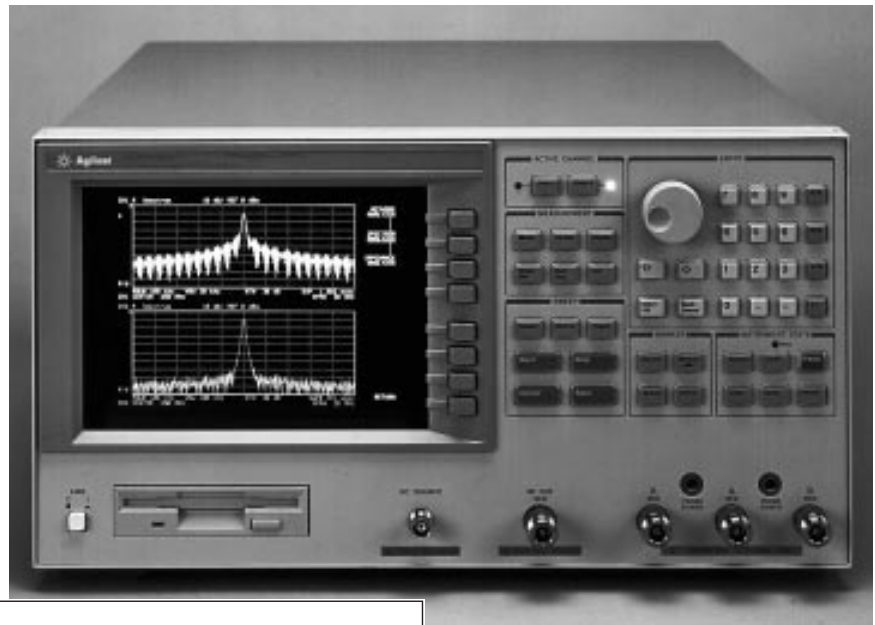


Agilent 4395A 10 Hz to 500 MHz Agilent 4396B 2 Hz to 1.8 GHz Spectrum Analyzers

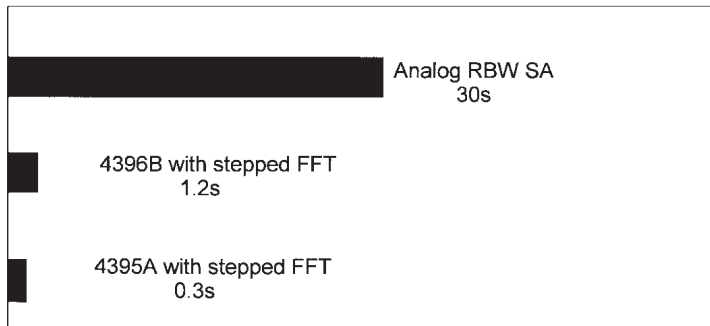
Dramatic Speed Improvement for Narrow RBW Sweeps by Audio/Video/IF/RF Spectrum Analyzers

Awareness Brochure

Design and Test Solution for
VCR, HDTV, HDD, ODD, DVD,
CATV, GPS, GSM, VSAT and
Other Communications



Sweep Time Comparison at
100 kHz Span and 100 Hz RBW



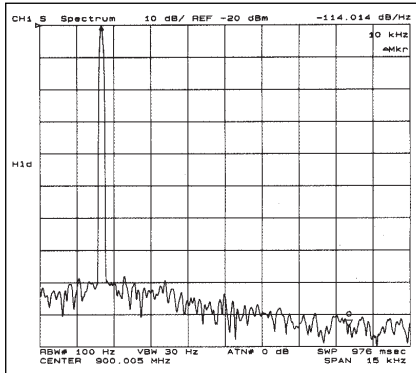
Agilent Technologies

Innovating the HP Way

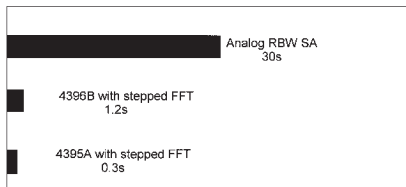
Precision Spectrum Analysis with Improved Speed and Accuracy

Accurate signal monitoring is critical for designing quality products. In today's competitive environment, you need better spectrum measurement capabilities to stay ahead of the competition. The Agilent Technologies 4395A and 4396B, designed with new digital techniques, outperform traditional analog spectrum analyzers.

- Improve testing speed up to one hundred times for narrow RBW sweep. The analyzer's stepped FFT technique (4395A: all RBWs, 4396B: RBW \leq 3 kHz) breaks the speed barrier to give you lower noise floor without sacrificing speed.
- Fully synthesized source.
- ± 1.0 dB overall level accuracy.
- 1 Hz RBW with 3:1 shape factor for close-in signals.

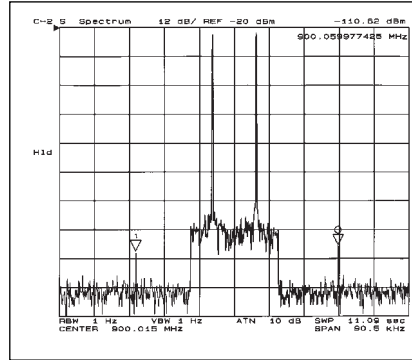


Sweep Time Comparison at 100 kHz Span and 100 Hz RBW



Get dramatic speed improvement, with no loss of accuracy, for narrow RBW sweeps. In addition, low phase noise provides improved signal resolution.

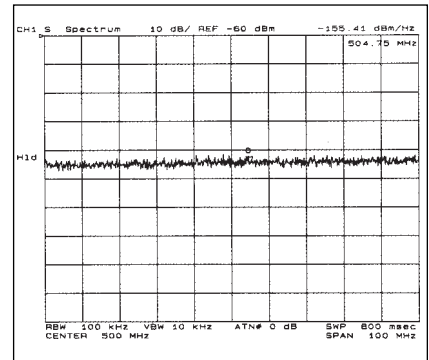
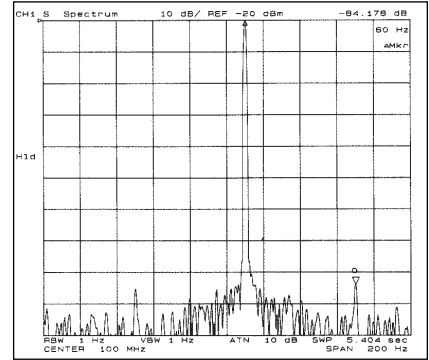
List sweep function can be used in the spectrum analysis. List sweep separates the sweep frequency range into segments, and each segment can have an independent frequency range, number of sweep points, RBW, and power level settings. By using list sweep function, separate frequency bands can be measured in one sweep, or different RBW can be set for harmonics, IMD, and wide dynamic range measurements can be made in a shorter time.



- A Fully synthesized source.
- Get ± 1.0 dB overall level accuracy.
- See close-in signals using the 1 Hz RBW with a 3:1 shape factor.

Monitor close-in low level signals

such as the 60-Hz power line sideband ripple shown here. You get excellent spectral resolution from digital RBW filters (4395A: all RBWs, 4396B: RBW \leq 3 kHz) with a shape factor as steep as 3:1.



Measure noise precisely.

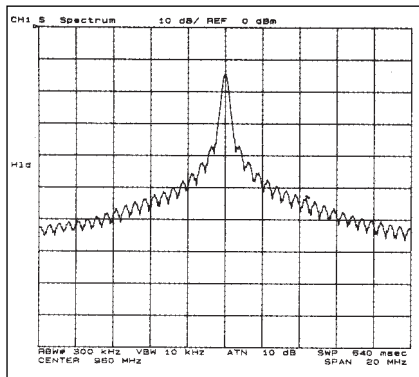
The analyzer's low noise floor provides the sensitivity required for detecting low-level signals.

Accurate Burst Signal Analysis with Time Gated Function (Opt. 1D6)

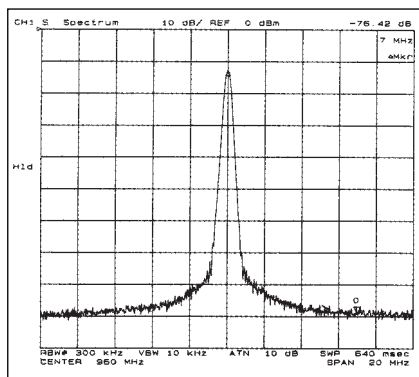
Signals to be measured are often composed of repeated bursts in these applications.

- CATV
- GPS
- GSM
- HDTV
- VSAT
- VCR
- Optical Disk Drive
- Hard Disk Drive
- Mobile Radio
- Cellular Communications

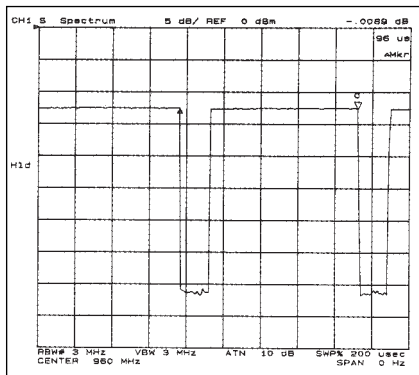
Spectrum Analysis results from **traditional swept measurements on burst signals** include not only the signal of interest, but also the signal from the burst repetition period. The noise floor is higher in burst measurements that mask the signal of interest. So accurate signal to noise and carrier to noise measurements are impossible.



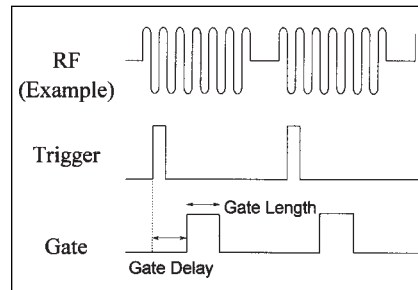
Measurements on burst signals often hide significant details (without time gating)



After performing time gating, the details are revealed



View of zero span measurement for burst signal



Burst signal time domain chart

You can use **Time Gated Function (Option 1D6)** to accurately characterize burst-modulated signals used in the previously listed applications. Narrow gating (4395A: 6 μ s min., 4396B: 2 μ s min.) can be performed. Digital video bandwidth smooths noise faster than analog spectrum analyzers.

View the amplitude and modulation characteristics of a repetitive signal in **Zero Span (Digitized Time-Domain Sweep)**. The analyzer functions as a tunable receiver.

Take an innovative approach to evaluating electronic components and circuits. The Agilent 4395A and 4396B combine three analyzer functions in one powerful instrument: a spectrum analyzer, a vector network analyzer, and an optional impedance analyzer. Now you can use one ana-

lyzer for multiple testing needs. In highly competitive industries that require rapid turn-around and time-to-market, the 4395A and 4396B provide the most complete, fast, and accurate characterization available for devices such as mixers, amplifiers, filters, transistors, cables, and mono-

lithic ICs or circuit block devices. Make all of the following measurements with the 4395A and 4396B. The 4395A and 4396B solve tough measurement problems and slash test times. The brief specifications are given in the next page.

Vector Network Analysis	Spectrum Analysis	Impedance Analysis²
Attenuation	Adjacent Channel Power ¹	Impedance (Z)
Bandwidth	Carrier-to-Noise	Admittance (Y)
Center Frequency	Flatness	Phase (θ)
Complex Impedance	Frequency	Resistance (R)
Cross Talk/Isolation	Harmonic Distortion	Reactance (X)
Directivity	Intermodulation Distortion	Conductance (Γ)
Flatness	Linearity	Susceptance (B)
Frequency Response	Noise	Capacitance (C)
Gain/Loss	Occupied Bandwidth ²	Inductance (L)
Gain Compression	On/Off Ratio	Dissipation Factor (D)
Group Delay	Phase Noise	Quality Factor (Q)
Insertion Loss	Power	Reflection Coefficient (Γ)
Linearity	Sensitivity	
Phase	Spurious	
Reflection Coefficient	Sidebands	
Return Loss		
Ripple		
Rolloff		
VSWR		

Optional: Burst-signal Analysis (Opt. 1D6)

1. With Agilent IBASIC

2. With Option 010 and Agilent 43961A

Agilent 4395A Major Specifications

Network Analyzer Specification		Spectrum Analyzer Specification		Impedance Analyzer Specification ²	
Frequency Range	10 Hz to 500 MHz ¹	Frequency Range	10 Hz to 500 MHz	Frequency Range	100 kHz to 500 MHz
Frequency Resolution	1 mHz	Noise Sidebands	<-104 dBc/Hz typical at 10 kHz offset	Meas. Parameter	Z , θ_z , R, X, Y , θ_y , G, B, Cs, Cp, Ls, Lp, Rp, Rs, X, D, Q, Γ , Γ_x , Γ_y
Output Power Range	-50 to 15 dBm	Resolution Bandwidth	1 Hz to 1 MHz in 1-3-10 steps	Z Accuracy	$\pm 3\%$ (typical, basic accuracy)
Dynamic Range	115 dB@10 Hz IFBW	Dynamic Range	>100 dB third-order free dynamic range	Source Level	-56 dBm to +9 dBm (at DUT)
Dynamic Accuracy	± 0.05 dB/0.3 deg.	Level Accuracy	± 0.8 dB@50 MHz	DC Bias	± 40 V (20 mA (max)) (Opt. 001 DC source or External DC source is required.)
Calibration	full two-port	Sensitivity	-145 dBm/Hz @freq. = 10 MHz	Compensation	OPEN/SHORT/LOAD Port Extension
Standard Features: Instrument BASIC, GPIB port, 3.5" floppy disk drive, direct print, RAM disk, VGA Monitor Output					
Optional Features: Impedance measurement (Opt. 010), Time-gated spectrum analysis (Opt. 1D6), High-stability frequency reference (Opt. 1D5), 50 Ω to 75 Ω Spectrum input impedance conversion (Opt. 1D7), DC Source (± 40 V, 100 mA (ALC)) (Opt. 001)					

- 100 kHz to 500 MHz if using the 87511 A/B S-parameter test set
- With Option 010 and the 43961A RF impedance test kit

Agilent 4396B Major Specifications

Network Analyzer Specification		Spectrum Analyzer Specification		Impedance Analyzer Specification ²	
Frequency Range	100 kHz to 1.8 GHz ¹	Frequency Range	2 Hz to 1.8 GHz	Frequency Range	100 kHz to 1.8 GHz
Frequency Resolution	1 mHz	Noise Sidebands	<-113 dBc/Hz typical at 10 kHz offset	Meas. Parameter	Z , θ_z , R, X, Y , θ_y , G, B, Cs, Cp, Ls, Lp, Rp, Rs, X, D, Q, Γ , Γ_x , Γ_y
Output Power Range	-60 to 20 dBm	Resolution Bandwidth	1 Hz to 3 MHz in 1-3-10 steps	Meas. range	2 Ω to 5 k Ω
Dynamic Range	>120 dB@10 Hz IFBW	Dynamic Range	>100 dB third-order dynamic range	Z Accuracy	$\pm 3\%$ (typical, basic accuracy)
Dynamic Accuracy	± 0.05 dB/0.3 deg.	Overall Level Accuracy	$< \pm 1.0$ dB	Source Level	-66 dBm to +14 dBm (at DUT)
Calibration	full two-port	Sensitivity	<-147 dBm/Hz @freq. = 1 GHz	DC Bias	± 40 V (20 mA (max)) (External DC bias source is required)
Standard Features: Instrument BASIC, GPIB port, 3.5" floppy disk drive, direct print; RAM disk, VGA Monitor Output					
Optional Features: Impedance measurement (Opt. 010), Time-Gated spectrum Analysis (Opt. 1 D6), High-Stability Frequency Reference (Opt. 1 D5), 50 Ω to 75 Ω Spectrum Input Impedance Conversion (Opt. 1 D7),					

- 300 kHz to 1.8 GHz if using the Agilent 85046A/B S-parameter test set
- With Option 010 and the Agilent 43961A RF impedance test kit

For more information, refer to the following Agilent literature:

P/N	KIND	Title	Product
5965-9374E	Awareness Brochure	Agilent's Family of Combination Analyzers 4395A/4396B	4395A/ 4396B
5965-6311E	Data Sheet	4396B 1.8 GHz Network/Spectrum Analyzer	4396B
5965-9340E	Data Sheet	4395A Network/Spectrum/Impedance Analyzer	4395A
5965-7656E	Application Note	Combining Network and Spectrum Analyses and IBASIC to Improve Device Characterization and Test Time, AN 1288-1	4396B
5965-7657E	Application Note	Configuring the Agilent 4396B for O/E Testing, AN 1288-2	4396B
5965-7658E	Application Note	Using the Agilent 4396B for Digital VTR Testing, AN 1288-3	4396B
5965-9434E	Application Note	How to Characterize CATV Amplifiers Effectively, AN 1288-4	4396B
5966-2292E	Product Note	How to Measure Noise Accuracy Using the Agilent Combination Analyzers	4395A/ 4396B

Agilent Technologies' Test and Measurement Support, Services, and Assistance

Agilent Technologies aims to maximize the value you receive, while minimizing your risk and problems. We strive to ensure that you get the test and measurement capabilities you paid for and obtain the support you need. Our extensive support resources and services can help you choose the right Agilent products for your applications and apply them successfully. Every instrument and system we sell has a global warranty. Support is available for at least five years beyond the production life of the product. Two concepts underlie Agilent's overall support policy: "Our Promise" and "Your Advantage."

Our Promise

"Our Promise" means your Agilent test and measurement equipment will meet its advertised performance and functionality. When you are choosing new equipment, we will help you with product information, including realistic performance specifications and practical recommendations from experienced test engineers. When you use Agilent equipment, we can verify that it works properly, help with product operation, and provide basic measurement assistance for the use of specified capabilities, at no extra cost upon request. Many self-help tools are available.

Your Advantage

"Your Advantage" means that Agilent offers a wide range of additional expert test and measurement services, which you can purchase according to your unique technical and business needs. Solve problems efficiently and gain a competitive edge by contracting with us for calibration, extra-cost upgrades, out-of-warranty repairs, and on-site education and training, as well as design, system integration, project management, and other professional services. Experienced Agilent engineers and technicians worldwide can help you maximize your productivity, optimize the return on investment of your Agilent instruments and systems, and obtain dependable measurement accuracy for the life of those products.

Get assistance with all your test and measurement needs at:

www.agilent.com/find/assist

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