Typical SDG6000X Phase Noise

November 08, 2021

Phase Noise

Phase noise is the random fluctuations of the phase of a signal in the frequency domain. Jitter is a similar measurement in the time domain. They are both caused by the random thermal fluctuations of the oscillator used as a timing reference in measurement instruments, signal sources, and other circuits that rely on oscillators or repetitive signals for timing and clocking functions.

These fluctuations cause the phase of the output clock signal to vary with time, very similar to jitter in a time-based system. This causes a widening of the signal when viewed in the frequency domain (see Figure 1 below). This can cover up any small signals that may be near the frequency of interest when measuring or can mask or cover required signals if the source phase noise is too high. For meaningful measurements or sources, select an instrument with lower phase noise than the signal source or measurement instrument that you are testing.

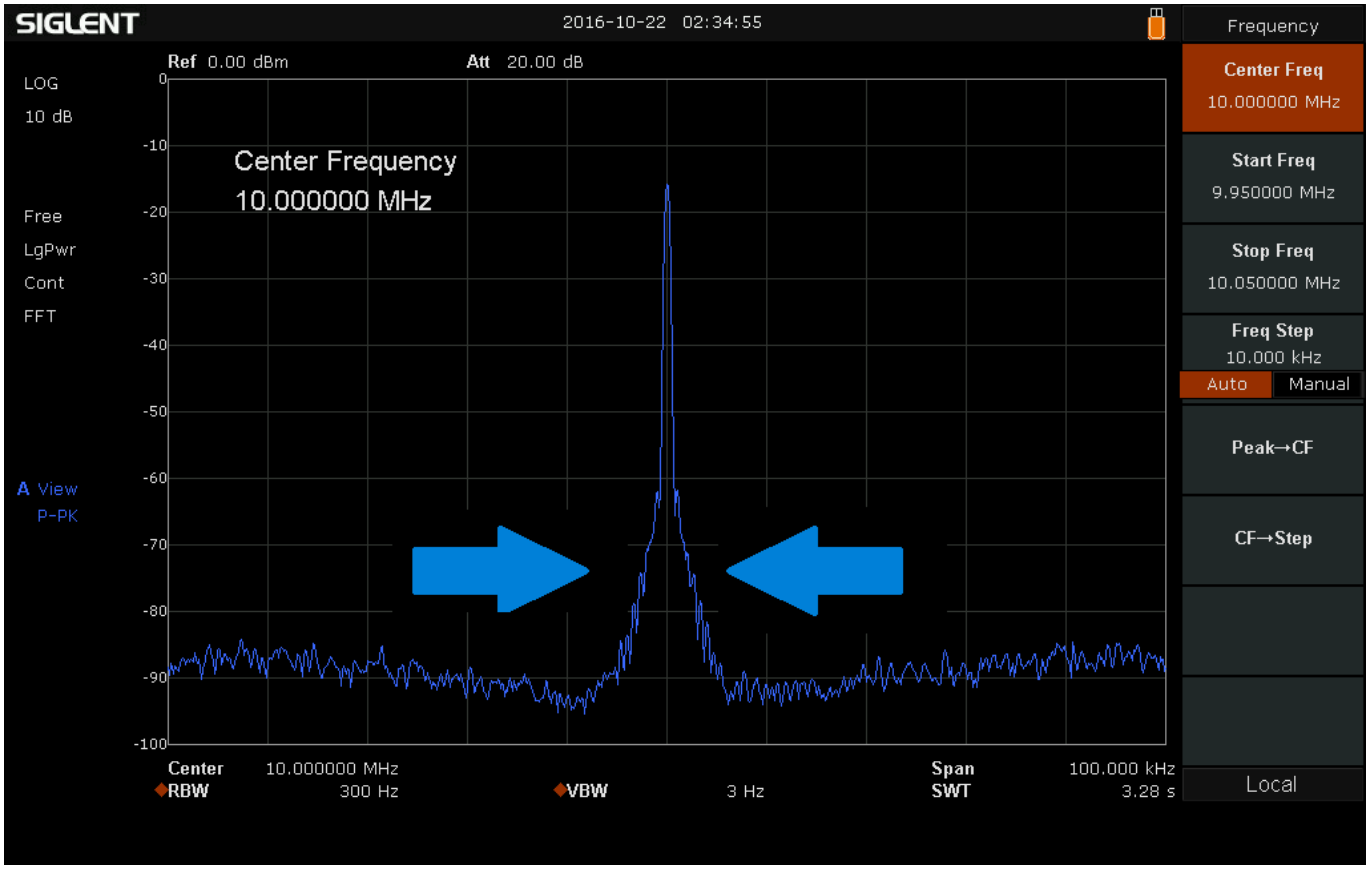
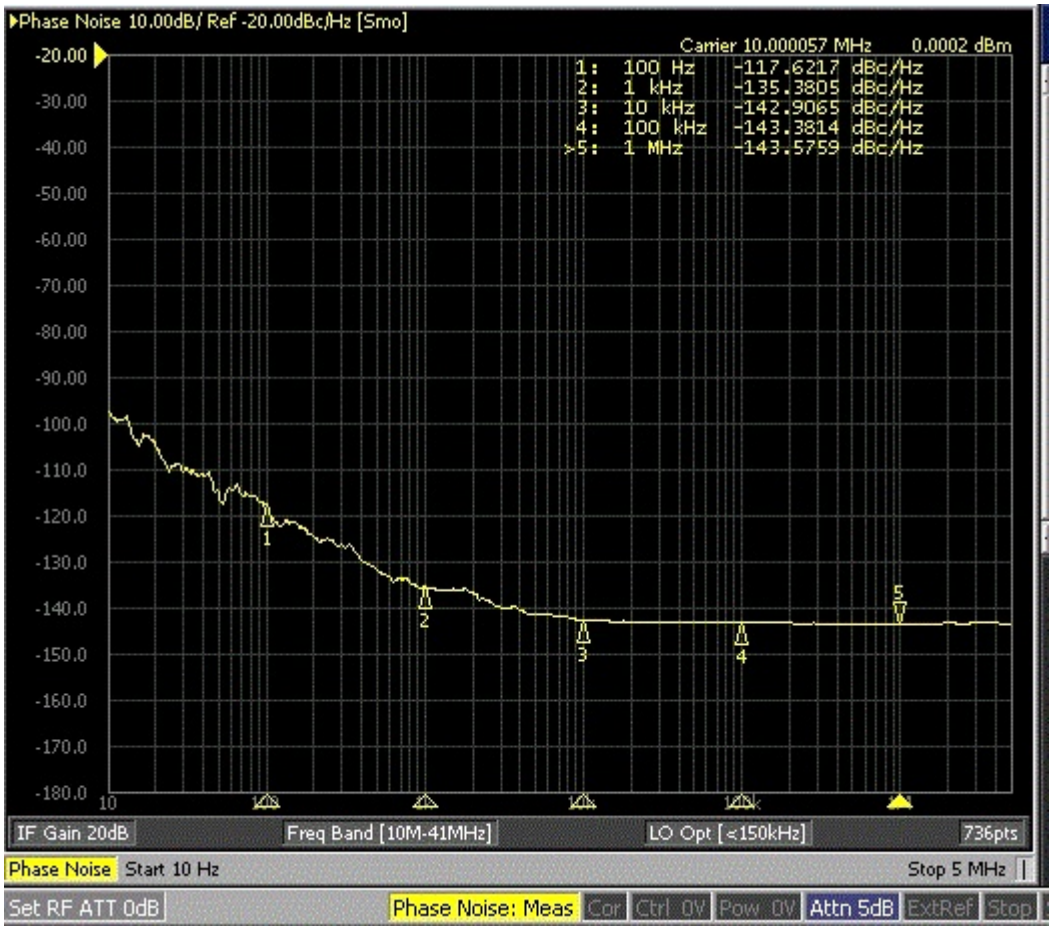


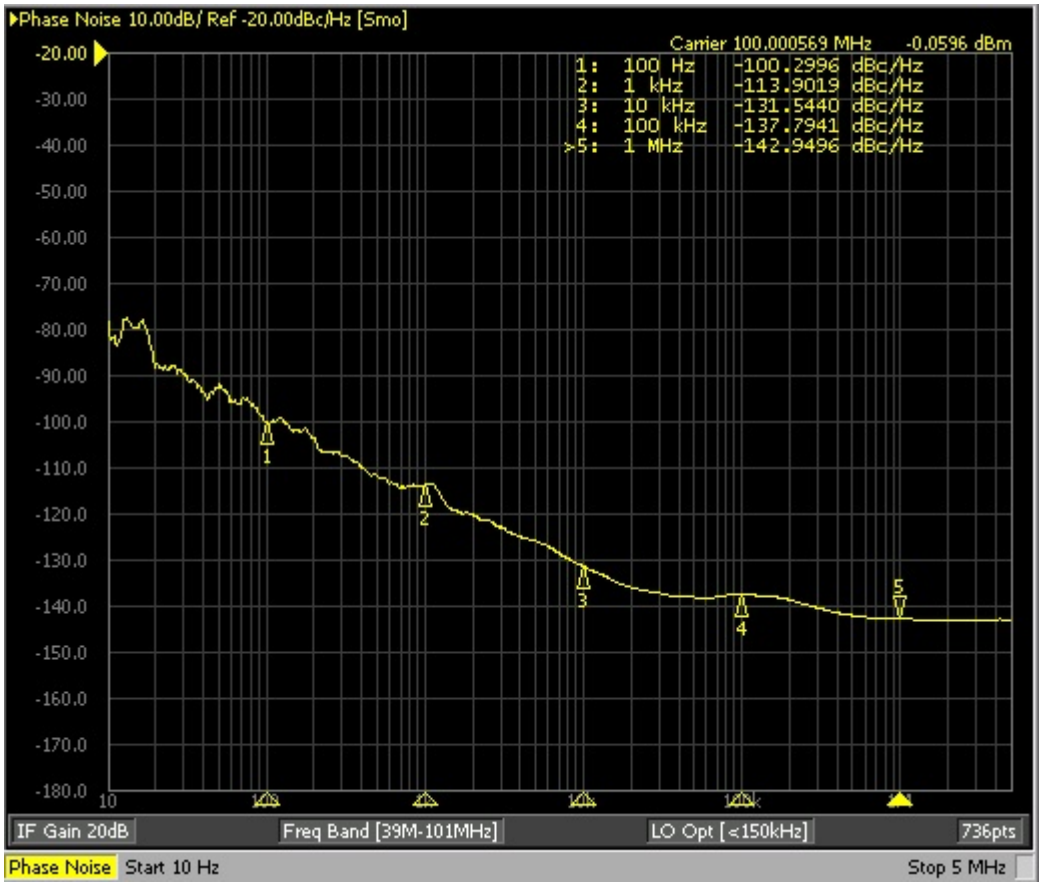
FIGURE 1

Below are some typical phase noise measurements of the SIGLENT SDG6000X Series of Arbitrary Waveform Generators.

Typical SDG6000X Function Generator Phase Noise @ 10 MHz carrier:



Typical SDG6000X Function Generator Phase Noise @ 100 MHz carrier:



Typical SDG6000X Function Generator Phase Noise @ 200 MHz carrier:


Phase Noise 10.00dB/ Ref -20.00dBc/Hz [Smo]
Carrier 200.001142 MHz -0.1156 dBm
1: 100 Hz -92.7823 dBc/Hz
2: 1 kHz -107.4070 dBc/Hz
3: 10 kHz -126.0219 dBc/Hz
4: 100 kHz -132.8062 dBc/Hz
>5: 1 MHz -141.8251 dBc/Hz
-20.00
-30.00
-40.00
-50.00
-60.00
-70.00
-80.00
-90.00
-100.0
-110.0
-120.0
-130.0
-140.0
-150.0
-160.0
-170.0
-180.0
10
IF Gain 20dB
Freq Band [99M-1.5GHz]
LO Opt [<150kHz]
736pts
Phase Noise
Start 10 Hz
Stop 5 MHz

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