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See last page for biographical details



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## MARGINAL TEST RESULTS

### SMOKE AND MIRRORS CLOUDS THE ISSUE

by  
Mike Gilmore, Technical Director of the FIA  
for Networking+ (February 2007)

Are you a potential client for a cabling installation - copper or optical fibre? If so, are you being advised by consultants or "doing it yourself" in terms of developing the installation specification. Either way there are lots of aids to prevent mistakes: reading BS 6701:2004 would be a good start since it represents a "one-stop-shop" approach to the specification, installation, operation and maintenance of the cabling and the networks it supports. However, there is one area in which a great deal of confusion has been generated over the past two years and in which the standards do not really help - the non-acceptance of "marginal" test results.

Before jumping into the subject too deeply, we ought to define what we are talking about. Marginal test results are those that cannot be determined to be either a definite pass or definite fail. In other words a marginal test result is a result that lies within the measurement accuracy of the equipment.

All measurement systems are subject to some level of error - whether it is reading a scale rule or measuring the distance to Alpha Centauri.

The fact that measurement error is a universal concept is actually captured in all the international and European structured cabling design standards. They require the proposed treatment of such results to be defined in the Quality Plan covering the installation. This means that whether we are testing copper or optical fibre cabling we are obliged to know the accuracy with which we can measure and decide how to treat results that lie within that band.

For example, I might be educated enough to realise that all such "marginal" results are acceptable, alternatively I may only wish to accept part of the band (the "marginal passes") and not accept the others (the "marginal fails").

In fibre optic testing it should be pointed out that virtually all test results on short systems are actually "marginal". The world of optical fibre is well versed in "treatment" of marginal results and will continue to be even when the new test standards expected in 2008 come on stream. If you wish to understand this specific topic better feel free to contact the FIA at [fiatd@btinternet.com](mailto:fiatd@btinternet.com).

So why the fuss? The problem lies in the attempts to measure the "Category" or "Class" of installed balanced cabling. The equipment we use to test this type of cabling is required to meet a standard, EN or IEC 61935-1, and that standard requires "marginal" results to be marked as such. Surely it is a good thing that we should know when a result has an indeterminate status?

Unfortunately, a growing number of consultants are choosing not to accept "marginal" results within their tender requirements. This trend is spreading like wild fire. Whether by intention or simple copycat behaviour, it is causing real problems for installers, component suppliers and ultimately for their clients - as I will attempt to explain below.

As a component supplier to such an installation, I have to build in "cabling performance headroom" to ensure that test equipment does not produce marginal results. In effect this means that although the tender states that, let's say, Class E cabling is required, it actually requires Class E++. So how much better than Class E does Class E++ have to be? Ah, there's the rub!

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The worst case measurement accuracy according to IEC 61935-1 is significantly worse than most test systems will achieve. This is quite natural since the standard only sets minimum requirements. For this reason it was decided that the test equipment should determine the marginal nature of any test result based on its own accuracy specification. Different manufacturers produce test systems with different accuracy specifications. This means that same result may be deemed marginal with one system but not with another.

Neither the component supplier or the poor installer (who sits unhappily between the client and the supplier) - cannot determine the required cabling performance headroom unless they know which test equipment is to be used. I would point out that building a headroom equivalent to the worst case measurement accuracy according to IEC 61935-1 is NOT AN OPTION.

So this is where situation gets really messy. For a given spread of test results, the smallest number of marginal results will occur when measured with the most accurate equipment (or at least the equipment that thinks it is most accurate).

So if the objective of the tender requirement is simply not to have an argument about marginal results then the most accurate equipment will deliver this objective with the smallest performance headroom from the installed cabling.

However, if it is the intention of the consultant - and, in most instances, it is - to effectively re-specify the cabling to get the best possible performance, then using the most accurate equipment works against them.

In April, the FIA is producing a White Paper on the general topic of marginal test results. In the meantime, if you wish further information on this issue please contact the FIA Technical Director at [fiatd@btinternet.com](mailto:fiatd@btinternet.com).

The FIA has a wide range of Technical Support Documents aimed to assist users in all areas of specification and operation of optical fibre cabling. If you wish to access the resources provided by the FIA go to [www.fia-online.co.uk](http://www.fia-online.co.uk). Enquiries can be e-mailed to [jane@fiasec.demon.co.uk](mailto:jane@fiasec.demon.co.uk) or, alternatively, you can contact the FIA Secretariat in 01763 273039.

## Biography

As the Technical and Standards Director of the UK Fibreoptic Industry Association, Mike is heavily involved in the development of training and competence standards for the fibre installation industry and sets down policy in this area. In addition he chairs the audit and arbitration committees for the FIA. His book "Fibre optic cabling; theory design and installation practice" published in 1991 remains a reference for both experts and entrants into this field.

In the UK, Mike is Chairman of TCT/7, the BSI technical committee responsible for the three panels on telecommunication cabling. He also chairs two of these panels (TCT7/-/1 and TCT7/-/3). TCT7/-/1 acts to assist development of European and international standards for telecommunications cabling. TCT7/-/3 manages the implementation of European standards and others in the UK.

At the European level Mike is Convenor of CENELEC TC215 Working Group 1, the group that controls the development of European standards for the design and installation of telecommunications cabling. In the international arena Mike is Convenor of ISO/IEC JTC1 SC25 WG3 IPTG, a standards committee working on generic cabling for industrial premises (ISO/IEC 24702).

Mike is a regular speaker at seminars and conferences in all five continents. He has provided the keynote address and opening presentation in many conferences in the UK, Germany and the Netherlands. His seminars, providing regular updates on the progression of cabling standards are particularly well attended and are operating in the UK and continental Europe.



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