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LONG-HAUL PMD TESTING: WHY YOU SHOULD UPGRADE TO THE FTB-5500B

APPLICATION NOTE

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Until recently, instruments used for measuring PMD on deployed links and networks were based on the traditional interferometric method. PMD was measured section by section, and eventually added up to figure the whole link's total PMD. Because the FTB-5500B PMD Analyzer is based on the generalized interferometric method, the picture is now totally different: you can test whole links—even links that include EDFAs—in one test sequence.

To put into perspective what this means in terms of time and money savings, let's take a look at the typical breakdown of both scenarios; i.e., testing section by section with a traditional PMD analyzer, or using the FTB-5500B PMD Analyzer.

For the purposes of our example, consider a 400 km link (ring) comprising five 80 km sections. We assume that two technicians are required, one operating the PMD analyzer, the other handling the light source; each one works at a \$100 hourly rate¹. We also assume that a single 16-fiber cable is being tested. All dollar figures are in US dollars.

Scenario 1: measuring link PMD with a traditional PMD analyzer

Step	Time per technician (in hours)	Cumulative cost (two technicians)
Travel to location 1	1.5	\$300
Setup (section 1)	1.5	\$600
Test (section 1)	1	\$800
Travel to location 2	1.5	\$1100
Lunch	1	\$1300
Setup (section 2)	1.5	\$1600
Test (section 2)	1	\$1800
Travel back home	1.5	\$2100
Travel to location 3	1.5	\$2400
Setup (section 3)	1.5	\$2700
Test (section 3)	1	\$2900
Travel to location 4	1.5	\$3200
Lunch	1	\$3400
Setup (section 4)	1.5	\$3700
Test (section 4)	1	\$3900
Travel back home	1.5	\$4200
Travel to location 5	1.5	\$4500
Setup (section 5)	1.5	\$4800
Test (section 5)	1	\$5000
Travel back to office	1.5	\$5300

¹ Loaded labor rate: includes wages, employer's cost of benefits and employer's tax liabilities; the actual rates vary depending upon locale, but these numbers are typical.

Scenario 2: measuring link PMD with the FTB-5500B

Step	Time per technician (in hours)	Cumulative cost (two technicians)
Travel to location 1	1.5	\$300
Setup (section 1)	1.5	\$600
Test (section 1)	0.5 (much faster testing)	\$700
Travel back to office	1.5	\$1000

In case of a link that is not a ring (i.e., testing section by section means the technicians have to travel increasingly farther from their home/office), another four hours, or \$800, can easily be added, raising the total cost to \$6100. Consequently, using a traditional PMD analyzer to test a single 16-fiber cable costs over \$5000 more than using EXFO's FTB-5500B.

The cost difference increases with the number of fibers tested

The above figures are only valid for a 16-fiber cable, and the costs are directly proportional to the number of fibers tested. A typical long-haul cable, for example, has 48 fibers. Using the FTB-5500B to test such a cable therefore would enable reducing operating expenses (OpEx) by more than \$15 000, which is almost the cost of instrument upgrade. This means that after the first job alone, the FTB-5500B is practically paid for. For an 864-fiber metro ring, the savings can amount to over \$230 000.

Avoiding unplanned extras

In the example above, we assumed that all testing operations had gone smoothly. In reality, three days of testing usually yields a surprise or two. Overall testing time therefore can easily exceed projections.

There is also the human error factor. Since an erroneous PMD measurement can be critical for a network, performing a single test sequence instead of five, as well as avoiding the hassle of computing sectional PMD values (48 fibers x 5 test sequences = a lot of files to handle and a high risk of error; this, not taking into account the old problem of $1\text{ ps} + 1\text{ ps} \neq 2\text{ ps}$...), helps avoid potential problems and extra costs.

The bottom line

In this article, we have been discussing OpEx costs alone. However, having your network fully qualified and operational several days earlier than usual is also worth a lot. Add it all up: the FTB-5500B PMD Analyzer (for which EXFO offers trade-in programs) pays for itself. If your network includes EDFAs, you should definitely think about upgrading to the FTB-5500B.

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