QUALIFICATION TEST REPORT

CONNECTOR, COAXIAL
BLIND MATE, 3.5 mm

501-271 Rev. O

Product Specification:	108-12106 Rev O
CTL No.:	CTL3484-105-006
	CTL3484-110-010
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Corporate Test Laboratory Harrisburg, Pennsylvania

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(R3484ts)

AMP

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CORPORATE TEST LABORATORY

Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on AMP* 3.5mm Blind Mate Coaxial Connectors to determine its conformance to the requirements of AMP Product Specification 108-12106 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the 3.5mm Blind Mate Coaxial Connectors. The testing was performed between February 15, 1993 and September 2, 1994

1.3 Conclusion

The 3.5mm Blind Mate Coaxial Connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-12106 Rev. O.

* Trademark

1.4 Product Description

The 3.5mm Blind Mate Coaxial Connectors are intended for use on semi-rigid RG-405/U and RG-402/U 50 ohm coaxial cable. They include full float panel and bulkhead plugs, right angle full float bulkhead and panel plugs, and bulkhead mounted jacks. The center contacts are beryllium copper.

1.5 Test Samples

The test samples were randomly selected from normal current production lots, and the following part numbers were used for test:

Test Group	Quantity	Part Nbr	Description
1,2,3,4,5,6	3 ea.	222199-1	Bulkhead Jack (RG/402)
1,2,3,4,5,6	3 ea.	222201-1	Bulkhead Plug (RG/402)
1,2,3,4,5,6	3 ea.	222197-1	Bulkhead Plug (RG/405)
1,2,3,4,5,6	3 ea.	222196-1	Bulkhead Jack (RG/405)

1.6 Qualification Test Sequence

	Test Groups					
Test or Examination	1	2	3	4	5	6
Examination of Product	1,12	1,5	1,5	1,8	1,5	1,4
Termination Resistance, Dry Circuit	4,8	2,4	2,4			
Dielectric Withstanding Voltage				3,7		
Insulation Resistance				2,6		
RF High Potential						3
RF Leakage					3	
RF Insertion Loss					2	
VSWR					4	
Corona						2
Vibration	6					
Physical Shock	7					
Mating Force	2,9					
Unmating Force	3,10					
Cable Retention	11					
Durability	5					
Thermal Shock				4		
Humidity-Temperature Cycling				5		
Mixed Flowing Gas			3			
Temperature Life		3				

The numbers indicate sequence in which tests were performed.

2. Summary of Testing

2.1 Examination of Product - All Groups

All samples submitted for testing were selected from normal current production lots. They were inspected and accepted by the Product Assurance Department of the Aerospace and Government Systems Sector.

2.2 Termination Resistance, Dry Circuit - Groups 1,2,3

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage has a maximum increase in resistance (ΔR) of less than 1.5 milliohms for the center contact and 3.0 milliohms for the outer contact.

Test Group	Nbr of Samples	Condition	Min	Max	Mean
		Center Contact			
1	6	After Mechanical	+0.19	+1.11	+0.500
2	6	After Temp Life	-0.93	+0.01	-0.355
3	6	After Gas Exposure	-0.03	+0.128	+0.066
		Outer Contact			
1	6	After Mechanical	+0.09	+1.30	+0.542
2	6	After Temp Life	-0.05	+0.55	+0.105
3	6	After Gas Exposure	0.00	+0.12	+0.055

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred when a test voltage was applied between the outer and center contacts.

2.4 Insulation Resistance - Group 4

All insulation resistance measurements were greater than 5,000 megohms.

2.5 RF Hi Pot - Group 6

There was no breakdown or flashover between the shield and the center contact when a test voltage of 1,000 vac 5.0 MHz for RG-402/U and 670 vac at 5.0 MHz for RG-405/U was applied for one minute.

2.6 RF Leakage - Group 5

There was less than 75 dB of leakage when a 0 dBm signal was applied at 2.5 GHz.

2.7 RF Insertion Loss - Group 5

All insertion loss results were less than 0.07 dB.

2.8 Voltage Standing Wave Ratio - Group 5

All voltage standing wave ratio measurements were less than the specification requirement of 1.02 + .007F(GHz) for straight plugs and jacks on RG-402/U cable and 1.05 + .007F(GHz) for straight plugs and jacks on RG-405/U cable.

2.9 Corona/Altitude - Group 6

There was no corona discharge greater than 5 picocoulombs at a potential of 375 volts DC for RG-402/U and 250 volts DC for RG-405/U at an altitude of 70,000 feet.

2.10 Vibration - Group 1

No discontinuities of the contacts were detected during vibration. Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.11 Physical Shock - Group 1

No discontinuities of the contacts were detected during physical shock. Following physical shock testing, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.12 Mating Force - Group 1

All mating force measurements were less than 6.0 pounds.

2.13 Unmating Force - Group 1

All unmating force measurements were less than 6.0 pounds.

2.14 Cable Retention - Group 1

There was no loss of electrical continuity or physical damage as a result of applying a 60 pound tensile load for RG 402/U during testing a 55 inch ounce torque was applied to the receptacle and 30 pound tensile load for RG 405/U to the cable for 30 seconds during testing a 16 inch ounce torque was applied to the receptacle

2.15 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 500 times.

2.16 Thermal Shock - Group 4

No evidence of physical damage to either the contacts or the connector was visible as a result of thermal shock.

2.17 Humidity-Temperature Cycling - Group 4

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to humidity-temperature cycling.

2.18 Mixed Flowing Gas - Group 3

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

2.19 Temperature Life - Group 2

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to an elevated temperature.

3. Test Methods

3.1 Examination of Product

Product drawings and inspection plans were used to examine the samples. They were examined visually and functionally.

3.2 Termination Resistance, Low Level

Termination resistance measurements at low level current were made using a four terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes DC with an open circuit voltage of 50 millivolts DC.

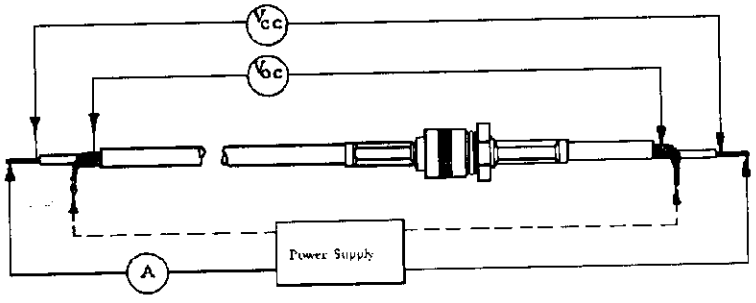

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 1,500 vac for RG-402/U and 1000 vas for RG-405/U was applied between the shield and center contact. This potential was applied for one minute and then returned to zero.

3.4 Insulation Resistance

Insulation resistance was measured between the shield and center contact, using a test voltage of 500 volts DC. This voltage was applied for two minutes before the resistance was measured. Measurements were made within 5 minutes after removal from the chamber.

3.5 RF High Potential

An RF test potential of 1,000 volts for RG-402/U and 670 volts for RG-405/U @ 5.0 Megahertz was applied between the shield and center contact of the unmated connectors. This potential was applied for one minute and then returned to zero.

3.6 RF Leakage

RF Leakage was measured on mated connectors using the Triaxial Cavity method. A 0 dBm signal at 2.5 GHz was applied to the connectors with a signal generator. RF Leakage was monitored with a spectrum analyzer.

3.7 Insertion Loss

A full Two-Port Calibration was performed on a network analyzer and the insertion loss, S_{21}, of the sample was measured.

3.8 Voltage Standing Wave Ratio

VSWR was measured on mated samples using an HP8510B network analyzer. The sweep range was 0.1 to 26.8 GHz.

3.9 Corona/Altitude'

A test voltage of 375 volts DC for RG-402/U and 250 volts DC for RG-405/U was applied between the outer and center contacts of the mated connectors. This test voltage was applied at a simulated altitude of 70,000 feet. The maximum discharge observed was less than 5 picocoulombs.

3.10 Vibration, Sine

Mated connectors were subjected to sinusoidal vibration, having 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 logarithmically between the limits of 10 and 2000 Hz and returned to 10 Hz in 20 minutes. This cycle was performed 12 times in each of three mutually perpendicular planes, for a total vibration time of 12 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.11 Physical Shock

Mated connectors were subjected to a physical shock test, having a sawtooth waveform of 100 gravity units (g peak) and a duration of 6 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular planes, for a total of 18 shocks. The connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.12 Mating Force

The force required to fully mate individual connectors was measured, using a free floating fixture.

3.13 Unmating Force

The force required to unmate individual connectors was measured using a free floating fixture.

3.14 Cable Retention

A tensile load of pounds was applied between the connector and cable for 30 seconds. During the hold period a rotational torque was applied. The connectors were monitored for discontinuities during testing.

3.15 Durability

Connectors were mated and unmated 500 times at a rate not exceeding 500 per hour.

3.16 Thermal Shock

Mated connectors were subjected to 5 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -65°C and 105°C. The transition between temperatures was less than one minute.

3.17 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 the relative humidity was held at 95%. During five of the first nine cycles, the connectors were exposed to a cold shock at -10°C for 3 hours.

3.18 Mixed Flowing Gas, Class II

Mated connectors were exposed for 14 days to a mixed flowing gas Class II exposure. Class II exposure is defined as a temperature of 30°C and a relative humidity of 70% with the pollutants of $C1_2$ at 10 ppb, NO_2 at 200 ppb, and H_2S at 10 ppb. Samples were preconditioned with 5 cycles of durability.

3.19 Temperature Life

Mated samples were exposed to a temperature of 105°C for 1,000 hours.

4. Validation

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3/14/95

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