Qualification Test Report Summary of the Electrical, Mechanical and Environmental Tests Performed on the MD801 Series Receptacle and Plug Connectors

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Reviewed by: Ted Rachwalski

Date: 06/11/15
Revision: C

Revision History

Date	Revision	Description	Revised By
11/21/14	A	Initial Release	N/A
06/12/15	B	Updated Part Numbers and added Test Data for Plug	J. Marchel
12/11/15	C	Updated part numbers, and header	A. Thelin

CERTIFICATION

All equipment and measuring instruments used during testing were calibrated using standards with accuracies traceable to the National Institute of Standards and Technology and complies with the applicable requirements of ANSI / NCSL Z540-1 and ISO / IEC 17025.

Scope:
The purpose for this testing is to verify the performance of the MD801 Series Receptacle Connectors with PC Tail contacts and MD801 Series Plug Connectors with Banding Platform. Test was performed using Cinch Connectors and Glenair Connectors to verify intermateability and ability to meet the qualification performance tests.

Manufacturer: Cinch Connectivity Solutions.

Introduction:
This document presents the results of a series of electrical, mechanical and environmental tests that were performed on (52) fifty-two MD801 Series Connectors (herein and after referred to as the Device Under Test (DUT). The DUTs were identified as follows (Cinch connector samples identified in bold print):

Group 1
Group 1A FEMALE - 10 SOCKETS, **MD801-011-07MT7-10SA**
Group 1A MALE - 10 PINS, 801-007-16MT7-10PA
Group 1B FEMALE - 10 SOCKETS, **MD801-011-07MT7-10SA**
Group 1B MALE - 10 PINS, 801-007-16MT7-10PA
Group 1C MALE - 7 SOCKETS, 801-007-16MT6-7SA
Group 1C FEMALE - 7 PINS, **MD801-011-07MT6-7PA**
Group 1D MALE - 7 SOCKETS, 801-007-16MT6-7SA
Group 1D FEMALE - 7 PIN, **MD801-011-07MT6-7PA**

Group 2
Group 2A MALE - 19 PINS, 801-007-16MT9-19PA
Group 2A FEMALE - 19 SOCKETS, **MD801-011-07MT9-19SA**

Group 2B MALE - 19 PINS, 801-007-16MT9-19PA
Group 2B FEMALE - 19 SOCKETS, **MD801-011-07MT9-19SA**
Group 2C MALE - 19 SOCKETS, 801-007-16MT9-19SA
Group 2C FEMALE - 19 PINS, **MD801-011-07MT9-19PA**
Group 2D MALE - 19 SOCKETS, 801-007-16MT9-19SA
Group 2D FEMALE - 19 PINS, **MD801-011-07MT9-19PA**
Group 2E MALE - 26 PINS, 801-007-16MT10-26PA
Group 2E FEMALE - 26 SOCKETS, **MD801-011-07MT10-26SA**
Group 2F MALE - 26 PINS, 801-007-16MT10-26PA
Group 2F FEMALE - 26 SOCKETS, **MD801-011-07MT10-26SA**
Group 3
Group 3A MALE - 10 SOCKETS, 801-007-16MT7-10SA
Group 3A FEMALE - 10 PINS, **MD801-011-07MT7-10PA**
Group 3B FEMALE - 13 SOCKETS, **MD801-011-07MT8-13SA**
Group 3B MALE - 13 PINS, 801-007-16MT8-13PA
Group 3C MALE - 10 SOCKETS, 801-007-16MT7-10SA
Group 3C FEMALE - 10 PINS, **MD801-011-07MT7-10PA**
Group 3D FEMALE - 13 SOCKETS, **MD801-011-07MT8-13SA**
Group 3D MALE - 13 PINS, 801-007-16MT8-13PA
Group 4
Group 4A FEMALE - 13 SOCKETS , **MD801-011-07MT8-13SA**
Group 4A MALE - 13 PINS, 801-007-16MT8-13PA
Group 4B MALE - 13 SOCKETS, 801-007-16MT8-13SA
Group 4B FEMALE - 13 PINS, S/N: ACC **MD801-011-07MT8-13PA**
Group 4C FEMALE - 13 SOCKETS, **MD801-011-07MT8-13SA**
Group 4C MALE - 13 PINS, 801-007-16MT8-13PA
Group 4D FEMALE - 10 SOCKETS, **MD801-011-07MT7-10SA**
Group 4D MALE - 10 PINS, 801-007-16MT7-10PA
Group 4E FEMALE - 10 SOCKETS, **MD801-011-07MT7-10SA**
Group 4E MALE - 10 PINS, 801-007-16MT7-10PA
Group 4F MALE - 13 SOCKETS, 801-007-16MT8-13SA
Group 4F FEMALE - 13 PINS, **MD801-011-07MT8-13PA**

Group 5
Group 5A FEMALE - 19 PINS, **MD801-011-07MT9-19PA**
Group 5A MALE - 19 SOCKETS, **MD801-007-16MT9-19SA**
Group 5B FEMALE - 19 SOCKETS, **MD801-011-07MT9-19SA**

Group 5B MALE - 19 PINS, **MD801-007-16MT9-19PA**
Group 5C FEMALE - 19 PINS, **MD801-011-07MT9-19PA**
Group 5C MALE - 19 SOCKETS, **MD801-007-16MT9-19SA**
Group 5D FEMALE - 19 SOCKETS, **MD801-011-07MT9-19SA**
Group 5D MALE - 19 PINS, **MD801-007-16MT9-19PA**
Group 5E FEMALE - 19 PINS, **MD801-011-07MT9-19PA**
Group 5E MALE - 19 SOCKETS, **MD801-007-16MT9-19SA**
Group 5F FEMALE - 19 SOCKETS, **MD801-011-07MT9-19SA**
Group 5F MALE - 19 PINS, **MD801-007-16MT9-19PA**

Test Result Summary:
The following tests were performed (sequence of tests for each group as shown) and their results are shown below:

DUT Group	Test	MD801 Series Complete Qualification Test Plan Requirements & Referenced Test Procedure	Results / Comments
Group 1	Magnetic Permeability	2 u max. / EIA-364-54	Pass
Group 1	Temperature Cycling	No mechanical damage. Connector shall meet CR, DWV, IR and Shell to Shell Resistance Post Test Procedure - EIA-364-32, Method A Test Condition IV, -55 C - +125 C, 5 Cycles	No damage See results below
Group 1	Post Temperature - Contact Resistance	23 GA contacts 54 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 48.00 mV
Group 1	Post Temperature - Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 1	Post Temperature - Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
Group 1	Post Temperature - Shell to Shell Conductivity	Voltage drop across a mated pair 20 mV max. Procedure - EIA-364-83	Pass, Average 0.85 mV
Group 1	Coupling Torque	Shell Size 6 & 7 – 8 in-lbs Shell Size 8 & 9 – 9 in-lbs Shell Size 10 – 12 in-lbs At a point when red line (fully mated indicator) is completely covered	Pass Size 6 & 7 - Average 5.45in-lbs
DUT Group	**Test**	**MD801 Series Complete Qualification Test Plan Requirements & Referenced Test Procedure**	**Results / Comments**
Group 1	Durability	500 mating / unmating cycles No deterioration which will	Pass No sign of wear

		adversely affect the connector. Connector shall meet CR, DWV, IR and Shell to Shell Resistance & Coupling torque Procedure - EIA-364-09	See results below
Group 1	Post Durability - Contact Resistance	23 GA contacts 54 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 48.00 mV
Group 1	Post Durability - Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 1	Post Durability - Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
Group 1	Post Durability - Shell to Shell Conductivity	Voltage drop across a mated pair 20 mV max. Procedure - EIA-364-83	Pass, Average 7.3 mV
Group 1	Post Durability - Coupling Torque	Shell Size 6 & 7 – 8 in-lbs Shell Size 8 & 9 – 9 in-lbs Shell Size 10 – 12 in-lbs At a point when red line (fully mated indicator) is completely covered	Pass Size 6 & 7 - Average 4.50 in-lbs
Group 1	Salt Spray (corrosion)	No exposure of base metal. Connector shall meet Shell to Shell Resistance and Coupling torque Procedure - EIA-364-26 500 Hour Exposure	Pass No signs of corrosion See results below

DUT Group	Test	MD801 Series Complete Qualification Test Plan Requirements & Referenced Test Procedure	Results / Comments
Group 1	Post Corrosion - Shell to Shell Conductivity	Voltage drop across a mated pair 20 mV max.	Pass, Average 0.4 mV

		Procedure - EIA-364-83	
Group 1	Post Corrosion - Coupling Torque	Shell Size 6 & 7 – 8 in-lbs Shell Size 8 & 9 – 9 in-lbs Shell Size 10 – 12 in-lbs At a point when red line (fully mated indicator) is completely covered	Pass Size 6 & 7 - Average 6.10 in-lbs

DUT Group	Test	MD801 Series Complete Qualification Test Plan Requirements & Referenced Test Procedure	Results / Comments
Group 2	Contact Retention	23 GA PC tail contacts 3 lbs Min.	Pass

		Procedure - EIA-364-29	
Group 2	Contact Resistance	23 GA contacts 45 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 39.78 mV
Group 2	Temperature Cycling	No mechanical damage. Connector shall meet CR, DWV, IR and Shell to Shell Resistance Procedure - EIA-364-32 Method A Test Condition IV, -55 C - +125 C, 5 Cycles	No damage See results below
Group 2	Post Temperature - Contact Resistance	23 GA contacts 54 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 41.50 mV
Group 2	Post Temperature - Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 2	Post Temperature - Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
Group 2	Post Temperature - Shell to Shell Conductivity	Voltage drop across a mated pair 20 mV max. Procedure - EIA-364-83	Pass, Average 5.16 mV
Group 2	Coupling Torque	Shell Size 6 & 7 – 8 in-lbs Shell Size 8 & 9 – 9 in-lbs Shell Size 10 – 12 in-lbs At a point when red line (fully mated indicator) is completely covered	Pass Size 9 - Average 5.65in-lbs Size 10 - Average 9.9in-lbs
DUT Group	**Test**	**MD801 Series Complete Qualification Test Plan Requirements & Referenced Test Procedure**	**Results / Comments**
Group 2	Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V)	Pass

		Procedure - EIA-364-21	
Group 2	Dielectric Withstanding Voltage at Sea Level	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 2	Vibration, Random	No discontinuity greater than 1 microsecond Procedure - EIA-364-28 Test Condition V, Letter G, Duration1-1/2 hours, 100 mA test current 50-2000 Hz, 23.92 g rms.	Pass
Group 2	Shock	No discontinuity greater than 1 microsecond Procedure - EIA-364-27 Test Condition D, 3 shocks x 3 axes x 2 dir. Half sine, 300g duration 3 ms	Pass
Group 2	Shell to Shell Conductivity	Voltage drop across a mated pair 20 mV max. Procedure - EIA-364-83	Pass, Average 5.00 mV
Group 2	Contact Resistance (After Conditioning)	23 GA contacts 54 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 42.00 mV
Group 2	Humidity	No deterioration IR 100 Megohms min. during final cycle. Connector shall meet CR, DWV, shell to shell resistance Procedure - EIA-364-31 Condition B Method III, 80-98% RH 10 cycles +25 C to +65 C, Step 7b deleted, 24 hour recovery period	Pass See results below

DUT Group	Test	MD801 Series Complete Qualification Test Plan Requirements & Referenced Test Procedure	Results / Comments

Group 2	Post Humidity - Contact Resistance	23 GA contacts 54 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 42.50 mV
Group 2	Post Humidity - Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 2	Post Humidity - Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
Group 2	Post Humidity - Shell to Shell Conductivity	Voltage drop across a mated pair 20 mV max. Procedure - EIA-364-83	Pass, Average 19.30 mV
Group 2	Contact Retention	23 GA PC tail contacts 3 lbs Min. Procedure - EIA-364-29	Pass

DUT Group	Test	MD801 Series Complete Qualification Test Plan Requirements & Referenced Test Procedure	Results / Comments
Group 3	Insulation Resistance	5000 Megaohms min.	Pass

		(500 VDC +/-50V) Procedure - EIA-364-21	
Group 3	Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 3	Contact Resistance	23 GA contacts 45 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 39.51 mV
Group 3	Coupling Torque	Shell Size 6 & 7 – 8 in-lbs Shell Size 8 & 9 – 9 in-lbs Shell Size 10 – 12 in-lbs At a point when red line (fully mated indicator) is completely covered	Pass Size 7 - Average 5.45in-lbs Size 8 - Average 6.40in-lbs
Group 3	Fluid Immersion	No visible damage that would affect form, fit and function. Connector shall meet DWV, coupling torque post fluid immersion Procedure - EIA-364-10 Unmated connectors Fluids – A, E, G, I.	Pass Form, fit and function not affected See results below
Group 3	Post Fluids - Coupling Torque	Shell Size 6 & 7 – 8 in-lbs Shell Size 8 & 9 – 9 in-lbs Shell Size 10 – 12 in-lbs At a point when red line (fully mated indicator) is completely covered	Pass Size 7 - Average 5.75in-lbs Size 8 - Average 11.1in-lbs
Group 3	Post Fluids - Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass

DUT Group	Test	MD801 Series Complete Qualification Test Plan Requirements & Referenced Test Procedure	Results / Comments

Group 4	Contact Resistance	23 GA contacts 73 mV drop at test current 5 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 67.51 mV
Group 4	Socket Contact Engagement Force	23 GA – 8 oz max (.0275 Diameter pin) Procedure - SAE AS39029	Pass
Group 4	Socket Contact Separation Force	23 GA – 0.5 oz min (.0265 Diameter pin) Procedure - SAE AS39029	Pass
Group 4	Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
Group 4	Water Immersion	No evidence of water penetration IR - 100 megohmsMegaohms min Procedure - MIL-STD 810 method 512.4 1 meter immersion for 1 hour	Pass No water intrusion Pass Post Insulation Resistance
Group 4	Post Immersion - Insulation Resistance	100 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
Group 4	Post Immersion - Contact Resistance	23 GA contacts 54 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 40.51 mV

DUT Group	Test	MD801 Series Complete Qualification Test Plan Requirements &	Results / Comments

		Referenced Test Procedure	
Group 5	Contact Retention	23 GA PC tail contacts – 3 lbs 23 GA Crimp contacts – 6 lbs Minimum Procedure - EIA-364-29	Pass
Group 5	Contact Resistance	23 GA contacts 45 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 40.81 mV
Group 5	Initial Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
Group 5	Initial Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 5	Initial Shell to Shell Conductivity	Voltage drop across a mated pair 10 mV max. Procedure - EIA-364-83	Pass, Average 5.6 mV
Group 5	Temperature Cycling	No mechanical damage. Connector shall meet CR, DWV, IR and Shell to Shell Resistance Procedure - EIA-364-32, Method A, Test Condition IV, -65 C to +150 C, 5 Cycles	No damage See results below
Group 5	Post Temperature - Contact Resistance	23 GA contacts 54 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 43.97 mV
Group 5	Post Temperature - Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 5	Post Temperature - Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
DUT Group	**Test**	**MD801 Series Complete Qualification Test Plan Requirements &**	**Results / Comments**

		Referenced Test Procedure	
Group 5	Post Temperature - Shell to Shell Conductivity	Voltage drop across a mated pair 20 mV max. Procedure - EIA-364-83	Pass, Average 5.06 mV
Group 5	Vibration, Random	No discontinuity greater than 1 microsecond Procedure - EIA-364-28 Test Condition V, Letter G, Duration 1-1/2 hours, 100 mA test current 50-2000 Hz, 23.92 g rms.	Pass
Group 5	Shock	No discontinuity greater than 1 microsecond Procedure - EIA-364-27 Test Condition D, 3 shocks x 3 axes x 2 dir. Half sine, 300g duration 3 ms	Pass
Group 5	Post Vibration/Shock - Contact Resistance	23 GA contacts 54 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 42.75 mV
Group 5	Post Vibration/Shock - Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
Group 5	Post Vibration/Shock - Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 5	Post Vibration/Shock - Shell to Shell Conductivity	Voltage drop across a mated pair 20 mV max. Procedure - EIA-364-83	Pass, Average 4.57 mV

DUT Group	Test	MD801 Series Complete Qualification Test Plan Requirements &	Results / Comments

		Referenced Test Procedure	
Group 5	Humidity	No deterioration, IR 100 Megohms min during final cycle. Connector shall meet CR, DWV, shell to shell resistance Procedure - EIA-364-31 Condition B Method III, 80-98% RH 10 cycles +25 C to +65 C Step 7b deleted, 24 hour recovery period	Pass See results below
Group 5	Post Humidity -Contact Resistance	23 GA contacts 54 mV drop at test current 3 A (24 AWG silver plated wire) Ref. SAE AS39029 Procedure - EIA-364-06	Pass, Average 42.90 mV
Group 5	Post Humidity - Insulation Resistance	5000 Megaohms min. (500 VDC +/-50V) Procedure - EIA-364-21	Pass
Group 5	Post Humidity - Dielectric Withstanding Voltage	23 GA Contacts 500VAC RMS One (1) minute dwell Procedure - EIA-364-20	Pass
Group 5	Post Humidity - Shell to Shell Conductivity	Voltage drop across a mated pair 20 mV max. Procedure - EIA-364-83	Pass, Average 8.593.45 mV