1.0 Objective

This specification defines the performance, test, quality and reliability requirements of the Small Form-factor Pluggage (SFP+) product.

2.0 Scope

This specification is applicable to the termination characteristics of the SFP+ Cage family of products which provides a dust/EMI cover to prevent contamination of the internal components and to optimize EMI performance.

3.0 Ratings

3.1 Operating Voltage Rating = 120 V_{AC}

3.2 Operating Current Rating = Signal application only

3.3 Operating Temperature Range = -55 ^{o}C to +105^{o}C

4.0 Applicable Documents

4.1 FCI Specifications

4.1.1 Engineering drawings : 10122382、10122388、10126907、10126908、10126909、10126910、10127103、10127105.

4.1.2 Application specification(s): GS-20-0384

4.2 National or International Standards

4.2.1 Flammability: UL94V-0

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

4.2.3 SFP-MSA: Cooperation Agreement for Small Form-Factor Pluggable Transceivers

4.2.3 SFF-8433: Improved Pluggable Form factor (ipf) for SFP+ Ganged Cages

5.0 Requirements

5.1Qualification

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

5.2Material

The material for each component shall be as specified herein or equivalent.

Cage(include top cage、bottom cage、middle cage and back cage) – Nickel Silver Alloy or Copper Alloy
EMI Springs – Copper Alloy except 10122382 is stainless steel
Light Pipe – Polycarbonate
Heat Sink – Aluminum Alloy
Heat Sink – Stainless Steel

5.3 Finish

The finish for applicable components shall be as specified herein or equivalent.

EMI Springs – Ni plated overall if it is copper alloy material or No Plating if it is stainless steel material
Heat Sink – Ni Plated overall

5.4Design and Construction

Connectors shall be of the design, construction, and physical dimensions specified on the applicable product drawing. There shall be no cracks, burrs, or other physical defects that may impair performance.

5.5 Workmanship includes freedom from blistering, cracks, discoloration, etc.

6.0 Electrical Characteristics

6.1 Contact Resistance, Low Level (LLCR)

The low level contact resistance shall not exceed 35 milliohms initially. The low level contact resistance shall also not exceed 10 milliohms increase in resistance (from the initial measurement) after any treatment and/or environmental exposure. Measurements shall be in accordance with EIA 364-23.

The following details shall apply:

a. Test Voltage - 20 milli-volts DC max open circuit.

b. Test Current - Not to exceed 100 milli-amperes.

7.0 Mechanical Characteristics

7.1 Transceiver Mating Force – EIA 364-13.

The force specification of mating transceiver and a SFP+ cage with connector：

35 N maximum without heat sink and clip.

48 N maximum with heat sink and clip.

The following details shall apply:

a. Cross Head Speed – 12.7 mm per minute.

b. Utilize free floating fixtures.

7.2 Transceiver Un-mating Force – EIA 364-13.

The force specification of un-mating transceiver out of a SFP+ cage with connector：

13 N maximum without heat sink and clip.

15 N maximum with heat sink and clip.

The following details shall apply:

a. Cross Head Speed – 12.7 mm per minute.

b. Utilize free floating fixtures.

7.3 Durability – EIA-364-09

The connector pairs shall be capable of withstanding 100 mating/unmating cycles.

a. Cycle Number – 100 cycles
b. Speed – 500 cycles per hour
c. Utilize free floating fixtures

7.4 Latch Strength (Cage retention) – EIA 364-98

a. Test Procedure : Apply 90N load directly to the cage latch at a maximum rate of 12.7 mm per minute and hold for 1 minute.

b. Requirement : No physical damage to the latch or cage assembly.

7.5 Cable retention force – EIA 364-98

a. Test Procedure : Place an axial load (80 N) on the mated cable connector with the latch engaged and hold for 10 minutes.

b. Requirement : No discontinuities of 1 microsecond or longer duration. Shall remain mated.

7.6 Cage press fit insertion force – EIA 364-5

a. Test Procedure : Place axial load on the cage to measure the insertion force of the press-fit sections into the PCB.

b. Requirement : 40 N maximum for per compliant pin.

7.7 Cage press fit extraction force – EIA 364-5

a. Test Procedure : Place axial load on the cage to measure the extraction force of the press-fit sections out of the PCB at a maximum rate of 12.7 mm per minute.

b. Requirement : 8 N minimum for per compliant pin.

7.8 Mechanical Shock – EIA 364-27 Condition H.

a. Test Procedure : Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.

b. Requirement : No discontinuities of 1 microsecond or longer duration. No Physical Damage

7.9 Random Vibration – EIA 364-28 Test Condition VII, Condition Letter D.

a. Test Procedure : Subject mated specimens to 3.10G's rms between 20 to 500 Hz. Fifteen minutes in each of 3 mutually perpendicular planes.

b. Requirement : No discontinuities of 1 microsecond or longer duration. No Physical Damage

7.10 Rotational cable pull

a. Test Procedure : Load cable module into a cage assembly mounted to a test board, with attached bezel. Apply axial load (35N Min) at a maximum rate of 12.7 mm per minute, rotate cable 40 degrees toward printed circuit board, and then rotate 360 degrees with the load still applied.

b. Requirement : meet visual requirements . no physical damage,

7.11 Cable side load force – EIA 364-38

a. Test Procedure : Apply a force of 80 N to the cable plug in a plane parallel to the bezel and hold for 10 minutes.

b. Requirement : No discontinuities of 1 microsecond or longer duration. Shall remain mated.

7.12 Cable longitudinal force – EIA 364-38

a. Test Procedure : Apply a force of 100 N to the cable plug in a plane perpendicular to the bezel and hold for 10 minutes.

b. Requirement : No discontinuities of 1 microsecond or longer duration. Shall remain mated.

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 specified in the Table 1 test sequences. Unless specified otherwise, assemblies shall be mated during exposure.

8.1 Thermal Shock – EIA 364-32. Test Condition VII

a. Number of Cycles – 5 cycles

b. Temperature Range - Between -55 and +105 deg C

c. Time at Each Temperature - 30 minutes

d. Transfer Time - 1 minutes, maximum

8.2 Humidity –EIA 364-31 method III (cyclic temperature)

a. Relative Humidity and temperature - between 25 and 65°C at 80 to 100% RH.
c. Duration – 10 days
d. Omit step 7b (vibration)

8.3 High Temperature Life – EIA 364-17.Method A. Condition 4

a. Test Temperature - 105 deg C

b. Test Duration – 240 hours

8.4 Mixed Flowing Gas corrosion (MFG) – EIA 364-65

a. Class -IIA (4 gas)

b. Duration - 20 days

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 ANSI Z-540 and ISO 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

The sample size and description for each test is listed in table 1

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 sequences shall be as shown in the qualification test table. Data shall be provided with the samples noting production history: production lot codes for components and assemblies, components and assemblies produced to print revision __, verification of plating composition and thickness, etc.

9.6 Re-Qualification 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.

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.

9.7 Qualification Test Table

Test Sequence Table

Test Items	Section	Test Group					
		1	2	3	4 (a)	5 (a)	6
		Test Sequence					
Examination of Product	5.5	1,10	1,8	1,7	1,5	1,5	1,3
Contact Resistance Low Level	6.1	3,7	3,6	3,5	2,4		
Transceiver Mating Force	7.1	2,8					
Transceiver Un- mating Force	7.2						
Durability	7.3	4					
Latch Strength(Cage Retention)	7.4	9					
Cable Retention Force	7.5					2	
Cage press fit insertion force	7.6		2	2			
Cage press fit extraction force	7.7		7	6			
Mechanical Shock	7.8	6					
Random Vibration	7.9	5					
Rotational cable pull	7.10						2
Cable side load force	7.11					3	
Cable longitudinal force	7.12					4	
Thermal Shock	8.1		4 (b)				
Humidity and Temperature cycling	8.2		5 (b)				
High Temperature Life	8.3			4 (b)(c)			
Mixed Flowing Gas	8.4				3 (c)		
Samples Quantity		5pcs	5pcs	5pcs	5pcs	5pcs	5pcs

NOTE：

(a) Applies to SFP+ direct attach cable assembly product only.
(b) Mated to blank transceivers.
(c) Precondition specimens with 20 durability cycles.

REVISION RECORD

Rev	Page	Description	EC#	Date
A	8	Release Product Specification		2013-10-19

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

FCI / Amphenol:

10122382-101LF 10122382-302LF 10126907-101LF 10122388-201LF 10126907-201LF 10127103-101LF 10122382-202LF 10122388-101LF 10122382-102LF 10122382-502LF 10127105-101LF 10126908-101LF 10122382-402LF 10126910-101LF 10126909-101LF