PRODUCT SPECIFICATION

PRODUCT NAME： HDMI A Female SERIES SPEC

DATE： 2012-02-13 REVISION： A

Rev.	Revised	Originator	Issue Date
1	NEW	STEVEN	2012.02.13

1.0 Scope :

This product specification defines the performance, test and quality requirements of Helioway High-Definition Multimedia Interface (HDMI) Connectors.

Product shall be of the design, construction and physical dimensions specified on the applicable product drawings.

2.0 Ratings:

2.1 Voltage Rating: 40 V AC (RMS.)

2.2 Current Rating:

Type A/C: 0.5A per contact minimum.

Type D: 0.3A per contact minimum.

2.3 Operating temperature: -25℃ ~ +85℃

3.0 Test Condition:

Unless otherwise specified, all tests and measurements shall be made according to the following standard conditions:

3.1 Temperature range : 15℃ to 35℃

3.2 Relative humidity: 25% to 85%

3.3 Atmospheric pressure: 86 kPa to 106 kPa

4.0 Test Methods and Requirements:

4.1 Examination of product:

Item	Test Description	Test Methods	Requirement
4.1.1	Examination of product (Appearance and Construction)	Shall be confirmed by eyes in accordance with each product drawing. Shall be confirmed by using appropriate measuring instruments.	1). Appearance shall be good without any damage. 2). Construction shall be met the design and physical dimensions required of product drawing.

4.2 Electrical Performance:			
Item	Test Description	Test Methods	Requirement
4.2.1	Contact Resistance	**EIA-364-06B** Mated connectors, Contact: measure by dry circuit, 20 m Volts maximum.,10mA. Shell: measured by open circuit, 5 Volts maximum, 100mA.	Initial contact resistance excluding conductor resistance: 10 milliohms maximum. (Target design value) After Test :30 milliohms maximum
4.2.2	Insulation Resistance	**EIA-364-21C** Unmated connectors, apply 500 Volts DC between adjacent terminal or ground.	100 megaohms minimum (unmated)
		Mated connectors, apply 150 Volts DC between adjacent terminal or ground.	10 megaohms minimum (mated)
4.2.3	Dielectric Strength	**EIA-364-20C, Method A** Unmated connectors, apply Type A/C: 500 Volts AC (RMS.) Type D: 250 Volts AC (RMS.) between adjacent terminal or ground. Mated connectors, apply Type A/C: 300 Volts AC (RMS.) Type D: 150 Volts AC (RMS.) between adjacent terminal and ground.	No Breakdown.
4.2.4	Electrostatic Discharge (Option)	**IEC-801-2** Test unmated each connector from 1k Volts to 8k Volts in 1k Volts steps using 8mm ball probe.	No evidence of Discharge to Contacts at 8k Volts.
4.2.5	Contact Current Rating	**EIA-364-70A** 55 °C, maximum ambient 85 °C, maximum temperature change	Type A/C: 0.5A minimum. Type D: 0.3A minimum.
4.2.6	Applied Voltage Rating	40 Volts AC (RMS.) continuous maximum, on any signal pin with respect to the shield.	No Breakdown
4.2.7	TMDS Signals Time Domain Impedance	**EIA-364-108** Rise time ≤ 200 psec (10%-90%). Signal to Ground pin ratio per HDMI designation. Differential Measurement Specimen Environment Impedance = 100 ohms differential. Source-side receptacle connector mounted on a controlled impedance PCB fixture.	Connector Area: Type A: 100 ohms ±15%. Type C/D: 100 ohms ±25%.

4.3 Mechanical Performance:				
Item	Test Description	Test Methods	Requirement	
4.3.1	Vibration	**EIA-364-28 Condition III** Amplitude: 1.52mm P-P or 147m/s² {15G} Sweep time: 50-2000-50Hz in 20 minutes. Duration: 12 times in each (Total of 36 Times) X, Y, Z-axes. Electrical load: DC100mA current shall be followed during the test.	Appearance	No Damage
			Contact Resistance	Contact: Change from initial value: 30 mΩ maximum. Shell: Change from initial value: 50 mΩ maximum
			Discontinuity	1 usec maximum.
4.3.2	Shock	**EIA-364-27**, **Condition A** Pulse width: 11 msec. Waveform: half sine, 490m/s²{50G}, 3 strokes in each X.Y.Z. axes	Appearance	No Damage
			Contact Resistance	Contact: Change from initial value: 30 mΩ maximum. Shell: Change from initial value: 50 mΩ maximum
			Discontinuity	1 usec maximum.
4.3.3	Durability	**EIA-364-09C** Measure contact and shell resistance after following. Automatic cycling: Type A: **10000 cycles at 100 ±50 cycles per hour** Type C and Type D: **5000 cycles at 100 ±50 cycles per hour**	Contact Resistance	Contact: Change from initial value: 30 mΩ maximum. Shell: Change from initial value: 50 mΩ maximum
4.3.4	Insertion / Withdrawal Force	**EIA-364-13** Insertion and withdrawal speed: 25mm/minute.	Insertion force	44.1 N {4.5kgf} maximum.
			Withdrawal force	Type A: 9.8N {1.0kgf} min. 39.2N {4.0kgf} max. Type C: 7 N minimum. 25 N maximum. Type D: 5 N minimum. 25 N maximum. and after 5000 cycles mating, 3 N minimum. 25 N maximum.
4.3.5	Wrenching strength	Mated connectors, apply perpendicular forces to plug at a 15 mm distance from the edge of the receptacle covered by test fixture. Perform this test using virgin parts. Forces are to 4 directions (left, right, up, down).	Appearance	Type D: 0-20N: No plug or receptacle damage. 20-40N: No receptacle damage.

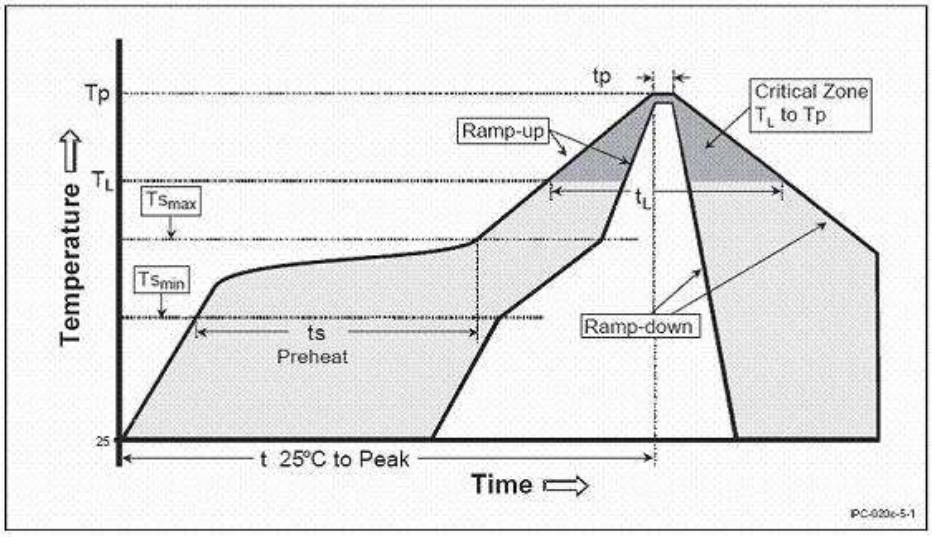
4.4 Environmental Performance:					
Item	Test Description		Test Methods	Requirement	
4.4.1	Thermal Shock		**EIA-364-32C, Condition I** 10 cycles of: a) -55 ℃ for 30 minutes b) +85 ℃ for 30 minutes	Appearance	No Damage
				Contact Resistance	Contact: Change from initial value: 30 mΩ maximum. Shell: Change from initial value: 50 mΩ maximum.
4.4.2	Humidity	A	**EIA 364-31B** Mate connectors together and perform the test as follows. Temperature : +25℃ to +85℃ Relative Humidity: 80% to 95% Duration: 4 cycles (96 hours) Upon completion of the test, specimens shall be conditioned at ambient room conditions for 24 hours, after which the specified measurements shall be performed.	Appearance	No Damage
				Contact Resistance	Contact: Change from initial value: 30 mΩ maximum. Shell: Change from initial value: 50 mΩ maximum.
		B	**EIA 364-31B** Unmated each connector and perform the test as follows. Temperature : +25℃ to +85℃ Relative Humidity: 80% to 95% Duration: 4 cycles (96 hours) Upon completion of the test, specimens shall be conditioned at ambient room conditions for 24 hours, after which the specified measurements shall be performed.	Appearance	No Damage
				Dielectric Withstanding Voltage and Insulation Resistance	Conform to item of Dielectric Withstanding Voltage and Insulation Resistance
4.4.3	Thermal Aging		**EIA-364-17B Condition 4, Method A** Mate connectors and expose to +105 ± 2°C for 250 hours. Upon completion of the exposure period, the test specimens shall be conditioned at ambient room conditions for 1 to 2 hours, after which the specified measurements shall be performed.	Appearance	No Damage
				Contact Resistance	Contact: Change from initial value: 30 mΩ maximum. Shell: Change from initial value: 50 mΩ maximum.
4.4.4	Solder-ability		**MIL-STD-202F** Immersed the solder tails of connector into the molten-tin oven as below condition, -Temp of tin Oven: 245℃ -Speed: 25.4mm/sec -Time: 5 seconds	More than 95% of the immersion shall be covered with solder, and no voids and no pin holes allowed on the immersed area.	

4.4 Environmental Performance: (Continued)

Item	Test Description	Test Methods	Requirement
4.4.5	Resistance to Soldering Heat	1) for WAVE SOLDERING : MIL-STD-202F, Method 210A, Test Condition B. Pre-heat : 80℃, 60 Seconds Temperature : 260 ± 5 ℃ Immersion duration : 10 ± 1 sec.	No mechanical defect on housing or other parts. Inspect dimension during the test, no physical damage.
		2) for REFLOW SOLDERING : REFLOW SOLDERING : Pre-heat : 150~200℃ for 120 sec : 220℃ 80sec REFLOW : 260 ± 5 ℃ 10sec	No mechanical defect on housing or other parts. Inspect dimension during the test, no physical damage.

Profile Feature	Sn-Pb Eutectic Assembly	Pb-Free Assembly
Average Ramp-Up Rate (Ts_{max} to Tp)	3 °C/second max.	3° C/second max.
Preheat – Temperature Min (Ts_{min}) – Temperature Max (Ts_{max}) – Time (ts_{min} to ts_{max})	100 °C 150 °C 60-120 seconds	150 °C 200 °C 60-180 seconds
Time maintained above: – Temperature (T_L) – Time (t_L)	183 °C 60-150 seconds	217 °C 60-150 seconds
Peak/Classification Temperature (Tp)	See Table 4.1	See Table 4.2
Time within 5 °C of actual Peak Temperature (tp)	10-30 seconds	20-40 seconds
Ramp-Down Rate	6 °C/second max.	6 °C/second max.
Time 25 °C to Peak Temperature	6 minutes max.	8 minutes max.

Note 1: All temperatures refer to topside of the package, measured on the package body surface.

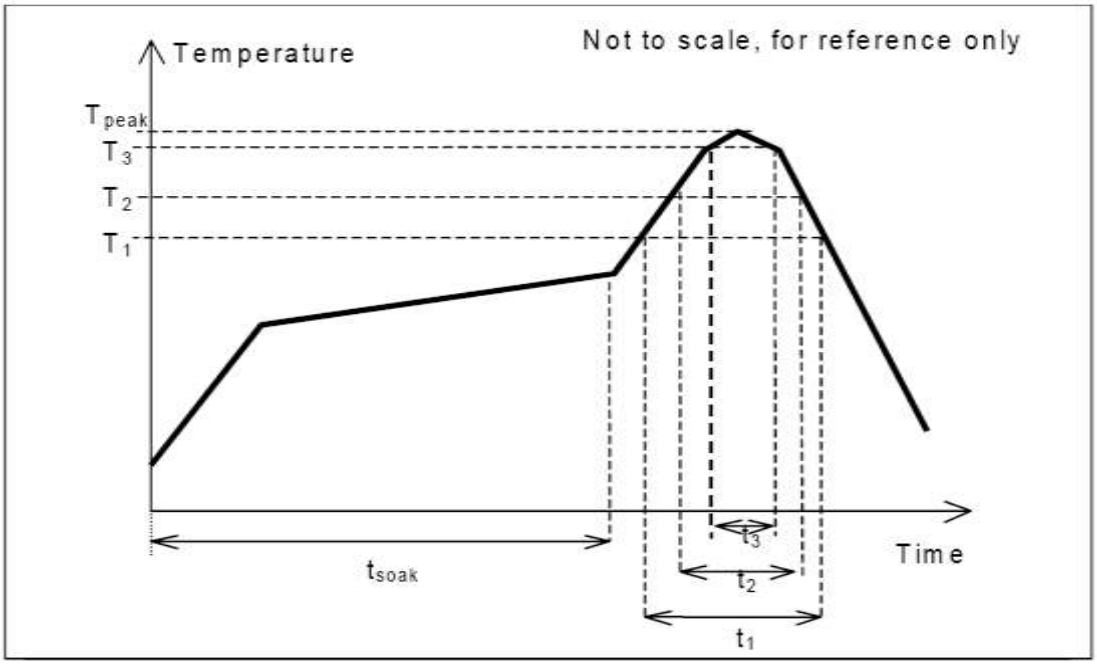


4.4.6	Salt Spray	**EIA-364-26**, **Condition A** Subject mated and unmated connectors should be tested according to the condition listed below: Temperature: 35±1.1℃ Humidity: 95~98% (R.H) PH Value: 6.5~7.2 Duration: 48 hours	No evidence of damage. The electrical performances should meet the spec. specified.

REFLOW SOLDERING PROFILE

Pb-free reflow profile requirements:

Parameter	Reference	Specification
Average temperature gradient in preheating		2.5°C/s
Soak time	tsoak	2-3 minutes
Time above 217°C	t1	60 s
Time above 230°C	t2	50 s
Time above 250°C	t3	5 s
Peak temperature in reflow	Tpeak	255°C (–0/+5°C)
Temperature gradient in cooling		Max -5°C/s



This profile is the minimum requirement for evaluating soldering heat resistance of components. Heat transfer method used for reflow soldering is hot air convection. The actual air temperatures used to achieve the specified profile is higher and largely dependent on the reflow equipment.