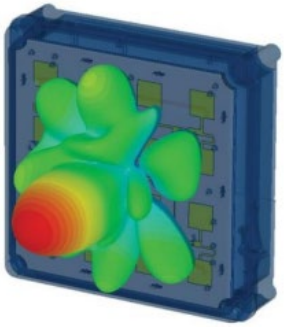
Need Faster Speeds to Characterize Your Phased Array Antenna?

Turn to our complete phased array test solution for calibration and verification with element-level accuracy

The phased array design and development process is complex as well as time and resource-consuming. Many barriers still exist when transitioning from single-element antennas to phased array solutions. A compact antenna range coupled with commercial test equipment and measurement software provides an economical and fast solution for calibrating and testing the performance of these antennas.

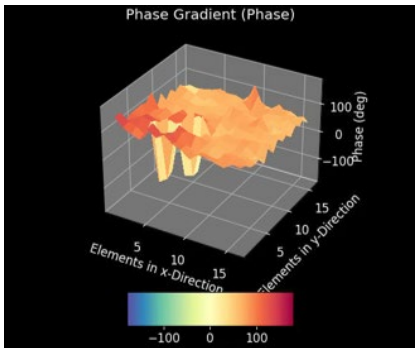


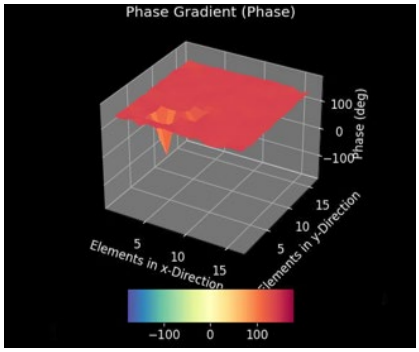
The phased array calibration and characterization test solution offers a comprehensive and user-friendly software interface. To deliver fast, fully automated measurements, it integrates and synchronizes digital control of Keysight's high-performance PNA-X vector network analyzer, VXG-C vector signal generator, and compact antenna range (CATR) with positioner, as well as the phased array antenna beamforming integrated circuit channels.

Calibrate Your Array in Minutes, Not Hours

Antenna array calibration is critical for phased array systems, as accurate beam pointing demands precise phase and amplitude control. A phased array system must undergo a calibration process to compensate for relative radio frequency (RF) variance between channels due to manufacturing differences in RF components, the printed circuit board, and the beamforming network. Additionally, electronic components vary with operating conditions, such as frequency and temperature, and will require stored calibration files as operating conditions change.

Pairing the CATR with the PNA-X vector network analyzer enables a suite of calibration routines and beam pattern measurements that sweep across azimuth and elevation. Keysight's phased array antenna calibration software characterizes the amplitude and phase of each array element with high levels of accuracy, reducing calibration time from hours to only minutes. The images below show a 256-element array before calibration (left) and after calibration (right). Two defective elements appear in both images.





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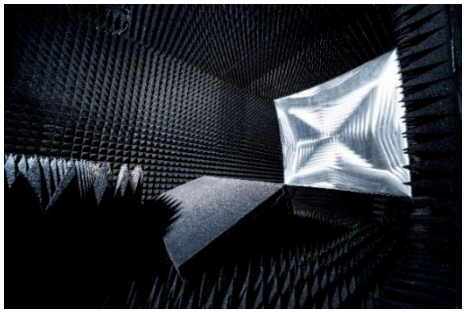
Speed Up Your Parametric Test

The phased array test solution also pairs the PNA-X vector network analyzer and VXG-C vector signal generator to deliver a convenient and flexible measurement system that accommodates a wide variety of phased array antenna performance verification tests. These tests include fast gain and phase calibration, effective isotropic radiated power (EIRP), antenna radiation pattern, antenna gain-to-noise-temperature (G/T), and RF to direct digital measurements.

Nonlinear measurements of the array, such as swept gain compression and error vector magnitude (in the classic “bathtub curve” of EVM vs. power), are made by driving the device into compression. The VXG-C provides a wideband modulated signal through a booster amplifier. The PNA-X also supports the Keysight PathWave Vector Signal Analysis software if other demodulation metrics like error summary tables, spectrum and time displays, and constellation diagrams are needed.

Get the Most Accurate Results

Keysight’s over-the-air CATR solutions are designed to integrate with the device development workflow from the early chipset and device prototyping through design verification, conformance, and carrier acceptance testing. The CATR is a shielded anechoic chamber with a rolled-edge reflector and a roll-over azimuth positioner. The chamber provides a measurement environment for characterizing antenna system performance from microwave through millimeter wave frequencies. By using a reflector, the fixed CATR method allows far-field measurements of both the individual elements and the full array in a much shorter distance than would be possible with a direct far-field measurement. Therefore, the CATR chamber provides lower signal path loss in a small, compact, and portable anechoic chamber.



Keysight enables innovators to push the boundaries of engineering by quickly solving design, emulation, and test challenges to create the best product experiences. Start your innovation journey at www.keysight.com.

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