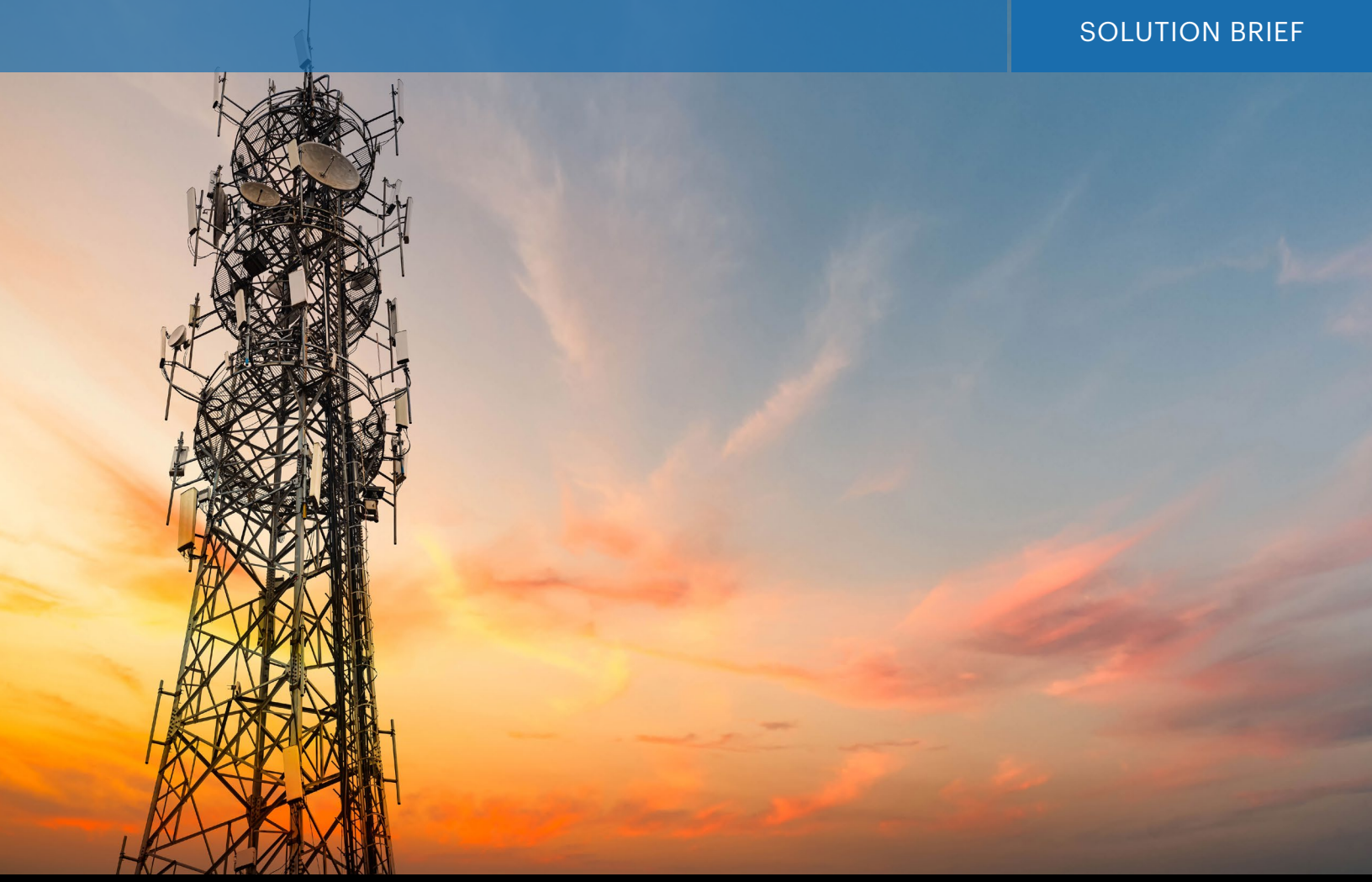
SOLUTION BRIEF



Conduct Quick and Accurate MIMO Testing

5G NR MIMO test and debug solution

KEYSIGHT

Introduction

Multiple-input multiple-output (MIMO) is a wireless communications technique for sending and receiving multiple data signals simultaneously over the same radio channel — 5G NR supports the method. MIMO uses up to eight layers in frequency range 1 (FR1), up to two layers in FR2 and multiple antennas to transmit data. The MIMO tactic exploits spatial differences in the channel to increase the overall throughput rate. By contrast, single-antenna single-input/single-output (SISO) implementation increase complexity. Such complexity introduces many design and testing challenges that affect peak data rates and make it difficult to troubleshoot and debug hardware performance issues.

Use Case Summary

As engineers move from SISO single-antenna implementations to MIMO for increased data rates, they need to ensure optimal performance in a multi-channel MIMO implementation. They must also perform comprehensive multi-channel MIMO measurements, such as error vector magnitude (EVM), a key metric for transmitter performance. For these reasons, the 5G NR MIMO measurement testbed should be flexible and scalable enough to address extreme frequency bandwidths and offer multiple channels to troubleshoot and debug hardware performance issues.

Solution Overview

Keysight's UXR Series oscilloscope works with the PathWave VSA 5G NR modulation analysis software to enable quick and accurate 5G NR MIMO test and debug. The solution provides up to four phase-coherent full-bandwidth channels with a maximum instantaneous bandwidth of up to 110 GHz at a sample rate of 256 GSa/s. These bandwidths enable Keysight's solution to achieve MIMO test and debug with high fidelity, low phase noise and accurate 5G NR EVM measurements.

Learn more at: MIMO and Wideband Millimeter-Wave Testing with the UXR

Figure 1. Keysight's 5G testbed

Summary

- The demand for next-generation wireless communications with better performance, MIMO support, shorter design cycles and greater bandwidth is driving the need for analysis tools that bridge the gap between signal / spectrum analysis and digital design.
- As they move from SISO to MIMO, engineers need to ensure optimal performance for a multichannel MIMO implementation.
- An accurate solution that combines signal, spectrum, and digital capabilities can help.

For more information: 5G NR MIMO Test and Debug

Keysight 5G NR MIMO test solution

- **UXR1104A Infiniium UXR-Series Oscilloscope**
- **PathWave VSA 5G NR Modulation Analysis**

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