Flag HDMI Connector

1. Purpose:

This is qualification test. The purpose of this test is to evaluate the performance of Flag HDMI Connector.
Testing was performed on below products to determine it compliance with the requirements of product specification 108-60079 Rev. A.

2. Scope:

This test report is for Flag HDMI Connector. Testing was performed at Tyco Electronics Shanghai Engineering Center Lab between Mar. 26, 2009 and Apr. 30, 2009. Test group J was not performed per applicant's application. Test group D was performed at EME lab.

3. Conclusion:

The test result is passed.
The Flag HDMI Type A connector meets the electrical, mechanical and environmental performance requirements of design objective, 108-60079, Rev.A.

4. Test Specimens

Specimens were taken randomly current production,The following samples were used.

P/N	Description	Test Group	Quantity
2007435-*	Flag HDMI,Type A Connector	A,B,C,D,E,F,G,H,I	5pcs EA

5. Test Method

Test Requirements and Procedures Summary

Item	Test Description	Requirement	rocedure
5.1	Examination of product.	Meets requirements of product drawing.	EIA-364-18 Visual dimensional and functional per applicable quality inspection plan.
ELECTRICAL			
5.2	Low level contact resistance.	Initial: Terminal & Shell: 50 mΩ max. After test : (Change from initial value) Terminal: 30 mΩ max. Shell: 50 mΩ max.	EIA-364-23C Terminal: measure by dry circuit, 20 mV maximum, 10 mA. EIA-364-06B Shell: measure by open circuit, 5 V maximum, 100 mA.
5.3	Dielectric withstandingvoltage.	1 minute hold with no breakdown or flashover. Leakage current：0.50 mA max.	EIA-364-20C, Method A Unmated: Test between adjacent contacts or ground. Voltage: 500 VAC. Mated: Test between adjacent contacts and ground. Voltage: 300 VAC.
5.4	Electrostatic Discharge	No evidence of Discharge to Contact at 8kVolts	EN61000-4-2 Test unmated each connector from 1kVolts to 8kVolts in 1kVolts steps using 8mm ball probe.
5.5	Insulation resistance	100 megaohm min.(unmated); 10 megaohm min. (mated)	ANSI/EIA 364-21C Unmated connectors: apply 500Volts DC for 1minute between adjacent terminal or ground; Mated connectors: apply 150Volts DC for 1minute between adjacent terminal or ground;

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5.6	Contact Current Rating	0.5 A min.	ANSI/EIA 364-70B Initial ambient temperature: 55°C Max. After temperature change: 85°C Max.
5.7	Applied voltage rating.	No breakdown.	40 VAC (RMS.) continuous maximum, on any signal pin with respect to the shied.
		MECHANICAL	
5.8	Insertion force	4.5 kgf (44.1 N) max.	EIA-364-13D, Method A Measure force necessary to mate the connector assemblies at a max of 25 mm/minute.
5.9	Withdrawal force	4 kgf (39.2 N) max. 1 kgf (9.8 N) min.	EIA-364-13D, Method A Measure force necessary to unmate the connector assemblies at a max of 25 mm/minute.
5.10	Durability	Contact resistance for all condition after test: (Change from initial value) Contact: 30 mΩ maximum, Shell: 50 mΩ maximum. Condition A: 50 cycles Condition B: 100 cycles Condition C: 10000 cycles	EIA-364-09C Mate and unmated connector assemblies for cycles at a maximum rate of 100 cycles/hour.
5.11	Mechanical shock.	Appearance: confirm to item 3.4.1; No discontinuities of 1 μs or longer duration. Contact Resistance after test: (Change from initial value) Contact: 30 mΩ maximum, Shell: 50 mΩ maximum.	EIA-364-27 test condition A Subject mated connectors to 50g's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along three mutually perpendicular planes
5.12	Mechanical Vibration.	Appearance: confirm to item 3.4.1; No discontinuities of 1 μs or longer duration. Contact Resistance after test: (Change from initial value) Contact: 30 mΩ maximum, Shell: 50 mΩ maximum.	EIA-364-28E Test Condition III Accelerate: 15G Sweep time: 50-2000-50 Hz in 20 min. Duration: 12 times in each of three mutually perpendicular planes.
		ENVIRONMENTAL	
5.13	Thermal shock.	Appearance: confirm to item 3.4.1; Contact Resistance after test: (Change from initial value) Contact: 30 mΩ maximum, Shell: 50 mΩ maximum.	EIA-364-32C Test condition I Subject mated connectors to 10 cycles (half hour/cycle) between -55°C and 85°C.
5.14	Thermal aging	Appearance: confirm to item 3.4.1; Contact Resistance after test: (Change from initial value) Contact: 30 mΩ maximum, Shell: 50 mΩ maximum.	ANSI/EIA-364-17B,Condition 4, Method A Mated connector to105±2℃, 250h Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2h, after which the specified measurements shall be performed.

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5.15	Humidity.	Condition A; Appearance: confirm to item 3.4.1; Contact Resistance after test: (Change from initial value) Contact: 30 mΩ maximum, Shell: 50 mΩ maximum. Condition B; Appearance: confirm to item 3.4.1; Dielectric Withstanding Voltage: confirm to item 3.4.3 Insulation resistance: confirm to item 3.4.5	ANSI/EIA-364-31B Method Ⅲ A; Mated connector B; Unmated connector +25~+85℃, 80 to 95%RH, 4 cycles (96h) Upon completion of the test, specimens shall be conditioned at ambient room conditions for 24h, after which the specified measurements shall be performmed.
5.16	Solderability.	The inspected area of each Lead must have 95% solder coverage minimum.	JESD22-B102D, Condition C; Steam aging preconditioning: 93 +3/-5°C, 8 hours ±15 min. solder temperature: 240+/-5°C solder time: 5~10 s.
5.17	Resistance to wave soldering heat.	See note	Tyco spec.:109-202, Condition B. Solder temp.: 265±5°C, 10+2/-0 sec.

6. Unless otherwise stated, the following environmental conditions prevailed during testing:
Temperature: 15°C to 35°C Relative Humidity 25% to 75%

7. Test Sequence:

Test Examination	Test Group								
	A	B	C	D	E	F	G	H	I
	Test Sequence								
Product Examination	1,13	1,7	1,8	1,3	1,9	1,5	1,4	1,3	1,3
Termination Resistance (Low Level)	2,4,6,8,10	2,4,6			3,7				
Delectric Withstanding Voltage	12		2,4			2			
Electrostatic Discharge				2					
Insulation Resistance	11		5,7			3			
Contact Current Rating							2		
Applied Voltage Rating						4	3		
Insertion Force					2,6				
Withdrawal Force					4,8				
Durability (100cycles)	3								
Durability (10000cycles)					5				
Mechanical Shock		5							
Mechanical Vibration		3							
Thermal Shock	5		3						
Thermal Aging	7								
Humidity (condition B)	9								
Humidity (condition A)			6						
Solderability								2	
Resistance to wave soldering heat									2

9. Test Result

Group	Test Item	N	Condition	Test Result			Requirement	Judgement
				Max	Min	Ave		
				Max	Min	Ave		
A	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Termination Resistance (Contact)	5x19	Initial R	47.55	12.85	35.09	R<50m Ω	Pass
	Termination Resistance (Shell)	5	Initial R	11.67	8.97	10.78	R<50m Ω	Pass
	Durability	5	Initial	No physical damage occurred			No abnormalities	Pass
	Termination Resistance (Contact)	5x19	Final △R	17.79	0.02	1.95	△R <30m Ω	Pass
	Termination Resistance (Shell)	5	Final △R	4.46	1.87	3.24	△R <50m Ω	Pass
	Thermal Shock	5	Final	No physical damage occurred			△R<30m Ω	Pass
	Termination Resistance (Contact)	5x19	Final △R	18.04	0.07	2.18	△R <30m Ω	Pass
	Termination Resistance (Shell)	5	Final △R	8.48	2.80	4.01	△R <50m Ω	Pass
	Thermal Aging	5	Final	No physical damage occurred			No abnormalities	Pass
	Termination Resistance (Contact)	5x19	Final △R	23.59	0.19	10.00	△R <30m Ω	Pass
	Termination Resistance (Shell)	5	Final △R	5.35	2.71	4.11	△R <50m Ω	Pass
	Humidity (condition B)	5	Final	No physical damage occurred			No abnormalities	Pass
	Termination Resistance (Contact)	5x19	Final △R	22.56	0.00	5.05	△R <30m Ω	Pass
	Termination Resistance (Shell)	5	Final △R	7.42	3.39	5.28	△R <50m Ω	Pass
	Insulation Resistance (mated)	5x10	Final	5.07×10^{13}	2.05×10^{13}	3.43×10^{13}	R>10^7 Ω	Pass
	Insulation Resistance (unmated)	5x10	Final	5.74×10^{13}	2.36×10^{13}	3.85×10^{13}	R>10^8 Ω	Pass
	Dielectric Withstanding Voltage (mated)	5x10	Final	No physical damage occurred			No abnormalities	Pass
	Dielectric Withstanding Voltage (unmated)	5x10	Final	No physical damage occurred			No abnormalities	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
B	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Termination Resistance (Contact)	5x19	Initial	45.81	11.42	34.06	R<50m Ω	Pass
	Termination Resistance (Shell)	5	Initial	14.33	6.09	10.14	R<50m Ω	Pass
	Mechanical Vibration	5	Initial	No discontinuities of 1us or longer duration occurred			No abnormalities	Pass
	Termination Resistance (Contact)	5x19	Final △R	27.01	0.01	6.19	△R <30m Ω	Pass
	Termination Resistance (Shell)	5	Final △R	7.54	0.45	4.39	△R <50m Ω	Pass
	Mechanical Shock	5	Final △R	No discontinuities of 1us or longer duration occurred			No abnormalities	Pass
	Termination Resistance (Contact)	5x19	Final △R	21.64	0.18	6.04	△R <30m Ω	Pass
	Termination Resistance (Shell)	5	Final △R	7.24	0.23	4.64	△R <50m Ω	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass

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Group	Test Item	N	Condition	Test Result Max	Test Result Min	Test Result Ave	Requirement	Judgement
				Max	Min	Ave		
C	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Dielectric Withstanding Voltage (mated)	5x10	Final	No physical damage occurred			No abnormalities	Pass
	Dielectric Withstanding Voltage (unmated)	5x10	Final	No physical damage occurred			No abnormalities	Pass
	Thermal Shock	5	Final	No physical damage occurred			No abnormalities	Pass
	Dielectric Withstanding Voltage (mated)	5x10	Final	No physical damage occurred			No abnormalities	Pass
	Dielectric Withstanding Voltage (unmated)	5x10	Final	No physical damage occurred			No abnormalities	Pass
	Insulation Resistance (mated)	5x10	Final	9.41×10^{12}	2.15×10^{12}	5.44×10^{12}	$R>10^{7}\ \Omega$	Pass
	Insulation Resistance (unmated)	5x10	Final	9.34×10^{12}	2.34×10^{12}	4.73×10^{12}	$R>10^{8}\ \Omega$	Pass
	Humidity (condition A)	5	Final	No physical damage occurred			No abnormalities	Pass
	Insulation Resistance (mated)	5x10	Final	6.15×10^{12}	2.21×10^{12}	3.88×10^{12}	$R>10^{7}\ \Omega$	Pass
	Insulation Resistance (unmated)	5x10	Final	5.24×10^{12}	1.22	2.63×10^{12}	$R>10^{8}\ \Omega$	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
D	Electrostatic Discharge	5	Initial	No evidence of discharge to contact at 8KV			No abnormalities	Pass
E	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Insertion Force	5	Initial	39.53	32.97	36.93	<44.1N	Pass
	Termination Resistance (Contact)	5x19	Initial R	49.79	24.94	38.19	R <50m Ω	Pass
	Termination Resistance (Shell)	5	Initial R	6.28	4.04	5.10	R <50m Ω	Pass
	Withdrawal Force	5	Final	31.56	26.88	28.86	9.8~39.2N	Pass
	Durability (10000 cycles)	5	Final	No physical damage occurred			No abnormalities	Pass
	Insertion Force	5	Final	33.91	21.41	27.78	<44.1N	Pass
	Termination Resistance (Contact)	5x19	Final △R	29.05	0.04	3.72	△R <30m Ω	Pass
	Termination Resistance (Shell)	5	Final △R	3.81	0.07	2.02	△R <50m Ω	Pass
	Withdrawal Force	5	Final	25.00	17.81	22.12	9.8~39.2N	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
F	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Dielectric Withstanding Voltage (mated)	5x10	Final	No physical damage occurred			No abnormalities	Pass
	Dielectric Withstanding Voltage (unmated)	5x10	Final	No physical damage occurred			No abnormalities	Pass
	Insulation Resistance (mated)	5x10	Final	6.31×10^{12}	1.99×10^{12}	3.74×10^{12}	$R>10^{7}\ \Omega$	Pass
	Insulation Resistance (unmated)	5x10	Final	6.51×10^{12}	2.37×10^{12}	4.28×10^{12}	$R>10^{8}\ \Omega$	Pass
	Applied Voltage Rating	5	Final	No physical damage occurred			No abnormalities	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass

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Group	Test Item	N	Condition	Test Result			Requirement	Judgement
				Max	Min	Ave		
				Max	Min	Ave		
G	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Contact Current Rating	5	Final	9.57	4.55	7.00	<30℃	Pass
	Applied Voltage Rating	5	Final	No physical damage occurred			No abnormalities	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
H	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Solderability	5	Final	No physical damage occurred			No abnormalities	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass
I	Examination of Product	5	Initial	No physical damage occurred			No abnormalities	Pass
	Resistance to Soldering Heat	5	Final	No physical damage occurred			No abnormalities	Pass
	Examination of Product	5	Final	No physical damage occurred			No abnormalities	Pass

END OF REPORT