COMPACT SOLUTION FOR NETWORK ANALYSIS IN THE mmWAVE RANGE

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

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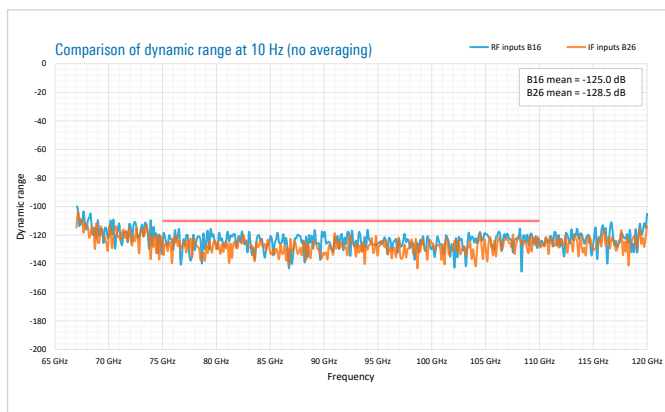

Your task

Extending the basic frequency range of high-end network analyzers has been possible for many years, although it was mainly to address high-frequency research applications. However, high-end network analyzers are not optimized for such setups, making them expensive and complicated.

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. LO and measurement signals are accessible with the R&S®ZNA-B26 direct IF access option (rear IF inputs), and 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 IF inputs also improves the standard performance of many converter setups, e.g. in terms of dynamic range, since the receivers' frontend mixer stages are bypassed.

The R&S®ZNA-B8 mmWave converter LO option (rear LO output) makes it possible 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 converters. An external generator is no longer needed, helping cut costs in 2-port or 4-port mmWave applications. Fitting this option to a 4-port R&S®ZNA model 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.

ROHDE & SCHWARZ

Make ideas real

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 in the mmWave range and allows users to mix and match different frequency converters (which have different frequency plans) to handle challenging measurement tasks.
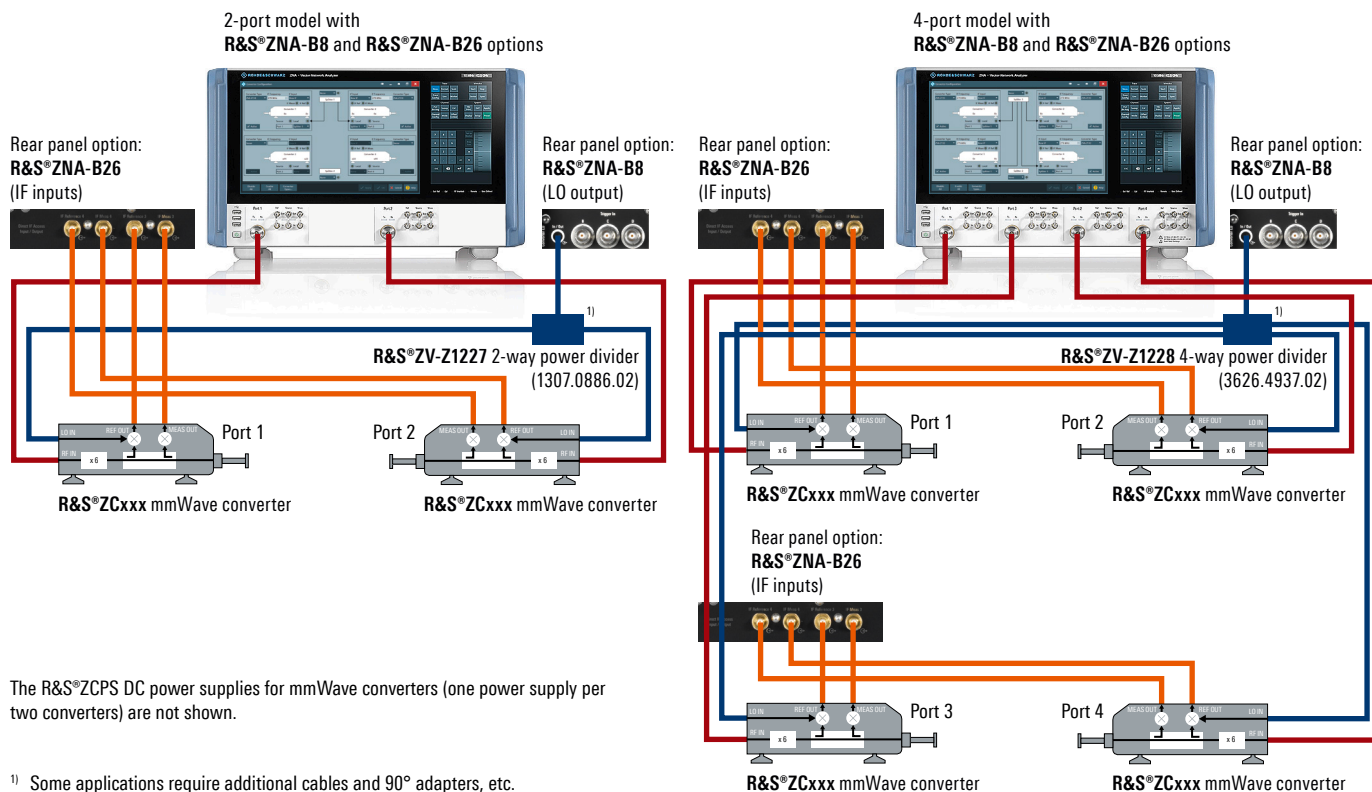
Summary

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 offers 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

2-port model with **R&S®ZNA-B8** and **R&S®ZNA-B26** options

Rear panel option: **R&S®ZNA-B26** (IF inputs)

Rear panel option: **R&S®ZNA-B8** (LO output)

R&S®ZV-Z1227 2-way power divider (1307.0886.02)

Port 1   Port 2

R&S®ZCxxx mmWave converter   **R&S®ZCxxx** mmWave converter

4-port model with **R&S®ZNA-B8** and **R&S®ZNA-B26** options

Rear panel option: **R&S®ZNA-B26** (IF inputs)

Rear panel option: **R&S®ZNA-B8** (LO output)

R&S®ZV-Z1228 4-way power divider (3626.4937.02)

Port 1   Port 2

R&S®ZCxxx mmWave converter   **R&S®ZCxxx** mmWave converter

Rear panel option: **R&S®ZNA-B26** (IF inputs)

Port 3   Port 4

R&S®ZCxxx mmWave converter   **R&S®ZCxxx** mmWave converter

The R&S®ZCPS DC power supplies for mmWave converters (one power supply per two converters) are not shown.

1) Some applications require additional cables and 90° adapters, etc.