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UMCC RF CONNECTOR

1 Purpose:

This is a product qualification test. The purpose of this test is to evaluate the performance of UMCC RF Connector. Testing was performed on below products to determine it compliance with the requirements of product design objective 108-112005 Rev 2.

2 Scope:

This test report covers the electrical and mechanical performance of UMCC RF Connector. Testing was performed at Tyco Electronics Shanghai Electrical Components Test Laboratory from Mar 26 to May 10.

3 Conclusion:

The test result is pass.

4 UMCC RF Connector is as shown in fig.1.



Fig 1

5 Test Specimens

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

Description	Part Number	Quantity
UMCC HEADER	1909763-1	40
UMCC PLUG	2081168-1	40x2

6 Test Method

6.1 Examination of Product

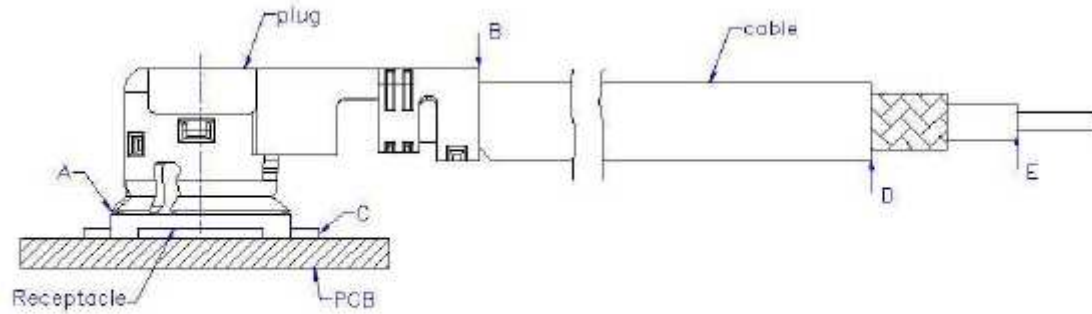
Visual inspection: Visual and dimensional inspection per product drawing.
Requirements: No physical damage.

6.2 Low Level Contact Resistance

Subject specimens to 20millivolts maximum open circuit voltage and 10milliamperes maximum current, take the resistance of the wire only away from measurement.

Requirements: outer contact $\leq 10\text{m}\Omega$ (Initial); center contact $\leq 20\text{m}\Omega$ (Initial);
 $\leq 15\text{m}\Omega$ (Final); $\leq 25\text{m}\Omega$ (Final).

Test method: MIL-STD-202, method 307



Contact resistance of inner contact: (resistance A-E) – (resistance B-E)
Contact resistance of outer contact: (resistance A-D) – (resistance B-D)

Fig.2

6.3 Insulation Resistance

Subject specimens to 100VDC, 1minute hold. Test between adjacent contacts.

Requirements: 500 M Ω min.(Initial), 100 M Ω min.(Final)

Test method: MIL-STD-202, method 302

6.4 Withstanding Voltage

Subject specimens to 200VAC(rms) at sea level. Test between adjacent contacts.

Requirements: one minute hold with no breakdown, creeping discharge or flashover.

Test method: MIL-STD-202, method 301

6.5 Voltage Standing Wave Ratio(VSWR)

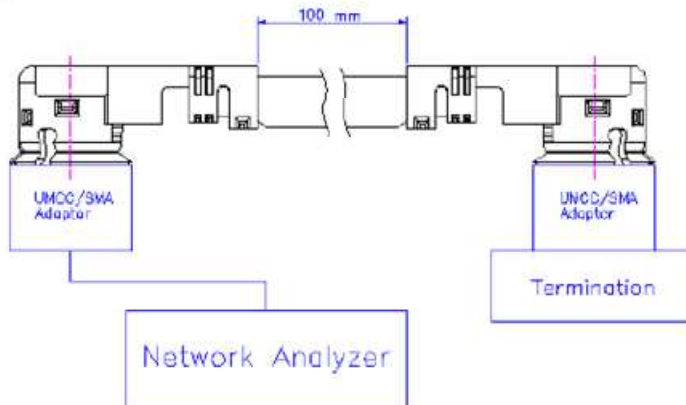
Test Frequency: 100M~6GHz

Requirements: plug: 1.3 Max @ 0.1~3GHz; 1.5 Max @ 3~6GHz

Receptacle: 1.3Max @ 0.1~3GHz; 1.4 Max @ 3~6GHz

Test method: EIA-364-108

Plug:



Receptacle:

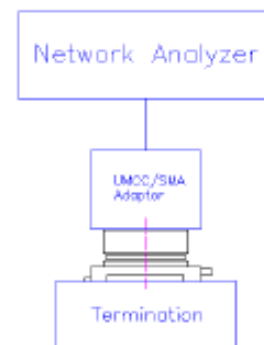


Fig.3

6.6 Unmating Force

Unmated the receptacle connector and plug at mad. Rate of 25 ± 3 mm per minute along the mating by the push-on/pull off machine.

Requirements: Total unmating force: 5N min. (initial), 3N min. (after 30cycles)

Test method: EIA-364-13, condition A

6.7 Durability

Unmated the receptacle connector and plug 30 cycles at a speed of 25 ± 3 mm per minute along the mating by the push-on/pull off machine.

Requirements: after 30 cycles, matched with contact resistance requirement

Test method: EIA-364-09

6.8 Crimp Strength

Pull the cable as shown in Fig 4 at a speed of 25 ± 3 mm per minute by tensile strength machine.
Requirements: Cable 0.81,1.13,1.32: 10N min.

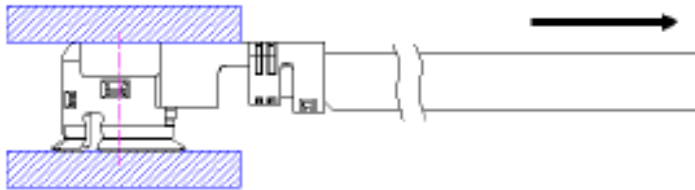


Fig.4

6.9 Cable Retention Force

Apply force on the cable as shown in fig5. during the testing ,run 100mADC to check electrical discontinuity.
Requirements: No discontinuity of 1microsecond or longer duration. See Note

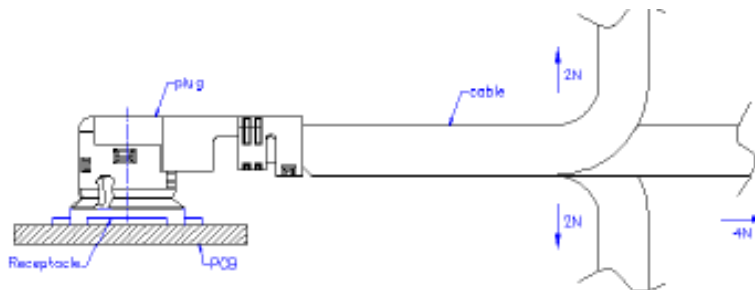


Fig.5

6.10 Vibration

Frequency: 10Hz-100Hz-10Hz/15 minutes.(6G), duration cycle: 3 mutually perpendicular directions, 5 cycles (75minutes) each direction.
Requirements: No discontinuity of 1microsecond or longer duration. See Note

6.11 Shock

100mA DC, Peak value of acceleration: 735m/s^2 (75g), duration:11ms, WaveForm: half sinusoidal, Directions, cycle: Frequency: 10Hz-100Hz-10Hz/15 minutes. Amplitude 1.5mm P-P, duration cycle: 3 mutually perpendicular directions, 5 cycles (75minutes) each direction.
Requirements: No discontinuity of 1microsecond or longer duration. See Note
Test method: MIL-STD-202, method 213, condition B.

6.12 Thermal Shock

Temperature, Duration: -40°C /30min. to 5°C ~35°C /5min. max. to 90°C /30min. to 5°C ~35°C /5min. max. cycles: 5cycles

6.13 Humidity

Apply the following environment to the mated specimens. Temperature: $40^\circ\text{C} \pm 2^\circ\text{C}$ Humidity:90~95%RH
Duration:96h

6.14 Salt Spray

Subject mated specimens to $35 \pm 2^\circ\text{C}$ and $5 \pm 1\%$ spray for 48 hours.
Test method: MIL-STD-202, Method 101, Condition B.

6.15 High Temperature Life

Subject mated specimens to $90 \pm 2^\circ\text{C}$ for 96 hours.
Test method: EIA-364-17

7 The test was conducted in the following environmental conditions prevailed during testing:

Temperature: 15°C to 35°C
Relative Humidity: 25% to 75%

8 Test Sequence

Test Items	Test Group									
	1	2	3	4	5	6	7	8	9	10
	Test Sequence									
Examination of product	1	1	1	1	1	1	1	1	1	1
Low Level Contact Resistance	2		2,6	2,4	2,4	2,4	2,5	2,5		2,4
Insulation Resistance	3						3,6	3,6		
Dielectric Withstanding Voltage	4									
VSWR		2								
Crimp Strength		3								
Unmating Force			3,5							
Durability			4							
Cable Retention Force				3						
Vibration					3					
Mechanical Shock						3				
Thermal Shock							4			
Humidity								4		
Salt Spray									2	
High Temperature Life										3
Final Examination of product	5			5	5	5	7	7	3	5

9 Test Result

9.1 Gray Wire

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
1	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	2.939	1.132	1.651	<10mΩ Outer contact	Pass
				5.761	3.177	4.343	<20mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>4.546x10 ⁵			>500MΩ	Pass
	Dielectric Withstanding Voltage	4	Initial	No flashover, no breakdown			No abnormalities	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
2	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	VSWR	4	Initial	1.1463	1.1152	1.1302	<1.4 0.1~6GHz	Pass
	Crimp Strength	5	Final	18.160	18.081	18.121	>10N	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
3	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	3.597	2.214	2.908	<10mΩ Outer contact	Pass
				4.647	2.153	3.334	<20mΩ Center contact	Pass
	Unmating Force	4	Initial	17.877	9.212	12.801	>5N	Pass
	Durability	4	Final	No physical damage occurred.			No abnormalities	Pass
	Unmating Force	4	Final	13.127	9.452	11.244	>3N	Pass
	Low Level Contact Resistance	4	Final	5.254	3.917	4.709	<15mΩ Outer contact	Pass
				12.431	10.724	11.407	<25mΩ Center contact	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
4	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	3.676	2.391	3.186	<10mΩ Outer contact	Pass
				7.525	4.048	5.277	<20mΩ Center contact	Pass
	Cable Retention Force	4	Initial	No electrical discontinuity great than 1us occurred			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	5.677	3.617	4.740	<15mΩ Outer contact	Pass
				11.013	8.489	9.557	<25mΩ Center contact	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
5	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	4.954	2.021	3.350	<10mΩ Outer contact	Pass
				8.772	2.766	6.176	<20mΩ Center contact	Pass
	Vibration	4	Final	No electrical discontinuity great than 1us occurred			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	8.721	8.374	8.490	<15mΩ Outer contact	Pass
				11.202	7.870	8.490	<25mΩ Center contact	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
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				Max	Min	Ave		
6	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	3.573	2.207	2.892	<10mΩ Outer contact	Pass
				7.007	2.474	4.680	<20mΩ Center contact	Pass
	Mechanical Shock	4	Final	No electrical discontinuity great than 1us occurred			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	8.762	7.603	8.143	<15mΩ Outer contact	Pass
				11.840	10.158	10.751	<25mΩ Center contact	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
7	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	3.960	1.949	2.922	<10mΩ Outer contact	Pass
				8.265	4.827	6.557	<20mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>2.026x10 ⁵			>500 MΩ	Pass
	Thermal Shock	4	Final	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	4.120	2.770	3.618	<15mΩ Outer contact	Pass
				12.900	10.630	11.943	<25mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>6.226x10 ⁴			>100 MΩ	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
8	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	3.291	1.815	2.619	<10mΩ Outer contact	Pass
				7.970	5.135	6.869	<20mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>3.987x10 ⁵			>500 MΩ	Pass
	Humidity	4	Final	No electrical discontinuity great than 1us occurred			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	6.790	4.090	4.928	<15mΩ Outer contact	Pass
				14.87	5.72	10.343	<25mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>1.677x10 ³			>100 MΩ	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
9	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Salt Spray	4	Final	No physical damage occurred.			No abnormalities	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
10	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	4.848	2.041	3.699	<10mΩ Outer contact	Pass
				7.732	6.839	7.161	<20mΩ Center contact	Pass
	High Temperature Life	4	Final	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	4.610	3.470	3.898	<15mΩ Outer contact	Pass
				9.350	7.310	8.513	<25mΩ Center contact	Pass

9.2 Black Wire:

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
1	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	2.876	2.015	2.550	<10mΩ Outer contact	Pass
				5.783	2.325	3.825	<20mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>3.879x10 ⁵			>500MΩ	Pass
	Dielectric Withstanding Voltage	4	Initial	No flashover, no breakdown			No abnormalities	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
2	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	VSWR	4	Initial	1.0922	1.0775	1.0871	<1.4 0.1~6GHz	Pass
	Crimp Strength	5	Final	16.770	16.166	16.468	>10N	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
3	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	4.438	2.034	3.617	<10mΩ Outer contact	Pass
				9.285	5.730	7.660	<20mΩ Center contact	Pass
	Unmating Force	4	Initial	18.433	12.853	14.485	>1.4N	Pass
	Durability	4	Final	No physical damage occurred.			No abnormalities	Pass
	Unmating Force	4	Final	12.738	9.315	10.806	>1.4N	Pass
	Low Level Contact Resistance	4	Final	6.098	4.109	4.971	<15mΩ Outer contact	Pass
				11.640	10.223	10.959	<25mΩ Center contact	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
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				Max	Min	Ave		
4	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	4.715	2.361	3.660	<10mΩ Outer contact	Pass
				5.584	4.717	5.147	<20mΩ Center contact	Pass
	Cable Retention Force	4	Initial	No electrical discontinuity great than 1us occurred			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	5.536	4.277	4.847	<15mΩ Outer contact	Pass
				10.330	8.609	9.489	<25mΩ Center contact	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
5	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	5.242	3.335	4.151	<10mΩ Outer contact	Pass
				4.626	3.461	4.048	<20mΩ Center contact	Pass
	Vibration	4	Final	No electrical discontinuity great than 1us occurred			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	7.261	5.180	5.730	<15mΩ Outer contact	Pass
				12.838	10.111	11.251	<25mΩ Center contact	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
6	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	4.207	2.379	3.284	<10mΩ Outer contact	Pass
				6.417	3.922	4.767	<20mΩ Center contact	Pass
	Mechanical Shock	4	Final	No electrical discontinuity great than 1us occurred			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	8.959	7.525	8.385	<15mΩ Outer contact	Pass
				12.418	10.469	11.479	<25mΩ Center contact	Pass
Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
7	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	6.433	3.105	4.998	<10mΩ Outer contact	Pass
				9.780	4.995	6.606	<20mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>2.379x10 ⁵			>500 MΩ	Pass
	Thermal Shock	4	Final	No electrical discontinuity great than 1us occurred			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	5.760	2.670	3.945	<15mΩ Outer contact	Pass
				10.280	8.210	9.185	<25mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>1.784x10 ³			>100 MΩ	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
8	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	3.623	2.420	2.976	<10mΩ Outer contact	Pass
				9.798	4.661	6.883	<20mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>4.537x10 ⁵			>500 MΩ	Pass
	Humidity	4	Final	No electrical discontinuity great than 1us occurred			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	5.280	2.920	4.035	<15mΩ Outer contact	Pass
				15.950	8.220	12.295	<25mΩ Center contact	Pass
	Insulation Resistance	4	Initial	>1.224x10 ³			>100 MΩ	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
9	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Salt Spray	4	Final	No physical damage occurred.			No abnormalities	Pass

Group	Test Item	N	Condition	Test Result			Requirement	Judgment
				Max	Min	Ave		
10	Examination of Product	4	Initial	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Initial	6.482	2.241	3.441	<10mΩ Outer contact	Pass
				10.175	8.306	9.136	<20mΩ Center contact	Pass
	High Temperature Life	4	Final	No physical damage occurred.			No abnormalities	Pass
	Low Level Contact Resistance	4	Final	4.820	3.950	4.470	<15mΩ Outer contact	Pass
				12.210	7.550	10.630	<25mΩ Center contact	Pass