Application Brief

Signal Integrity Measurement Challenges

Anritsu

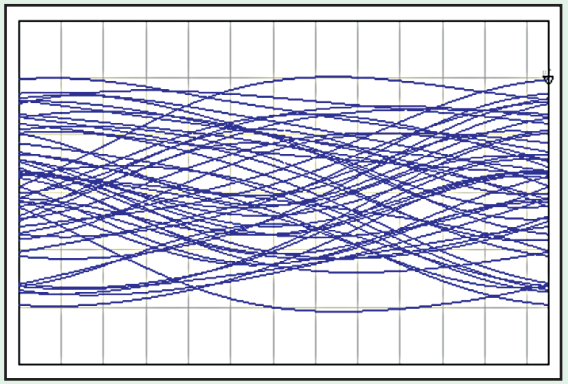
Eliminating High-Speed Interconnect Bottlenecks

Cloud computing and mobile internet services are causing large increases in network traffic. The instantaneous traffic rates at internet data centers have reached 1 Tbit/s and device interconnects are becoming transmission bottlenecks. Assuring signal integrity at high data rates while minimizing cost requires closing the loop of simulation and measurement during the design stage.

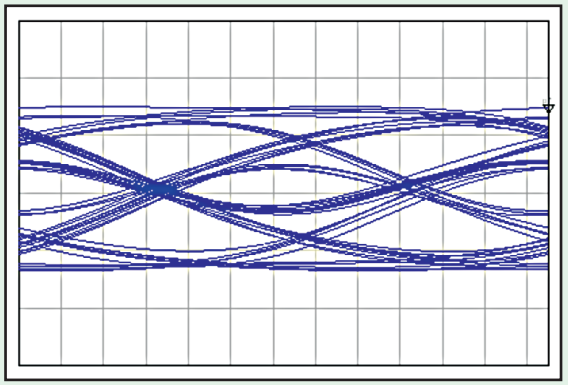
Today's Challenges:

Compliance to Standards	Designs for speeds exceeding 20 Gbit/s require test solutions with frequencies ranging from near DC to 70 GHz or even 110 GHz in a single sweep. Minimizing measurement uncertainty ensures compliance to new standards.
Correlating Simulation and Measurement	Accurate models help accelerate your design cycle. Poor causality results in reduced confidence in simulations. Minimizing DC extrapolation errors improves model accuracy and leads to better agreement with 3-D EM simulators. Poor quality low frequency s-parameter data can lead to erroneous eye diagram simulations. Concatenating measured data from multiple VNAs is time consuming and often introduces errors.
Cost/Performance Tradeoffs	Higher data rates introduce new design challenges like skin effects and dielectric loss on PC boards, along with the trade-offs of vias, stackups, and connector pins. Accurate measurements provide the confidence to make performance/ cost decisions.
Test Fixture De-Embedding	Many passivity/causality problems are due to poor calibration and de-embedding methods. High fixture loss may affect the accuracy and repeatability of de-embedding.
Changing Measurements Needs Over Time	Increasing bit rates or moving from passive device or linear active device measurement to non-linear device measurements can lead to the need for expensive new test equipment purchases.

Simulated Eye Diagrams using Measured S-Parameter Data



20 Gbit/s transmission with 0.5 dB insertion loss error at 10 MHz.



Using accurate low frequency S-parameter data reveals a compliant eye-pattern that is 85% open.

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Application Brief

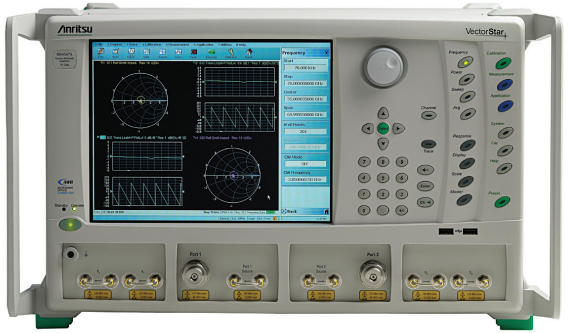
Signal Integrity Measurement Solutions

Anritsu VectorStar Resolves High-Speed Interconnect Bottlenecks

The Anritsu VectorStar™ MS4640B Series offers the best VNA performance across the widest frequency bandwidth. Direct broadband measurements from practically DC to greater than 110 GHz, high accuracy time domain, and wide dynamic range frequency domain measurements make the VectorStar the ideal tool for Signal Integrity designers. For transmission, reflection, NEXT and FEXT measurements on high speed balanced transmission lines and connectors, the VectorStar offers up to 12-port solutions.

Feature	Benefit
Broadest Frequency Span 70 kHz to 70/110 GHz	• Obtain the most thorough and accurate broadband measurements • Eliminate the time consuming, error prone concatenation process across the RF, microwave, and millimeter-wave bands
Highest performance S-parameter measurements down to 70 kHz	• Accelerate your design cycle with reduced risk of DC extrapolation errors in your modeling • Eliminate the need for concatenation of low and high frequency VNAs • Simulate eye diagrams with confidence
Best Time Domain Analysis	• Broadest coverage from 70 kHz to 70/110 GHz provides best combination of accurate and hi-res low pass time domain results • 100,000 points provide best-in-class alias-free range
Widest Range of Calibration and De-Embedding Techniques	• Improves ability to locate discontinuities, impedance changes, and crosstalk issues. • Newer more flexible and repeatability-tolerant methods help resolve complex 28+ Gbit/s problems
Complete Upgradability Within Family	• Buy what's needed now and protect investment by upgrading later or spread spending across budget years • Add Differential**View**™ and second source option for true mode stimulus measurements and also benefit from a continuous measurement display while actively editing key parameters • Test-set concept permits port-count to be increased when required

MS4640B VectorStar Series
70 kHz to 20/40/50/70/110+ GHz



VectorStar Series
Expandable 4/8/12-port solution 70 kHz to 70 GHz

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www.anritsu.com or 1-800-267-4878

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