 Durability –Test Group 1

No physical damage occurred as a result of manually mating and unmating the specimens 500 times.

2.10 Mating Torque-Test Group 1

All samples were torqued to 8 inch pounds.

2.11 Unmating Torque-Test Group 1

All unmating torque measurement were greater than 6 inch ounces.

2.12 Thermal Shock-Test Group 4

No evidence of physical damage was visible as a result of thermal shock testing

2.13 Humidity-Temperature Cycling-Test Group 4

No evidence of physical damage was visible as a result of humidity temperature testing.

2.14 Temperature Life-Test Group 2

No evidence of physical damage was visible as a result of temperature life testing.

2.15 Mixed Flowing Gas-Test Group 3

No evidence of physical damage was visible as a result of exposure to the pollutants of mixed flowing gas.

2.16 Final Examination of Product-All Test Groups

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST METHODS

3.1 Initial Examination of Product

Where specified, samples were visually examined for evidence of physical damage detrimental to product performance..

3.2 Low Level Contact Resistance (LLCR)

LLCR measurements were made using a 4 terminal measuring technique (Figure 3).The test current was maintained at 100 milliamperes maximum with a 20 millivollt maximum open circuit voltage.

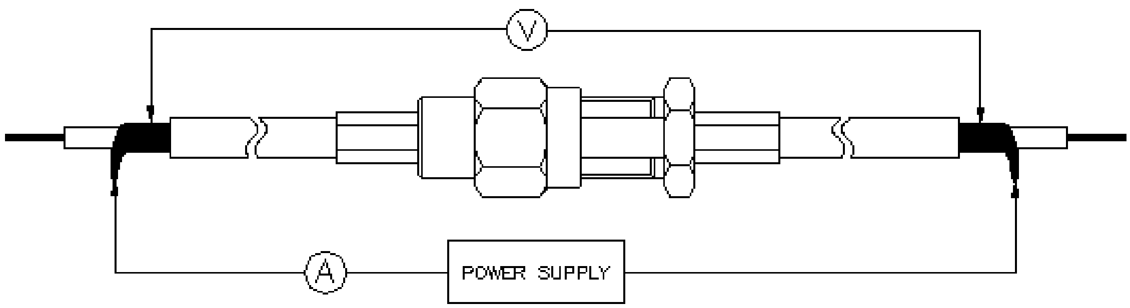

Figure 4
Typical LLCR Measurement Points

3.3 Insulation Resistance

Insulation resistance was measured between signal contact and outer shield of mated specimen .A test voltage of 500 volts DC was applied for 2 minutes before resistance was measured.

3.4 Withstanding Voltage

A test potential of 1000 volts AC was applied between signal contact and outer shield or mated specimens. The potential was applied for 1 minute and then returned to zero.

3.5 RF Insertion Loss

A full Two-Port calibration was performed on a network analyzer and the insertion loss ,S21,of the sample was measured.

3.6 Voltage Standing Wave Ratio (VSWR)

Mated samples were measured with network analyzer, the sweep range was 50M to 3 GHz.

3.7 Sinusoidal Vibration

Mated specimens were subjected to sinusoidal vibration, have a simple harmonic motion with an amplitude of 0.06 inch double amplitude or 20 G's whichever is less. The vibration frequency was varied uniformly between the limits of 10 and 2000 Hz and return to 10 Hz in 20 minutes. This cycle was performed for 12 times in each of 3 mutually perpendicular planes. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8 Mechanical Shock

Subject mated specimens to 100 G's waveform shock pulses of 6 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.9 Durability

Specimens were manually mated and unmated 500 times at a rate not exceeding 600 per hour.

3.10 Mating Torque

The samples were torqued to 8 inch pounds.

3.11 Unmating Torque

The torque was measured with a torque wrench.

3.12 Thermal Shock

Mated connectors were subjected to 5 cycles of temperature extremes with each cycle consist of 30 minutes at each temperature. The temperature extremes were -55 °C and 85 °C. The transition between temperatures was less than 1 minute

3.13 Humidity-Temperature Cycling

Mated connectors 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 of 95%

3.14 Temperature Life

Mated connectors were exposed to a temperature of 85 °C for 1000 hours. Samples were preconditioned with 10 cycles of durability.

3.15 Mixed Flowing Gas

Mated connectors were exposed for 14 days to mixed flowing gas class II exposure. Class II exposure is defined as a temperature of 30 °C and a relative humidity of 70% RH with pollutants of Cl_2 at 10 ppb,NO_2 at 200 ppb,H_2S at 10 ppb,. Samples were preconditioned with 10 cycles of durability.

3.16 Final Examination of Product

Specimens were visually examined for evidence of physical damage detrimental to product performance.