



AttoTude Validates 224G and 448G PAM4 THz Technology for AI Data Centers

Semiconductor and AI Data Center Interconnects

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Keysight and Attotude Collaborate on Advanced Signal Analysis Solutions for THz Interconnect Development

01**Company**

AttoTude, a developer of wired THz interconnect technology for AI and hyperscale data center applications

02**Solutions**

Enhanced signal analysis capabilities in Keysight VSA software, including FlexFrame measurement capability, used with Keysight Pro Oscilloscopes

03**Challenge**

Characterize high-speed waveforms on THz carriers to advance interconnect performance for AI scale-up infrastructure

04**Results**

Accelerated characterization of AttoTude's THz technology and supported validation and evolution of its 224 Gb/s and 448 Gb/s PAM4 solutions

AttoTude Inc. provides terahertz (THz) interconnect technology for AI and hyperscale data center applications. As AI infrastructure pushes data throughput, reliability, and energy efficiency requirements higher, the company needed signal analysis tools that could help characterize high-speed waveforms modulated onto THz carriers and support faster development of its technology.

To support that work, AttoTude adopted enhanced signal analysis capabilities in Keysight's Vector Signal Analysis (VSA) software, used with Keysight Pro benchtop UXR-Series Oscilloscope. With FlexFrame measurement capability and recent software enhancements, the solution helps AttoTude validate and evolve its THz technology for 224 Gb/s and 448 Gb/s PAM4 solutions.

“**Dave Welch,****Co-founder and CEO, AttoTude**

As we push the boundaries of THz communications for AI data centers, it is essential to have advanced signal analysis tools that can keep pace with our innovations. Keysight's UXR Oscilloscope and 89600 VSA software with FlexFrame capabilities have proven invaluable in validating and evolving our THz technology for 224G and 448G PAM4 solutions.

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The Challenge

AI data centers are driving a new class of interconnect requirements. As compute density and parallel processing demands grow, interconnect technologies must support higher bandwidth while also addressing reliability, power, and scale constraints across the data center environment. AttoTude is focused on this problem with wired THz transceivers and THz over wire interconnect technology designed for AI data center applications.

The company's approach centers on ASIC-based transmission over low-loss THz waveguides. Its THz platform operates at frequencies up to 1 THz, with data rates reaching 448 Gb/s PAM4 modulation and is suitable for next-generation AI clusters and 200 Tb/s (200T) switches. That combination creates a demanding characterization environment where engineers need clear visibility into signal behavior at very high frequencies and data rates.

For AttoTude, the challenge was not only advancing the THz interconnect architecture itself. It also required signal analysis tools capable of helping engineers characterize high-speed waveforms modulated onto THz carriers and work through difficult channel conditions during development.

As AI infrastructure scales, that level of characterization becomes increasingly important. Development teams need to identify signal impairments early, validate design behavior with confidence, and keep innovation moving as interconnect demands continue to rise. This made robust measurement and analysis capability a key part of AttoTude's development workflow.

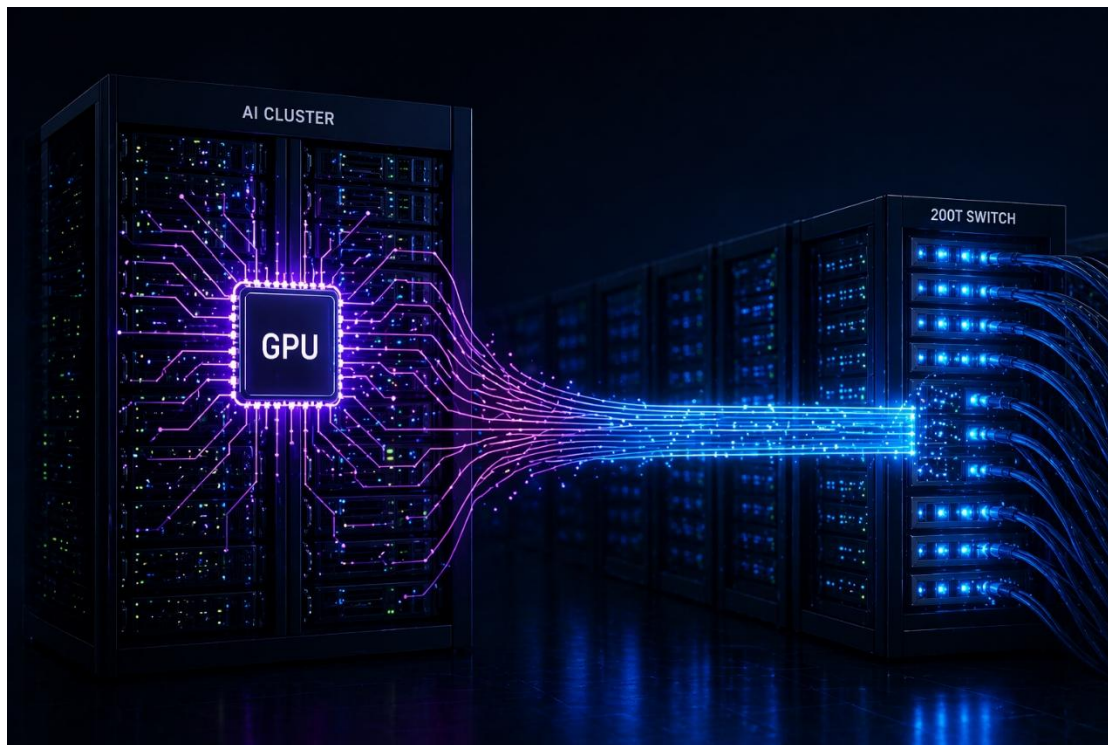


Figure 1. AI data center architectures require high-bandwidth, energy-efficient interconnects between GPU clusters and high-capacity switching infrastructure

The Solution

AttoTude adopted Keysight VSA software and the UXR-Series Oscilloscope to support characterization of its THz technology. In the collaboration, the oscilloscope and VSA software provided critical signal analysis tools for high-speed waveforms modulated onto THz carriers.

A central part of the solution is the VSA software's FlexFrame measurement capability. Recent FlexFrame enhancements include improved frequency estimation algorithms for challenging channel conditions, streamlined predistortion and receiver equalization capabilities, and expanded modulation format support. These capabilities align well with advanced development work where engineers need to analyze and troubleshoot complex signals with flexibility.

The **VSA software** is designed for research and development signal analysis and provides flexible, sophisticated measurement tools for finding and fixing complex signal problems. It supports more than 75 signal standards and modulation types, offers high-resolution analysis across time, frequency, and modulation domains, and can be applied across the design flow from simulation to production.

On the hardware side, Keysight positions its Pro oscilloscopes, including **XR9-class UXR-Series oscilloscopes**, as its highest-performance benchtop oscilloscopes for next-generation research and development and high-speed measurement challenges. Together, the Pro oscilloscopes and VSA software gave AttoTude a signal analysis environment suited to demanding THz interconnect characterization work.



Vector Signal Analyzer Software

Pro Benchtop Oscilloscopes

Figure 2. Keysight's signal analysis workflow gives engineering teams visibility into complex waveform behavior across time, frequency, and modulation domains

Results

With Keysight's solution, AttoTude accelerated characterization of its THz technology for AI data center applications. The collaboration supported the company's work to validate and evolve its technology for both 224 Gb/s and 448 Gb/s PAM4 solutions.

The work also supports a broader data center objective. AttoTude is developing THz interconnect technology to address bandwidth, reliability, and energy efficiency challenges in AI infrastructure, and the Keysight solution provided critical signal analysis tools to help move that effort forward.

For engineering teams, the value is clearer signal insight during development. Improved frequency estimation, predistortion support, receiver equalization capabilities, and expanded modulation support help teams characterize signals more effectively in complex channel conditions. That can make it easier to understand behavior, troubleshoot issues, and continue iterating on advanced interconnect designs.

The result connected advanced measurement capability with next-generation interconnect development. As AI data centers demand higher-performance scale-up infrastructure, accurate signal analysis helps innovators such as AttoTude move THz interconnect technology closer to practical deployment.

Conclusion

AI infrastructure is raising the bar for interconnect performance. Companies developing new approaches need tools that can keep pace with very high frequencies, fast data rates, and demanding characterization requirements.

Keysight's collaboration with AttoTude shows how advanced signal analysis can support this work. By combining VSA software with FlexFrame measurement capability and Pro Oscilloscopes, Keysight helped AttoTude characterize and validate THz technology for AI data center interconnect applications.

As THz-based interconnect innovation advances, this kind of measurement visibility can help engineering teams move from concept to validation with greater confidence. For organizations pursuing next-generation AI data center architectures, that makes signal analysis an important part of the development path.

Related Information

- [Keysight VSA software page](#)
- [Keysight Pro Benchtop Oscilloscopes page](#)
- [AttoTude company website](#)
- [Keysight and Attotude Collaborate on Advanced Signal Analysis Solutions for THz Interconnect Development](#), March 19, 2026 press release



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