AMP 2.0mm Pitch HPI High Performance Interconnect Wire-To-Board System

1. INTRODUCTION

1.1 OBJECTIVE

Testing was performed on the HPI connector 2.0 mm Pitch to determine if it meets the requirements of AMP Specification, 108-57100.

1.2 SCOPE

This report covers the electrical, mechanical and environmental performance requirements of the HPI connector 2.0 mm Pitch.

1.3 CONCLUCION

The HPI connector 2.0 mm Pitch meets the electrical, mechanical and environmental performance requirements of Product Specification, 108-57100.

1.4 PRODUCT DESCRIPTION

This connector is wire-to-board connector of 2.0 mm pitch. Applicable wire size : AWG#30, #28, #26, #24 (Insulation diameter: 0.9~1.5mm dia.)

| 1.5 TEST SAMPLES

Samples were taken randomly from current production.

The following samples were used.

Descriptions	
Receptacle CRIMP Housing,	2-16 Circuit Position
Receptacle CRIMP Contact,	Applicable wire: AWG#24-30
Post Header Vertical Type,	2-16 Circuit Position
Post Header Right-angle Type,	2-16 Circuit Position

2. TEST CONTENTS

NO.	TEST ITEMS	REQUIREMENTS	JUDGEMENT
2.1.1	Conformity of Product physical requirements	Product shall conform to the requirements of applicable Product Drawing and Application Specification	Acceptable.
ELECTRICAL PERFORMANCE REQUIREMENTS			
2.2.1	Termination Resistance	Initial: 10m ohms max. Final: 20m ohms max.	Acceptable
2.2.2	Insulation Resistance	1000M ohms min. (Initial) 500M ohms min (Final)	Acceptable
2.2.3	Dielectric Strength	Connector must withstand test potential of 1000 VAC for 1 min. Current leakage limit to 5.0mA max.	Acceptable
MECHANICAL PERFORMANCE REQUIREMENTS			
2.3.1	Connector Mating/ Unmating Force	Initial And 50th Cycle	Acceptable.

Circuit Pos	Mating N (kgf max)	Unmating N (kgf min) Initial	Unmating N (kgf min) Final
3pos	29.4N(3.0kgf)	7.8N(0.8kgf)	5.9N(0.6kgf)
8pos	53.9N(5.5kgf)	13.7N(1.4kgf)	11.8N(1.2kgf)
15pos	88.2N(9.0kgf)	19.6N(2.0kgf)	17.6N(1.8kgf)

Mate and unmate to measure the force required to engage and disengage by operating at a rate of 25mm a minute.

2.3.2	Individual Pin Insertion/ Extraction Force	Insertion Force	Extraction Force	Acceptable
		6.9N(0.7kgf) max	1.0N(0.10kgf) min (Initial) 0.8N(0.08kgf)min (Final)	
		Mate and unmate to measure the force required to engage and disengage by operating at a rate of 25mm a minute.		
2.3.3	Tensile Strength of Wire Termination	AWG #24—29.4N(3.0kgf) min. AWG #26—19.6N(2.0kgf) min. AWG #28—9.8N(1.0kgf)min. AWG #30—7.8N(0.8kgf) min. At a rate of 100mm a minute.		Acceptable
2.3.4	Contact Retention Force	14.7N(1.5 kgf) min. per contact At a rate of 100mm a minute.		Acceptable
2.3.5	Post Retention Force	9.8N(1.0 kgf) min. per contact At a rate of 100mm a minute.		Acceptable

ENVIRONMENTAL PERFORMANCE REQUIREMENTS			
2.4.1	Vibration Sinusoidal Low Frequency	Subject mated connectors to 10-55-10 Hz traversed in 1 minute at 1.52mm amplitude 2 hours in each of 3 mutually perpendicular planes. No electrical discontinuities greater than 1 microsecond. Termination resistance (low level) shall be met.	Acceptable
2.4.2	Temperature Life (Heat Aging)	85℃±2℃ for 240hours. Termination resistance (low level) shall be met.	Acceptable
2.4.3	Humidity, Steady State	40℃ 90-95% R.H for 240hrs Insulation Resistance (Final) 500 M ohms min. Termination resistance (low level) shall be met. Dielectric Strength shall be met.	Acceptable
2.4.4	Thermal Shock	25 cycle -55 ℃ and +85 ℃ for 30 minutes each duration at temperature extremes. Termination resistance (low level) shall be met. Must meet electrical requirement.	Acceptable
2.4.5	Salt Spray	5% salt concentration for 48 hours. Termination resistance (low level) shall be met.	Acceptable
2.4.6	Industrial Gas / Sulfurous Acid Gas (SO2)	3±1 ppm concentration at 20±2℃ for 96 hours Termination resistance (low level) shall be met.	Acceptable
2.4.7	Solderability	245±5℃ for 5sec The inspected area of each lead must have 95% solder coverage minimum.	Acceptable
~~2.4.8~~	~~Resistance to Soldering Heat~~	~~230±5℃ for 3±0.5 seconds (Flow soldering)~~ ~~350±10℃ for 1-2 seconds (Manual soldering)~~ ~~No physical damage shall occur.~~	~~Acceptable~~
2.4.8	Resistance to Wave Soldering Heat	Solder Temp.：245±5℃, 5 ±0.5sec. *-440054-* *-440055-* No physical damage shall occur.	Acceptable
2.4.8	Resistance to Wave Soldering Heat	Solder Temp.：260±5℃, 10±0.5sec. 9-440054-1 9-440054-4 8-440054-6 8-440054-7 *-2355933-* No physical damage shall occur.	Acceptable
2.4.8	Resistance to Reflow Soldering Heat	Peak Temp.：260+0/-5℃, 20~40sec. 9-440054-1 9-440054-4 8-440054-6 8-440054-7 *-1775469-* *-1775470-* *-2355933-* Duration：3 cycles No physical damage shall occur.	Acceptable
2.4.9	Durability (Repeated Mating /Unmating)	50 cycles of repeated mating /unmating at a rate of 10 cycles a minute. Termination resistance (low level) shall be met.	Acceptable
2.4.10	Ammonia	After 7 hours exposure in ammonia chamber with 25cc of 3% ammonia solution for every liter of chamber capacity Termination resistance (low level) shall be met.	Acceptable

End

3. TEST RESULT

No	Test Items			Unit	Result					Spec.	Judgment
					N	Max.	Min.	Ave.	S		
1	Dielectric withstanding Voltage		Initial	Ohm	52	Tested samples withstood test potential of 1k VAC for 1 minutes, and showed no evidence of abnormalities in appearance.				No abnormalities	Acceptable
			After Humidity	Ohm	52					No abnormalities	
			After Thermal Shock	Ohm	52					No abnormalities	
	Insulation Resistance		Initial	Ohm	52	All samples 1000M ohm min.				1000M ohm min.	Acceptable
			After Humidity	Ohm	52	All samples 500M ohm min.				500M ohm min.	
			After Thermal Shock	Ohm	52	All samples 500M ohm min.				500M ohm min.	
2	Connector Mating Force	3pos	1st mating	N	20	18.1	16.0	17.13	0.46	29.4N Max.	Acceptable
		8pos	1st mating	N	20	29.1	24.1	26.30	1.24	53.9N Max.	Acceptable
		15pos	1st mating	N	20	41.9	33.6	37.72	2.56	88.2N Max.	Acceptable
	Connector Unmating Force	3pos	1st mating	N	20	15.8	14.0	15.12	0.50	7.8N Min.	Acceptable
		3pos	After 50 times	N	20	7.4	6.1	6.73	0.42	5.9N Min.	Acceptable
		8pos	1st mating	N	20	18.0	14.5	15.25	1.31	13.7N Min	Acceptable
		8pos	After 50 times	N	20	15.5	13.5	14.34	0.56	11.8N Min.	Acceptable
		15pos	1st mating	N	20	23.7	20.4	21.93	0.89	19.6N Min.	Acceptable
		15pos	After 50 times	N	20	25.4	20.8	22.82	0.71	17.6N Min.	Acceptable
3	Individual pin Insertion/ Extraction Force		1st mating	N	30	3.7	2.9	3.25	0.34	6.9N Max.	Acceptable
			1st unmating	N	30	3.2	2.9	3.06	0.13	1.0N Min.	Acceptable
			After 50 times unmating	N	30	1.5	1.0	1.29	0.24	0.8N Min.	Acceptable
4	Tensile Strength of wire Termination		AWG #24	N	30	54.9	51.0	53.61	1.23	29.4N Min	Acceptable
			AWG #26	N	30	33.3	29.4	32.73	1.24	19.6N Min	Acceptable
			AWG #28	N	30	20.6	18.6	19.89	0.81	9.8N Min.	Acceptable
			AWG #30	N	30	15.7	12.7	14.41	1.23	7.8N Min.	Acceptable
5	Contact Retention Force			N	30	24.1	21.2	22.88	0.930	14.7N min.	Acceptable
6	Post Retention Force			N	30	27.1	14.7	22.28	4.50	9.8N min.	Acceptable
7	Vibration Sinusoidal Low Frequency		Initial	Mili-ohm	52	3.35	2.37	2.87	0.28	10milliohm max.	Acceptable
			Final		52	3.55	2.30	2.89	0.40	20milliohm max.	Acceptable
				μS	52	No discontinuity				1 μS max	Acceptable
8	Temperature Life		Initial	Milli-ohm	52	3.28	2.48	2.96	0.19	10milliohm max.	Acceptable
			Final		52	3.49	2.34	3.01	0.33	20milliohm max.	Acceptable
9	Humidity, Steady State		Initial	Milli-ohm	52	3.34	2.30	2.92	0.25	10milliohm max.	Acceptable
			Final		52	3.30	2.68	2.99	0.17	20miliohm max.	Acceptable

10	Thermal Shock	Initial	Milli-ohm	52	3.42	2.41	2.86	0.25	10milliohm max.	Acceptable
		Final		52	3.51	2.36	2.96	0.32	20milliohm max.	Acceptable
11	Salt Spray	Initial	Milli-ohm	52	3.26	2.47	2.92	0.19	10milliohm max.	Acceptable
		Final		52	3.50	2.38	3.00	0.34	20milliohm max	Acceptable
12	Industrial Gas / Sulfurous Acid Gas (SO2)	Initial	Milli-ohm	52	3.35	2.37	2.87	0.28	10milliohm max.	Acceptable
		Final		52	3.59	2.36	2.92	0.40	20milliohm max.	Acceptable
13	Solderability			More than 95% of tested area was covered with fresh wet solder.					Wet solder Coverage 90% min.	Acceptable
14	Resistance to Soldering Heat			All tested samples proved acceptable. Tested samples showed no evidence of effects such as deformation etc. that are detrimental to connector function.					No physical damage shall occur.	Acceptable
15	Durability (Repeated Mating / Unmating)	1st mating	Milli-ohm	52	3.40	2.43	2.90	0.26	10milliohm max.	Acceptable
		After 50 times	Milli-ohm	52	3.54	2.49	2.99	0.31	20milliohm max.	Acceptable
16	Ammonia	Initial	Milli-ohm	52	3.33	2.45	2.90	0.25	10milliohm max.	Acceptable
		Final	Milli-ohm	52	3.52	2.26	2.91	0.32	20milliohm max.	Acceptable
17	Resistance to cold			All tested samples proved acceptable. Tested samples showed no evidence of effects such as deformation etc. that are detrimental to connector function.					No physical damage shall occur.	Acceptable

End