VNA Adapters

Introduction

The Vector Network Analyzer (VNA) adapter you characterizes the components for datacomm cabling including cables, connectors. With 8 ports on each unit, all the measurements that a 16 port network analyzer can be obtained in less than 10 minutes of setup time. With the specialized PC based workflow software, extend the calibration planes to various fixtures including the TIA-1183 fixture to characterize components from 1MHz to 2 GHz. Test against the various standardized component limits to determine a quick pass/fail criteria of the components.

Move away from Traditional approach

VNA have found tremendous adoption in component testing for vendors specializing in datacomm cabling. The components could be cables themselves, connectors or jacks etc. A VNA gives the flexibility and advanced setups using fixtures to characterize the components individually. There are also stringent requirements on the noise floor for the various S-parameters.
But in most cases a vector network analyzer would be an overkill and sometimes misfits the requirement of user.
The frequencies of interest have typically been less than 3GHz for datacomm cabling. And since all the datacomm cabling are differential, for testing differential parameters, it necessitates the use of BAL-UNs, assuming a typical network analyzer has only 2 ports. The BAL-UNs are typically band limited to 600MHz, or sometimes 1 GHz. To perform testing beyond that, a network analyzer with more than 2 ports (4 or more) should be used and paired to work as a differential source. This process can be time consuming, error-prone and high in cost.

Transform WireXpert into a 16 port Network Analyzer

With two VNA adapters each on Local and Remote unit, the solution provides the flexibility to perform all the measurements that a 16 port network analyzer can perform. The WireXpert output ports act as a differential pair thereby supporting natively all the required measurements for Balanced Cabling.

Isolate failure within the link

Since most of the frequency performance metrics for Balanced Cabling for data communications is band limited under 2 GHz, WireXpert serves most of the laboratory requirements for component qualification.
The solution is portable, hence should there be a failure of a link in the field, the failing component can be isolated for valuable information regarding failures. This information would also serve as generating liability report in the event where the components in a link come from different manufacturers.

Ordering Information
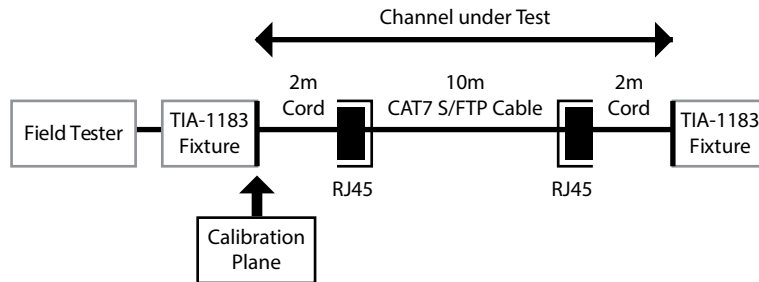
WX-4500-FA	WireXpert Copper Cable Certifier Kit
WX_AD_VNA	Kit for lab based testing comprising of: 2 x VNA test fixture adapters WX_AD_COAX 8 x coaxial test cords WX_AD_COAX_CORD

WireXpert

Extend the Calibration Plane to the Fixture

Component testing typically involves the use of "Test Fixtures" where components can be mounted individually. Measurement using fixtures requires the shift of calibration plane to the end of fixture. Psiber Data offers a PC based software that connects to the WireXpert with a USB cable allowing you to extend the calibration plane to the end of the fixture, providing accurate measurements comparable to a Vector Network Analyzer. The calibration can be performed like a standard SOLT calibration with artifacts for the fixture for Short, Open, Load.
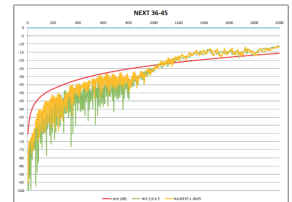
Channel under Test

| Field Tester | TIA-1183 Fixture | 2m Cord | 10m CAT7 S/FTP Cable | 2m Cord | TIA-1183 Fixture |

RJ45   RJ45

Calibration Plane

A typical VNA setup using the TIA-1183 fixture for characterizing a CAT7 link with 2m patch cords.

WireXpert can be preloaded with test limits, hence automatic pass/fail criteria can be implemented from the device without the use of customized software.

Comparison of NEXT between a VNA and WireXpert with VNA adapter

Excellent Accuracy

With a dynamic range of 9 5 dB, and noise floor exceeding the draft Level V specification. On the right is the comparison between a 4 port Vector Network analyzer and WireXpert showcasing the various artifacts of a CAT7 cable beyond the specification of 600MHz on insertion loss and Near End Crosstalk (NEXT)
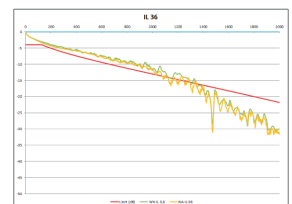
Comparison of Insertion Loss between a VNA and WireXpert with VNA adapter

Performance Specifications

Frequency of Measurement	1Mhz - 2.5Ghz	
Insertion Loss Dynamic Range	70dB	
Frequency (MHz)	**Directivity min. dB**	**RNEXT min. dB**
1	60	85
200	40	77
400	35	75
600	30	72
1,000	25	68
1,500	23	60
2,000	20	60