Agilent Technologies
Innovating the HP Way

WireScope 350 White Paper

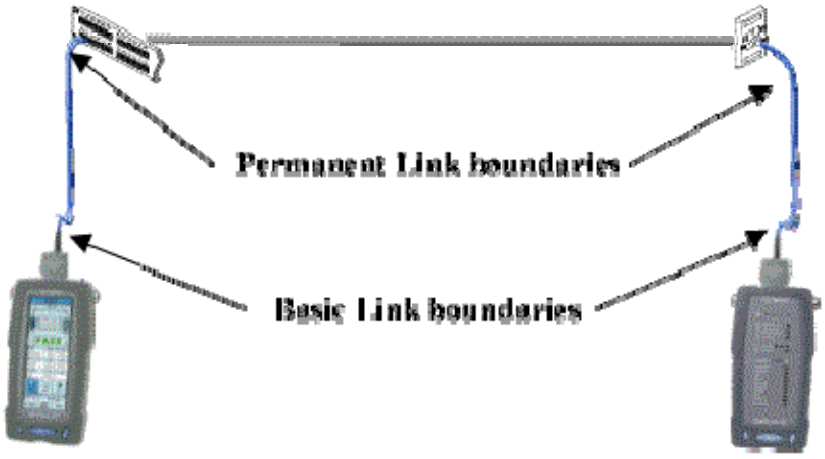
The Monster Cords

Fanny Mlinarsky

Does our industry need bulky and expensive Permanent Link test cords and complex field calibration procedures to support Category 6 testing? Does a monster cord provide better measurement repeatability or longer life? This paper demonstrates that the answer to both questions is no.

Background – Basic Link vs. Permanent Link

The latest standards emerging from TIA and ISO introduce a new model for link testing – the Permanent Link. The key difference between the Basic and the Permanent Links is that for Basic Link the test cord is part of the link under test whereas for Permanent Link the test cord is part of the tester.



The new Permanent Link model makes good sense. The Basic Link model adds cord error to your measurement, while the Permanent Link model requires the manufacturers to remove the error contributed by the test cord.

In order to remove the error contribution of the test cord from the measurement, some tester manufacturers have introduced expensive and bulky solutions with complex field calibration procedures. To justify the high cost of these monster cords, the manufacturers insist that accurate, repeatable measurements simply cannot be achieved with “ordinary” cords. Furthermore, they say that the monster cords never wear out. Agilent Technologies disagrees on both counts.

ETL-Witnessed Test Demonstration

We have performed a series of measurements under ETL supervision with the goal of demonstrating measurement accuracy and repeatability under 5 different stress conditions on our Universal Permanent Link SmartProbe. Review the results on the following page.

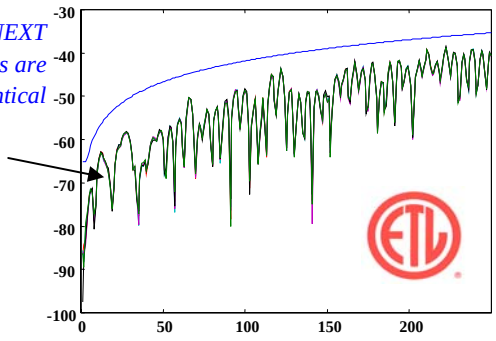
Test Configurations

The Agilent Universal Permanent Link SmartProbe was distorted in 5 different configurations shown here.

The measurement results for the 3 sensitive swept measurements were practically indistinguishable for all of these different contortions.

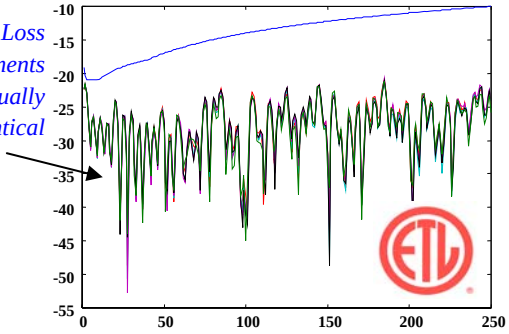
Config 1 **Config 2** **Config 3** **Config 4** **Config 5**

5 NEXT measurements are virtually identical



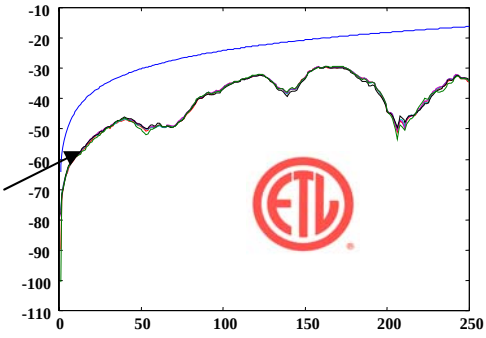
NEXT 3-4, cable E

5 Return Loss measurements are virtually identical



Return Loss, Pair 2 Cable E

5 ELFEXT measurements are virtually identical



ELFEXT 1-4, Cable E

***Figure 1**: NEXT, ELFEXT and return loss measurements performed under 5 configurations shown above. Each set of plots contains 5 curves – one for each configuration. The 5 measurements are almost indistinguishable demonstrating that the measurement remains accurate even if the cord is distorted.*

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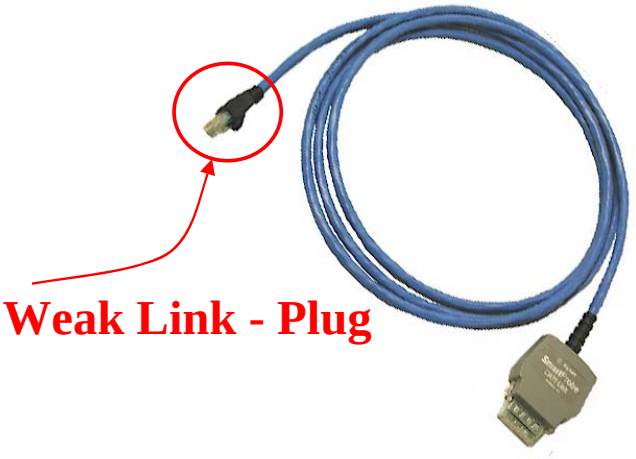
Longevity Benefit of the Monster Probe?

The plug at the end of the test cord limits the cord's useful life because plugs develop defects with use. A common defect is the loss of spring action, rendering connections unreliable and affecting the accuracy of all measurements. The cord itself is typically not a problem if it is well designed. The Agilent Universal Link SmartProbe is robust and rigid. It provides consistent Level III performance under various types of stress, bending and coiling. The weak link, as in all test cords, is the plug.



The plug at the end of the cord wears out faster than the cord itself

Conclusion

The ETL-witnessed experiment demonstrates that the permanent link test cord, if properly designed, does not effect measurement accuracy and stability under stress. Thus, a monster cord is unnecessary to maintain repeatable measurements.

As to the longevity of the cord, the plug at the end of the cord wears out much faster than the cord itself. Since a replacement plug module for the monster cord costs as much as a replacement Universal Link SmartProbe, the monster cord offers no longevity benefit over a standard Agilent Universal Link SmartProbe.

Agilent Technologies, Inc.
WireScope Operation
753 Forest Street
Marlborough, MA 01752
(800) 418-7111 • (508) 486-0400
Fax (508) 486-0600

 03/01

www.wirescope.com