Long Haul Fibre Characterization Tests

1.0 Optical Time Domain Reflectometer (OTDR)

The OTDR shows a trace of cable loss against cable length and highlights events in the cable such as fusion splices, connectors and bends.
Traces are taken from each end of the span and the true loss of an event is given by averaging the loss in each direction. The OTDR can give the following measurements::
(1.1) End to end loss of the fibre span in both directions
(1.2) Location and loss of all splices
(1.3) Location, loss and reflectance of all connectors
(1.4) Position and loss of any bends in the fibre
(1.5) Length of fibre span
(1.6) Optical Return Loss (Can be measured using an OCWR – see 3.0 below)

2.0 Power Meter and Light Source

The Power Meter and Light Source are used to determine the end to end of the fibre span in dBs. The loss readings will show:
(2.1) End to end loss of fibre span including end connectors

3.0 Optical Continuous Wave Reflectometer (OCWR)

ORL is measured in dBs and represents the sum of all individual reflections within a fibre span including the background backscatter of the fibre:
(3.1) Total fibre span ORL value
(3.2) Near end testing of connectors

4.0 Chromatic Dispersion (CD)

Chromatic Dispersion is used to measure dispersion slope and total dispersion at specific wavelengths of the fibre under test. This is a uni-directional test. The Chromatic Dispersion test is used to determine if the embedded fibre plant can support the DWDM system to be deployed at the desired transmission rate and if not the test instrument will help determine the proper compensation plan to resolve any chromatic dispersion issues.
(4.1) Chromatic Dispersion

5.0 Polarization Mode Dispersion (PMD)

Polarization Mode Dispersion is used to measure cumulative PMD dispersion per kilometre, pass/fail per carrier rate, and second order dispersion. This is a uni-directional test. The PMD test is used to determine if the embedded fibre plant can support the high data rate DWDM system.
(5.1) Polarization Mode Dispersion per span
(5.2) Second Order PMD

6.0 Project Details Required for Quotation

In order to quote for a project you need to evaluate the following and will need to get your client to confirm outstanding details:

(6.1) Project Details
Types of test required (see sections 1.0 to 5.0)
Customer Specifications
Transmission system details
Nature of Reports required – paperwork and or soft copy
Data Analysis if required
Network Configuration (Span types, ring maps, distances)
Project Locations
Number of Spans to test
Number of fibres to test
Required Wavelengths to test

(6.2) Procedures
Field and Support Contact names
Phone numbers
Site locations
Meeting times
Escalation contact information
Escalation procedures
Method of Procedure (MOP)

(6.3) Timing & Manpower
Lead time to start work
Estimated number of days for completion
Number of crews deployed

(6.4) Cost Considerations
Insurance
Engineering Fee
Crew Engineering Services
Equipment Usage Fee (hiring of specialized equipment)
Crew travel costs
Crew daily expenses
After hours testing

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