Testing Method & Procedure – MPO/MTP®

White paper

Introduction

Data centres have never ceased their appetite for bandwidth. Virtualization, storage area networks, cloud computing, coupled with a host of other factors, all these boost that appetite. To meet such appetite means the use of a steady proliferation of fibre connections and ever-faster links. With the development of multi-fibre technology, MPO/MTP technology with multi-fibre connectors have been designed to support high-performance data centre service.

The term MPO refers to multi-fibre push-on or also multi-path push-on, and MTP is a registered trademark of US Conec used to describe their connector. The US Conec MTP product is fully compliant with the MPO standards. As such, the MTP connector is a MPO connector. For simplicity, the following paragraphs will mention MTP only instead of MPO/MTP. MTP cabling solutions provide ideal conditions needed to realize high network performance, and accommodate bandwidth requirements both at present and in near future.

Ribbon fibre systems using MPO/MTP connectors are now widely deployed in data centres for 40/100G Ethernet. Insertion loss (IL) testing is as an important test procedure for any fibre system and is also essential for the MPO/MTP® fibre systems. Return loss (RL) testing for singlemode type is followed then.

This white paper gives an overview of MPO/MTP® testing method and procedure.

MPO/MTP® Testing Method

There are a number of different sources where dirt and other particles can contaminate the fibre:

- Test Equipment
- Dust Caps
- Bulkheads
- People
- Environment

Connectors and ports on test equipment are mated frequently and are highly likely to become contaminated. Once contaminated, this equipment will often cross-contaminate the network connectors and ports being tested.

Inspecting and cleaning test ports and leads before testing network connectors prevents cross-contamination. The test equipment used to test insertion and return loss are taken into consideration. In addition to the basic testers - Light Source and Power Meters, reference grade launch cords are required. Cable test assembly system is used at the testing instrument.

Preparation

1. Open the instrument, preheat it at least half an hour, until the instrument power stability.
2. Connect the product onto the master cord, open the test software, and select the product which is corresponding to the data file and test file.
3. Clean and inspect end-face of each master cord, ensure that the mater cord meet the test requirement.

Operation Procedure

1. Insertion Loss (IL) Testing

1.1 Clean the instrument. Connect the master cord MPO connector onto the instrument's optical receive port, as shown in Figure 1; click the "Channel Initial Deviation Setting (Auto)" button to start clearing. As shown in Figure 3.

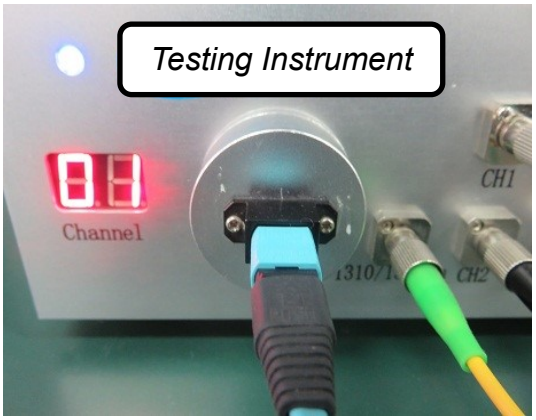

Figure 1

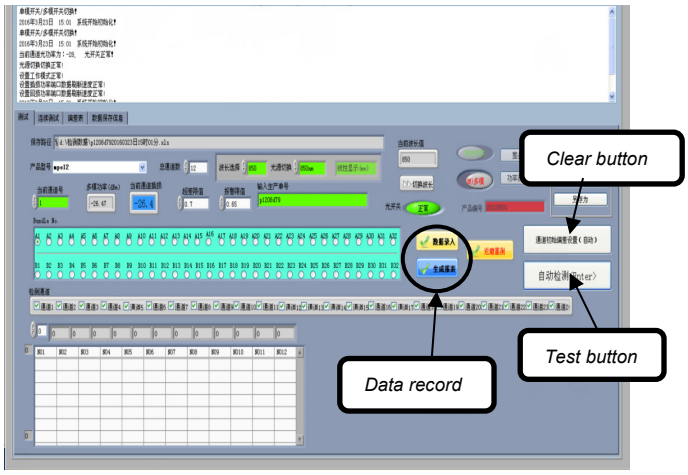

Figure 3

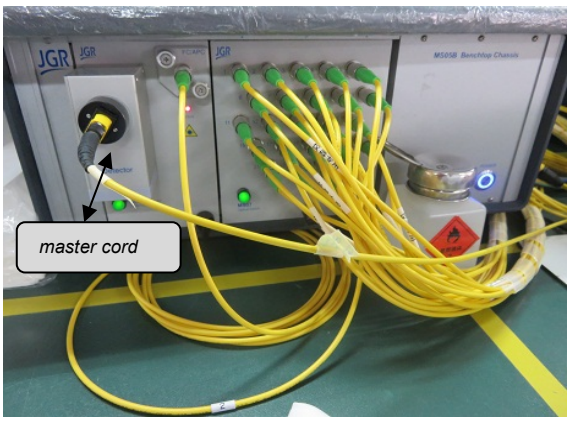

Figure 4

1.2 Test A side firstly, insert adaptor onto the master cord, clean and inspect the end-face of the being test patch cord; after confirming qualified, insert one side onto the adaptor, this called the being test connector; insert another side onto the instrument optical receive port, as shown in Figure 2

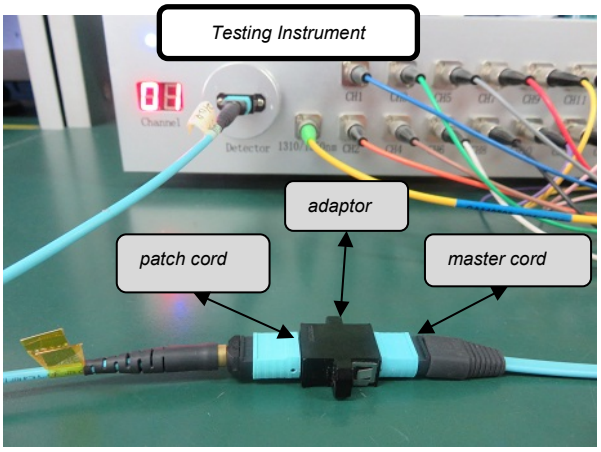

Figure 2

1.3 Click "Auto Detect" to test, as shown in Figure 3. After each joint test is completed, click "Data Entry" → "Generate Report" to save the data.

1.4 Then test B side, repeat 2.1.2 and 2.1.3, complete the B-end test.

2. Return Loss (RL) Testing

2.1 Clear instrument. Connect the master cord MPO connector onto the instrument's optical receive port (no need for Multi-mode patch cord), as shown in Figure 4, click the "Reference" button, click the "▸ start" button to start clearing, as shown in Figure 5.

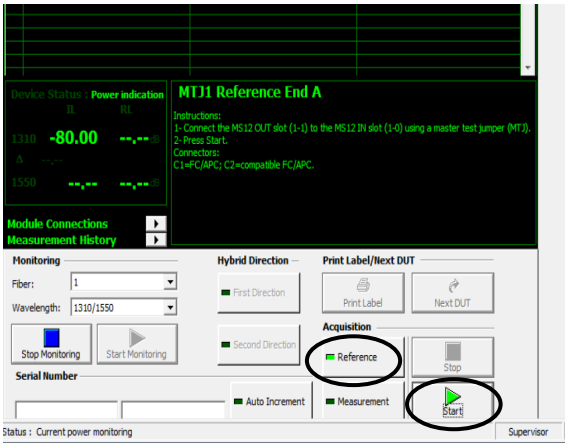

Figure 5

2.2 Test A side firstly, insert adaptor onto the master cord, clean and inspect the end-face of the being test patch cord; after confirming qualified, insert one side onto the adaptor, this called the being test connector; insert another side onto the instrument optical receive port.

2.3 Click the "▸ start" button to test.

2.4 Test B side, repeat 2.2) and 2.3), complete the B-end test.

Conclusion

Multi-fibre connectors are becoming more and more widespread, especially where high fibre densities are required and space is limited, such as, for example, in data centres.

Testing cables with MPO connectors can be challenging. Cleaning and inspection are important but difficult. You must establish the colour code configuration to understand the path of a given fibre in order to figure out how to connect to one fibre for testing. There are many options on how to test depending on the configuration of the cable plant, e.g. all MPO connectors or breakouts into individual fibre or duplex fibre connectors. Most test options will have higher uncertainty than typical single fibre testing. The tech doing the work must make decisions based on the cabling configuration and the test equipment available. Watch for test results showing higher loss as that may indicate that reference test cables are wearing out.

This white paper also illustrated the testing of MPO/MTP fibre systems, including test equipment, launch cord validation and IL measurement. Cable assembly test system provides the most accurate mandrel-free insertion loss (IL) and return loss (RL) measurement in the industry for both cable assemblies and components.

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