浮动 SMB& FAKRA 系列连接器产品规格书

CAMERA FLOATING SOCKET& FAKRA Series CONNECTOR SPECIFICATION

版次 Revision	日期 Date	修订履历 Modify	作成者 Producer
X0	20251229	初版发行	Amy

作成部门 Department	作成 Producer	确认 Confirmation	承认 Recognition
工程部	Amy	Bob	Jay Yan

【1】参考文献

References:

产品外观、尺寸、电气性能、机械性能、环境性能等规格参考 ISO20860&USCAR-2/17/18/&EIA-364 标准。

Product appearance, size, electrical performance, mechanical performance, environmental performance and other specifications refer to ISO20860&USCAR-2/17/18&EIA-364 standards.

【2】产品适用范围

Scope of product application

本规范使用于浮动 SMB& FAKRA 系列连接器，包含了产品的性能、试验方法和要求。

This specification applies to CAMERA FLOATING SOCKET& FAKRA connector series,contains the product performance,test methods and in specification requirements.

【3】产品结构、外观和尺寸

Product Structure, dimension and Appearance:

结构、尺寸、主要部件的材料和表面处理应在图纸中规定。

不得有任何划痕，裂缝，污渍或翘曲对连接器的功能或外观有伤害。

Structure,dimension,material and surface plating were defined in drawings.

There shall be no scratches, cracks, stains or warp that are detrimental to the function or the appearance of the connector.

【4】额定值

Ratings

项目 Item	规格 Standard	
最大容许电压 Maximum allowable voltage	60V DC MAX	[AC(有效值 rms)/DC]
最大容许电流 Maximum allowable current	1A MAX	
工作温度范围 Temperature range	-40℃ ~ +105℃	

【5】部件仓储条件 Storage condition（reference item）

项目 Item	规格内容 Standard
储存温度 Storage temperature	20±8℃
储存湿度 Storage humidity	20%-65%RH Less than 20%-65%RH
储存期限 Storage life	1 年(焊接最佳时段为 6 个月以内) one year (The best time for welding is within 6 months)

1）产品储存区域应保持清洁干燥，以免产品被污染或受潮变质。
To avoid product contamination or moisture deterioration ,Product storage area should be kept clean and dry.

2）产品的摆放应整齐，排列井然有序，叠放時要做到〝上小下大、上轻下重〞。
Products should be placed neatly in an orderly. The bigger and heavier the product is , the lower you put .

3）产品不可直接堆放在地板上，用卡板堆放。
Products should not directly stacked on the floor, please put them by card-board.

【6】试验条件 Test Conditions
试验及测量如果没有特别的规定，就按周围温度 5～35℃，相对湿度为 20-85%RH，普通气压 86～106kPa 来实施。但是，如果按此标准测量出的值有疑义时，以判定状态为准。
The test and measurement shall be conducted at the ambient temperature of5～35℃.relative Humidity of 20-85%RH or less,and normal atmospheric pressure of86～106kPa unless otherwise Specified.If the judgment made on the basis of the values measured standard conditions is doubtful the test and measurement should be made under the judgment conditions.

【7】试验判定状态
Judgment conditions
判定状态是指:有规定环境条件下，周围温度 5～35℃，相对湿度为 20-85%RH，普通气压 86～106kPa 的环境状态下。
Judgment conditions,environmental conditions under which the measurement is conducted.Are the conditions of ambient temperature of 5～35℃ relative humidity of

20-85%RH normal atmospheric pressure of86-106kPa.

【8】.试验要求及程序

Test Requirement and Procedure

8.1 外观、尺寸检查 Appearance、Dimension Examination

NO.	试验项目 Items	试验条件 Test Condition	规格 Requirement
8.1.1	外观检查 Visual Examination	应按照每张图纸目视确认。 应使用适当的测量仪器确认。 Refer to the product drawing visually. Use test equipment. **USCAR-2**	外观良好，不存在有害问题。 （变质，裂缝，畸形等） Good surface, no scratch, bending, broken allowed
8.1.2	尺寸检查 Dimension Examination	符合图纸要求和 **USCAR-18** Meets requirements of product drawing and **USCAR-18**	适当的测量仪器确认 Use test equipment

8.2.电气的性能 Electrical performance

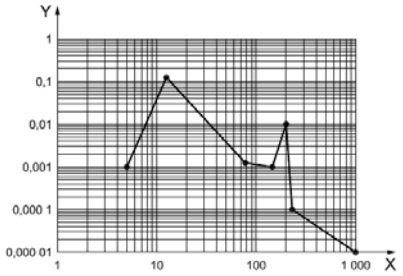
NO.	试验项目 Items	试验条件 Test Condition	规格 Requirement
8.2.1	特性阻抗 Characteristic Impedance	使用网络分析仪进行测试，调入网络分析仪中的损耗测试程序，先接入校准模块进行校准，再进行测试。 Use Network Analyzer to test, set the analyzer to return loss test mode. Before test, do the adjustment first. **USCAR-17**	阻抗：50 Ω+/-10% （TDR 测试，脉冲上升时间为 160 ps ） Impedance:50 +/-10% (TDR test with 160 ps rise time at pulse)
8.2.2	回波损耗 Return Loss	通过网络分析仪测试。 频率范围为 DC 0~6GHz Tested by network analyzer. Frequency：DC 0~6GHz USCAR-17	回波损耗 Return loss: ≥25 dB (2 MHz to 0.5 GHz) ≥25-4.333*(f-0.5 GHz)/1 GHz [dB] (0.5 GHz to 3.5 GHz) ≥12 dB (3.5 GHz to 6 GHz)

8.2.3	插入损耗 Insertion Loss	通过网络分析仪测试。 频率范围为 DC 0~6GHz Tested by network analyzer. Frequency：DC 0~6GHz **USCAR-17**	插入损耗 Insertion loss ： ≤ 0.3 dB (2MHz to 1 GHz) ≤ 0.3+0.3*(f-1GHz)/ 1GHz [dB] (1GHz to 6 GHz)
8.2.4	接触电阻 Contact Resistance	采用低电平压降方式测量电阻值。 开路电压:20mV MAX 电流:100mA MAX Testing by the voltage dropping method with the low level current. Open circuit voltage:20mV MAX Circuit current:100mA MAX **USCAR-17**	中心导体初始接触电阻≤40mΩ,25 次 Min 插拔或环境试验后接触电阻≤40mΩ The initial contact resistance of the center conductor is ≤24mΩ, and the contact resistance is ≤24mΩ after 25 Min insertion and removal or environmental test 外导体初始接触电阻≤20mΩ,25 次 Min 插拔或环境试验后接触电阻≤20mΩ The initial contact resistance of the outer conductor is ≤20mΩ, and the contact resistance is ≤20mΩ after 25 Min insertion and removal or environmental test
8.2.5	绝缘电阻 Insulation Resistance	在内外导体之间施加 500V DC 的电压，测试时间至少 15 秒钟。 Testing by applying the specified voltage (DC 500 V) between the inner and ground contacts for at least 15 seconds. **USCAR-2 5.5.1**	≥100MΩ
8.2.6	耐电压 Dielectric Withstanding Voltage	相邻端子间或端子与地面间施加 AC 800V（有效值）历时 1 分钟测量。 AC 500V (rms)shall be applied for 1 minute to between next terminal. **USCAR-17**	无击穿现象 No breakdown

8.3.机械的性能
Mechanical Performance

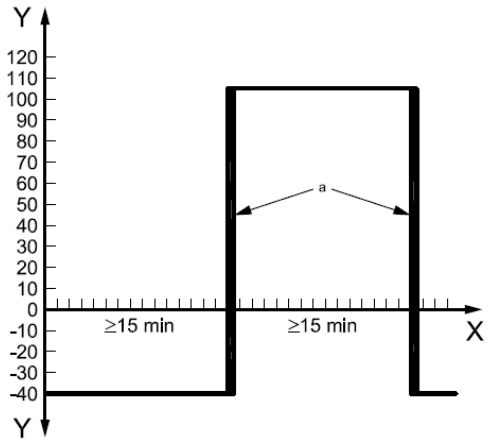
NO.	试验项目 Items	试验条件 Test Condition	规格 Requirement
8.3.1	连接器插入力 Connector insertion Force	将插座和插头在室温中以 50±10mm / min 分的速度进行插入动作，测量插入峰值负载（带锁扣）。 Insert the socket and plug at room temperature at a rate of 50±10mm / min to measure Connector insertion Force(with latch). **USCAR-17**	≤75N（单孔） ≤75N(Single hole) ≤25 N（取决于插头侧） ≤25N(Dpend on the SOCKET side)
8.3.2	连接器拔出力 Connector pulling Force	将插座和插头在室温中以 50±10mm / min 分的速度进行拔出动作，测量拔出峰值负载（不带锁扣）。 Insert the socket and plug at room temperature at a rate of 50±10mm / min to measure Connector pulling Force(without lock). **USCAR-17**	≤75N（单孔） ≤75N(Single hole) ≤25 N（取决于插头侧） ≤25N(Dpend on the SOCKET side)
8.3.3	外壳保持力 Housing Retention Force	以 50mm/min 的速率，沿轴向对主体和外壳进行分离量测外壳从主体拔出时的力。 With the speed 50mm/min, measuring the retention force when pull the housing out from the main body. **USCAR-17**	≥110N（FAKRA）
8.3.4	中心针保持力 Center contact retention force	固定连接器沿需测试方向以 50±10mm / min 的速度沿轴向对端子和绝缘体进行分离量测中心针从绝缘体拔出时的力。 Separate the terminal and insulator axially with a fixed connector at a speed of 50±10mm/min in the direction to be tested. Measure the force when the central pin is pulled out of the insulator. **USCAR-17**	Fakra 浮动: 自上而下的最小阈值限制[N] （通过标准）： 15N Fakra Floating : top-bottom Minimum Threshold limit [N] (passcriteria): 15N Fakra 浮动: 自下而上的最小阈值 限制[N] (通过标准)：50N Fakra Floating : bottom-top Minimum Threshold limit [N] (passcriteria): 50N

8.3.5	锁扣强度 Lock intensity	在连接器装配状态（锁定状态）下，在 35℃的环境温度中以 50±10mm / min 的速度拉动插座，测量锁扣机构脱离或破坏时的负载。 The socket is pulled the speed for50±10mm / min and load in case the Locke mechanism breaks away or breaks is measured in 35℃ atmosphere. **USCAR-17**	≥100N（FAKRA）
8.3.6	扣位错差力 Coding efficiency	将正确的对配件错开 90°插入连接器内测试插入力。 correct the parts to be staggered 90 degrees into the connector to test insertion force. 将其他型号 Coding 插入连接器内测试插入力。 Insert other coding models into the connector to test the insertion force. **USCAR-17 5.4.4**	≥80N
8.3.7	重复插拔测试 Repeated insertion withdrawal test	手动将插座和插头以20mm / min的速度插拔25次(不带锁扣）。 Manually insert socket and plug 25 times at 20 mm/min speed(without lock). **ISO20860-1**	外观无损坏 Appearance No damage 插拔力：≤75N（单孔） Force：≤75N(Single hole No lock) ≤25 N（取决于插头侧） ≤25N(Dpend on the SOCKET side) 接触电阻 Contact Resistance 外观无损坏 Appearance No damage
8.3.8	振动冲击试验 Vibration/Shock test	连接器安装在振动台上，冲击：三个相互垂直的方向上,每个方向进行 10 次冲击, 35g 力,持续时间 10 毫秒；振动：三个相互垂直的方向上每个方向 8 个小时的 1.81Grms 振动。连接器安装在振动台上。 Shock ： ten shock is each of the three mutually perpendicular axes， half sine acceleration 35g，duration 10ms ； Vibration classification see table and Duration 8h in each of the mutually perpendicular axes，at a speed of 1 octave per minute.	没有电流中断 1μsec 或更长时间 No current interruption of 1μ sec or longer. 外观无损坏 Appearance No damage 接触电阻 Contact Resistance

		USCAR-2 5.4.6 Frequency Hz / Power spectral density g^2/Hz 5,0 — 0,002 00 12,5 — 0,248 00 77,5 — 0,003 20 145,0 — 0,002 00 200,0 — 0,011 80 230,0 — 0,000 32 1 000,0 — 0,000 02 g_{rms} = 1,81.  X frequency, Hz Y power spectral density, g^2/Hz	绝缘阻抗 Insulation Resistance 耐电压 Withstand voltage 特性阻抗 Characteristic Impedance 插入损耗 Insertion Loss 回波损耗 Return Loss
8.3.9	跌落测试 Drop Test	准备连接器组件,其中包含在预期应用中使用的所有组件（CPA，杠杆/滑块等),将样品分 6 组，用于测试 X、Y 和 Z 轴方向,每个面从高度 1 米垂直落到混凝土或钢板上，记录组件的任何损坏或移动/分离，验证每个样品连接器组件。 Prepare the test samples including(CPA/Lever/Sliding block,etc).Divide the samples into 6 groups for testing at X,Y and Z direction.Drop from 1M high and fall on the floor or on a steel plate.Take note of every sample’ s situation after the drop test. **USCAR-2 5.4.8**	没有影响功能或外观无裂缝缺陷等的证据。 连接器锁定机构必须正常运行而不会破损。 No impact on function and surface.The connector is well mated and work well without any broken.

8.4.环境性能,其它/Environmental Performance and Others

NO.	试验项目 Items	试验条件 Test Condition	规格 Requirement
8.4.1	冷热冲击试验 Thermal shock test	连接器对插 10 次后，-40℃ 低温 30 分钟，105℃ 高温 30 分钟切换不超过 30s，100 次循环测试。 After the connector is inserted for 10 times, - 40 ° low temperature for 30 minutes, 105 ° high temperature for 30 minutes, the switching shall not exceed 30s, 100 cycles. **USCAR-17 5.6.1**	外观无损坏 Appearance No damage 接触电阻 Contact Resistance 绝缘阻抗 Insulation Resistance

		X time Y temperature, °C a Maximum transition time is 30 s.  	耐电压 Withstand voltage 特性阻抗 Characteristic Impedance 插入损耗 Insertion Loss 回波损耗 Return Loss
8.4.2	温湿度循环 Temperature Humidity Cycling	连接器对插 10 次后，测试周期：40 个循环 时间　温度　相对湿度 0.5H　-40±3℃　不控制 4.5H　+80~+90℃　80-90% 2.0H　+105℃±3℃　不控制 1.0H　23±3℃　不控制 After the connector is inserted for 10 times，Test Cycle:40 Time　temperature　Relative humidity 0.5hrs　-40±3°C　uncontrolled 4.5hrs　+85±3°C　80-90% 2.0hrs　+105±3°C　uncontrolled 1.0hrs　+23±3°C　uncontrolled **USCAR-2 5.6.2**	外观上无异常 Appearance No damage 接触电阻 Contact Resistance 绝缘阻抗 Insulation Resistance 耐电压 Withstand voltage 特性阻抗 Characteristic Impedance 插入损耗 Insertion Loss 回波损耗 Return Loss
8.4.3	高温放置试验 Heat resistance	将连接器放置在 105±3℃的温度下放置 1008 小时，然后静置直到恢复常温后测量。 The connector under the temperature of 105 ± 3 ℃ for 1008 hours, then let stand until after normal	外观无损坏 Appearance No damage 接触电阻 Contact Resistance

		temperature measurement. **USCAR-2 5.6.3**	绝缘阻抗 Insulation Resistance
			耐电压 Withstand voltage
			特性阻抗 Characteristic Impedance
			插入损耗 Insertion Loss
			回波损耗 Return Loss
8.4.4	低温放置试验 Chilly resistance	将连接器放置在-40±3℃的温度下放置 120 小时，然后静置直到恢复常温后测量。 The connector in place - 40 ±3 ℃ temperature, 120 hours, then let stand until after normal temperature measurement. EIA-364-59	没有电流中断 1μsec 或更长时间 No current interruption of 1μ sec or longer.
			外观无损坏 Appearance No damage
			接触电阻 Contact Resistance
			绝缘阻抗 Insulation Resistance
			耐电压 Withstand voltage
			特性阻抗 Characteristic Impedance
			插入损耗 Insertion Loss
			回波损耗 Return Loss

8.4.5	盐水喷雾试验 Salt Spray Test	将连接器放置 35±2℃、5±1%的盐水喷雾(48H)；试验后常温水洗；再室温干燥，常温常湿放置 1-2 小时。 The connector is (48H)exposure to a salt spray from 5±1% solution at 35±2℃ . Use water at room temperature to wash ;To dry at room temperature Keep wet for 1-2 hours. **EIA-364-26**	外观无损坏 Appearance No damage 接触电阻 Contact Resistance
8.4.5	可焊性 Solderability	将连接器端子焊接部分浸入助焊剂后，在 245±5℃的无铅锡槽中历时 3±0.5 秒。 The terminal of connector shall be put into the flux and dipped into Pb free solder bath 245±5℃ 、3±0.5s **EIA-364-52**	沾锡面积 95%以上 Soldering area more than 95%
8.4.6	耐焊性 Resistance to soldering test	在以下条件下进行焊料耐热性测试。 在 DIP 工艺的情况下。 温度：260±5°C；10±1 秒。 The pin header shall be tested resistance to soldering heat in the following condition. In case of DIP. Temperature :260±5°C；10±1s. **EIA-364-56**	外观无损坏 Appearance No damage
8.4.7	锡须测试 Tin Whisker test	①储存在环境温度下：于 25℃±10℃，50%±25%相对湿度下储存 1000h。Storage at ambient temperature: 1000 h at 25 ±10 °C, 50 ±25% rel. humidity ②仅在热膨胀系数不匹配（CTE 热膨胀系数）大于 8ppm 或基材 CTE 大于 15ppm 时进行温度循环试验：温度范围为-40℃至 85℃ 浸泡 10min；1500 次循环。 Temperature cycle test only if thermal mismatch (CTE) between layers is >8 ppm or CTE of base material is >15 ppm: -40 °C to 85 °C; 10 min soak; 1500 cycles ③湿热试验：于 85℃、85%相对湿度下持续 1000h。Damp heat test: 1000 h at 85 °C, 85% rel. humidity 长度超过 10μm 的晶须并附上图片。最大允许晶须长度为 50μm。（引用文件 QPR_Soldering Processes_A2C00052907AAA_Rev.E 2017-06-19 焊接工艺）	长度超过 10μm 的晶须并附上图片。最大允许晶须长度为 50μm。 Whiskers with a length exceeding 10 μ m and attached images. The maximum allowable whisker length is 50 μ m.

8.4.8	防护等级测试 Protection level test	防水： 不能让任何介质渗入连接器(如果适用，必须使用示水膏) 绝缘电阻:>100 MΩ 锁定或释放组件的功能必须保持完整不变。 触点外壳的尺寸必须与测试前后的发布图一致。 Do not allow any medium to seep into the connector (if applicable, water indicating paste must be used) Insulation resistance:> 100 MΩ The functionality of locking or releasing components must remain intact and unchanged. The size of the contact shell must be consistent with the release drawings before and after testing.	
8.4.9	清洁度测试 Cleanliness test	零件清洁度符合 ISO16232；技术规范编号：002.02.21-003；技术规范编号：0.02.02-30 cleanliness of parts acc. to ISO 16232; TST N 002.02.21-003, TST N 002.02-30 Cleanliness of parts acc. to ISO 16232; TST N 002.02.21-003, TST N 002.02-30 THE INSPECTION METHOD WITH ALL PARAMETERS MUST BE AGREED WITH A CONTINENTAL ADAS TECHNICAL CLEANLINESS LABORATORY. THE SUPPLIER MUST CONFIRM THE PARAMETERS BY DOUBLE INSPECTION. PRIMARY CONTACT IS ADAS TECHNICAL CLEANLINESS LABORATORY FIRST PLANT OF DELIVERY. CCC = A (H9/I7/J6/K4) TOTAL FOR ALL PARTICLES CCC = A (G7/H3/I0/J-K00) FOR METALLIC PARTICLES Metallic particles > 500 µm not allowed; Max. fibers length of 1000 µm are allowed; additionally 10 fibers between 1000 and 2500 µm are allowed per 1000 cm2 Complete component surface: "about A = 11 cm2"	
8.4.10	可焊性测试（3.2.5） Solderability Test—— Dry heat 干热	Test A. Solderability Test for SMD components 试验 A：SMD 组件的可焊性试验 Standard JEDEC J-STD-002 Test S1 标准 JEDEC J-STD-002 S1 试验标准 or IEC 60068-2-58 Td1 Method 2 或 IEC 60068-2-58 Td1 方法 2 or JESD22-B102 Method 2 或 JESD22-B102 方法 2 Peak Temperature +230 ±3 °C (Lead-free) 最高温度+230±3℃（无铅） Peak Temperature +210 ±3 °C (Leaded) 最高温度+210±3℃（含铅） Test Substrate Ceramic plate or any substrate that is not wettable 测试基材 陶瓷板或任何不可润湿的基底 （引用文件 QPR_Soldering Processes_A2C00052907AAA_Rev.E 2017-06-19 焊接工艺） （reference: QPR_Soldering Processes_A2C00052907AAA_Rev.E 2017-06-19 welding technology ）	
8.4.11	可焊性测试（3.2.5） Solderability Test—— High humidity high temperature 高湿高温		

<table>
<tr><td>8.4.12</td><td>缩锡测试（3.3.5）
Dewetting Test—— Dry heat
干热</td><td rowspan="2">Test A. Dip and Look Test
试验 A. 浸入观察试验
Standard JEDEC J-STD-002 Test A1
标准 JEDEC J-STD-002 试验 A1
or JESD22-B102 Method 1
或 JESD22-B102 方法 1
or IEC 60068-2-58
或 IEC 60068-2-58 标准
or IEC 60068-2-20
或 IEC 60068-2-20 标准
Contact Temperature +260 ±5 °C (Lead-free and leaded)
接触温度+260±5℃（无铅和含铅）
Immersion Time 5 ±0,5 sec
浸泡时间 5±0,5 sec
（引用文件 QPR_Soldering Processes_A2C00052907AAA_Rev.E 2017-06-19 焊接工艺）
(reference:QPR_SolderingProcesses_A2C00052907AAA_Rev.E 2017-06-19 welding technology)</td><td rowspan="2"></td></tr>
<tr><td>8.4.13</td><td>缩锡测试（3.3.5）
Dewetting Test—— High humidity high temperature
高湿高温</td></tr>
<tr><td>8.4.14</td><td>耐焊热测试（3.4）
Resistance to Soldering Heat Test</td><td>Test A. Reflow soldering. PiP & SMD Electromechanical components (e.g. relays)
试验 A. 回流焊。PiP 和 SMD 机电组件（如继电器）
<table><tr><th>Component Size</th><th>Ramp up to 150 °C</th><th>T_{smin}</th><th>t_s</th><th>T_{smax}</th><th>T_L</th><th>t_L</th><th>T_{peak}</th><th>t_P</th><th>T 25 °C to peak</th><th>Ramp down</th></tr><tr><td>All</td><td>Min. 3.0 °C/sec</td><td>≥190 °C</td><td>≥110 sec</td><td>≥200 °C</td><td>≥217 °C</td><td>≥90 sec</td><td>≥260 °C</td><td>≥40 sec***</td><td>≥300 sec</td><td>2.0 °C/sec</td></tr></table>
表 7.SMD 和 PiP 无铅焊接的最低要求

***According to IEC TR 60068-3-12
* * *遵照 IEC TR 60068-3-12 标准
（引用文件 QPR_Soldering ）
Processes_A2C00052907AAA_Rev.E 2017-06-19 焊接工艺）
(reference:QPR_SolderingProcesses_A2C00052907AAA_Rev.E 2017-06-19 welding technology)</td><td></td></tr>
</table>

【9】产品测试组别 Test Sequence:

NO.	测试组别 Test Sequence	A	B	C	D	E	F	G	H	I	J	K	M	N	O	P	Q	R	S
	样品数量 Quantity / 检查项目.Test Name	10	5	5	10	12	5	10	18	10	10	10	5	5	5	3	2	3	3
1	外观检查 Surface examination	1,3	1	1	1,3	1,3	1,6	1,13	1,3	1,13	1,14	1,14	1,5	1,3	1,3	1,14	1 , 3	1 , 3	1 , 3
2	尺寸检查 Dimension Examination																		
3	特性阻抗 Characteristic Impedance							2,7		2,7	2,7	2,7				2,7			
4	回波损耗 Return Loss							3,8		3,8	3,8	3,8				3,8			
5	插入损耗 Insertion Return Loss							4,9		4,9	4,9	4,9				4,9			
6	接触电阻 Contact Resistance						2,5	5,10		5,10	5,10	5,10	2,4			5,10			
7	绝缘阻抗 Isolation Resistance							11		11	11	11				11			
8	耐电压 Voltage Withstanding							12		12	12	12				12			
9	插入/拔出力 Mating/unmating Force	2					3												
10	外壳保持力 Housing Retention Force		2																
11	中心针保持力 Central Pin Retention Force			2															
12	锁扣强度 Lock intensity				2						13	13				13			
13	扣位防错差力 Coding efficiency					2													
14	重复插拔测试 Repeated insertion withdrawal test						4												
15	振动/机械冲击 Shock/Vibration							6											
16	跌落试验 Drop Test								2										
17	冷热冲击 Thermal Shock									6									

18	温湿度循环 Temperature and Humidity Cycle										6								
19	高温测试 High-Temp. Exposure											6							
20	低温放置试验 Chilly resistance															6			
21	盐水喷雾试验 Salt Spray Test												3						
22	可焊性（3.2.5） Solderability													2					
23	锡须测试 Tin Whisker test																2		
24	防护等级测试 Protection level test																	2	
25	清洁度测试 Cleanliness test																		2
26	缩锡测试（3.3.5） Dewetting Test																		
27	耐焊性 Resistance to soldering heat														2				