



VECTRON
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**Subject: RMS Jitter Calculation in the
12 kHz to 20 MHz Bandwidth for VI's
VCO600A/VS500 @622**

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For applications requiring a 622.080, or 666.5143, MHz PECL/ECL VCO with the lowest possible jitter

in the 12kHz to 20 MHz bandwidth, VI is offering the VCO600A/VS500 Series. These devices utilize SAW technology that resonates at a fundamental frequency eliminating the need for internal multiplication, which is usually required to achieve high frequencies. The net result is no harmonics/subharmonics and low phase noise, or in the time domain, low jitter. The phase noise was measured on several pairs of the VCO600A @ 622.080 MHz using an HP 3048A Phase Noise Measurement System. The typical phase noise was then integrated from 12 kHz to 20 MHz and converted to jitter using the methodology outlined in VI's "Jitter in Clock Sources" by Joe Adler, (available for download at VI's website www.vectron.com). The following are the results:

X: = -60.98 dB Equivalent sideband level or the integrated phase noise

$J_{rms} := (360/(2\pi)) 10^{db/20} = 0.0051$ rms jitter in degrees

$J_{rms}/360 := 0.0014225$ Unit Intervals (UI) rms or 0.0009960 UI peak to peak

$(J_{rms}/360)(1/622.080MHz) = \mathbf{0.230 pS rms}$ or $\mathbf{1.610 pS peak to peak}$

The sideband level of -60.98 dBc for the integration of the phase noise over 12 kHz to 20 MHz has an equivalent RMS jitter value of 0.230 ps or 1.610 pS peak to peak.