

**SIM CONNECTOR 5 DIRECTIONAL**

"The product may not perform according to the product specification if precautions have not been taken in the application to provide mechanical stability of the connector in relation to its mating parts".

**1. SCOPE .**

**1.1 Content.**

This specification covers performance, test and quality requirements for a Tyco Electronics\* SIM connector 5 directional. The connector is designed to make a connection between a Subscriber Identity Module (SIM) according to ISO 7816-2 and a printed circuit board.

**1.2 Qualification.**

When tests are performed on subject product, procedures specified in this Product Specification shall be used. All inspections shall be performed using applicable inspection plan and product drawing.

**2. APPLICABLE DOCUMENTS.**

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, latest edition of the document applies. In the event of conflict between the requirements in this specification and the product drawing, product drawing shall take precedence. In the event of conflict between the requirements of this specification and referenced documents, this specification shall take precedence.

**2.1 TYCO Documents.**

114-19092      Application Specification SIM connector 5 directional, 6 position  
501-19095      Test Report SIM connector 5 directional, 6 position

**2.2 TYCO Drawings.**

C-1705300      SIM connector 5 directional, 6 position.

**2.3 Other Documents**

IEC 60512      Basic testing procedures and measuring methods for electromechanical components for electronic equipment.  
IEC 60068      Basic environmental testing procedures.  
ISO 7816-2      Identification Cards - Integrated Circuits Cards with contacts - dimensions and locations of the contacts  
GSM 11.11      IETS Subscriber Identity Module - Interface Specification.

**3. REQUIREMENTS.**

**3.1 Design and Construction.**

Products shall be of design, construction and physical dimensions as specified in the applicable product drawing.

**3.2 Materials and Finish.**

- A. Contacts: Copper alloy, post-plated with nickel and selective gold.
- B. Housings: UL94 V0 rated Liquid Crystal Polymer (LCP).

**3.3 Ratings:**

- A. Voltage: 30 Volts alternating current peak
- B. Current: 0,5 Ampères / contact
- C. Temperature: -40°C to 85°C (for both use and storage)
- D. Durability: 5.000 cycles

**3.4 Performance and Test Description.**

The product is designed to meet electrical, mechanical and environmental performance specified in this paragraph as tested per test sequence specified in Para 3.5.  
 Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3. and are performed with connectors in mated condition.  
 When applicable the actual Phone Hand-sets shall be used for testing. The batteries shall be electrical disconnected from the Battery-pack connectors during testing.

<b>VISUAL</b>			
Para	Test Description	Performance Requirements or severity	Procedure
3.4.1.	Examination of product	Meets requirements of product drawing and application instructions on customer drawing	Visual, dimensional and functional per applicable inspection plan. In acc. with IEC 60512-1-1. Magnification 10x.
<b>ELECTRICAL</b>			
3.4.2.	Termination Resistance	Max open voltage 20 mV. Max. current 100 mA. All contacts measured. Termination resistance consists of bulk connector + contact resistance of 2 contacts. Requirement: Initial: 50 mΩ max. Final: 100 mΩ max.	In accordance with IEC 60512-2-1. See paragraph 3.5.1. Figure 1.
3.4.3.	Insulation resistance	Test voltage 100V DC or AC peak, unmated. Duration 1 minute. Requirement: 500 MΩ min.	In accordance with IEC 60512-3-1.

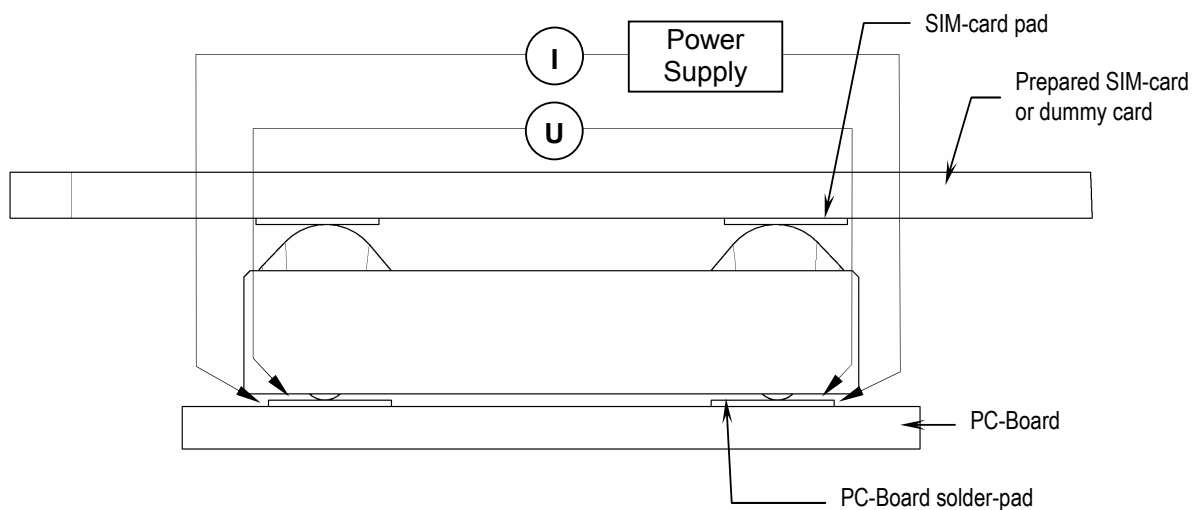
<b>ELECTRICAL (continued)</b>			
3.4.4.	Voltage Proof	Test Voltage: 200 VAC Duration: 1 minute unmated Requirement: No break-down or flash-over.	In accordance with IEC 60512-4-1.
3.4.5.	Current cycling	Subject mated contacts to 500 cycles of specified current (I <sub>n</sub> ) 45 min on / 15 min off. Req: Termination resistance shall not exceed "Final" value	In accordance with IEC 60512-9-5.
<b>MECHANICAL</b>			
3.4.6.	Contact normal force	At max. Deflection: 0,9 N max. At 0,5 mm distance from housing top: 0,1 N min.	Normal force test equipment Force / deflection curve.
3.4.7.	Vibration (Sinusoidal)	10 - 500Hz sweeping 1 octave/minute displ. 0,75 mm peak. Duration: 60 minutes each in 3 directions. Requir.: no physical damage, no discontinuity >1 μsec.	In acc. with IEC 60512-6-5 See para. 3.5.3. Figure 2.
3.4.8.	Random Vibration	Sweep from 5-20 Hz, ASD 0,96 x 10 <sup>-2</sup> g <sup>2</sup> /Hz, then -3dB/octave 20-500Hz. Duration: 30 minutes each in 3 directions. Requir.: no physical damage, no discontinuity >1 μsec.	In acc. with IEC 60512-6-5 See para. 3.5.3. Figure 2.
3.4.9.	Physical shock	Subject connector to 100 g half sine shock pulses of 8.5 ms duration. 3 shocks in both directions of 3 mutual perpendicular axes. Requir.: no physical damage, no discontinuity >1 μsec.	In acc. with IEC 60512-6-5 See para. 3.5.3. Figure 2.
3.4.10.	Mechanical Operation	5.000 mating cycles, Rate: 500 cycles/hour. Speed: 10 mm/s	In acc. with IEC 60512-9-1 See para. 3.5.3. Figure 3 and 4.

ENVIRONMENTAL			
3.4.11.	Damp/heat cyclic	25/40°C, 95% RH, 12+12 hrs cycles - 10 cycles. (Unmated in testgroup 3).	In acc. with IEC 60512-11-12
3.4.12.	Heat age test	Temperature: 85°C Duration: 500 hrs	In acc. with IEC 60512-11-9
3.4.13.	Rapid change of temperature	-40/+85°C 0,5 hour/0,5 hour 100 cycles, unmated. Change over time < 15 sec.	In acc. with IEC 60512-11-4
3.4.14.	Solderability	Solderbatch temp. 215 ±3°C Dip duration 3 ±0,3 sec. Ageing 3 (16 hrs at 155°C), unmated. Req. Max. 5% dewetting	In acc. with IEC 60068-2-20 test Ta.
3.4.15.	Resistance to soldering heat	2 cycles of heat curve covering IR soldering curve unmated Requirement: no cracks, chips or melting	In acc. with EIA-J RX-0102/102 § 3.3.4. See para. 3.5.4. Figure 5.
3.4.16.	Salt Mist	+35°C, 5% NaCl, duration 48 hrs	In acc. with IEC 60512-11-6
3.4.17.	Artificial perspiration	Temperature 55°C, unmated (touchable parts only) Duration: 24 hrs.	In acc. with NF S 80-77
3.4.18.	Dust test	For severity details, see para 3.5.2.	In acc. with MIL-STD 810E TM510.3

**3.5 Additional Testing Details**

**3.5.1 Termination resistance shall be measured as follows:**

Termination resistance shall be measured as indicated in figure 1.



**Figure 1.**

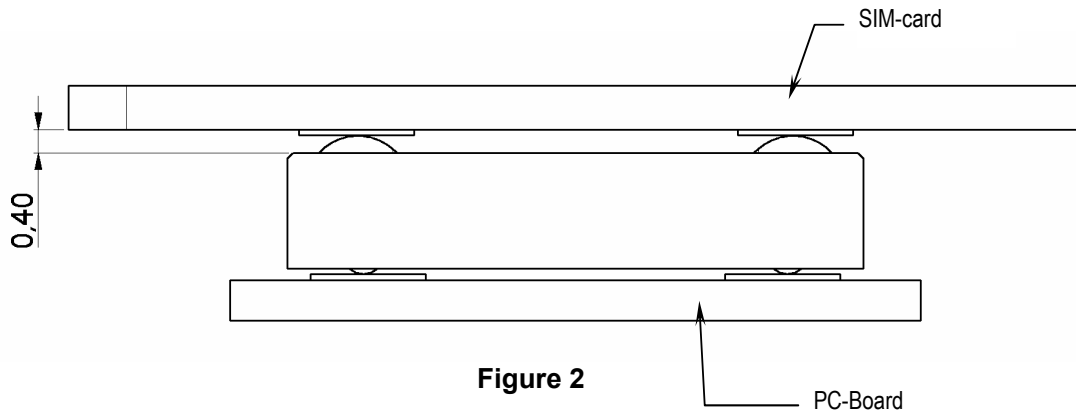
**3.5.2 Dust Severity Details shall be as specified in the table below:**

Sequence number	Temperature °C	Dust concentration grams/cubic meter	Air velocity meters/second	Duration hours
1	23	10,5	8,9	6
2	63	0	1,53	16
3	23	10,5	8,9	6

**3.5.3 Testframes**

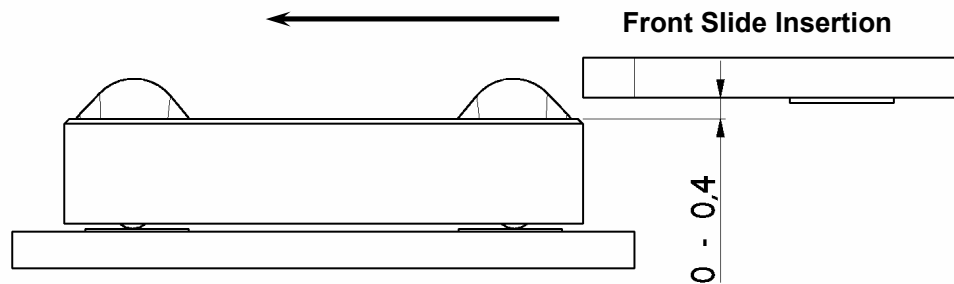
During Vibration and physical shock, test-frames shall provide mechanical stability of the connector in relation to its mating parts and shall simulate the actual application as indicated in figure 2.

An electrical circuit is checking that no electrical contact interruptions occur that exceed the requirement.



**Figure 2**

When applicable, necessary parts of the actual application shall be used for Mechanical Operation or else testframe(s) shall simulate the actual application as indicated in figures 3 (front slide insertion) and 4 (side slide insertion).



**Figure 3**

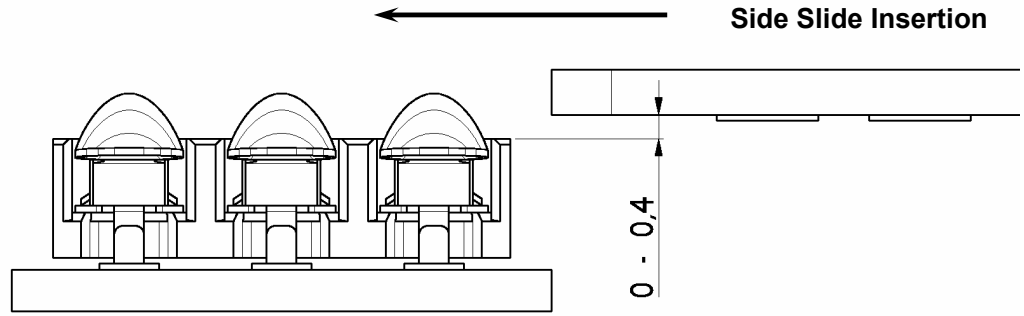


Figure 4

**3.5.4 Resistance to soldering heat**

Resistance to soldering-heat test shall cover the Forced hot air convection (reflow) heat curve as indicated in figure 5,

ref. IPC/JEDEC J-STD-020B with increased T peak ( $T_p$ ).

Between exposures, parts shall be allowed to cool down to room temperature, for 5 minutes minimum.

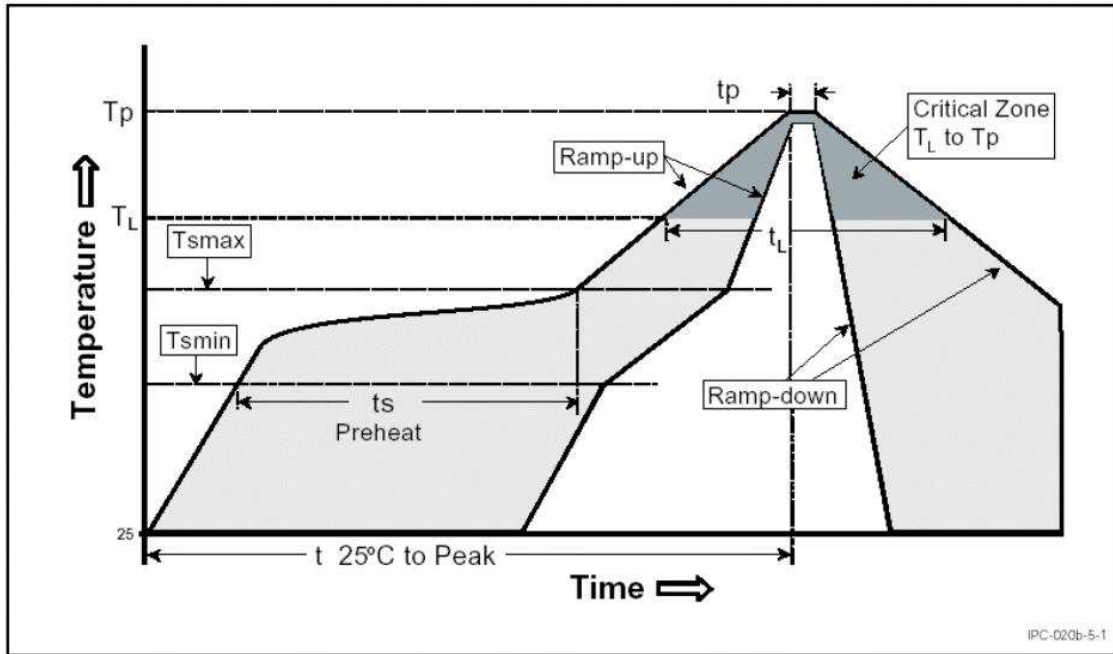


Figure 5. Forced hot air convection (reflow) heat curve.

Profile feature	Pb-Free Assembly Small Body
Average ramp-up rate ( $T_L$ to $T_p$ )	3°C /second max.
Preheat <ul style="list-style-type: none"> <li>- Temperature Min (<math>T_{S\ min}</math>)</li> <li>- Temperature Max (<math>T_{S\ max}</math>)</li> <li>- Time (min to max) (<math>t_s</math>)</li> </ul>	150°C 200°C 60-180 seconds
$T_{S\ max}$ to $T_L$ <ul style="list-style-type: none"> <li>- Ramp-up Rate</li> </ul>	3°C /second max.
Preheat <ul style="list-style-type: none"> <li>- Temperature Min (<math>T_L</math>)</li> <li>- Time (<math>t_L</math>)</li> </ul>	217°C 60-150 seconds
Peak temperature ( $T_p$ )	260 +0/-5°C
Time within 5°C of actual Peak Temperature ( $t_p$ )	20-40 seconds
Ramp-down Rate	6°C /second max.
Time 25°C to Peak Temperature	8 minutes max.

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

**3.6 Product Qualification and Regualification Test Sequence**

TEST OR EXAMINATION	TEST-GROUP (a)							
	1	2	3	4	5	6	7	8
	TEST-SEQUENCE (b)							
Examination of product	1,8	1,10	1,9	1,6	1,3	1,6	1,6	1,6
Termination resistance	3,7	4,9		3,5		3,5	3,5	3,5
Insulation resistance			3,7					
Voltage proof			4,8					
Current cycling				4				
Vibration (Sinusoidal)	4							
Random Vibration	5							
Contact normal force		3,8						
Mechanical operation		5						
Physical shock	6							
Damp/heat cyclic		6	6					
Heat age test		7						
Solderability					2			
Resistance to soldering heat	2	2	2	2		2	2	2
Rapid change of temperature			5					
Salt mist						4		
Artificial perspiration							4	
Dust test								4

- (a) See Para 4.1.A.
- (b) Numbers indicate sequence in which tests are performed.

Sample description	Number of samples in testgroups							
	1	2	3	4	5	6	7	8
SIM Connector on PC-Board	5	2 x 5	5	5	5	5		5
SIM Connector loose piece							5	



**4. QUALITY ASSURANCE PROVISIONS.****4.1 Qualification Testing.****A. Sample Selection.**

Samples shall be prepared in accordance with applicable instructions and shall be selected at random from current production.

All testgroups shall consist of a minimum of 5 connectors.

Unless otherwise specified in the requirement paragraph (3.4.--), all contacts from all testgroups shall be tested.

**B. Test Sequence.**

Qualification inspection shall be verified by testing samples as specified in Para 3.6.

**4.2 Requalification Testing.**

If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of original testing sequence as determined by product, quality and reliability engineering.

**4.3 Acceptance.**

Acceptance is based on verification that product meets requirements of Para 3.4. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

Testing to confirm corrective action is required before resubmittal.

**4.4 Quality Conformance Inspection.**

Applicable AMP quality inspection plan will specify sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with applicable product drawing and this specification.