

Anritsu Advancing beyond

Simultaneous Sweep

Unlocking New Test Efficiency on MS46131A VNAs



Introduction

The Anritsu MS46131A is the world's first 1-port Vector Network Analyzer (VNA) capable of supporting frequencies up to 43.5 GHz in a compact, USB-powered form factor. Designed for high-performance S-parameter measurements in both lab and production environments, the MS46131A combines precision, portability, and ease of use. Its unique architecture allows for flexible deployment across a variety of test scenarios—from antenna characterization and component testing to high-frequency cable and connector analysis—while maintaining the accuracy and reliability expected from Anritsu instrumentation.

The newly released Simultaneous Sweep feature for the MS46131A series introduces a major advancement in parallel test workflows. This capability enables users to operate multiple MS46131A VNAs concurrently in independent software instances, unlocking true parallel measurement execution. The result is significantly enhanced test flexibility, improved throughput, and reduced total test time across diverse RF and microwave applications.

The Legacy Configuration: Shared Settings

In earlier software versions, users could connect up to four MS46131A units. However, these units operated under a single instance of the ShockLine software, which required all connected VNAs to share identical configuration settings (frequency range, number of points, IF bandwidth, power level, etc.).

This setup imposed key limitations:

- Uniform settings across all VNAs, restricting test versatility
- Single calibration state enforcement, or manual switching between calibration sets for different RF paths
- Reduced overall test efficiency when characterizing multiple devices with unique requirements

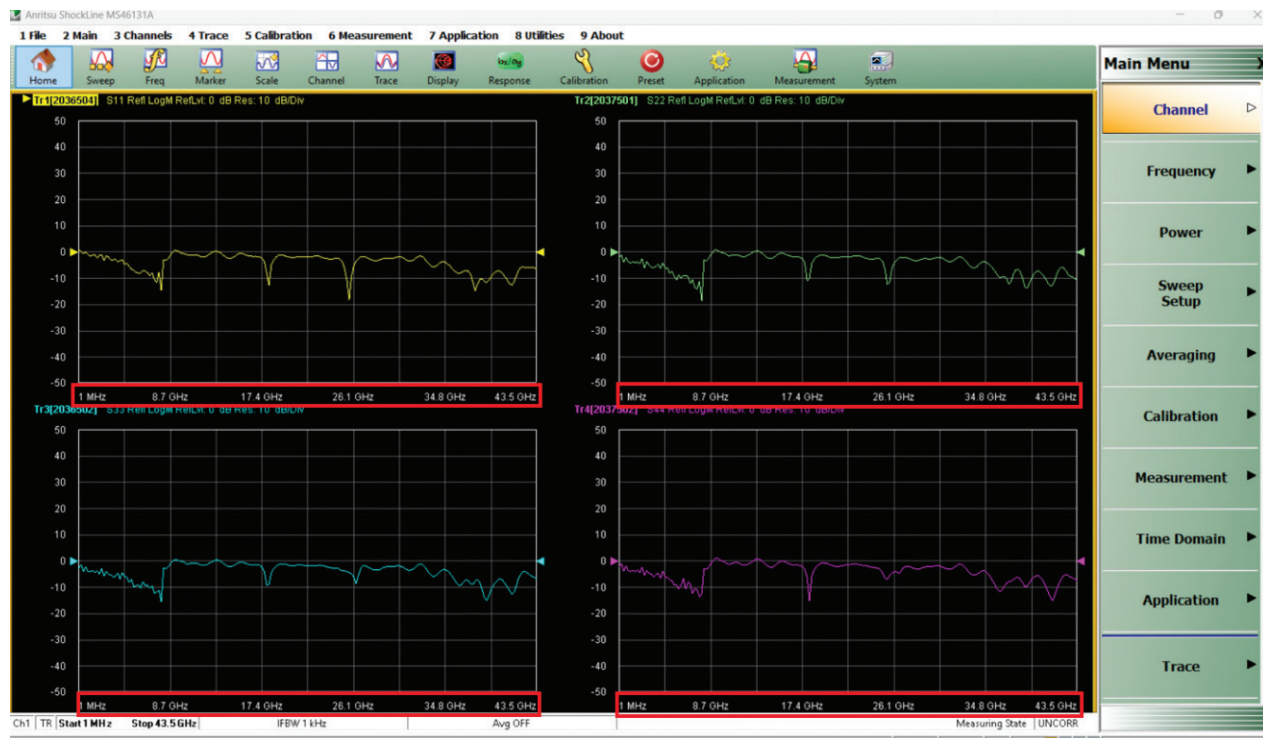


Figure 1.

The New Simultaneous Sweep Capability

Available in software version v2025.4.1, the Simultaneous Sweep feature allows each MS46131A to operate within its own software instance. This architecture supports: Independent frequency spans and sweep configurations, custom calibration and power settings per VNA and concurrent, real-time measurement across up to four units.

This advancement enables true parallel testing with unparalleled flexibility.

Key Advantages

- Independent Configuration: Tailor each VNA to specific device conditions.
- Parallel Testing: Significantly reduces test duration when evaluating multiple ports or devices.
- Scalability: Supports up to four MS46131A units simultaneously.
- Resource Optimization: Maximizes test bench efficiency in both R&D and manufacturing environments.

Use Case: Multi-Antenna Characterization

Multi-antenna systems often require characterization of individual antennas under varying conditions more often testing these devices with different performance parameters. With independent instances enabled by simultaneous sweep, engineers can connect four MS46131As to four separate antennas with each MS46131A can be configured separately without impacting the others and still run concurrent measurements.

Each VNA can use a unique calibration, frequency range, or stimulus power, tailored to its specific test case. Similar use case can apply to phased array antenna characterization where each VNA is connected to different antenna elements and measured concurrently. This results in significantly faster data acquisition and better insight into element-to-element variation.

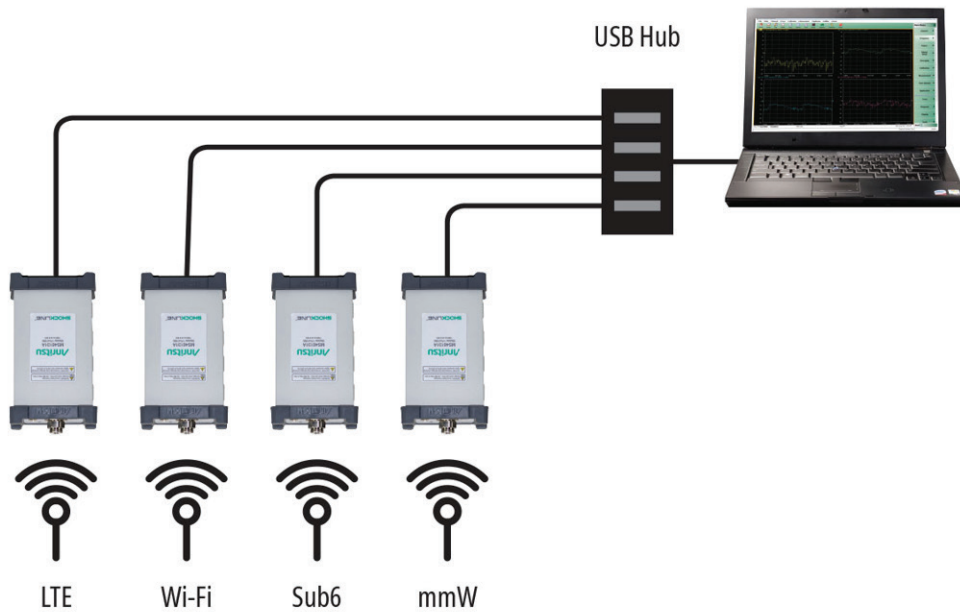


Figure 2.

Updated User Interface

To support the Simultaneous Sweep feature, the user interface has been updated to enable users to launch multiple independent VNA control instances. Each instance can be started from a central SL application launcher. Each window provides full control over sweep parameters, trace views, and calibration menus.

Upon launching the ShockLine software with four MS46131A units connected, users are presented with two interface options:

- Legacy Mode (left): Operates all VNAs within a single shared instance
- Simultaneous Sweep Mode (right): Allows opening each VNA in a separate control instance
 - Once Simultaneous Sweep mode is selected, subsequent launches default to this mode

Below is how the UI looks upon first launching the ShockLine application with 4 MS46131A connected.

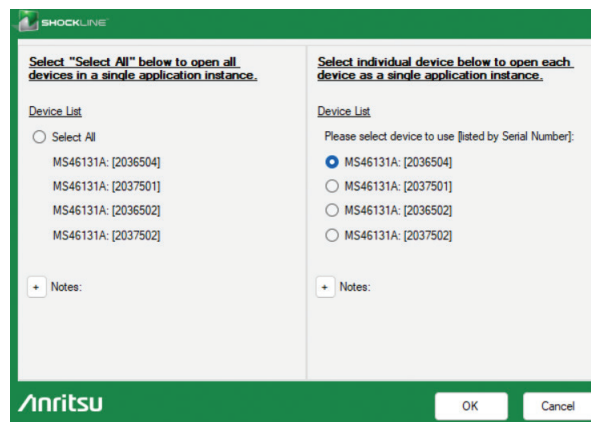


Figure 3. Selection Screen between Legacy Shared Instance and Simultaneous Sweep Interface



Figure 4. UI of the First MS46131A Instance

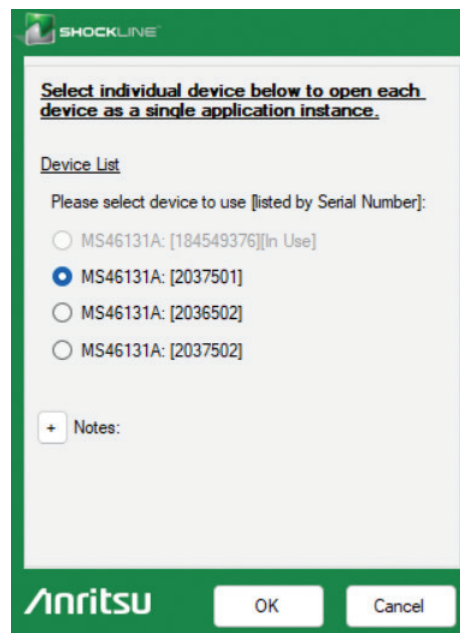


Figure 5. Selection Screen of the Second MS46131A Instance

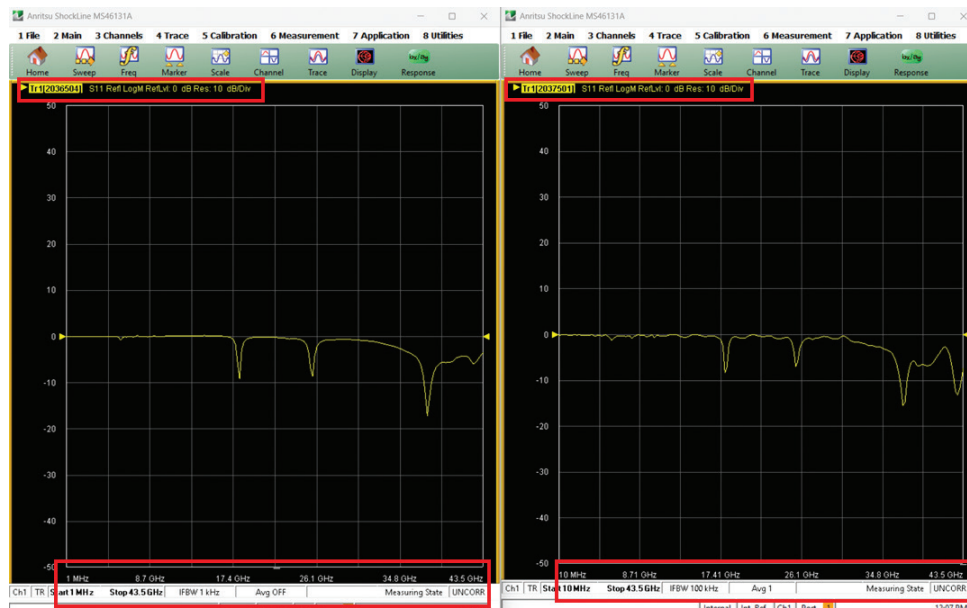


Figure 6. UI Setup with Two Independent VNA Control Panels



Figure 7. UI Setup with Four Independent VNA Control Panels

External Triggering for Synchronized Sweeps

Beyond the Simultaneous Sweep feature, external triggering provides a reliable hardware-level solution for synchronizing sweeps across multiple MS46131A VNAs. Each unit includes a Trigger port that can be configured to either send or receive trigger signals, enabling coordination via an external source such as a pulse generator or by designating one VNA as the master.

Trigger functionality is configured through the software interface:

- Trigger Out: Set to ON. Acts as a master to initiate triggers
- Trigger Out: Set to OFF. Functions as a receiver that waits for an incoming trigger signal



Figure 8.

This flexible setup ensures precise sweep timing alignment across all connected instruments, supporting demanding applications that require tightly synchronized measurements.

Synchronization Steps:

1. Trigger Out: Set to OFF and Trigger Source: Set to External
2. Set each VNA to Single Sweep and Hold mode
3. Connect an external trigger source to the Trigger port
4. Issue a trigger pulse to initiate sweeps simultaneously across all units

This method is particularly useful in time-critical measurements or when absolute synchronization is required across multiple ports or devices.

Remote Control via SCPI Commands

Each MS46131A can be individually controlled over LAN using SCPI (Standard Commands for Programmable Instruments) via TCP/IP. To manage multiple VNAs simultaneously, assign a unique TCP port number to each instrument. This allows independent or coordinated control from a central automation controller or script.

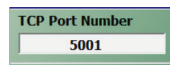


Figure 9.

For example:

- VNA #1 → TCP Port 5001
- VNA #2 → TCP Port 5002
- VNA #3 → TCP Port 5003
- VNA #4 → TCP Port 5004

The SCPI command set supports complete sweep configuration, triggering, and data retrieval. This capability enables seamless integration into automated test setups, including the orchestration of simultaneous or sequential sweeps across multiple instruments.

Scripting languages such as Python (with libraries like PyVISA or sockets), LabVIEW, or MATLAB can be used to communicate with each VNA independently or in parallel, depending on the test requirement.

Conclusion

Simultaneous sweeping with multiple MS46131A VNAs allows synchronized measurements across up to four 1-port VNAs, enabling effective multi-device characterization. This method provides time efficiency and consistent measurement conditions, critical for certain RF applications. Each MS46131A operates independently with its own configuration settings, local power and control. Sweep coordination can be achieved through software synchronization and/or external triggering. A centralized script can communicate with each VNA via TCP/IP over a local network, issuing sweep commands and retrieving data.

The Simultaneous Sweep feature on the Anritsu MS46131A series represents a transformative leap in how users can leverage compact, high-performance 1-port VNAs in parallel workflows. It addresses the limitations of prior shared-instance configurations and opens up new levels of efficiency and flexibility for both production and R&D environments.

Simultaneous sweep empowers test engineers with the tools to do more—in less time, with greater flexibility, accuracy and independence.



Specifications are subject to change without notice.

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