QMA (Snap-On Mating Style Coaxial Connector)

1. INTRODUCTION

1.1. Purpose

Testing was performed on the Tyco Electronics QMA Snap-On Mating Style Coaxial Connector to determine its conformance to the requirements of Product Specification 108-2087 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the QMA Snap-On Mating Style Coaxial Connector . Testing was performed at the Engineering Assurance Product Test Laboratory between 21Mar03 and 26Sep03. The test file number for this testing is CTL B033555. This documentation is on file at and available from the Engineering Assurance Product Test Laboratory.

1.3. Conclusion

The QMA Snap-On Mating Style Coaxial Connector listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-2087 Revision A.

1.4. Product Description

The QMA Snap-On Mating Style Coaxial Connector mates when fingers on the outer contact of the plug snap over a step on the jack housing. Pulling back on the outer housing of the plug opens the fingers which releases the connector.

1.5. Test Specimens

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

Test Group	Quantity	Part Number	Description
1,7	10 each	1408332-1	QMA vertical PWB jack
2,3,4,6	5 each	1408332-1	QMA vertical PWB jack
1,2,4,5,7	5 each	1408333-1	QMA straight cable plug
1,3,4,5,7	5 each	1408336-1	QMA right angle cable plug
6	5	1408354-2	QMA straight cable plug male contact
6	5	1408334-2	QMA right angle cable plug male contact

NOTE *Specimens for test groups 1, 2, 3 and 7 were mounted on printed circuit board PN 60-469676-1.*

Figure 1

1.6. Environmental Conditions

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

- Temperature: 15 to 35˚C
- Relative Humidity: 25 to 75%

* Trademark
| Indicates change

1.7. Qualification Test Sequence

Test or Examination	Test Group (a)						
	1	2	3	4	5	6	7
	Test Sequence (b)						
Initial examination of product	1	1	1	1	1	1	1
Low level contact resistance	2,6	2,4	2,4				
Voltage standing wave ratio					2		
Insulation resistance				2,6			
Withstanding voltage				3,7			
RF insertion loss					3		
Solderability						2	
Vibration	4						
Mechanical shock	5						
Durability	3						
Interface retention force							2
Thermal shock				4			
Humidity-temperature cycling				5			
Temperature life		3(c)					
Mixed flowing gas			3(c)				
Final examination of product	7	5	5	8	4	3	3

NOTE
(a) See paragraph 1.5.
(b) Numbers indicate sequence in which tests are performed.
(c) Precondition specimens with 10 durability cycles.

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 - Test Groups 1, 2 and 3

All low level contact resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 5 milliohms for the center contact and 2.5 milliohms for the outer contact after testing.

2.3. Voltage Standing Wave Ratio (VSWR) - Test Group 5

All voltage standing wave ratio measurements were less than 1.15 for straight product and 1.22 for right angle product.

2.4. Insulation Resistance - Test Group 4

All insulation resistance measurements were greater than 5000 megohms.

2.5. Withstanding Voltage - Test Group 4

No dielectric breakdown or flashover occurred.

2.6. RF Insertion Loss - Test Group 5

All insertion loss results were less than .26 dB at 6000 MHz.

2.7. Solderability Dip Test - Test Group 6

All contact leads had a minimum of 95% solder coverage.

2.8. Vibration - Test Group 1

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

2.9. Mechanical Shock - Test Group 1

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

2.10. Durability - Test Group 1

No physical damage occurred as a result of mating and unmating the specimens 100 times.

2.11. Interface Retention Force - Test Group 7

All retention forces were greater than 60 N.

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 cycling.

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

A Certificate of Conformance was issued stating that all specimens in this test package were produced, inspected, and accepted as conforming to product drawing requirements, and were manufactured using the same core manufacturing processes and technologies as production parts.

3.2. Low Level Contact Resistance

Low level contact resistance measurements were made using a 4 terminal measuring technique. The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

3.3. Voltage Standing Wave Ratio (VSWR)

VSWR was measured using an HP8510C network analyzer between 0 and 6000 MHz.

3.4. Insulation Resistance

Insulation resistance was measured between adjacent contacts of unmated and unmounted specimens. A test voltage of 500 volts DC was applied for 2 minutes before the resistance was measured.

3.5. Withstanding Voltage

A test potential of 750 volts AC was applied between the center conductor and outer braid of unmated cable specimens. A test potential of 1000 volts AC was applied between the center conductor and outer shell of unmated and unmounted jack specimens. In both cases, the potential was applied for 1 minute and then returned to zero.

3.6. RF Insertion Loss

Measurements were taken at a frequency of 6000 MHz.

3.7. Solderability, Dip Test

Specimen were subjected to a solderability test. The areas to be evaluated were immersed in a nonactivated rosin flux for 5 to 10 seconds, allowed to drain for 5 to 20 seconds. The specimens were then immersed in the molten solder at a rate of approximately 1 inch per second, held for 4 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the specimens were visually examined for solder coverage. The solder used for testing was 60/40 tin lead composition and was maintained at a temperature of 245 ± 5°C.

3.8. Vibration, Random

Mated specimens were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 20 and 500 Hz. The spectrum remains flat at 0.02 G^2/Hz from 20 to 500 Hz. The root-mean square amplitude of the excitation was 3.10 GRMS. This was performed for 15 minutes in each of 3 mutually perpendicular planes for a total vibration time of 45 minutes. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.9. Mechanical Shock, Half-sine

Mated specimens were subjected to a mechanical shock test having a half-sine waveform of 30 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular planes for a total of 18 shocks. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.10. Durability

Specimens were mated and unmated 100 times at a maximum rate of 500 cycles per hour.

3.11. Interface Retention Force

Force was applied to failure using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm per minute.

3.12. Thermal Shock

Mated specimens were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -40 and 85˚C. The transition between temperatures was less than 1 minute.

3.13. Humidity-temperature Cycling

Mated specimens were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 65˚C twice while maintaining high humidity.

3.14. Temperature Life

Mated specimens were exposed to a temperature of 80˚C for 500 hours. Specimens were preconditioned with 10 cycles of durability.

3.15. Mixed Flowing Gas, Class IIA

Mated specimens were exposed for 14 days to a mixed flowing gas Class IIA exposure. Class IIA exposure is defined as a temperature of 30˚C and a relative humidity of 70% with the pollutants of Cl_2 at 10 ppb, NO_2 at 200 ppb, H_2S at 10 ppb and SO_2 at 100 ppb. Specimens 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.