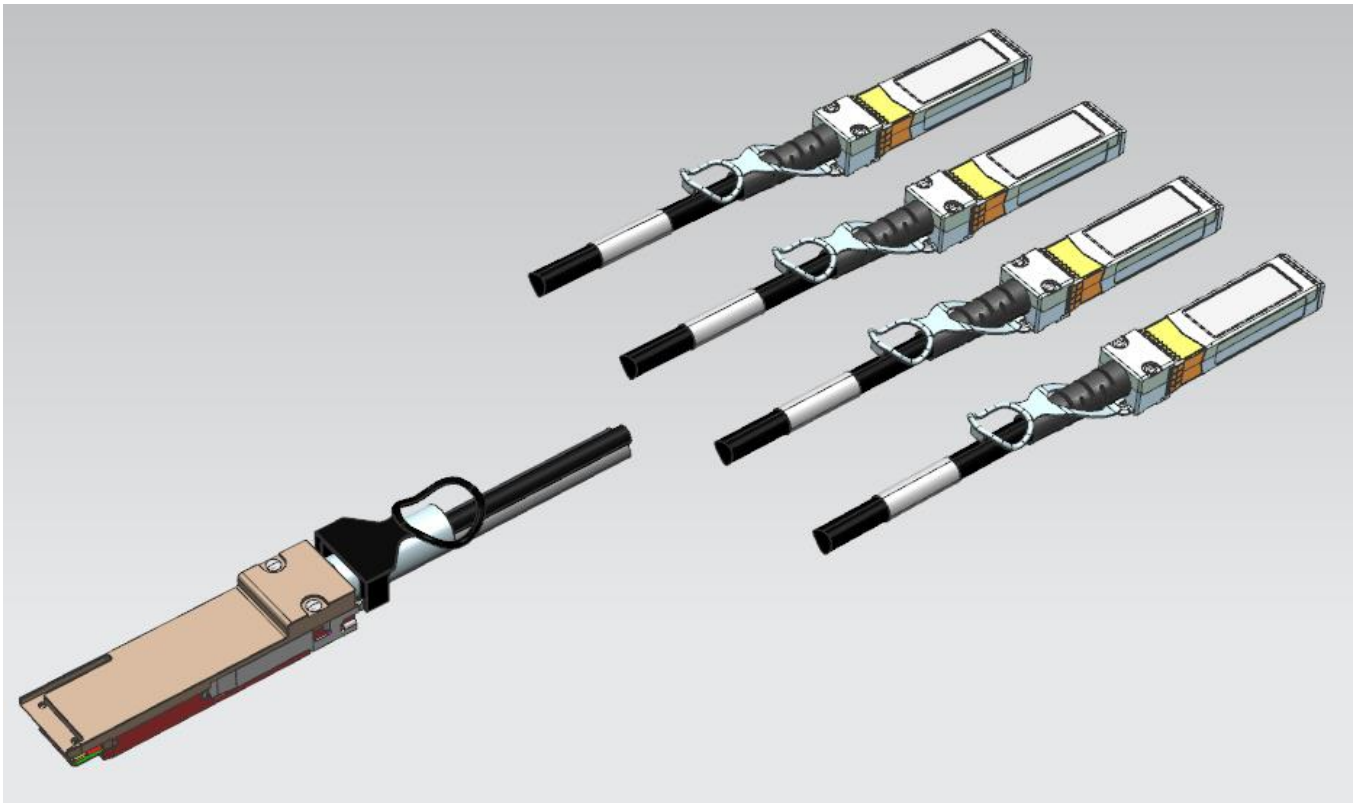
PRODUCT SPECIFICATION

ZQSFP+ to 4X ZSFP+ 25G PASSIVE COPPER CABLE ASSEMBLY



REVISION:	ECR/ECN INFORMATION:	TITLE:	SHEET No.
B	EC No: DATE: **11/03/2021**	**PRODUCT SPECIFICATION** **ZQSFP+ to 4X ZSFP+ 25G Passive Copper Cable Assembly**	**1** of **13**

DOCUMENT NUMBER:	CREATED / REVISED BY:	CHECKED BY:	APPROVED BY:
1003450001	**SCHANNARAYAN**	**SKAMATHN**	**MGARRISON**

Table of Contents

1.0 SCOPE 4

2.0 PRODUCT DESCRIPTION 4

2.1 PRODUCT NAME AND SERIES NUMBER(S) 4
2.2 DIMENSION, MATERIALS, PLATING AND MARKINGS 4
2.3 SAFETY AGENCY APPROVALS 4
2.4 PIN ASSIGNMENTS 4
2.5 ADDITIONAL GENERAL SPECIFICATIONS 4

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS 5

3.1 MOLEX DOCUMENTS 5
3.2 INDUSTRY DOCUMENTS 5

4.0 QUALIFICATION 5

5.0 RATINGS 5

5.1 SUPPLY VOLTAGE 5
5.2 SUPPLY CURRENT 5
5.3 POWER CONSUMPTION 5
5.4 TEMPERATURE 5
5.5 DURABILITY 5

6.0 PERFORMANCE (CONNECTOR TO PCB) 6

ENVIRONMENTAL TEST DATA FOR CONNECTOR AND CABLE INTERFACE PER EIA STANDARD. 6

ZQSFP+ END REFER TO PS-170432-001 6

ZSFP+ END REFER TO PS-170382-001 6

7.0 PERFORMANCE (CABLE ASSEMBLY) 7

MECHANICAL TEST DATA FOR ZSFP+ END REFER TO ZSFP+ PRODUCT SPEC PS-111145-0001 7

NOTE: ALL THE TESTS HAVE BEEN PERFORMED ON TEMP-FLEX RAW CABLES. 7

TEST GROUP 1 – TEMPERATURE LIFE 7

TEST GROUP 2 – THERMAL SHOCK 7

TEST GROUP 3 – VIBRATION 7

TEST GROUP 4 – DURABILITY 7

TEST GROUP 5 - MATING AND RETENTION FORCES (CABLE PLUG TO CAGE) 8
TEST GROUP 6 - RETENTION IN CAGE (CABLE PLUG TO CAGE) 8
TEST GROUP 7 - EIA CABLE FLEX TEST 8
TEST GROUP 8 - CABLE RETENTION IN PLUG 8
TEST GROUP 9 - MECHANICAL SHOCK 9
TEST GROUP 10 - TWIST 9

8.0 HIGH PERFORMANCE CHARACTERIZATION 10

8.1 SYSTEM (CONNECTOR & CABLE SYSTEM) 10
8.2 FREQUENCY DOMAIN 11
9.0 PRODUCTION TEST SETUP 12
9.1 PRODUCTION TEST SPEC PER RTS-100345-0001 12
10. 0 PACKAGING – CABLE ASSEMBLY 13
10.1 PLUG AND CABLE ASSEMBLY 13

1.0 SCOPE

This Product Specification covers the ZQSFP+ to 4X ZSFP+ passive cable assemblies. Both ZQSFP+ and ZSFP+ cable end mates with the 0.80 mm (.031 inch) centerline Z-Axis Pluggable connectors.

2.0 PRODUCT DESCRIPTION

2.1 PRODUCT NAME AND SERIES NUMBER(S)

Product Name: ZQSFP+ to 4X ZSFP+ 25G Passive Cable Assemblies
Series Number: 100345

2.2 DIMENSION, MATERIALS, PLATING AND MARKINGS

See the appropriate sales drawing for dimensions, materials, plating, and marking.

2.3 SAFETY AGENCY APPROVALS

UL file: E72548
RoHS: Compliant, No Exemptions

2.4 PIN ASSIGNMENTS

Pin assignment may vary depending on the cable assembly configuration. Different configurations will have different part numbers within the series. Reference the appropriate cable sales drawing of the specific part number for the correct pin assignment.

2.5 ADDITIONAL GENERAL SPECIFICATIONS

Plug PCB:

- Material is halogen free, Overall thickness is 1.0 mm over pads
- Edge finger contacts are Electro-less Nickel, Electro-less Palladium, Immersion Gold (ENEPIG) plating

Plug Materials:

- Backshell – Nickel Plated Zinc Diecast
- Pull – Nylon
- De-Latch – Stainless Steel (ZQSFP+ end), Zinc Diecast (ZSFP+ end)

Bulk Cable:

- 2 pair, 100 Ohms differential, CL2, UL

3.0 APPLICABLE DOCUMENTS AND SPECIFICATIONS

3.1 MOLEX DOCUMENTS

1003450001	Sales Drawing ZQSFP+ to 4X ZSFP+ 25G Passive Cable Assembly (TF)
1003451000	Sales Drawing ZQSFP+ to 4X ZSFP+ 25G Passive Cable Assembly (Belden)

3.2 INDUSTRY DOCUMENTS

EIA 364 Series	Electrical Connector Test Procedures Including Environmental Classifications with Test Procedures
SFF-8402	SFP+ 28 Gb/s 1X Pluggable Transceiver Solution (SFP28)
SFF-8432	Specification for Improved Pluggable Formfactor
SFF-8661	QSFP+ 28 Gb/s 4X Pluggable Module
SFF-8679	QSFP+ 4X Base Electrical Specification
IEEE 802.3bj	Standard for Ethernet

4.0 QUALIFICATION

Laboratory condition and sample selection are in accordance with EIA 364

5.0 RATINGS

5.1 SUPPLY VOLTAGE

3.3 VDC +/- 5%

5.2 SUPPLY CURRENT

0.03 A Max at 3.135V

5.3 POWER CONSUMPTION

0.125 Watt Max

5.4 TEMPERATURE

Operating Range: -20ºC to +60ºC (30AWG)
-20ºC to +85ºC (26AWG)
Non-operating: -40°C to +85°C

5.5 DURABILITY

PL1 – Performance Level 1 – 0.38 µm Au – 50 cycles, 5-year Life (no MFG)
PL2 – Performance Level 2 – 0.76 µm Au – 250 cycles, 10-year Life (14-day MFG)

6.0 PERFORMANCE (CONNECTOR TO PCB)

ENVIRONMENTAL TEST DATA FOR CONNECTOR AND CABLE INTERFACE PER EIA STANDARD.

ZQSFP+ END REFER TO PS-170432-001

ZSFP+ END REFER TO PS-170382-001

7.0 PERFORMANCE (CABLE ASSEMBLY)

MECHANICAL TEST DATA FOR ZSFP+ END REFER TO ZSFP+ PRODUCT SPEC PS-111145-0001
NOTE: ALL THE TESTS HAVE BEEN PERFORMED ON TEMP-FLEX RAW CABLES.

TEST GROUP 1 – TEMPERATURE LIFE

ITEM	TEST	TEST CONDITION	REQUIREMENT	RESULTS
1	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	Baseline	N/A
2	**Temperature Life**	EIA-364-17C, 75C for 500 hours then return to ambient	No evidence of physical damage	PASS (30AWG) PASS (26AWG)
3	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	No degradation in electrical performance	PASS (30AWG) PASS (26AWG)

TEST GROUP 2 – THERMAL SHOCK

ITEM	TEST	TEST CONDITION	REQUIREMENT	RESULTS
1	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	Baseline	N/A
2	**Thermal Cycling Non-Powered**	EIA-364-32D, Method A, -20 to 75C, 100 cycles, 15 min. dwells	No evidence of physical damage	PASS (30AWG) PASS (26AWG)
3	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	No degradation in electrical performance	PASS (30AWG) PASS (26AWG)

TEST GROUP 3 – VIBRATION

ITEM	TEST	TEST CONDITION	REQUIREMENT	RESULTS
1	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	Baseline	N/A
2	**Vibration**	Clamp & vibrate per EIA-364-28F, TC-VII, Test condition letter – D, 15 minutes in X, Y & Z axis.	No evidence of physical damage	PASS (30AWG) PASS (26AWG)
3	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	No degradation in electrical performance	PASS (30AWG) PASS (26AWG)

TEST GROUP 4 – DURABILITY

ITEM	TEST	TEST CONDITION	REQUIREMENT	RESULTS
1	**Insertion/Removal Cycles, Module/Cage**	Insert and latch, then remove with delatch system. ZQSFP+ End Per SFF 8661 Rev 2.1 - 50 cycles	Proper function of latch / delatch after cycling	PASS (30AWG) PASS (26AWG)

TEST GROUP 5 - MATING AND RETENTION FORCES (CABLE PLUG TO CAGE)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	RESULTS
1	**Cable plug Insertion**	ZQSFP+ END: Per SFF 8661 Rev 2.1	ZQSFP+ 40N Max	PASS (30AWG) PASS (26AWG)
2	**Cable plug Extraction**	ZQSFP+ END: Place axial load on de-latch to de-latch plug. Per SFF 8661 Rev 2.1	ZQSFP+ 30N Max	PASS (30AWG) PASS (26AWG)

TEST GROUP 6 - RETENTION IN CAGE (CABLE PLUG TO CAGE)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	RESULTS
1	**Cable plug Retention in Cage**	Place on cable jacket approximately 1 ft behind cable plug. No functional damage to cable plug below 90N. ZQSFP+ End Per SFF 8661 Rev 2.1	ZQSFP+ 90N Min	PASS (30AWG) PASS (26AWG)

TEST GROUP 7 - EIA CABLE FLEX TEST

ITEM	TEST	TEST CONDITION	REQUIREMENT	RESULTS
1	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	Baseline	N/A
2	**EIA - Cable Flex**	Flex cable 180° for 20 cycles. (10 cycles in two axes) at 12-14 cycles per minute with a sufficient load to ensure that the cable follows the contour of the mandrels. Per EIA-364-41C	No evidence of physical damage	PASS (30AWG) PASS (26AWG)
3	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	No degradation in electrical performance	PASS (30AWG) PASS (26AWG)

TEST GROUP 8 - CABLE RETENTION IN PLUG

ITEM	TEST	TEST CONDITION	REQUIREMENT	RESULTS
1	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	Baseline	N/A
2	**Cable Retention in Plug Test**	ZQSFP+ Cable plug is fixtured with the bulk cable hanging vertically. A 90N axial load is applied (gradually) to the cable jacket and held for 1 minute. Per EIA-364-38B	No evidence of physical damage	PASS (30AWG) PASS (26AWG)
3	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	No degradation in electrical performance	PASS (30AWG) PASS (26AWG)

TEST GROUP 9 - MECHANICAL SHOCK

ITEM	TEST	TEST CONDITION	REQUIREMENT	RESULTS
1	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	Baseline	N/A
2	**Mechanical Shock**	Clamp and Shock per EIA-364-27C, TC-G, 3 times in 6 directions, 100g, 6ms	No evidence of physical damage	PASS (30AWG) PASS (26AWG)
3	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	No degradation in electrical performance	PASS (30AWG) PASS (26AWG)

TEST GROUP 10 - TWIST

ITEM	TEST	TEST CONDITION	REQUIREMENT	RESULTS
1	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	Baseline	N/A
2	**Twist**	Twist cable 180° (±90° from nominal position) for 100 cycles at 30 cycles per minute with a 0.5kg load applied to the cable jacket. Clamp position: 300mm.	No evidence of physical damage	PASS (30AWG) PASS (26AWG)
3	**High Performance Electrical Testing**	High performance electrical test (Impedance & IL)	No degradation in electrical performance	PASS (30AWG) PASS (26AWG)

8.0 HIGH PERFORMANCE CHARACTERIZATION

8.1 SYSTEM (CONNECTOR & CABLE SYSTEM)

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	RESULTS
1	**Data Rate**	Mated connector to edge card contacts, includes host board launched	**28**Gbps Maximum	PASS
2	**Pin Assignement**	Transmit and Receive Pins: ZQSFP+ per SFF 8679 Rev 1.5 ZSFP+ per SFF 8431 Rev 3.0	Per ZQSFF 8679 Rev 1.5 and SFF 8431 Rev 3.0	PASS
3	**ESD Non-Operational**	High Speed Contacts shall withstand 2kV electrostatic discharge based on Human Body Model per JEDEC JESD22-A114-B.	Unit operates normally after discharge	PASS (30AWG) PASS (26AWG)

8.2 FREQUENCY DOMAIN

ITEM	DESCRIPTION	TEST CONDITION	REQUIREMENT	RESULTS
1	**Differential Insertion Loss**	Loss @ 12.8906GHz	**IEEE 802.3bj Table 92-10**	PASS (30AWG) PASS (26AWG)
2	**Differential Transmit Return Loss**	0.05GHz – 19GHz	**IEEE 802.3bj Section 92.10.3**	PASS (30AWG) PASS (26AWG)
3	**Differential Receive Return Loss**	0.05GHz- 19GHz	**IEEE 802.3bj Section 92.10.3**	PASS (30AWG) PASS (26AWG)
4	**Differential to Common Mode Conversion Return Loss**	0.01GHz- 19GHz	**IEEE 802.3bj Section 92.10.4**	PASS (30AWG) PASS (26AWG)
5	**Differential to Common Mode Conversion Loss – Differential Insertion Loss**	0.01GHz- 19GHz	**IEEE 802.3bj Section 92.10.5**	PASS (30AWG) PASS (26AWG)
6	**Common Mode Transmit Return Loss**	0.2GHz- 19GHz	**IEEE 802.3bj Section 92.10.6**	PASS (30AWG) PASS (26AWG)
7	**Common Mode Receive Return Loss**	0.2GHz- 19GHz	**IEEE 802.3bj Section 92.10.6**	PASS (30AWG) PASS (26AWG)
8	**Channel Operating Margin**	Matlab Code	**IEEE 802.3bj Section 92.10.7**	PASS (30AWG) PASS (26AWG)

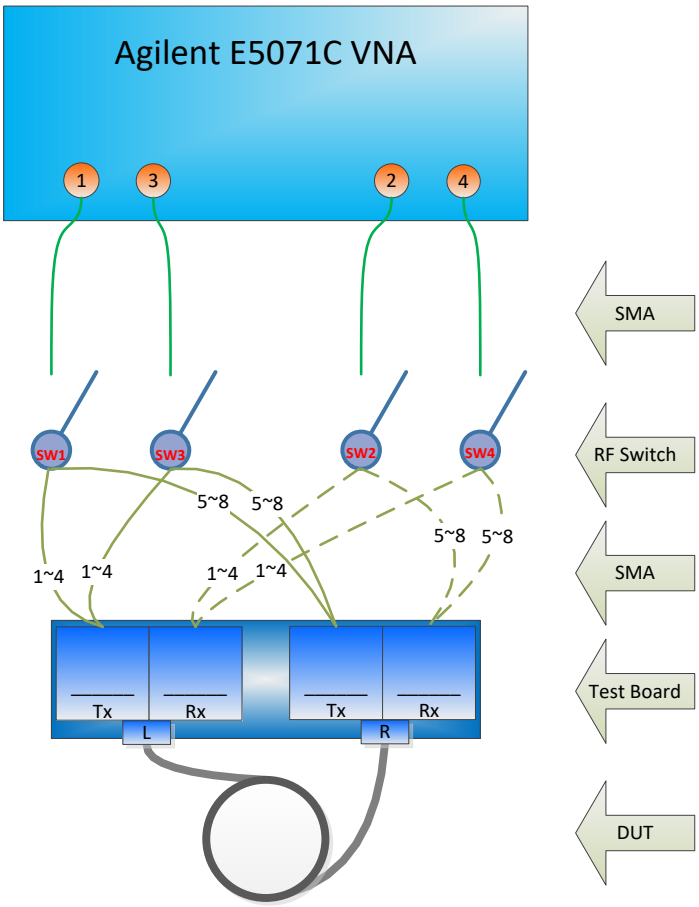
9.0 PRODUCTION TEST SETUP

MEASURING INSTRUMENT
Agilent E5071C Vector Network Analyzer

SWITCHING
Four 10 position RF switches

SWITCH TO TESTBOARD INTERFACE
RF Coaxial cable assemblies

TESTBOARD AND CABLE ASSEMBLY RECEPTACLE
Molex custom ZQSFP+ - 4X ZSFP+ test board with Molex ZQSFP+ and ZSFP+ receptacle



9.1 PRODUCTION TEST SPEC PER RTS-100345-0001

10. 0 PACKAGING – CABLE ASSEMBLY

10.1 PLUG AND CABLE ASSEMBLY

Product shall be packaged to protect against damage during handling, transit and storage.