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 specification is applicable to the termination characteristics of the smart card connector family of products which provides interconnection between a smart card and a 1.57 mm rigid PCB.

3.0 GENERAL

This document is composed of the following sections:

4.0 APPLICABLE DOCUMENTS

4.1 Specifications

4.1.1 FCI engineering drawing—10057542, 10105377

4.2 Other Standards and Specifications

4.2.1 UL94-V0: Flammability

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

4.2.3 ISO 7816: Smart card standard

4.3 FCI Specifications

BUS-02-056: Metal Selection

BUS-02-057: Plating Selection Guidelines

5.0 REQUIREMENT

5.1 Qualification

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

5.1.1 Material

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

5.1.1.1 Terminal: The base material shall be phosphor bronze.

5.1.1.2 Cover: PBT 30%GF.

5.1.1.3 Base: PBT 30%GF.

5.1.2 Terminal finish

5.1.2.1 Under plating: 50μ" nickel over all

5.1.2.2 Signal terminal: 15μ"/30μ"gold minimum on mating area; 120μ" pure tin on solder tail.

5.1.2.3 Sensor terminal: 15μ" gold minimum on mating area; 120μ" pure tin on solder tail,

5.1.3 Design and Construction

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

The connection between the smart card and the connector is accomplished by cantilever contacts.

The detection of the card end position is obtained by a blade contact, normally open or closed.

5.2 Mechanical performance

Para.	Test Description	Test condition	Requirement
5.2.1	Durability	Mate&unmate smart card for 100,000 cycles at a rate of 500±50 cycles per hour.	No defect that would impair normal operation. Contact resistance 100mΩ MAX
5.2.2	Mating/unmating force	Mate and unmate a smart card with connector at a maximum speed of 100mm/min.	Mating force: 10N Max. Unmating force: 1.5N Min.
5.2.3	Vibration	10-150-10Hz 0.15mm or 2g,total 5 cycles in X,Y,Z axes, full duration=40minutes	No physical or mechanical damage or disassociation of parts. No discontinuity greater than 1μ seconds.
5.2.4	Shock Test	30g/11ms,1/2-sine,3 shocks each in X,Y,Z axes(total 18 shocks).	No physical or mechanical damage or disassociation of parts. No discontinuity greater than 1μ seconds.

5.3 Electrical performance

Para.	Test Description	Test condition	Requirement
5.3.1	Contact Resistance	Mated connector with dry circuit of 20mV,100mA max.	100 mΩ maximum.
5.3.2	Insulation Resistance	Unmated connector with 500VDC between adjacent contacts.	1000MΩ
5.3.3	Dielectric Withstand Voltage	Unmated connector with 1000Vrms for 1 minute between adjacent contacts.	No flashover, sparkover, or breakdown allowed

5.4 Environmental Conditions

Para.	Test Description	Test condition	Requirement
5.4.1	Thermal shock	-40°C to +85°C,1 cycles per hour, total 5 cycles.	No physical damage. 100mΩ max contact resistance.
5.4.2	Damp Heat	40°C-95%(relative humidity)-56days.	100mΩ max contact resistance.
5.4.3	Mixed flowing gas	10days(Unmating for 2/3 of the total duration + Mating for 1/3 of the total	100mΩ max contact resistance. No defect that would impair normal

		duration	operation.
5.4.4	Temperature life	105°C/300hours.	No physical damage. 100mΩ max contact resistance.
5.4.5	Solderability	Manual 350°C/2s Wave 260°C/5s with the protection (use protective adhesive tape (Kapton or Telflon) or protective metallic devices)	95% of immersed area must show no voids, pin holes and etc.

6.0 QUALITY ASSURANCE PROVISIONS

6.1 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.

6.2 Inspection Conditions

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

a. Temperature: 25±5°C

b. Relative Humidity: 30% to 60%

c. Barometric Pressure: Local ambient

6.3 Sample Quantity and Description

See Table 1

6.4 Acceptance

6.4.1 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.

6.4.2 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.

6.5 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 I.

6.6 Re-qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate

re-qualification testing consisting of all applicable parts of the qualification test matrix Table I.

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.

TABLE 1 - QUALIFICATION TESTING

Test Description	Para.	Test group					
		A	B	C	D	E	F
		Test sequence					
Examination of Product		1,7	1,14	1,5	1,7	1,5	
Durability	5.2.1		7				
Shock	5.2.4				5		
Vibration	5.2.3				3		
Mating force	5.2.2	3,6	5,9				
Unmating force	5.2.2		6,8				
Contact Resistance	5.3.1	2,5	2,11	2,4	2,4,6	2,4	
Insulation Resistance	5.3.2		3,12				
Dielectric Withstand Voltage	5.3.3		4,13				
Thermal shock	5.4.1			3			
Damp heat	5.4.2		10				
Temperature Life	5.4.4	3					
Mixed Flowing Gas	5.4.3					3	
Solderability	5.4.5						1
Sample Size(PCS)		5	5	5	5	5	5

7.0 REVISION HISTORY

REV.	PAGE	DESCRIPTION	ECR#	DATE
A	ALL	RELEASE	N05-0363	12/20/05
B	2, 4	1. Item 5.1.1.3 change GE PC to PBT 30%GF. 2.Item 5.4.4 change contact resistance from 50mΩ to 100 mΩ.	N09-0023	1/21/09
C	2	Add product 10105377	N09-0229	03/03/10

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