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SMART PLUS B CONNECTOR		KENNY TAI	05/20/04

1.0 OBJECTIVE

1.1 This specification defines the performance, test, quality and reliability requirements of the smart card connector product.

2.0 SCOPE

This specifies is applicable to the termination characteristics of the smart card connector family of products which provides interconnection between smart card printed wiring boards.

3.0 GENERAL

This document is composed of the following sections :

- 1.0 Objective
 - 2.0 Scope
 - 3.0 General
 - 4.0 Applicable Documents
 - 5.0 Requirements
 - 5.1 Qualification
 - 5.2 Material
 - 5.3 Finish
 - 5.4 Design and Construction
 - 6.0 Electrical Characteristics
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 - 8.0 Environmental Conditions
 - 9.0 Quality assurance provisions
 - 9.1 Equipment Calibration
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 - 9.4 Acceptance
 - 9.5 Qualification Testing
 - 9.6 Requalification Testing
 - 10.0 Reference Documents
- TABLE 1 Qualification testing matrix

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4.0 APPLICABLE DOCUMENTS

4.1 Specifications

4.1.1 Engineering drawings 55640

4.2 Other Standards and Specifications

4.2.1 UL94-HB: Flammability

4.2.2 EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications.

4.2.3 ANSI-J-002: Joint Industry Standard, Solderability Test for Component Leads, Terminations, Lugs, and Terminals and Wires.

4.2.4 IEC 68-2: International Electrotechnical Commission for Environmental testing.

4.2.5 ISO 7816: Smart card standard

4.3 FCI Specifications

VGN 11428/A

BUS-02-055; BUS-02-056; BUS-02-057; BUS-02-058

5.0 REQUIREMENT

5.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

5.2 Material

The material for each component shall be as specified herein or equivalent. Reference BUS-02-055; BUS-02-056; and BUS-02-058.

5.2.1 Terminal: The base material shall be phosphor bronze.

5.2.2 Insulating Housing: The insulators shall be high performance PCB that are rated 94V-0 or better in accordance with UL-94.

5.3 Finish

The finish for applicable components shall be as specified herein or equivalent. Reference BUS-02-057.

5.3.1 Terminals Contact coating (0.8 μ m Gold), over 1.3 μ m Nickel.

5.4 Design and Construction

Connectors shall be of the design, construction, and physical dimensions specified on the applicable product drawing and the card standard described in ISO 7816, GSM 11.11



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6.0 ELECTRICAL CHARACTERISTICS

- 6.1 Contact Resistance, Low Level (LLCR) - The low level Loop contact resistance shall not exceed 200 mΩ (reference Drawing No. 1) (200 mΩ after environmental exposure) when measured in accordance with EIA 364-23. Single terminal contact resistance shall not exceed 20 mΩ (reference Drawing No.2) The following details shall apply:
 - a. Method of Connection - The resistance shall be measured from the card contacts to a point on the PCB as near the solder tail as possible.
 - b. Test Voltage - 20 millivolts DC max open circuit.
 - c. Test Current - Not to exceed 100 milliamperes.
- 6.2 Insulation Resistance - The insulation resistance of connectors shall not be less than 1000 megohms after environmental exposure when measured in accordance with EIA 364-21. The following details shall apply:
 - a. Test Voltage - 500 volts DC.
 - b. Electrification Time - 1 minutes, unless otherwise specified.
 - c. Points of Measurement - Between adjacent contacts.

7.0 MECHANICAL CHARACTERISTICS

- 7.1 Mating/Unmating Force - The force to insert the card is n500g~700g. The force to pull the card out is 500g ~ 700g.
- 7.2 Normal Force - The single terminal contact normal force is 15g ~ 25g when tested in accordance with FCI Test Specification BUS-03-404.
- 7.3 Peeling Force - The FPC horizontal peeling force exceed 8.5kg, vertical peeling force exceed 1.8 kg.

8.0 ENVIRONMENTAL CONDITIONS

After exposure to the following environmental conditions in accordance with the specified test procedure and/or details, the product shall show no physical damage and shall meet the electrical and mechanical requirements per paragraphs 6.0 and 7.0 as shecified in the Table 1 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

- 8.1 Thermal shock :-40°C to 85°C (0.5 hour - 6 times) IEC 68-2-14
Requirement- After test Contact resistance change from initial value : 20 mΩ MAX
Isulation resistance 1000mΩ MIN.
- 8.2 Humidity, Steady State test : 40°C -95%-96 hours MIL-STD-202F 103B
Isulation resistance 1000mΩ MIN.

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- 8.3 High Temperature Life test : 85°C/250 hours MIL-STD-202F 108
Requirement- After test contact resistance change from initial value: 20mΩ MAX
- 8.4 Salt spray : 2 days IEC 68-2-11
Requirement- After test contact resistance change from initial value: 20mΩ MAX
- 8.5 Cold exposure test : 2°C/2 hours
Requirement- After test contact resistance change from initial value: 20mΩ MAX
- 8.6 Durability - Standard laboratory procedure as applicable to the specific product.
 - a. Number Cycles - 10000 cycles.
 - b. Cycling Rate - 400~600 cycles per hour
 Requirement- .No physical or mechanical damage which affects connector function.
.After test contact resistance change from initial value: 20mΩ MAX
- 8.7 Vibration operational test: MIL-STD-202 Method 204D Test condition B 15G, 10-2000 Hz.
The test has to be made with the customer device to have a global set.
Requirement - No physical or mechanical damage or dissassociation of parts.
No discontinuity greater than 100 nanoseconds.
- 8.8 Shock test: MIL-STD-202 Method 213B 50G, 1msec. Semi-Sine wave
Requirement - No physical or mechanical damage or dissassociation of parts.
No discontinuity greater than 100 nanoseconds.

9.0 QUALITY ASSURANCE PROVISIONS

- 9.1 Equipment Calibration
All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with MIL-C-45662 and QS 9000.
- 9.2 Inspection Conditions
Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:
 - a. Temperature: 25 +/- 5 deg C
 - b. Relative Humidity: 30% to 60%
 - c. Barometric Pressure: Local ambient
- 9.3 Sample Quantity And Description
See Table 1

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9.4 Acceptance

9.4.1 Electrical and mechanical requirements placed on test samples as indicated in paragraphs 6.0 and 7.0 shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with this product specification shall meet the stated requirements.

9.4.2 Failures attributed to equipment, test setup, or operator error shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

9.5 Qualification Testing

Qualification testing shall be performed on sample units produced with equipment and procedures normally used in production. The test sequence shall be as shown in Table 1.

9.6 Requalification Testing

If any of the following conditions occur, the responsible product engineer shall initiate requalification testing consisting of all applicable parts of the qualification test matrix Table 1.

- a. A significant design change is made to the existing product which impacts the product form, fit or function. Examples of significant changes shall include but not be limited to, changes in the plating material composition or thickness contact force, contact surface geometry, insulator design, contact base material, or contact lubrication requirements.
- b. A significant change is made to the manufacturing process which impacts the product form, fit or function.
- c. A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

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TABLE 1 - QUALIFICATION TESTING

TEST	PARA.	TEST GROUP					
		1	2	3	4	5	6
		TEST SEQUENCE					
Examination of Product	5.4	1 7	1 9	1	1 7	1 5	1 5
Contact Resistance Low Level	6.1		2 4 6 8	2 4	2 6	2 4	2 4
Insulation Resistance	6.2	2 4 6					
Total Mating/Unmating Force	7.1				3 5		
Thermal Shock	8.1	5	3				
Humidity, Steady State	8.2	3	5				
High Temperature Life	8.3		7				
Environmental Sequence	8.4 8.5						3
Durability	8.8			3			
Vibration operational test	8.7				4		
Shock test	8.8					3	
Sample Size		4	4	4	2	2	4

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REVISION RECORD

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