I. Purpose

This document guideline for engineer to select test method for internal periodical reliability test for all FOV products

II. Application scope

Apply to all products which are manufactured in FOV.

III. Reference

- SPPU-10502 Fast SC connector (lastest version)
- 000-8-WI-0090 Hướng dẫn làm reliability test.
- 000-5-WI-037 Instruct 4M investigation and action for fiber broken in ferrule assembly process.
- 000-5-WI-097 Hướng dẫn sử dụng máy refine - Polisher, HV

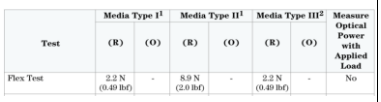
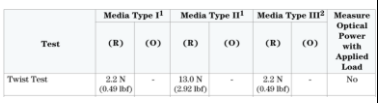
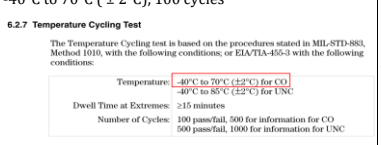
IV. Terms definition

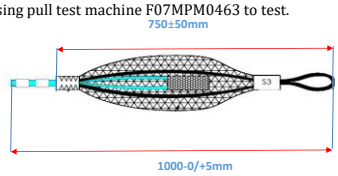
- IL: insertion loss
- RL: return loss

V. Content

1. The method and criteria for reliability test

No	Test type	Test method	Criteria	Method	Product type reference
1	Mechanical for single connector	Mechanical endurance	+ Insertion Loss variation before and after test shall be < 0.2dB. + Return loss > 50dB.	IEC 61300-2-2 Connect and disconnect 500 times, cleaning the mating interface once every 10 times.	FA
2		Fiber or cable retention	+ Insertion Loss variation before and after test shall be < 0.2dB. + Return loss > 50dB.	IEC 61300-2-4 '+ Load applied at 300mm behind plug - Fiber: 5N, 0.5N/s, 60s - 900um: 7N, 0.5N/s, 60s - Cable: 70N, 5N/s, 120s	FA
3		Durability	+ Insertion Loss variation before and after test shall be ≦0.5dB. + Return loss > 50dB.	GR-326-CORE Section 4.4.3.8 + Connector insertion : 200 times + Measurements are taken at insertions 24, 49, 74, 99, 124, 149, 174, and 199 without cleaning. + Readings are taken at insertions 25, 75, 125 and 175 after one-sided cleaning. + Readings are taken at insertions 50, 100, 150 and 200 after two-sided cleaning.	Patch cord
4		Vibration test	+ Insertion Loss variation before and after test shall be ≦0.5dB. + Return loss > 50dB.	GR-326-CORE Section 4.4.3.1 + Vibration frequency & amplitude : 10 to 55Hz, 1.5mm (peak to peak) + Rate: 45Hz/min + Time: 2hours/axis, + Principal axis: 3 axis(X, Y, Z)	Patch cord
5		Flex Test	+ Insertion Loss variation before and after test shall be ≦0.5dB. + Return loss > 50dB.	GR-326-CORE Section 4.4.3.2 + Load: 0.9 kgf. + Rotate the angle of the test fixture arm through the following cycle: 0°, 90°, 0°, -90°, 0°, and repeat for 100 cycles.	Patch cord
6		Twist Test	+ Insertion Loss variation before and after test shall be ≦0.5dB. + Return loss > 50dB.	GR-326-CORE Section 4.4.3.3 + Load: 0.5 kgf + Turns : rotate 1.5 turns X revolutions reverse direction and rotate 3 turns Y revolutions. + Cycle of turn: 10	Patch cord
7		Proof test	+ Insertion Loss variation before and after test shall be ≦0.5dB. + Return loss > 50dB.	GR-326-CORE Section 4.4.3.4 - Straight pull: Load at 0° : 4.5 kgf , time: 5s at least. Load at 0° : 6.8 kgf , time: 5s at least - 90° Side pull: Load at 90° : 2.3kgf, time: 5s at least. Load at 90° : 3.4kgf, time: 5s at least.	Patch cord (Check crimping force of clamping at housing process for AFL product quarterly)
8		Impact test	+ Insertion Loss variation before and after test shall be ≦0.5dB. + Return loss > 50dB.	GR-326-CORE Section 4.4.3.7 + Height of connector with impact point: 1.5m + Cycle : 8	Patch cord
9		Connector installation	+ Insertion Loss variation before and after test shall be ≦0.5dB. + Return loss > 50dB.	GR-326-CORE Section 4.4.6 + Mount the adapter on a vertical mounting surface. + Insert a connector plug. The jumper cable that exits from the plug is to be dressed so that about one meter of cable is supported by the end of the connector boot. + Measure loss. + Bring a panel parallel to mounting surface at a distance from the mounting panel, x =70 mm (2.75 in.) + Measure loss.	Patch cord

10	Mechanical for multi connector	Durability	+ Insertion Loss variation before and after test shall be ≦0.5dB.	GR-1435-Core Section 4.6.4 + MPO connector insertion : 50 times + Cleaning 2 MPO connectors and measuring loss after each 5 connection times.	MPO
11		Vibration test	+ Insertion Loss variation before and after test shall be ≦0.5dB.	GR-1435-Core Section 4.6.1 Vibration frequency & amplitude: 10 to 55Hz, 1.5mm (peak to peak) Rate: 45 Hz/min + Time: 2hours/axis, + Principal axis: 3 axis(X, Y, Z)	MPO
12		Flex Test	+ Insertion Loss variation before and after test shall be ≦0.5dB.	GR-1435-Core Section 4.6.2  + Media Type I: cable with Reinforced jacketed + Media Type II: fiber 900um + Media Type III: fiber UV 250um + (R) : requirement + (O) : objective + Rotate the angle of the test fixture arm through the following cycle: 0°, 90°, 0°, -90°, 0°, and repeat for 100 cycles. + Rate: ≤20 cycles/min	MPO
13		Twist Test	+ Insertion Loss variation before and after test shall be ≦0.5dB.	GR-1435-Core Section 4.6.  + Media Type I: cable with Reinforced jacketed + Media Type II: fiber 900um + Media Type III: fiber UV 250um + (R) : requirement + (O) : objective + Rotate the angle: 1 turn clockwise and back to zero, then 1 turn counterclockwise to zero. +Cycle: 10.	MPO
14		Twist Test 4	Polarization cross talk ≧ 18dB Return loss ≧ 50dB Insertion Loss ≦0.48dB ΔIL≦ 0.3dB Leak rate< 3 e- 9 atm·cc/sec for SFF Leak rate< 1 e- 8 atm·cc/sec for Glacier	GR-468 core section 3.3.1.3.1 Twist of each fiber, 500g, 10 cycles from 0° to 90° to –90° to 0°,at 3cm from fixed ferrule. Follow internal FOV control document: 000-4-WI-0598	Acacia
15		Straight pull 4	Polarization cross talk ≧ 18dB Return loss ≧ 50dB Insertion Loss ≦0.48dB ΔIL≦ 0.3dB Leak rate< 3 e- 9 atm·cc/sec for SFF Leak rate< 1 e- 8 atm·cc/sec for Glacier	GR-468 core section 3.3.1.3.3 For the fiber pigtails covered that the load is either 0.5 kg, is applied to the secured cable at a minimum of 10 cm from the loose end of the fiber, and is maintained for 1 minute. Follow internal FOV control document: 000-4-WI-0598	Acacia
16		Proof test	+ Insertion Loss variation before and after test shall be ≦0.5dB.	GR-1435-Core Section 4.6.2 Load at 0° : requirement 44N , time: 5s at least. Load at 0° : objective 66N , time: 5s at least. Load at 90° : requirement 33N , time: 5s at least. Load at 90° : objective 44N , time: 5s at least.	MPO (Check crimping force of clamping at housing process for AFL product quarterly)
17		Impact test	+ Insertion Loss variation before and after test shall be ≦0.5dB.	GR-1435-Core Section 4.6.3 + Height of connector with impact point: 1.5m + Cycle: 8	MPO
18	Thermal, Humidity test	Extended Thermal Age	+ Insertion Loss variation before and after test shall be ≦0.5dB.	GR-1221-CORE Section 6.2.4 85°C (± 2°C), < 40% RH, 2000 hrs	All products
19		Extended Humidity	+ Insertion Loss variation before and after test shall be ≦0.5dB.	GR-1221-CORE Section 6.2.5 75°C (± 2°C), 90% (± 5%) RH , 168 hr. (7 days)	All products
20		Extended Thermal Cycle	+ Insertion Loss variation before and after test shall be ≦0.5dB.	GR-1221-CORE Section 6.2.7 -40°C to 70°C (± 2°C), 100 cycles 	All products
21	4 Thermal test	Extended Thermal Cycle	Polarization cross talk ≧ 18dB Return loss ≧ 50dB Insertion Loss ≦0.48dB ΔIL≦ 0.3dB Leak rate< 3 e- 9 atm·cc/sec for SFF Leak rate< 1 e- 8 atm·cc/sec for Glacier	GR-468 core section 3.3.2.2 -40/+85 deg.C (30 min. at each temp./cycle), 100cycles. Follow internal FOV control document: 000-4-WI-0598	Acacia

22	Cross section for ziconia ferrule	Cross section	Follow internal FOV control document: 000-5-WI-037 + Lenth of UV coating inside ferrule + Air bubble inside ferrule after curing + Length of medome position + Concentricity of medome fiber + Check appearance of medome tube	Follow internal FOV control document: 000-5-WI-037. Note: 3pcs/ ziconia ferrule type.	All product which use ziconia ferrule.	
23	Cross section for Cerrocast 4	Cross section	5 positions of fiber must arrange correct	Cross section and check under microscope. Follow internal FOV control document: 000-4-WI-0657	Trillian	
24	Pull eyes pull force at Packing process	Pull test	Force ≤ 50 LBS (about 22.6 Kg)	Prepare a sample as picture and pack sample follow:SOP-D-0036-0* (*is latest version) after that using pull test machine F07MPM0463 to test. 	Patch cord, MPO AFL product	

Note:

- Test method, criteria and frequency test need follow lastest customer requirement.
- In case, internal FOV carry out ORT, we refer internal test method, criteria and frequency test

REVISION HISTORY

Date	PIC	Ver	Description		Reason of change	Change requester
			Old contents	New contents		
6-Sep-24	DienDC	4	V. 1. The method and criteria for reliability test - None - None - None	V. 1. The method and criteria for reliability test - Twist Test - Straight pull - Thermal test	Add requirement for Acacia product by internal review	TrungDN
			V. 1. The method and criteria for reliability test - None	V. 1. The method and criteria for reliability test - Cross section for Cerrocast	Add requirement for Trillian by internal review	
5-Jul-24	Ban NT	3	V. 1. The method and criteria for reliability test - FTA product	V. 1. The method and criteria for reliability test - None	- Remove FTA produc which had EOL and cutomer already made document for test method and criteria.	Tien DT
			- General machanical test	- Separate machanical test for single connector and multi connector	-Update and make clear criteria and method for each product type.	
			- None	- Cross section	- Update cross section check for ziconia ferrule	
			- None	- Proof test	Check crimping force of clamping at housing process	
			- None	- Pull test	Pull eyes pull force at Packing process	
17-Mar-20	Ban NT	2	Vietnamese version	English version	- Expand to all FOV products - Follow standard: GR-468-CORE.002	Kien NT
			II. Application None	II. Application - Add product groups		
			V. Content - None	V. Content - Add test method, criteria follow GR-468-CORE.002		
23-Jul-15	Phuc NH	1	-	-	New establish	Tien DT