

COMPACT SOLUTION FOR NETWORK ANALYSIS IN THE mmWAVE RANGE

The R&S®ZNA vector network analyzer with the integrated LO output option provides a simple, cost-effective solution for 2-port and 4-port measurements using Rohde & Schwarz mmWave converters.



Your task

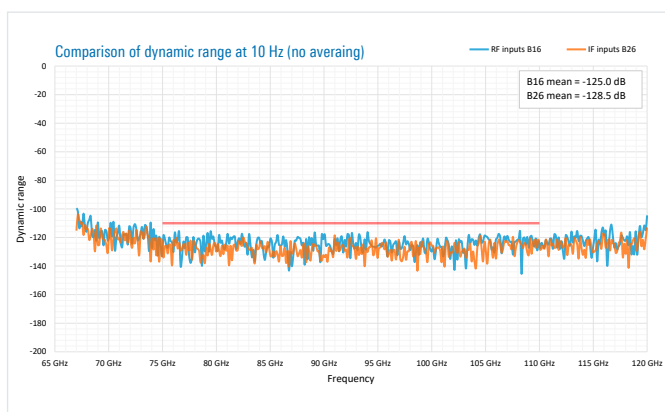
Extending the basic frequency range of high-end network analyzers has always been possible and was previously done in order to address high-frequency research applications. However, this involved expensive options and additional hardware to connect frequency extenders to the network analyzers.

As markets have developed, these high-frequency applications have migrated from research to more general-purpose device testing in production. The increasing use of E-band frequencies in backhaul and emerging 5G communications and the rapid advance of automotive radar have pushed the demand for a simple and cost-effective solution.

Rohde & Schwarz solution

The R&S®ZNA vector network analyzer (VNA) offers features that make it superior in performance and cost-effective at the same time, delivering maximum return on investment. With the R&S®ZNA-B26 direct IF access option (rear IF inputs), external frequency converters can be connected to the back of the instrument, freeing up the front panel ports and providing greater flexibility. Using these direct receiver inputs also improves the standard performance of many converters, e.g. in terms of dynamic range, since the receivers' frontend mixer stages are bypassed.

Typical dynamic range of an R&S®ZC110 mmWave converter using the rear-panel direct IF inputs



The R&S®ZNA-B8 mmWave converter LO option (rear LO output) makes it possible to use an additional internal high-power source to feed the LO signal to the converters. With this option, a 2-port or 4-port R&S®ZNA can be configured to interface directly with the mmWave convert-

Application Card
Version 01.00

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ers. No additional external test sets are required. Fitting this option to a 4-port R&S®ZNA model, for example, frees up all four test ports on the analyzer front panel, allowing for a full 4-port mmWave configuration with four converters. The LO output on the instrument rear can deliver up to +25 dBm signal power up to a frequency of 26.5 GHz. This perfectly satisfies the converters' power requirements, even when long cables are used.

The R&S®ZNA vector network analyzer 4-port models offer two other unique features that make them the most flexible instruments on the market:

- ▶ **R&S®ZNA-B5 2nd internal LO source for R&S®ZNA 4-port models:**
Allows the analyzer's internal receivers to be tuned to two different frequencies simultaneously. This makes it possible to characterize complex, frequency-converting devices quickly and easily in terms of both magnitude and phase, even with mmWave converter setups.
- ▶ **R&S®ZNAxx-B3 3rd and 4th internal source for R&S®ZNA 4-port models:**
Provides two additional internal sources so that each port has its own, independently controllable signal source.

The combination of the R&S®ZNA-B5 and R&S®ZNAxx-B3 options enables measurements on frequency-converting devices and allows users to mix and match different frequency converters (which have different frequency plans) to handle challenging measurement tasks.

Summary

The R&S®ZNA vector network analyzer uniquely addresses the needs for both a basic, cost-effective 2-port mmWave VNA solution and a more complex VNA test system requiring more than two converters to handle complex, frequency-converting measurements.

With up to five internal sources (including the rear LO output) and eight independent, phase-coherent internal receivers, measuring the phase of complex devices such as radar frontends and beamforming networks at mmWave frequencies is no longer a complicated task. No other instrument can offer the same level of integration, simplifying installations as it requires no additional external hardware.

See also

www.rohde-schwarz.com/product/ZNA application notes

Typical test setups: 2-port and 4-port mmWave converter configurations with the R&S®ZNA network analyzer

