

Product/Process Change Notifications



PCN - 19 083

Amphenol Information Communication and Commercial Products Group
www.amphenol-icc.com

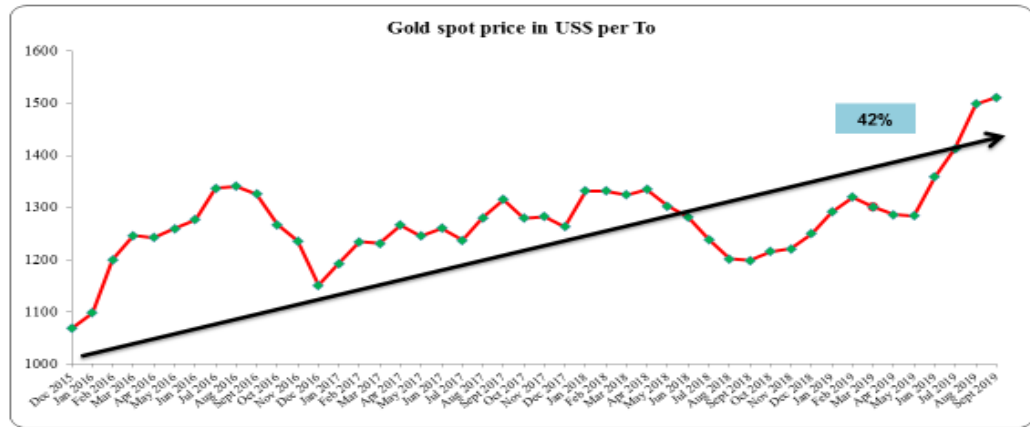
Release Date: October 31 2019

Product Name:	Airmax			
	Airmax			
Product Manager:	Chris Liu			
Subject:	Airmax plating change to GXT+			
Distribution:	Global			
Type of Change:	Materials Change			
Change Description:	Amphenol is migrating to a qualified/approved high performance plating, GXT+ due to the significantly increase in commodity costs. There is no change to the existing plating supply chain or plating location.			
Reason for Change:	Gold and Palladium prices have increase sinificantly over the last several years (see attached). While Amphenol has absorbed most of those increases, the pace of inflation is significantly higher than productivity and process gains. Amphenol is implementing GXT+ to avoid passing price increases on to our customer base. For those customers that approve GXT+, your existing connector prices will remain in effect. For customers that don't qualify GXT+ by January 1, 2020, there will be a 8.8% price increase effective on all new orders after that date.			
Affected Parts:	See Affected parts.xls file			
Effective Date of Change:	January 1, 2020		<u>Note: New Part numbers are issued to identify the change to GXT+ plating and is effective along with this PCN. Please refer to the Affected parts.xls file column heading "Alternative parts" for the new part number series with GXT+ plated connectors.</u>	
Last Time Buy Date:	NA			
Earliest Disty Return Date:	NA			
Last Time Shipment Date	NA			
Datasheet Attached?	NA			
Qual/Test Data Attached?	Yes			
Samples Availability Date:	November	1	2019	
Available Alternatives?	Yes			
Questions?	Contact your local AICC Representative, or Product Manager			
	Chris Liu /Product Manager			
	8866 9210/ Chris.Liu@fci.com			

Note:
 Customers should contact Product Manager (or their local AICC Representative) directly regarding any concern on the PCN.
 Lack of any such customer feedback within three weeks of PCN release date will be interpreted as non-objection .

PCN19083	10115033-111LF	MATERIALS CHANGE	January 1, 2020		10122771-111LF	524-5K4F-5 PAIR STITCHED VERT HEADER	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10115910-101LF	MATERIALS CHANGE	January 1, 2020		10155256-101LF	525-5JVF-3 PAIR RA RECEPTACLE VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10115911-101LF	MATERIALS CHANGE	January 1, 2020		10148773-101LF	525-5JUF-4 PAIR RA RECEPTACLE VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10115912-101LF	MATERIALS CHANGE	January 1, 2020		10155261-101LF	525-5JUF-4 PAIR RA RECEPTACLE VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10115913-101LF	MATERIALS CHANGE	January 1, 2020		10155264-101LF	525-5JXF-5 PAIR RA RECEPTACLE VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10116601-101LF	MATERIALS CHANGE	January 1, 2020		10123358-101LF	524-5K2F-3 PAIR STITCHED VERT HEADER	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10116602-101LF	MATERIALS CHANGE	January 1, 2020		10123360-101LF	524-5K4F-5 PAIR STITCHED VERT HEADER	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10117903-101LF	MATERIALS CHANGE	January 1, 2020		10155598-101LF	563-5GTF-4 PAIR RA HEADER	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10117992-101LF	MATERIALS CHANGE	January 1, 2020		10123359-101LF	524-5K3F-4 PAIR STITCHED VERT HEADER	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10119172-101LF	MATERIALS CHANGE	January 1, 2020		10155595-101LF	563-5GZF-3 PAIR RA HEADER	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10119464-1050031L	MATERIALS CHANGE	January 1, 2020		10155608-1050031LF	563-5JCF-4 PAIR VERT HEADER	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10119465-1050031L	MATERIALS CHANGE	January 1, 2020		10155606-1050031LF	563-5JFF-3 PAIR VERT HEADER	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10119886-101LF	MATERIALS CHANGE	January 1, 2020		10155266-101LF	525-5JWF-3 PAIR RAH VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10119886-111LF	MATERIALS CHANGE	January 1, 2020		10155266-111LF	525-5JWF-3 PAIR RAH VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120001-101LF	MATERIALS CHANGE	January 1, 2020		10155271-101LF	525-5K5F-4 PAIR RAH VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120009-101LF	MATERIALS CHANGE	January 1, 2020		10155274-101LF	525-5K6F-5 PAIR RAH VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120033-101LF	MATERIALS CHANGE	January 1, 2020		10155600-101LF	563-5JIF-5 PAIR RA HEADERS	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120035-101LF	MATERIALS CHANGE	January 1, 2020		10155593-101LF	563-5GZF-3 PAIR RA HEADER	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120122-101LF	MATERIALS CHANGE	January 1, 2020		10155594-101LF	563-5G2F-3 PAIR RA HEADER	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120757-101LF	MATERIALS CHANGE	January 1, 2020		10130665-102LF	563-5G1F-3 PAIR VERT RECEPTACLE	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120758-101LF	MATERIALS CHANGE	January 1, 2020		10128101-102LF	563-5G1F-3 PAIR VERT RECEPTACLE	4340-47400	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10120759-101LF	MATERIALS CHANGE	January 1, 2020		10130666-102LF	563-5G1F-3 PAIR VERT RECEPTACLE	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120765-101LF	MATERIALS CHANGE	January 1, 2020		10130668-102LF	563-5JUF-4 PAIR VERT RECEP	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120766-101LF	MATERIALS CHANGE	January 1, 2020		10130669-102LF	563-5JUF-4 PAIR VERT RECEP	4340-47400	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10120773-101LF	MATERIALS CHANGE	January 1, 2020		10127982-102LF	563-5GUF-5 PAIR VERT RECEPTACLE	4340-47400	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10122263-101LF	MATERIALS CHANGE	January 1, 2020		10155257-101LF	525-5JVF-3 PAIR RA RECEPTACLE VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10122919-101LF	MATERIALS CHANGE	January 1, 2020		10155267-101LF	525-5JWF-3 PAIR RAH VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10124261-101LF	MATERIALS CHANGE	January 1, 2020		10155458-101LF	524-5K2F-3 PAIR STITCHED VERT HEADER	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10124313-101LF	MATERIALS CHANGE	January 1, 2020		10155459-101LF	525-5JVF-3 PAIR RA RECEPTACLE VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10124432-101LF	MATERIALS CHANGE	January 1, 2020		10155258-101LF	525-5JVF-3 PAIR RA RECEPTACLE VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10124459-101LF	MATERIALS CHANGE	January 1, 2020		10122643-101LF	524-56FF-3 PAIR RAR VS2	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10124460-101LF	MATERIALS CHANGE	January 1, 2020		10122655-101LF	524-56GF-4 PAIR RAR VS2	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10124461-101LF	MATERIALS CHANGE	January 1, 2020		10122665-101LF	524-56HF-5 PAIR RAR VS2	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10124474-102LF	MATERIALS CHANGE	January 1, 2020		10155463-102LF	525-5K8F-5 PAIR RAH VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10124864-101LF	MATERIALS CHANGE	January 1, 2020		10155270-101LF	525-5K5F-4 PAIR RAH VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10127542-101LF	MATERIALS CHANGE	January 1, 2020		10155462-101LF	525-5K5F-4 PAIR RAH VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10129146-101LF	MATERIALS CHANGE	January 1, 2020		10127979-101LF	524-5K2F-3 PAIR STITCHED VERT HEADER	4548-45480	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10130531-101LF	MATERIALS CHANGE	January 1, 2020		10124957-101LF	524-5K3F-4 PAIR STITCHED VERT HEADER	4548-45480	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10130563-101LF	MATERIALS CHANGE	January 1, 2020		10155260-101LF	525-5JUF-4 PAIR RA RECEPTACLE VSE	4548-45480	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10131510-101LF	MATERIALS CHANGE	January 1, 2020		10155460-101LF	524-5K4F-5 PAIR STITCHED VERT HEADER	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10131512-101LF	MATERIALS CHANGE	January 1, 2020		10155461-101LF	525-5K5F-4 PAIR RAH VSE	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10133027-101LF	MATERIALS CHANGE	January 1, 2020		10124997-101LF	524-56GF-4 PAIR RAR VS2	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10135261-101LF	MATERIALS CHANGE	January 1, 2020		10138573-101LF	524-56FF-3 PAIR RAR VS2	4548-45480	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10135275-101LF	MATERIALS CHANGE	January 1, 2020		10123421-101LF	524-56GF-4 PAIR RAR VS2	4548-45480	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10136585-101LF	MATERIALS CHANGE	January 1, 2020		10123420-101LF	524-56FF-3 PAIR RAR VS2	4548-45480	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10136586-101LF	MATERIALS CHANGE	January 1, 2020		10124756-101LF	524-56FF-3 PAIR RAR VS2	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10136589-102LF	MATERIALS CHANGE	January 1, 2020		10124149-102LF	524-56CF-3 PAIR RAH VS2	4548-45480	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10136590-101LF	MATERIALS CHANGE	January 1, 2020		10124755-101LF	524-56CF-3 PAIR RAH VS2	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10136593-102LF	MATERIALS CHANGE	January 1, 2020		10130572-102LF	524-56DF-4 PAIR RAH VS2	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10136594-102LF	MATERIALS CHANGE	January 1, 2020		10124150-102LF	524-56DF-4 PAIR RAH VS2	4548-45480	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
PCN19083	10136596-102LF	MATERIALS CHANGE	January 1, 2020		10124151-102LF	524-56EF-5 PAIR RAH VS2	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10140923-102LF	MATERIALS CHANGE	January 1, 2020		10155457-102LF	524-56CF-3 PAIR RAH VS2	4548-45480	CHRIS.LIU@FCI.COM	ACTIVE
PCN19083	10147903-102LF	MATERIALS CHANGE	January 1, 2020		10155456-102LF	524-56CF-3 PAIR RAH VS2	4548-45480	CHRIS.LIU@FCI.COM	PRE-PRODUCTION
Count:	134								

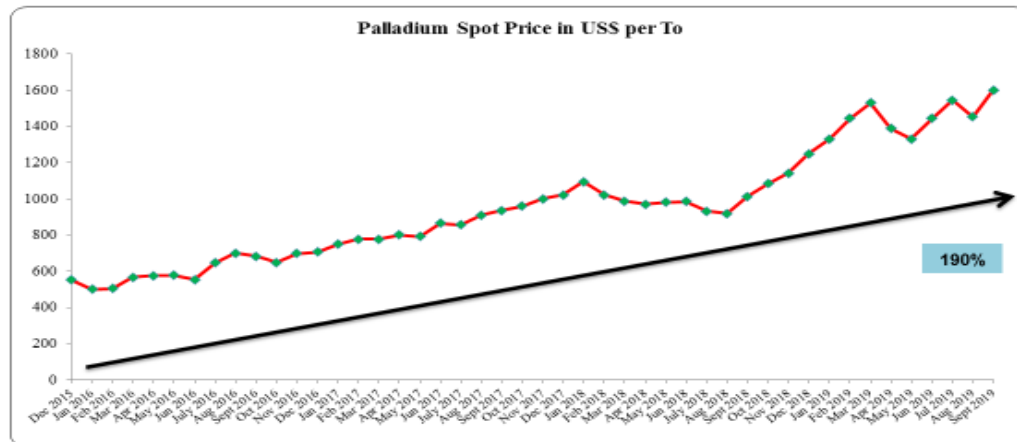
Gold price evolution 2016 – Sept 2019



- Price increased by 42% since Dec 2015, 31% since Dec 2016, and 20% since Dec 2017.
- Compared to 2018 average, prices are up by 19%.
- Compared to H1 2019, prices are up by 16%.

Source : LBMA

Palladium price evolution 2016 – Sept 2019



- Price increased by 190 % since Dec 2015, 127% since Dec 2016 and 57% since Dec 2017
- Compared to 2018 average, prices are up by 55%.
- Compared to H1 2019, prices are up by 13%.

Source : LPPM

LABORATORY TEST REPORT



REPORT NO. EL-2013-01-009	DATE OF REPORT 09Jan2013	DATES TESTED 14May2012-25Jun2012	TESTED BY S. Khounevixay	
REQUESTOR D. Anderson	TITLE Qualification of AIRMAX VS® Connectors with the FCI GXT+™ Finish System		Prepared By/Title Glenn E. Staudt Staff Prod. Test Eng.	Approved By/Title R. Druckenmiller Mgr., Prod. Test Lab.

PURPOSE

Qualification testing of AIRMAX VS® connectors was conducted to assess the effectiveness of the FCI GXT+™ finish system in meeting the requirements of FCI product specification GS-12-239, Rev. F. Testing comprised only those portions of the full qualification test plan that are expected to be influenced by the finish system of the separable contact interface: test groups 1 (corrosion resistance), 2 (thermal aging), 3b (effect of thermal shock and humidity on contact resistance), and 4 (vibration and mechanical shock, without monitoring for electrical continuity during treatment).

CONCLUSIONS

The tested product met the specified requirements.

SAMPLE DESCRIPTION

Details of the submitted samples are given in the following table.

SAMPLE DESCRIPTION

Item	Description	Part #	Lot #	Plating Type (µm)
1	AIRMAX VS® Right Angle Header	10028436-101LF	120324	GXT+™
2	AIRMAX VS® Vertical Receptacle	10028264-101LF	120407	GXT+™

All terminals were produced from C52100 basis metal with the FCI GXT+™ finish system, which consists of 0.4 micrometer of FCI GXT™ (gold flash over palladium-nickel alloy) plating over nanocrystalline nickel underplate with PAO (poly-alpha-olefin) lubricant. For testing, headers and receptacles were mounted (via compliant pins) onto test boards SK10030567-001 (Rev. 1) and SK10030566-001 (Rev. 2), respectively.

The test samples were received at the laboratory on 16 Apr 2012.

Prior to testing, the samples were examined at low magnification and deemed acceptable for testing.

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TEST DESCRIPTIONS

Test sequences are given in the following table with group numbers and clause numbers from FCI product specification GS-12-239. Testing was conducted under US Product Test Laboratory number EL-2012-04-024.

Clause #	Test Description	Grp. # 1	Grp. # 2	Grp. # 3b	Grp. # 4
4.2	Visual Examination	1,13	1,5	1,13	1,11
5.1	Low Level Contact Resistance (LLCR)	2,4,6,8,10,12	2,4	2,4,6,8,10,12	2,4,6,8,10
7.1	Thermal Shock			3	
7.2	Humidity			9	
7.3	Temperature Life		3		
7.4	Mixed Flowing Gas (MFG)	5 ^a ,7 ^b			
7.5	Vibration				7
7.6	Mechanical Shock				9
7.7	Durability	3,11		5,11	3
7.8	Dust Application			7	5
7.9	Contact Disturbance	9			
Sample Size (Hdr/Rcpt Pairs per Sample Set)		4	4	4	4

^a 10 day exposure of unmated backplane connector (vertical receptacle)

^b 10 day exposure of mated connector pairs

TEST METHODS/REQUIREMENTS

Clause #	Item	Test Method	Condition	Requirement
4.2	Visual Exam	EIA/ECA-364-18B	Visual	No Blister, Crack, Discoloration, etc.
5.1	LLCR	EIA/ECA-364-23C	Option 1	Initial $\leq 35 \text{ m}\Omega$ Change $\leq 10 \text{ m}\Omega$
7.1	Thermal Shock	EIA-364-32F	Method A, Cond. 1, Dur. A	No Damage
7.2	Humidity	EIA-364-31C	Method 3 exc. Profile ¹ & Dur. ²	No Damage
7.3	Temperature Life	EIA-364-17C	Method A, Cond. 3, Dur. C	No Damage
7.4	MFG	EIA-364-65B	Class 2A, 20 days Total Dur.	No Damage
7.5	Vibration	EIA-364-28F	Condition 2 except Duration ³	No Damage ⁴
7.6	Mechanical Shock	EIA-364-27C	Condition H	No Damage ⁴
7.7	Durability	EIA-364-09C	100 Mating Cycles	No Damage
7.8	Dust Application	EIA/ECA-364-91A	Composition 1	No Damage
7.9	Contact Disturb.	GR-1217-CORE, Issue 2 §9.1.3.3.5	Unmate 0.1 mm, Reseat	No Damage

¹ 10 hr Cycle Profile: 2 hr Ramp Up, 4 hr High Dwell, 2 hr Ramp Down, 2 hr Low Dwell

² 50 Cycle (500 hr total) Test Duration

³ Vibration Treatment Duration: 8 hours per axis

⁴ Discontinuity monitoring omitted.

TEST RESULTS

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Group # 1 Test Results

Step #	Test	Requirement	Step Description	Result	Comments
1	Visual Exam	No Blister, Crack, etc.	Initial Visual	No Blister, Crack, etc.	Pass
2	LLCR	$\leq 35 \text{ m}\Omega$	Initial LLCR	27.6 m Ω Max	Pass
3	Durability	No Damage	Initial Dur	No Damage	Pass
4	LLCR	$\leq 10 \text{ m}\Omega$	LLCR after Dur	0.3 m Ω Max Change	Pass
5	MFG	No Damage	Unmated MFG	No Damage	Pass
6	LLCR	$\leq 10 \text{ m}\Omega$	LLCR, 10 d MFG	0.6 m Ω Max Change	Pass
7	MFG	No Damage	Mated MFG	No Damage	Pass
8	LLCR	$\leq 10 \text{ m}\Omega$	LLCR, 20 d MFG	0.7 m Ω Max Change	Pass
9	Disturbance	No Damage	Disturb	No Damage	Pass
10	LLCR	$\leq 10 \text{ m}\Omega$	LLCR after Disturb	0.7 m Ω Max Change	Pass
11	Durability	No Damage	Final Dur	No Damage	Pass
12	LLCR	$\leq 10 \text{ m}\Omega$	Final LLCR	0.5 m Ω Max Change	Pass
13	Visual Exam	No Blister, Crack, etc.	Final Visual	No Blister, Crack, etc.	Pass

Group # 2 Test Results

Step #	Test	Requirement	Step Description	Result	Comments
1	Visual Exam	No Blister, Crack, etc.	Initial Visual	No Blister, Crack, etc.	Pass
2	LLCR	$\leq 35 \text{ m}\Omega$	Initial LLCR	27.7 m Ω Max	Pass
3	Temp Life	No Damage	Temp Life	No Damage	Pass
4	LLCR	$\leq 10 \text{ m}\Omega$	Final LLCR	2.4 m Ω Max Change	Pass
5	Visual Exam	No Blister, Crack, etc.	Final Visual	No Blister, Crack, etc.	Pass

Group # 3 Test Results

Step #	Test	Requirement	Step Description	Result	Comments
1	Visual Exam	No Blister, Crack, etc.	Initial Visual	No Blister, Crack, etc.	Pass
2	LLCR	$\leq 35 \text{ m}\Omega$	Initial LLCR	27.6 m Ω Max	Pass
3	Thermal Shock	No Damage	T Shk	No Damage	Pass
4	LLCR	$\leq 10 \text{ m}\Omega$	LLCR after T Shk	1.0 m Ω Max Change	Pass
5	Durability	No Damage	Initial Dur	No Damage	Pass
6	LLCR	$\leq 10 \text{ m}\Omega$	LLCR after Dur	0.6 m Ω Max Change	Pass
7	Dust	No Damage	Dust	No Damage	Pass
8	LLCR	$\leq 10 \text{ m}\Omega$	LLCR after Dust	0.6 m Ω Max Change	Pass
9	Humidity	No Damage	Humidity	No Damage	Pass
10	LLCR	$\leq 10 \text{ m}\Omega$	LLCR after Hmd	0.9 m Ω Max Change	Pass
11	Durability	No Damage	Final Dur	No Damage	Pass
12	LLCR	$\leq 10 \text{ m}\Omega$	Final LLCR	0.8 m Ω Max Change	Pass
13	Visual Exam	No Blister, Crack, etc.	Final Visual	No Blister, Crack, etc.	Pass

Group # 4 Test Results

Step #	Test	Requirement	Step Description	Result	Comments
1	Visual Exam	No Blister, Crack, etc.	Initial Visual	No Blister, Crack, etc.	Pass
2	LLCR	$\leq 35 \text{ m}\Omega$	Initial LLCR	27.7 m Ω Max	Pass
3	Durability	No Damage	Initial Dur	No Damage	Pass
4	LLCR	$\leq 10 \text{ m}\Omega$	LLCR after Dur	0.3 m Ω Max Change	Pass
5	Dust	No Damage	Dust	No Damage	Pass
6	LLCR	$\leq 10 \text{ m}\Omega$	LLCR after Dust	0.6 m Ω Max Change	Pass
7	Vibration	No Damage	Vib	No Damage	Pass
8	LLCR	$\leq 10 \text{ m}\Omega$	LLCR after Vib	1.5 m Ω Max Change	Pass
9	Mechanical Shock	No Damage	Mech Shk	No Damage	Pass
10	LLCR	$\leq 10 \text{ m}\Omega$	Final LLCR	0.5 m Ω Max Change	Pass
11	Visual Exam	No Blister, Crack, etc.	Final Visual	No Blister, Crack, etc.	Pass

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EQUIPMENT

Item	Manufacturer	ID Number	Last Cal.	Cal. Due
Microscope	Bausch & Lomb (StereoZoom 5)	VG6617	N/C	N/A
Microscope	Olympus (SZH)	VG7399	N/C	N/A
Digital Camera	Jenoptik (ProgRes CF, SN 4808-26-0156)	VG8010	N/C	N/A
Timer	Control Co. (14-649-121, SN 111419170)	VG8012	29Mar2011	Mar2013
Climate Monitor	Control Co. (11-661-7D, SN 11177278)	VG7960	24Aug2011	Aug2013
Climate Monitor	Control Co. (11-661-7D, SN 111776691)	VG7961	30Aug2011	Aug2013
Micro-Ohmmeter	Keithley (Model 580, SN 390667)	VG6107	11Oct2011	Oct2012
Scanner	Keithley (Model 706, SN 377930)	Q316352	N/C	N/A
Tensile/Compression Tester	Instru-Met (Model 4502, SN 4651)	VG8031	20Sep2011	Sep2012
Tensile/Compression Tester	Instru-Met (Model 1122, SN 4665)	VG8096	20Sep2011	Sep2012
Load Cell	Instron (1000 lb, SN 1693)	VG6452	19Sep2011	Sep2012
Load Cell	Instron (50 kg, SN 045)	VG6827	20Sep2011	Sep2012
Mass	Instron (20 av lb #1)	VG6842	22Jul2011	Jul2012
Mass	Instron (20 av lb #2)	VG6843	22Jul2011	Jul2012
Mass	Instron (20 av lb #3)	VG6844	22Jul2011	Jul2012
Mass	Instron (20 av lb #4)	VG6845	22Jul2011	Jul2012
Mass	Instron (20 av lb #5)	VG6846	22Jul2011	Jul2012
Mass	Instron (10 av lb #1)	VG6253	22Jul2011	Jul2012
Mass	Instron (10 av lb #2)	VG6254	22Jul2011	Jul2012
Mass	Instron (10 av lb #3)	VG6251	22Jul2011	Jul2012
Mass	Instron (10 av lb #4)	VG6252	22Jul2011	Jul2012
Dust Chamber	FCI (8 cubic feet)	VG7011	N/C	N/A
Timer	Dimco-Gray Co. (GraLab 171)	VG6783	N/C	N/A
Dry Heat Oven	Heraeus (T6, SN 40062998)	VG7881	10May2012	May2013
Balance	Mettler (PK4800, SN A14285)	VG6551	02Feb2012	Feb2013
Dry Heat Oven	Blue M (DC-1506C G0P, SN DC-5517)	VG6858	10May2012	May2013
Thermal Shock Chamber	Thermotron (ATS-320-V-10-705-LN2, SN 24380)	VG6931	10May2012	May2013
Humidity Chamber	Espec (ESX-3CA, SN 0112297)	VG9011	25Oct2011	Oct2012
Electrodynamic Shaker	Unholtz-Dickie (206, SN 499)	VG7977	N/C	N/A
Dual Power Amplifiers	Unholtz-Dickie (TA250AD, SN 701,702)	VG7976	N/C	N/A
Vibration Controller	Vibration Research (VR 8500, SN 12B248)	VG7974	05Jun2012	Jun2013
Accelerometer	Endevco (752A12, SN 16562)	VG9009	29Jun2011	Jun2012
Electrodynamic Shaker	LDS (V810, SN S1505-001)	VG7978	N/C	N/A
Power Amplifier	LDS (DPA20K, SN 14778/1)	VG7436	N/C	N/A
Vibration Controller	Bruel & Kjaer (LDS LAS-200, SN 12368558)	VG8084	03Nov2011	Nov2012

N/C = Not Calibrated
N/A = Not Applicable

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Item	Manufacturer	ID Number	Last Cal.	Cal. Due
Corrosion Chamber	FCI (#1, Class IIA)	VG7537	N/C	N/A
Thermometer	Barnstead (1003)	VG7982	23Jan2006	Jan2016
Temp. Controller (Chamber)	Digi-Sense (Model 89000-10)	VG7182	N/C	N/A
Temp. Controller (Air Line)	Digi-Sense (Model 2186-20)	VG6946	N/C	N/A
Temp. Controller (Hmd.Chmbr)	Digi-Sense (Model 2186-20)	VG7057	N/C	N/A
Temp. Controller (Humidifier)	Digi-Sense (Model 89000-10)	VG7116	N/C	N/A
Temp. Controller (Humidifier)	Digi-Sense (Model 89000-10)	VG7117	N/C	N/A
Dew Point Meter	General Eastern (Hygro M4)	VG7217	03Jun2011	Jun2012
Air Flow Controller	Brooks Instrument (Model 5878)	VG6938	N/C	N/A
Gas Flow Controller	Brooks Instrument (Model 5878)	VG6939	N/C	N/A
Permeation Rack	InterFact Associates	VG6944	VBU	N/A
NOx Analyzer	Teledyne (M200E, SN 4247)	VG9018	VBU	N/A
SO ₂ Analyzer	Teledyne (M100E, SN 3364)	VG9017	VBU	N/A
H ₂ S Analyzer	Teledyne (TML-87, SN HS1386)	VG8097	VBU	N/A
Water Circulator	Yamato-Komatsu (Model CTE-22A)	VG6953	N/C	N/A
Flowmeter	Gilmont (Accucal GF-4550)	VG7946	15Sep2011	Sep2012
Permeation Tube	NO ₂	59-40894	14May2012	May2013
Permeation Tube	SO ₂	56-40895	07May2012	May2013
Permeation Tube	H ₂ S	56-40896	07May2012	Jan2013
Chamber Gas	NO ₂	CC352567	N/C	N/A
Chamber Gas	SO ₂	CC63269	N/C	N/A
Chamber Gas	H ₂ S	SA20366	N/C	N/A
Chamber Gas	Cl ₂	CC169934	N/C	N/A
Balance	Mettler (AT20, SN 1115083194)	VG7106	02Feb2012	Feb2013
Corrosion Chamber	FCI (#1, Class IIA)	VG7537	N/C	N/A
Thermometer	Barnstead (1003)	VG7982	23Jan2006	Jan2016
Temp. Controller (Chamber)	Digi-Sense (Model 89000-10)	VG7182	N/C	N/A
Temp. Controller (Air Line)	Digi-Sense (Model 2186-20)	VG6946	N/C	N/A
Temp. Controller (Hmd.Chmbr)	Digi-Sense (Model 2186-20)	VG7057	N/C	N/A
Temp. Controller (Humidifier)	Digi-Sense (Model 89000-10)	VG7116	N/C	N/A
Temp. Controller (Humidifier)	Digi-Sense (Model 89000-10)	VG7117	N/C	N/A
Dew Point Meter	General Eastern (Hygro M4)	VG7217	03Jun2011	Jun2012
Air Flow Controller	Brooks Instrument (Model 5878)	VG6938	N/C	N/A
Gas Flow Controller	Brooks Instrument (Model 5878)	VG6939	N/C	N/A
Permeation Rack	InterFact Associates	VG6944	VBU	N/A

N/C = Not Calibrated
 VBU = Verify before Use
 N/A = Not Applicable

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REVISION RECORD

Revision Level	Affected Pages	Description	Revision Date
A	All	Original Release	09Jan2013

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LABORATORY TEST REPORT



REPORT NO. EL2013-02-005	DATE OF REPORT 15FEB2013	DATES TESTED 07FEB2013-11FEB2013	TESTED BY S. Khounevixay, J. Rau	
REQUESTOR D. Anderson	TITLE Salt Spray Testing of AirMax VS® Connector System with GXT+™ Plating and PAO Lubricant		Prepared By/Title J. Kopec Sr. Staff Eng.	Approved By/Title R. Druckenmiller Manager

PURPOSE

This report summarizes the salt spray testing performed on the FCI AirMax VS connector system with GXT+ plating and PAO (Polyalpha Olefin) lubricant on both right angle header (RAH) and vertical receptacle (VH) contacts. Testing consisted of visual examination and low level contact resistance (LLCR) measurement before and after 48 hours salt spray exposure. Two connector pairs were exposed in the mated condition and 3 mated pairs were exposed in the unmated condition (both RAH & VR). Testing was performed in accordance with a test sequence provided by the requestor and salt spray test EIA-364-26B, test condition B and AirMax VS product specification GS-12-239F.

CONCLUSIONS

All mated and unmated samples successfully met LLCR and visual examination requirements following 48 hours salt spray exposure.

SAMPLE DESCRIPTION

Samples were received 5FEB2013 and deemed suitable for testing by a member of the product test laboratory staff.

Item	Description	Part #	Lot #	Base Mat'l	Plating Type	Lubricant
1	AirMax VS 4P RAH	10028436-101LF	120324	PhosBr	GXT+	PAO
2	AirMax VS 4P VR	10028264-101LF	120407	PhosBr.	GXT+	PAO
3	AirMax VS 4 PR VR LLCR test board	10115932	1205	FR4	Sn	n/a
4	AirMax VS 4 PR RAH LLCR test board	sk10030567-001	1203	FR4	SnPb	n/a

GXT+ is a 0.050µm (2.0µ") hard gold flash plated on a 0.33 µm (13.0µ") PdNi deposit with a coating of PAO (PolyAlpha Olefin) lubricant applied to the mating area. The nickel underlayer is a high performance electroplated nickel such as nanocrystalline reverse pulse plated sulfamate nickel or high corrosion resistance/high ductility commercial sulfate based nickel.

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TEST DESCRIPTIONS

Test Description	1	2
Visual Examination	1,5	1,5
Low Level Contact Resistance	2,4	2,4
Salt Spray – mated	3	
Salt Spray - unmated		3

Group 1 sample size consisted of 2 connector pairs exposed to salt spray in the mated condition. Group 2 sample size consisted of 3 connector pairs exposed to salt spray in the unmated condition (both RAH & VR).

TEST RESULTS

GROUP 1 MATED TEST RESULTS

Step #	Test	Requirement	Step Description	Result	Comments
1	Visual Examination	No damage	Initial	No damage	Pass
2	LLCR	35 mΩ max.	Initial	*27.98 mΩ max.	Pass
3	Salt Spray	No precious metal corrosion, crack, or delamination	48 hours	No corrosion, crack, or delamination	Pass
4	LLCR	10 mΩ max. increase	After salt spray	0.58 mΩ max. increase	Pass
5	Visual Examination	No damage	Final	No damage	Pass

*=includes test board bulk resistance

GROUP 2 UNMATED TEST RESULTS

Step #	Test	Requirement	Step Description	Result	Comments
1	Visual Examination	No damage	Initial	No damage	Pass
2	LLCR	35 mΩ max.	Initial	*28.52 mΩ max.	Pass
3	Salt Spray	No precious metal corrosion, crack, or delamination	48 hours	No corrosion, crack, or delamination	Pass
4	LLCR	10 mΩ max. increase	After salt spray	0.39 mΩ max. increase	Pass
5	Visual Examination	No damage	Final	No damage	Pass

*=includes test board bulk resistance

Figures 1 through 4 illustrate the typical observed condition following salt spray exposure.

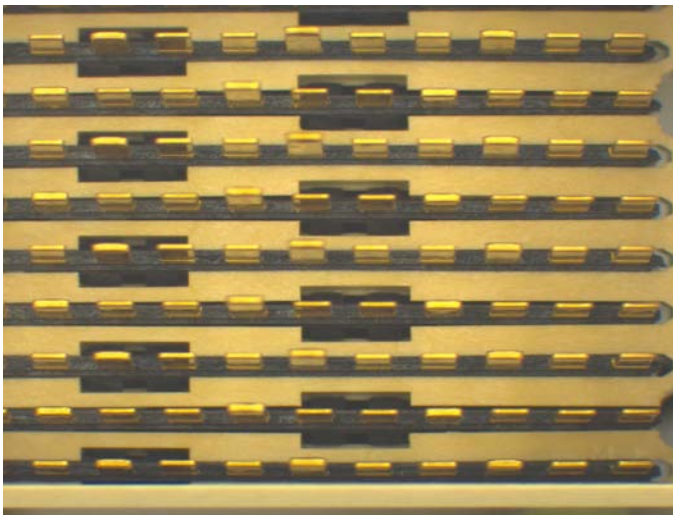


Fig. 1 – Mated RAH After Salt Spray



Fig. 2 – Mated VR After Salt Spray

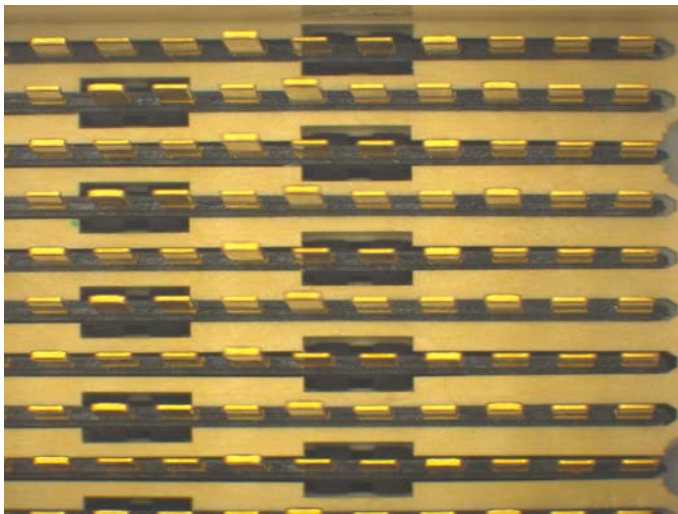


Fig. 3 – Unmated RAH After Salt Spray

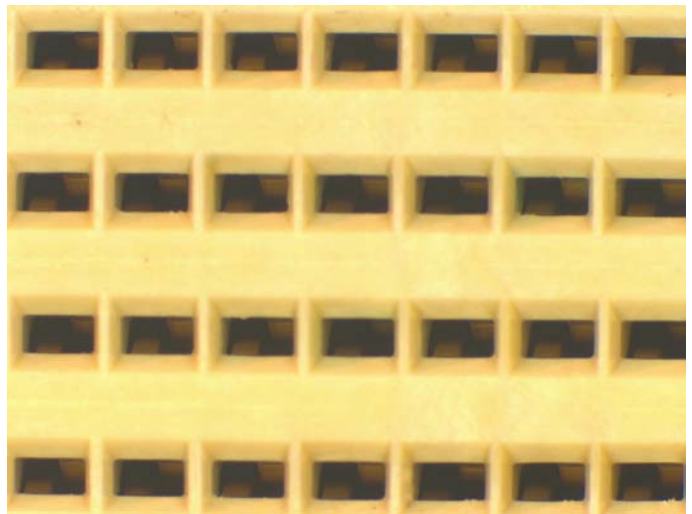


Fig. 4 – Unmated VR After Salt Spray

EQUIPMENT

Item	Manufacturer	ID Number	Last Cal.	Cal. Due
Salt Spray Chamber	Harshaw	VG6470	CNR	CNR
Digital Thermometer	Omega	VG7148	MAY2012	MAY2013
pH/Ion Meter	Accumet	VG6884	CBU	CBU
Thermometer	Fisher Scientific	VG8035	JAN2010	DEC2020
Hydrometer	Fisherbrand	VG7944	NOV2003	NOV2013
Micro-ohmmeter	Keithley	S56825	AUG2012	AUG2013
Micro-ohmmeter	Keithley	VG7393	AUG2012	AUG2013
Channel Scanner	Keithley	Q316352	CNR	CNR
Channel Scanner	Keithley	VG7145	CNR	CNR
CNR = calibration not required CBU = calibrate before use				

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REVISION RECORD

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A	All	Original Release	15FEB2013

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CUSTOMER TEST REPORT



REPORT NO. EL-2013-03-023-01 CR	DATE OF REPORT 31OCT2019	DATES TESTED 14DEC2012 – 03JUN2013	TESTED BY C. Eissing, S. Khounevixay, J. Rau, J. Schell	
REQUESTOR L. Tanis	TITLE Qualification of AICC AirMax VS®, VS2™, and VSe® Connectors – GXT+® to GXT® Plating Cross-Mate		Prepared By/Title J. Morrow Eng. Support Specialist	Approved By/Title R. Druckenmiller Lab Manager

PURPOSE

This report summarizes the qualification testing performed on the AICC AirMax VS, VS2, and VSe 3-pair 6-IMLA connectors. Four combinations of header/receptacle pairs are represented. Each combination contained GXT+ plated product cross-mated with 30 µinch GXT plated product. Testing consisted of groups 1, 4, and 6 of AICC Product Specification GS-12-0956, Rev B. Overall acceptability of results for VS2 and VSe are considered interchangeable since the mating interface design for these two variants is identical.

CONCLUSIONS

All combinations of the connector pairs listed successfully met the requirements of the product specification for the groups tested.

SAMPLE DESCRIPTION

Samples were received 14Dec2012 and deemed suitable for testing by a member of the product test laboratory staff.

SAMPLE DESCRIPTION

Combination	Description	Part #	Lot #	Base Mat'l	Plating Type	Housing Mat'l
1	AirMax VS2 3 Pair 6 IMLA Right Angle Receptacle (RAR)	10122643-201LF	V12481P	Copper Alloy	GXT+	Hi-temp resin
	AirMax VS 3 Pair 6 IMLA Stitched VS Vertical Header (VH)	10122769-101LF	M12434	Copper Alloy	30 GXT	Hi-temp resin

Testing for Combination 1 was performed under lab project EL-2012-12-022B.

Combination	Description	Part #	Lot #	Base Mat'l	Plating Type	Housing Mat'l
2	AirMax VS2 3 Pair 6 IMLA RAR	10122643-201LF	V12481P	Copper Alloy	GXT+	Hi-temp resin
	AirMax VS 3 Pair Stitched VH	10122698-201LF	M12434	Copper Alloy	GXT+	Hi-temp resin

Testing for Combination 2 was performed under lab project EL-2012-12-022D.

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SAMPLE DESCRIPTION (cont'd)

Combination	Description	Part #	Lot #	Base Mat'l	Plating Type	Housing Mat'l
3	AirMax VSe 3 Pair 6 IMLA RAR	10115910-101LF	V12481P	Copper Alloy	30 GXT	Hi-temp resin
	AirMax VS 3 Pair 6 IMLA Stitched VH	10122698-201LF	M12434	Copper Alloy	GXT+	Hi-temp resin

Testing for Combination 3 was performed under lab project EL-2012-12-022F.

Combination	Description	Part #	Lot #	Base Mat'l	Plating Type	Housing Mat'l
4	AirMax VSe 3 Pair 6 IMLA RAH	10119886-201LF	V12463P	Copper Alloy	GXT+	Hi-temp resin
	AirMax VS 3 Pair 6 IMLA VR	10043546-101LF	M13022	Copper Alloy	30 GXT	Hi-temp resin

Testing for Combination 4 was performed under lab project EL-2012-12-022A.

TEST DESCRIPTIONS

GS-12-0956	Test Description	1	4	6
5.4	Visual Examination	1,16	1,14	1,5
-	Mate connectors	2,8	2,8	
-	Unmate connectors	6	6	
6.1	Low level contact resistance (LLCR)	3,5,9,11,13,15	3,5,9,11,13	2,4
8.4	MFG – unmated 10 days	7		
8.4	MFG – mated 10 days	10		
8.5	Salt spray			3
8.6	Vibration		10	
8.7	Mechanical shock		12	
8.8	Durability – 99X	4,14	4	
8.9	Dust – unmated headers		7	
8.10	Disturb	12		

Sample Sizes:

Group 1 – Four connector pairs for each combination.

Group 2 – Three connector pairs for each combination.

Group 3 – Four connector pairs for each combination.

TEST METHODS/REQUIREMENTS

Item	Test Method	Condition	Requirement
Visual examination	EIA-364-18B	10x	No defects
LLCR	EIA-364-23C	20mV max, 100mA max.	60 mΩ max. initial 10 mΩ max. increase
MFG	EIA-364-65B	Class IIa, 20 days total	No damage
Salt Spray	EIA-364-26B	Test cond. B, 48 hours*	No damage
Vibration	EIA-364-28F	Test cond. II, 10G, 10 to 500 Hz, 15 min. cycle, 8 hours/axis, 3 axes, rigid mounting	No damage
Mechanical Shock	EIA-364-27C	Test cond. H, ½ sine, 30G, 11 msec., 3 shocks/direction/axis, 3 axes, rigid mounting	No damage
Durability	EIA-364-09C	127 mm/minute max.	No damage
Dust	EIA-364-91A	Composition #1, 1 hour, Headers only	No damage
Disturb	GS-12-0956 Para 8.10	0.10 mm (0.004")	No damage

*This is an exception to the product specification which states Condition A, 96 hours.

TEST RESULTS**GROUP 1 MIXED FLOWING GAS TEST RESULTS**

Step #	Test	Requirement	Step Description	Result	Comments
1	Visual Examination	No defects	Initial	No defects	Pass
2	Mate connectors	-	-	-	-
3	LLCR	60 mΩ max.	Initial	Comb. 1: 39.9 mΩ max. Comb. 2: 39.9 mΩ max. Comb. 3: 39.5 mΩ max. Comb. 4: 34.8 mΩ max.	Pass
4	Durability	No damage	1 st 99 cycles	No damage	Pass
5	LLCR	10 mΩ max. increase	After 100X	Comb. 1: 0.9 mΩ max. inc. Comb. 2: 1.0 mΩ max. inc. Comb. 3: 1.9 mΩ max. inc. Comb. 4: 0.9 mΩ max. inc.	Pass
6	Unmate connectors	-	-	-	-
7	MFG – unmated	No damage	1 st 10 days	No damage	Pass
8	Mate connectors	-	-	-	-
9	LLCR	10 mΩ max. increase	After 10 days MFG	Comb. 1: 2.1 mΩ max. inc. Comb. 2: 8.8 mΩ max. inc. Comb. 3: 9.9 mΩ max. inc. Comb. 4: 1.1 mΩ max. inc.	Pass
10	MFG – mated 10 days	No damage	2 nd 10 days	No damage	Pass
11	LLCR	10 mΩ max. increase	After 20 days MFG	Comb. 1: 6.7 mΩ max. inc. Comb. 2: 8.9 mΩ max. inc. Comb. 3: 9.3 mΩ max. inc. Comb. 4: 2.5 mΩ max. inc.	Pass
12	Disturb	No damage	After MFG	No damage	Pass
13	LLCR	10 mΩ max. increase	After disturb	Comb. 1: 6.2 mΩ max. inc. Comb. 2: 7.8 mΩ max. inc. Comb. 3: 9.7 mΩ max. inc. Comb. 4: 3.3 mΩ max. inc.	Pass
14	Durability	No damage	2 nd 99 cycles	No damage	Pass
15	LLCR	10 mΩ max. increase	After 200X total	Comb. 1: 5.2 mΩ max. inc. Comb. 2: 6.8 mΩ max. inc. Comb. 3: 9.9 mΩ max. inc. Comb. 4: 2.4 mΩ max. inc.	Pass
16	Visual Examination	No defects	Final	No defects	Pass

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TEST GROUP 4 TEST RESULTS

Step #	Test	Requirement	Step Description	Result	Comments
1	Visual Examination	No defects	Initial	No defects	Pass
2	Mate connectors	-	-	-	-
3	LLCR	60 mΩ max.	Initial	Comb. 1: 39.7 mΩ max. Comb. 2: 38.9 mΩ max. Comb. 3: 39.4 mΩ max. Comb. 4: 35.4 mΩ max.	Pass
4	Durability	No damage	1 st 99 cycles	No damage	Pass
5	LLCR	10 mΩ max. increase	After 100X	Comb. 1: 1.4 mΩ max. inc. Comb. 2: 2.7 mΩ max. inc. Comb. 3: 3.5 mΩ max. inc. Comb. 4: 0.5 mΩ max. inc.	Pass
6	Unmate connectors	-	-	-	-
7	Dust	No damage	1 hour	No damage	Pass
8	Mate connectors	-	-	-	-
9	LLCR	10 mΩ max. increase	After dust	Comb. 1: 4.5 mΩ max. inc. Comb. 2: 1.5 mΩ max. inc. Comb. 3: 9.0 mΩ max. inc. Comb. 4: 0.8 mΩ max. inc.	Pass
10	Vibration	No damage	Sinusoidal, 10G,10-500Hz, 8 hours/axis	No damage	Pass
11	LLCR	10 mΩ max. increase	After vibration	Comb. 1: 1.4 mΩ max. inc. Comb. 2: 2.1 mΩ max. inc. Comb. 3: 5.5 mΩ max. inc. Comb. 4: 1.6 mΩ max. inc.	Pass
12	Mechanical shock	No damage	½ sine, 30G, 11ms	No damage	Pass
13	LLCR	10 mΩ max. increase	After shock	Comb. 1: 1.7 mΩ max. inc. Comb. 2: 1.8 mΩ max. inc. Comb. 3: 6.6 mΩ max. inc. Comb. 4: 0.6 mΩ max. inc.	Pass
14	Visual Examination	No defects	Final	No defects	Pass

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TEST GROUP 6 TEST RESULTS

Step #	Test	Requirement	Step Description	Result	Comments
1	Visual examination	No defects	Initial	No defects	Pass
2	LLCR	60 mΩ max.	Initial	Comb. 1: 39.7 mΩ max. Comb. 2: 24.4 mΩ max. Comb. 3: 39.3 mΩ max. Comb. 4: 35.3 mΩ max.	Pass
3	Salt Spray	No damage	96 hours	No damage	Pass
4	LLCR	10 mΩ max. increase	After salt spray	Comb. 1: 3.8 mΩ max. inc. Comb. 2: 8.8 mΩ max. inc. Comb. 3: 9.5 mΩ max. inc. Comb. 4: 7.0 mΩ max. inc.	Pass
5	Visual examination	No defects	Final	No defects	Pass

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REVISION RECORD

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A	All	Original Release	31OCT2019

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End of Report

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