Jitter measurements were performed on a Wavecrest SIA-3300C signal integrity analyzer. The measurements were recorded by testing the devices on an evaluation board with an AC coupled output. The evaluation board was connected to the SIA-3300C with an SMA bullet and 90k samples were taken. The values in the table represent typical values with $V_c = \frac{V_{dd}}{2}$.

**Period Jitter**: Period jitter compares the length of each cycle to the average period of an ideal clock using the long term averaging frequency.

**Random Jitter**: Unbounded and unpredictable jitter.

**Deterministic Jitter**: Bounded and predictable jitter.

**Total Jitter**: The sum of all of the jitter, measured to a $1 \times 10^{-12}$ BER or confidence level.

Also included is the integrated jitter for the 12 kHz to 20 MHz offset band, using an Agilent E5052A.

<table>
<thead>
<tr>
<th>Output MHz</th>
<th>Period RMS ps</th>
<th>Random P/P ps</th>
<th>Deterministic P/P fs</th>
<th>Total P/P ps</th>
<th>Measured on Agilent E5052A RMS 12kHz - 20MHz² fs</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.000</td>
<td>3.0</td>
<td>25.8</td>
<td>3.1</td>
<td>0</td>
<td>42.6</td>
</tr>
<tr>
<td>16.000</td>
<td>3.1</td>
<td>27.4</td>
<td>3.1</td>
<td>30</td>
<td>44.1</td>
</tr>
<tr>
<td>20.000</td>
<td>2.4</td>
<td>20.6</td>
<td>2.4</td>
<td>30</td>
<td>34.2</td>
</tr>
<tr>
<td>27.000</td>
<td>2.8</td>
<td>24.7</td>
<td>2.8</td>
<td>0</td>
<td>41.0</td>
</tr>
<tr>
<td>35.328</td>
<td>2.8</td>
<td>24.6</td>
<td>2.8</td>
<td>0</td>
<td>40.4</td>
</tr>
<tr>
<td>44.736</td>
<td>2.8</td>
<td>24.5</td>
<td>2.8</td>
<td>0</td>
<td>38.9</td>
</tr>
<tr>
<td>54.000</td>
<td>2.2</td>
<td>18.8</td>
<td>2.2</td>
<td>30</td>
<td>31.2</td>
</tr>
<tr>
<td>65.536</td>
<td>2.0</td>
<td>17.0</td>
<td>2.0</td>
<td>0</td>
<td>28.7</td>
</tr>
</tbody>
</table>

1. Data is based on 12kHz-5MHz for output frequencies < 44.736MHz

Table of typical jitter values for the VVC1/VVC2 series of oscillators
Phase Noise Results

Phase noise measurements were performed on an Agilent E5052A signal source analyzer (SSA). The E5052A has a phase noise to jitter integration calculation feature and devices were characterized in the 12kHz-20MHz band (except for the lower frequencies where the equipment limitations prevented measurement to 20 MHz – see graphs for frequency band). Please contact Vectron for other offset integration bands.
Typical Phase Noise for the VVC1/VVC2 Series

Phase Noise 10.00dB/Ref -40.00dBc/Hz [Sm]
Typical Phase Noise for the VVC1/VVC2 Series

Phase Noise 10.00dB Ref -40.00dBc/Hz [Smo]

Carrier 44.735763 MHz  9.86c
1: 10 Hz  -62.2242 dBc/Hz
2: 100 Hz  -93.3443 dBc/Hz
3: 1 kHz  -124.6600 dBc/Hz
4: 10 kHz  -144.5394 dBc/Hz
5: 100 kHz -156.5988 dBc/Hz
6: 1 MHz  -159.4686 dBc/Hz
7: 10 MHz  -162.1632 dBc/Hz
8: 20 MHz  -161.9226 dBc/Hz
X: Start 1.2 kHz
Stop 20 MHz
Center 10.006 MHz
Span 19.998 MHz

Analysis Range X: Band Marker
Analysis Range Y: Band Marker
Integ Noise: -88.7483 dBc / 19.99 MHz
RMS Noise: 54.2331 µrad
RMS Jitter: 194.722 µsec
Residual FM: 594.446 Hz

Phase Noise 10.00dB Ref -40.00dBc/Hz [Smo]

Carrier 53.99541 MHz  11.50c
1: 10 Hz  -66.2138 dBc/Hz
2: 100 Hz  -100.5283 dBc/Hz
3: 1 kHz -129.1133 dBc/Hz
4: 10 kHz -145.7727 dBc/Hz
5: 100 kHz -155.5277 dBc/Hz
6: 1 MHz -160.8817 dBc/Hz
7: 10 MHz -163.7518 dBc/Hz
8: 20 MHz -163.7916 dBc/Hz
X: Start 1.2 kHz
Stop 20 MHz
Center 10.006 MHz
Span 19.998 MHz

Analysis Range X: Band Marker
Analysis Range Y: Band Marker
Integ Noise: -89.7621 dBc / 19.99 MHz
RMS Noise: 45.9355 µrad
RMS Jitter: 135.385 µsec
Residual FM: 487.5G Hz

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Typical Phase Noise for the VVC1/VVC2 Series

Contact Application Engineering for any phase noise/jitter data on frequencies not listed.

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