Acquisition:Spectrum:FFT Window Type Property

»Table of Contents

Short Name: FFT Window Type

Property of niRFSA

Specifies the time-domain window type.

Default Value: 7-term Blackman-Harris

Supported Devices: NI 5661/5663/5663E/5665

Uniform (500)	No window is applied.
Hanning (501)	The Hanning window is useful for analyzing transients longer than the time duration of the window, and also for general-purpose applications. A Hanning window is applied to the waveform using the following equation: $y[i] = 0.5 \times x[i] \times [1-\cos(w)]$ where $w = (2\pi)i/n$ and n = waveform size.
Hamming (502)	A Hamming window is applied to the waveform using the following equation: $y[i] = x[i] \times [0.54 - 0.46\cos(w)]$ where $w = (2\pi)i/n$ and n = the waveform size. **Note** Hanning and Hamming windows are somewhat similar. However, in the time domain, the Hamming window does not get as close to zero near the edges as does the Hanning window.
Blackman-Harris (503)	A Blackman-Harris window is applied to the waveform using the following equation: $y[i] = x[i] \times [0.42323 - 0.49755\cos(w) + 0.07922\cos(2w)]$ where $w = (2\pi)i/n$ and n = the waveform size.
Exact Blackman (504)	An Exact Blackman window is applied to the waveform using the following equation: $y[i] = x[i] \times [a_0 - a_1\cos(w) + a_2\cos(2w)]$ where $w = (2\pi)i/n$ n = the waveform size $a_0 = 7938/18608$ $a_1 = 9240/18608$ $a_2 = 1430/18608$
Blackman (505)	A Blackman window is useful for analyzing transient signals, and provides similar windowing to Hanning and Hamming windows but adds one additional cosine term to reduce ripple. A Blackman window is applied to the waveform using the following equation: $y[i] = x[i] \times [0.42 - 0.50\cos(w) + 0.08\cos(2w)]$ where $w = (2\pi)i/n$ and n = the waveform size.
Flat Top (506)	The fifth-order Flat Top window has the best amplitude accuracy of all the window functions. The increased amplitude accuracy (±0.02 dB for signals exactly between integral cycles) is at the expense of frequency selectivity. The Flat Top window is most useful in accurately measuring the amplitude of single frequency components with little nearby spectral energy in the signal. A fifth-order Flat Top window is applied to the waveform using the following equation: $y[i] = x[i] \times [a_0 - a_1\cos(w) + a_2\cos(2w) - a_3\cos(3w) + a_4\cos(4w)]$ where $w = (2\pi)i/n$ n is the waveform size $a_0 = 0.215578948$

NI RF Vector Signal Analyzers Help (NI-RFSA 2.5.2)

Edition Date: March 2012

Part Number: 372058H-01

»View Product Info

	a_1 = 0.41663158 a_2 = 0.277263158 a_3 = 0.083578947 a_4 = 0.006947368.
4-term Blackman-Harris (507)	A four-term Blackman-Harris window is a general-purpose window; it has side-lobe rejection in the upper 90 dB, with moderately wide side lobe. A 4-term Blackman Harris window is applied to the waveform using the following equation: $y[i] = x[i] \times [0.422323 - 0.49755\cos(w) + 0.07922\cos(2w)]$ where $w = (2\pi)i/n$ and n = the waveform size.
7-term Blackman-Harris (508)	A 7-term Blackman-Harris window has the highest dynamic range; it is ideal for signal-to-noise ratio applications. A 7-term Blackman Harris window is applied to the waveform using the following equation: $y[i] = x[i] \times [a_0 - a_1\cos(w) + a_2\cos(2w) - a_3\cos(3w) + a_4\cos(4w) - a_5\cos(5w) + a_6\cos(6w)]$ where $w = (2\pi)i/n$ n is the waveform size a_0 = 0.27105140069342 a_1 = 0.43329793923448 a_2 = 0.21812299954311 a_3 = 0.06592544638803 a_4 = 0.01081174209837 a_5 = 0.00077658482522 a_6 = 0.00001388721735.
Low Side Lobe (509)	The Low Side Lobe window further reduces the size of the main lobe. The following equation defines the Low Side Lobe window. $w(n) = \sum_{k=0}^{4}(-1)^k a_k \cos(k\omega),$ for n = 0, 1, ..., N - 1 where N is the length of window $w = (2\pi n)/N$ a_0 = 0.323215218 a_1 = 0.471492057 a_2 = 0.17553428 a_3 = 0.028497078 a_4 = 0.001261367

Remarks

The following table lists the characteristics of this property.

Datatype	I32
Permissions	Read/Write
High-level VIs	N/A
Channel-based	No
Resettable	Yes