

# N7502A Signal Simulation System

## Product Overview

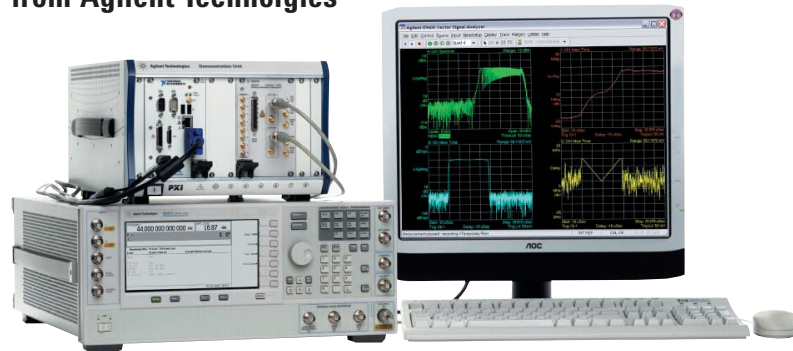
### Advanced Signal Simulation Capabilities from Agilent Technologies

#### Generate precision wideband signals easily and repeatedly

Agilent's new N7502A signal simulation system offers 1 GHz bandwidth with unmatched dynamic range up to 44 GHz carrier frequencies, allowing you to generate ultrawide-bandwidth signals easily and repeatedly with precision and freedom from spurious output and noise.

The N7502A system includes the new N6030A arbitrary waveform generator (AWG) and the Agilent E8267D PSG vector signal generator with optional 1 GHz baseband inputs. You take advantage of these core elements via the N7502A system software, which makes it straightforward to create even the most complex waveforms.

For signal analysis capability, you can add a PSA spectrum analyzer for signals up to 80 MHz bandwidth. For wider bandwidths, add vector signal analysis capability with a combination of an Infiniium real-time oscilloscope, 89601A vector signal analysis software and a suitable downconverter.



#### Flexibility and performance for today and tomorrow

The Agilent N7500 Series signal simulation and processing systems offer flexibility and performance for addressing wide variety of complex signal environments, including: radar/EW systems, satellite communications, and terrestrial microwave radio. As your needs change, the N7502A system is scalable to meet them. New equipment, new signals, and new capabilities can be added with minimal disruption to work flow.

#### Key attributes

##### Frequency coverage

250 kHz to 20, 31.8 or 44 GHz

##### Wide bandwidth

- 1 GHz for RF signals above 3.2 GHz
- 160 MHz for RF signals less than 3.2 GHz

#### Fast switching speed

The system can switch frequency in less than 1 ns for signals within the 1 GHz frequency bandwidth.

#### Wide dynamic range

- Broadband noise floor: less than -135 dBm
- Phase noise: less than -109 dBc/Hz at 10 kHz offset, CW
- Wide spurious-free dynamic range

#### System software

- MATLAB® command-line interface
- LabVIEW IVI-C-style driver
- Waveform generation toolbox
- Signal Studio for pulse building compatibility
- I/Q correction software



**Agilent Technologies**

### Block diagram

A simplified block diagram of the N7502A is shown below. The baseband generator I/Q outputs are routed to the E8267D synthesizer's I/Q inputs through phase-matched cables.

Optionally, the receive signal can then be downconverted and processed using a custom downconverter and broadband digitizing oscilloscope with built-in vector signal analysis software to demodulate and analyse waveforms, by comparing them to idealized or expected results.

### Multi-channel configurations

Multiple channels can be configured with the addition of up to eight AWGs and PSGs. Phase-coherent channels can be established with the ability to measure and control phase relationships.

### Applications

The N7502A signal simulation system is designed to generate stimulus for aerospace defense test needs including radar, satellite, electronic warfare (EW), electronic intelligence (ELINT), and signal intelligence (SIGINT) and other wideband IQ modulation applications. The system can generate realistic

EW and battlefield scenarios. Additionally, it can provide satellite channel simulation with high channel occupancy to improve system validation.

Specific measurements for noise power ratio, and Barker-coded and chirp radar signals are shown in the following screenshots.

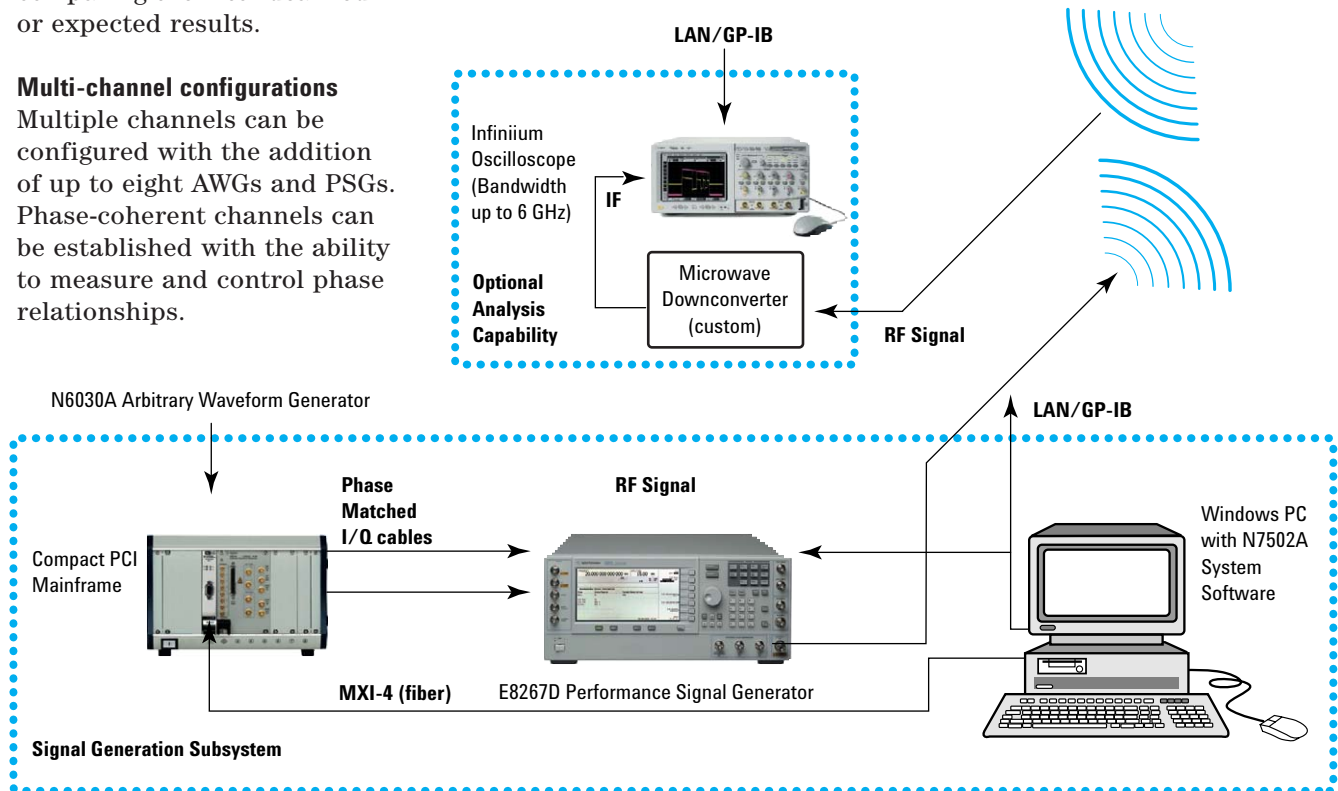


Figure 1. Simplified block diagram of N7502A

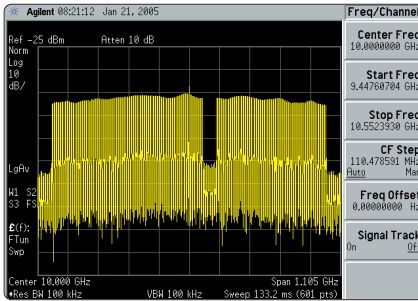


Figure 2. Noise power ratio waveform

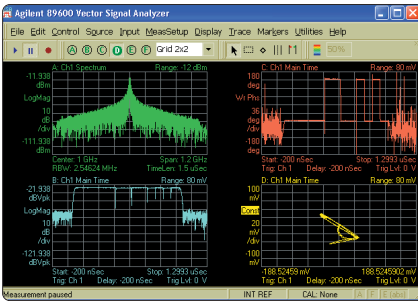


Figure 3. Barker-coded radar signal

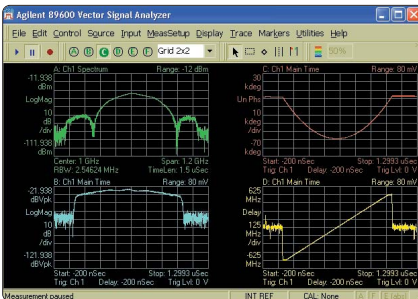


Figure 4. Chirp radar signal up to 1 GHz wide

**Application assistance**

Agilent’s signal generation and analysis experts are available to help you take full advantage of the system for your unique application. User training and consulting can help you get up to speed quickly. If your application has unique

requirements, Agilent program managers and engineering professionals can help define and implement unique functionality. They ensure that your custom requirements are successfully implemented, from initial design through acceptance.

**Waveform generation toolbox**

The Waveform Generation Toolbox provides a simplified interface for baseband modulation of the N7502A system. Even the most complex signals are defined and implemented easily through the software interface. Signals can be defined through basic parameter entry or from files created in MATLAB or other engineering environments.

For each selection in the main menu, a subsequent screen appears, enabling the user to enter the parameters required to define the waveform and invoke the built-in calibration routines. A display on each sub-panel shows the ideal frequency domain waveform calculated from entered parameters.

A simulation mode is provided to enable development and operation without connection to the instrument hardware.



Figure 5. Waveform generation toolbox main menu

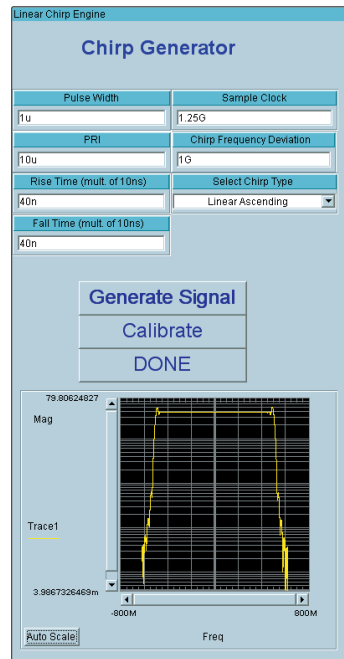


Figure 6. Linear chirp generator parameter entry screen

### Warranty information

Agilent provides a 1-year return-to-Agilent warranty on custom systems. Warranty extensions and custom repair strategies are available to meet your specific requirements. System specifications

### System Specifications

Your system specifications will be dependent on system configuration, including the building blocks you chose and your specific requirements.

### Ordering information

Contact your Agilent representative.

### Web Resources

For additional product information, visit:

[www.agilent.com/find/signalsimulation](http://www.agilent.com/find/signalsimulation)

### Related Agilent literature

- *N6030A Arbitrary Waveform Generator*  
Technical overview  
5989-1457EN
- *E8267D PSG Vector Signal Generator*  
Data sheet  
5989-0697EN
- *Infiniium Oscilloscopes and 89601A Vector Signal Analysis Software*  
Data sheet  
5989-0947EN

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