



The Fibreoptic Industry Association

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TESTING TIMES AHEAD

On the face of it, the testing of optical fibre cabling is hardly the most exciting topic. It is generally expected that tests applied to any type of installed cabling are nothing more than a simple confirmation that the installation meets the applicable specification. Where tests are applied as part of a troubleshooting regime, in order to identify a fault, it is also generally assumed that the results obtained will point to the source of the problem.

Millions of pounds have been expended since the early 1990's on development of field test equipment to measure the attenuation, near- and far-end crosstalk, propagation delay and its skew of installed twisted pair cabling. To obtain the desired level of measurement accuracy it has been necessary to design special test leads and test heads, somewhat euphemistically called "personality modules". At this time more money is being invested in attempting to measure "alien crosstalk" - the interference coming from adjacent cables.

In comparison, the broad sweep of optical fibre cabling testing has seen little change since I first started working in the technology back in the early 1980's. At the top end of the market, the testing of long-haul single mode systems has focussed on characterising ever longer installed links using OTDR technology. Also the discovery of new bandwidth restriction mechanisms such as polarisation dispersion has led to new types of test and test equipment. But at the grass roots, the simple tests applied to measure the attenuation of both singlemode and multimode installed cabling have been of little interest.

Most installers purchase either low-end light sources and power meter combinations (LSPM) or add optical heads to their copper test equipment. They buy "patch cords" for a few pounds, put them in the test kit bag and go off to test. There have been standard test methods since the mid-1980's - initiated in the UK and replicated almost to the letter in international, European and US standards. In some cases, these older test methods have been amended by both by cabling system and test equipment suppliers in order to allow their more sophisticated offerings to be used. Whether the correct methods have been used cannot be determined after the event and, as a result, the delivery of a set of LSPM test results by an installer may not provide quite the confirmation of installed performance that is assumed to be case.

In an attempt to improve this situation the FIA published their Technical Support Document 2000-4-2-1 which explained the correct method to use to test a particular cabling configuration with a specific type of test equipment.

The typical length of installed cabling in buildings has fallen over the past few years. This factor coupled with the production of low loss connection systems has led to a dramatic reduction of the applicable test limits. Measurement accuracy has therefore become the focus of international standardisation.

Following work undertaken by the FIA, and confirmed by others, it has been discovered that the measured result can be significantly influenced by the launch conditions produced by the light source. This means that, even if the correct test method is used, the result may not be replicated with another piece of test equipment.

Adding all the effect together produces an unappetising picture. Measuring an expected loss of 1.5dB with an inaccuracy of 1.5dB allows valid results between 0 and 3dB - most customers would look askance at such a variation and something had got to be done.

A new standard has been produced by ISO/IEC, targeted at the testing of structured cabling installations. ISO/IEC 14763-3:2006 defines three major changes to current practice. Firstly, the use of a single test method which is applicable to all types of cabling configuration and all types of LSPM equipment. Secondly, the use of "proper" test cords designed to reduce measurement inaccuracy. Finally, and most controversially, the specification of the launch conditions into the cabling under test - this applies specifically to multimode systems and is aimed to reduce the variation of results from different light sources. This test standard will be referenced by European and British standards in the very near future and will replace the various techniques in the FIA-TSD mentioned above.

The acid test, as always, is whether installers will adopt the demands of the new standard. The test cords will be more expensive and the techniques to control the launch conditions may add to the cost of those cords. The FIA will be producing a series of advisory notes (and a revision of the TSD 2000-4-2-1) to explain the changes and will taking steps to ensure the correct specification and procurement routes for the test cords. However, much of the responsibility to ensure that the correct approach is taken will lie in the hands of the customers, their consultants and project managers.

If you wish to access the resources provided by the FIA go to www.fia-online.co.uk. Enquiries can be e-mailed to jane@fiasec.demon.co.uk or, alternatively, you can contact the FIA Secretariat in 01763 273039.