Application Note

Application: IMD testing for RF power amplifiers.

Challenge: Synchronization between two separate signal generators, increased setup complexity, and higher overall costs.

Tabor's Solution: RF Analog Signal Generator LS1292B.

Instrument Key Specifications

• 12GHz RF Analog Signal Generators

• Extremely fast switching speed of <100us

• Exceptionally low phase noise of -145dBc/Hz @100MHz and 10kHz offset

• 2/4 phase coherent channels in a single box

• Remotely programmable via MATLAB, Python, LabView and other software programming environments

• Easy to use benchtop platform with 5'' touch screen and user-friendly GUI

• Small form factor and space efficient benchtop platform

• AM, FM, PM sweep & pulse modulation

• Removable SD card for instrument security

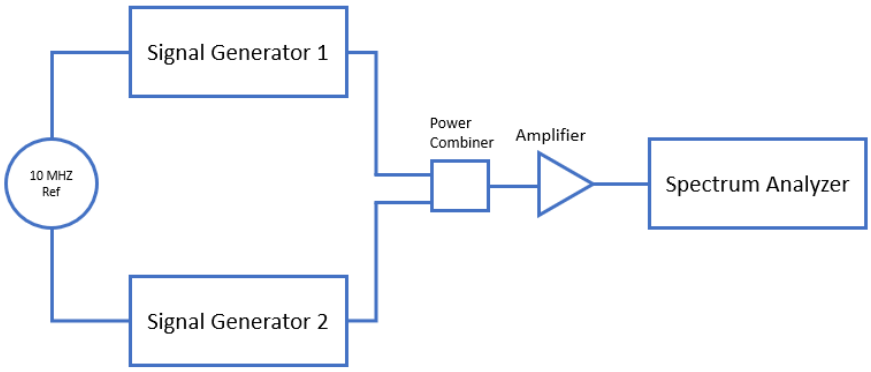
Result: Improved IMD testing with reduced setup complexity, providing phase stability for accurate measurements at a reduced cost.

Improve Intermodulation Distortion Testing for RF Power Amplifiers with the LS1292B RF Analog Signal Generator

A Power Amplifier (PA) is used in many RF and microwave applications for transmitting signals over distance. As a PA is a non-linear device, it will generate unwanted interference products when two or more frequencies interact with each other. The resulting frequencies are called Intermodulation Distortion (IMD) and can be within the systems bandwidth or not. Out-of-band interfering signals can violate regulations and appear as illegal transmissions. In-band distortion can impede the performance of the system, reduce its capacity, and can be catastrophic in some safety critical systems cases.

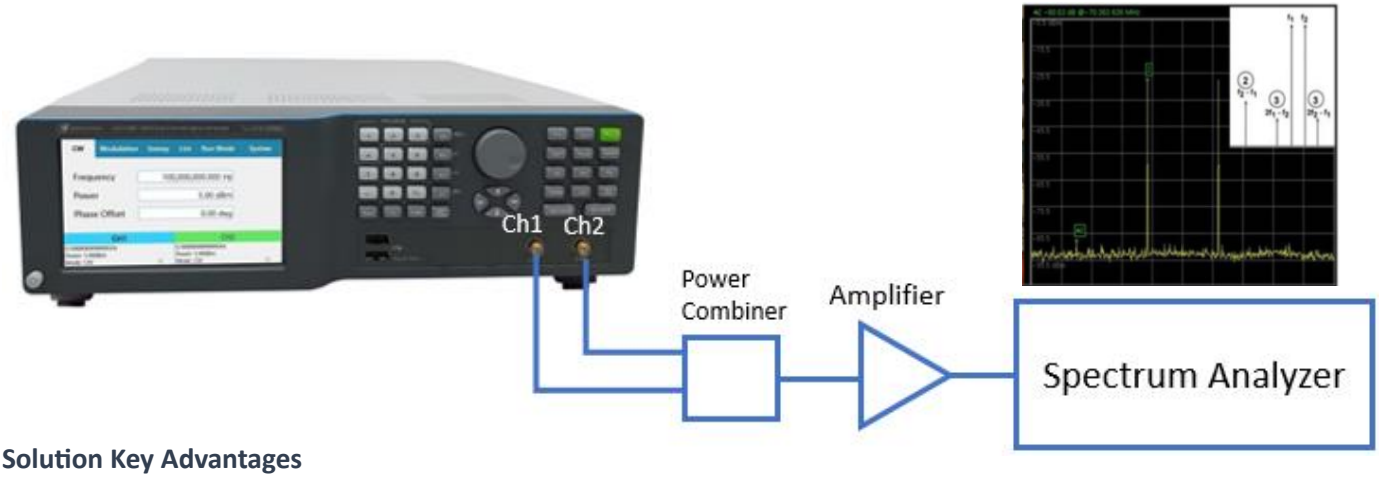
Traditional Methods and Challenges

When using two separate signal generators and a 10MHz reference for synchronization discrepancies in phase and amplitude between the two signal generators may introduce nonlinearity IMD errors. This will impair precise synchronization and require additional calibration steps.



The use of two generators create a more complex experimental setup. It demands increased effort and resources for calibration, alignment, and maintenance. Moreover, the adoption of two separate signal generators comes with a higher costs. The limitations extend to control and synchronization, where the increased complexity may hinder effective adjustments during experimentation. Additionally, the dual-generator setup consumes more physical space, proving less practical in compact laboratory environments and reducing overall portability. The difficulties involved in adjusting and maintaining relative phase and amplitude increase the setup time and raise the likelihood of errors. Maintaining phase stability between two tones for prolonged operation results in drift in the measurements.

Tabor's One Stop Solution — Tabor LS1292B RF Signal Generator



Solution Key Advantages

Phase stability and reduced complexity: The LS1292B provides phase stability across channels that is a crucial factor in RF testing. It allows to accurately measure intermodulation distortion and evaluate the signal integrity, critical for mission-critical communication and navigation.

It has a wide frequency range and agile waveform generation capabilities that enables it to test a broad spectrum of RF frequencies, ensuring comprehensive IMD testing e.g., various satellite communication bands.

The LS1292B provides precise control over signal parameters that ensures consistent and reproducible test results. This level of control is essential for meeting the strict standards required in e.g., Satcom applications.

Cost effectiveness: Investing in a high-quality, dual-channel signal generator is often more cost effective than purchasing two separate generators. This can result in significant savings in terms of equipment acquisition and maintenance costs.

Multiple ways to control: Tabor LS1292B can be seamlessly integrated into an IMD testing setup. The waveform generator's intuitive user interface and flexibility makes it easy for engineers to configure complex RF signal waveforms for IMD measurements. It has multiple ways to control the instrument:

- Use the front panel display of LS1291B or install the Lucid Control Panel software on a remote computer to control the instrument functions, modes, and features via its graphical user interface (GUI).
- Write applications in various environments like LabVIEW, Python, CVI, C++, VB and MATLAB
- Link the Tabor DLLs to other Windows-based API's or use low-level SCPI commands to program the instrument, regardless of whether the application is written for Windows, Linux or Macintosh operating systems.

To learn more about Tabor's solutions or to schedule a demo, please contact your local Tabor representative or email your request to info@tabor.co.il. More information can be found on our website at www.taborelec.com.