


Forewarned is forearmed

Comprehensive field testing is the only way to determine whether a network infrastructure meets expected performance levels. Adrian Young of Fluke Networks explains why it is so important

 End user awareness of common field testing mistakes can help avoid project delays and cost overruns. Some of these mistakes can simply be avoided by a good test plan before testing begins. And following good practices during testing and adequate understanding of test results once complete will also ensure successful testing.

Cable ID scheme

There are many pitfalls when testing, but what comes as a surprise to many is that the cable ID scheme can cause one of the most severe headaches.

When a test is complete, the result is saved to the tester. The file name given should be the same as the cable ID for the link. If this is wrong, the end user may refuse payment but the installer might get lucky and have the ability to do an 'edit and replace' with the cable ID in software. Almost all field testers offer the ability to pre-load the cable ID scheme into the tester – assuming the project manager enters it correctly of course – to avoid this from happening.

Calibration

Did you specify the field tester should have a valid calibration? The term calibration is often confused with setting a reference in the field to eliminate the effect of test leads – probably because we should be referring to it as traceable calibration instead.

The instrument must be calibrated to traceable standards every 12 months or as defined by the test equipment vendors according to IEC14763-2 (Draft). This standard goes on to say the test results must be accompanied by a valid calibration certificate.

Channel or permanent link?

There are two link definitions in the standards for testing. The permanent link excludes patch cords which the installer typically has no control over. The channel is for the end user wishing to know the performance of the entire link including patch cords. The channel test offers an opportunity to hide a failing installation. Not only are the test limits relaxed for the channel test compared to the permanent link test, using a five metre cord at each

Adequate understanding of completed test results is important



end places the connector further away from the test instrument, producing a more favourable result.

The test report should detail the type of adaptor that was used for the test along with the test limit. If the link is a patch panel to an RJ-45 plug, then the mixing of a permanent link adaptor at one end and a channel adaptor at the other end will be acceptable. If you see a channel adaptor on both ends of the link and the test limit says permanent link, it should be investigated.

Marginal results

Contractual disputes over marginal passes still occur. If a test result margin falls within the accuracy of the field tester, the result must be marked with an asterisk (*). This is defined in IEC61935-1.

The standard goes on to say that although an individual result must be

marked with an asterisk, the overall result is still a pass, so long as there are no failing parameters in the test suite. Why the dispute? More often than not the cabling system was sold as a premium cabling system far exceeding the standards. So any marginal results can suggest there is an issue. Unless you specifically state that marginal passes are not acceptable, you will have to accept the results. There is guidance for the user in IEC14763-2 (Draft) where it states, 'To minimise marginal test results, the quality plan shall specify the properties of the field tester that is used for testing, and consider enhanced measurement accuracy specifications that may be available from field tester manufacturers'.

Test leads

The electrical performance of the permanent link test lead is going to be an



IEC14763-3 states that the first and last connections on a link under test must be better than 0.3dB for multimode and 0.5dB for singlemode

of variability between test equipment vendors. Although the test lead must use a qualified RJ-45 plug for NEXT, there is no requirement for return loss. It is at the discretion of the user to specify the RJ-45 plug used for testing meets both NEXT and return loss requirements defined for Category 5e, 6, and 6A.

Alien crosstalk

ANSI/TIA-568-C.2 and ISO/IEC11801:2010 still indicate this as an optional test for

issue and should not be taken for granted. It is well known for modular 8-pin RJ-45 style connecting hardware that the mated NEXT depends strongly on the properties of the plug. Requirements of IEC61935-1 include that 'the plugs of link adaptors of field testers shall be within the range of test plugs that are defined for the purpose of qualifying modular 8-pin connecting hardware'. The range is deliberately very narrow, to give consistent results across field testers.

The electrical performance of that RJ-45 plug on the end of the permanent link test lead is the single biggest cause

'Users often find themselves confused between choosing the North American standard ANSI/TIA-568-C and the international standard ISO/IEC11801:2010.'

Category 6A/Class EA cabling systems. But curiously, IEC14763-2 (Draft) will specify four levels of acceptance testing where Level 3 acceptance testing does include alien crosstalk. Once again it is the responsibility of the end user to specify whether this test is to be completed or not.

For the first time, we will get a sampling plan for alien crosstalk testing based on existing sampling standards. At the recent IEC meeting in Seattle, WA, there was an agreement to use an equivalent acceptance quality level (AQL) of 0.4 per cent, normal inspection, general

inspection Level I as defined in ISO2859-1 for populations of up to 500,000 links.

Tier 1 and 2 fibre

It's generally accepted that all fibre installations should be tested for optical loss. IEC14763-3 refers to this as Tier 1 testing. Optional is Tier 2 testing, which includes the use

