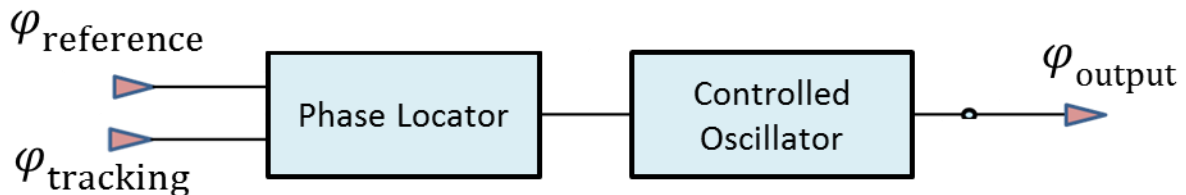


IL_3G375M

An instantaneous loop (iL), or ideal Phase Locked Loop (PLL), achieves breakthrough advances in phase tracking with high loop gain. Salient are roughly a millions times faster tracking bandwidth, low nanosecond range lock times versus typical millisecond or higher range, and orders of magnitude reduction in jitter over typical tracking.

- Output from 300 MHz to 3 GHz
- Near-ideal phase coherence
- Orders of magnitude reduction in jitter, or phase noise

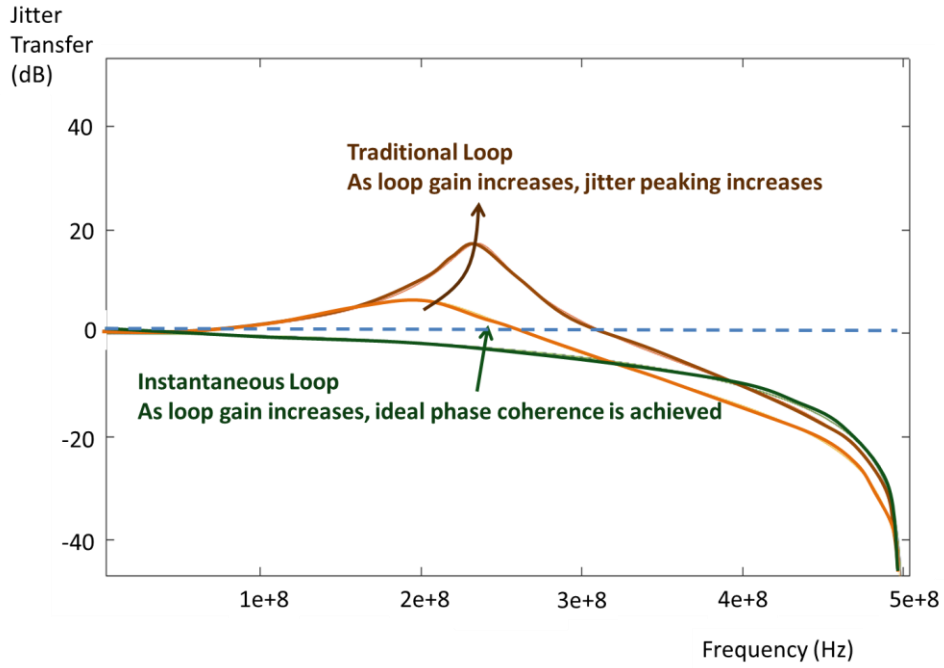


Interface Ports

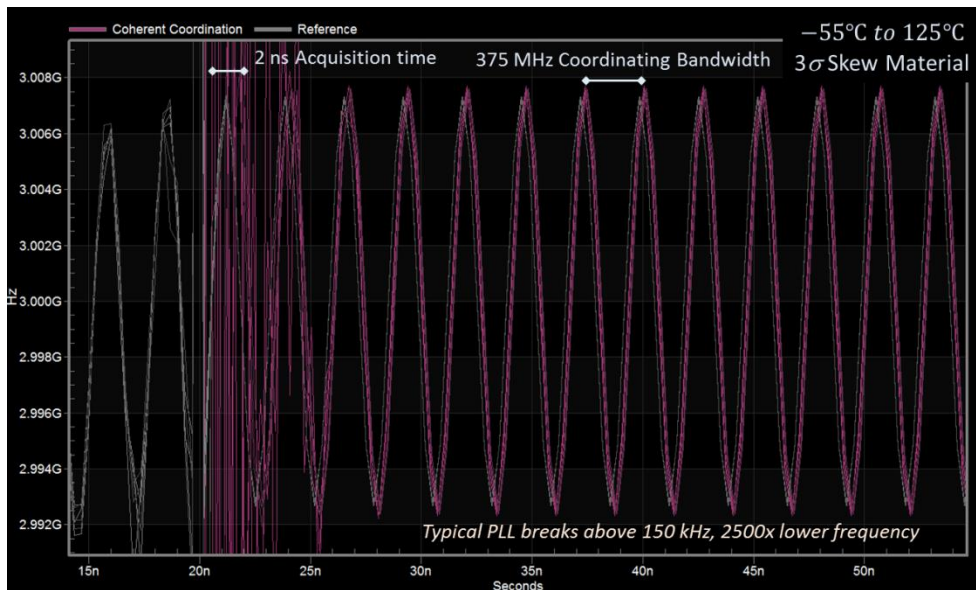
<i>Interface</i>	<i>Direction/serial</i>	<i>Description</i>
$\phi_{\text{reference}}$	In	Input or reference clock
ϕ_{tracking}	In	Tracking clock
$\phi_{\text{synthesized}}$	Out	Synthesized output clock

Performance Specifications

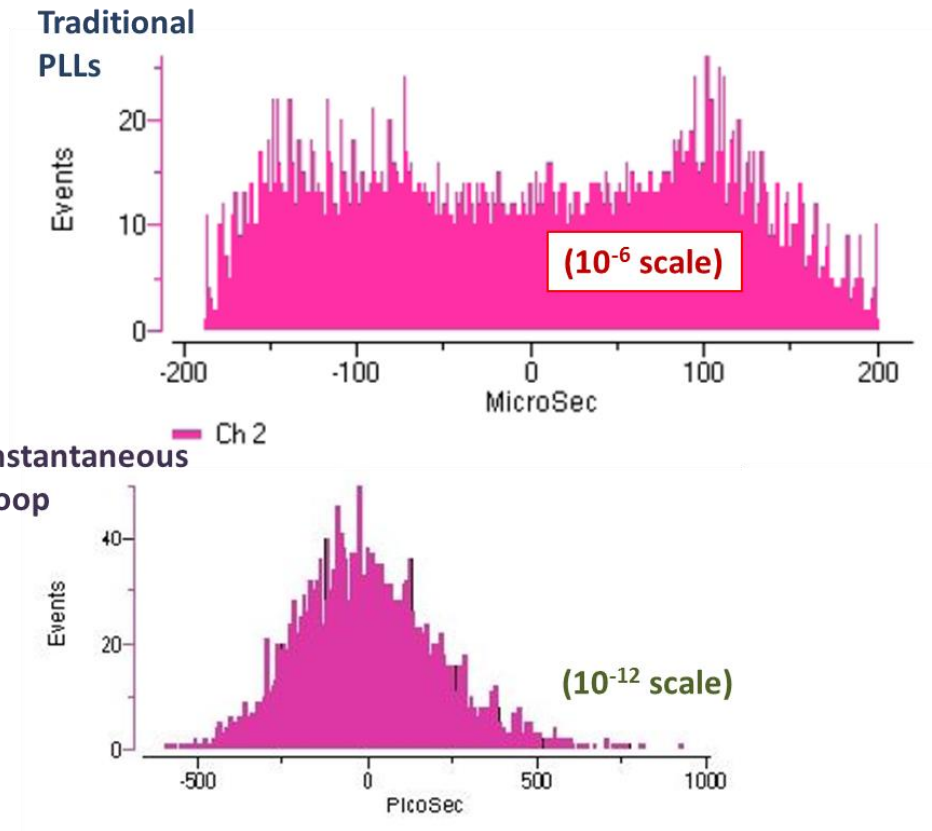
Parameter	Specification (Worst case or range across -55 °C to 125 °C and 3σ material skew)
Coordinating (Tracking) bandwidth ^{1, 2}	Frequency/2 (1.5 GHz at 3 GHz reference)
Jitter peaking and accumulation over coordinating (Tracking) bandwidth ³	Less than 0.02%
Phase Noise (3 GHz Output) ⁴	100x decrease over typical phase tracking
Acquisition (startup/settle/lock) time	8 ns (~1,000,000x faster than typical PLLs)
Output frequency range	300 MHz to 3 GHz
Frequency Aliasing	None, intrinsic to iL design
Voltage	1.2 V
Power consumption	0.5 mA



¹ Tracking bandwidth increases as tracking accuracy, loop gain, increases with iL.

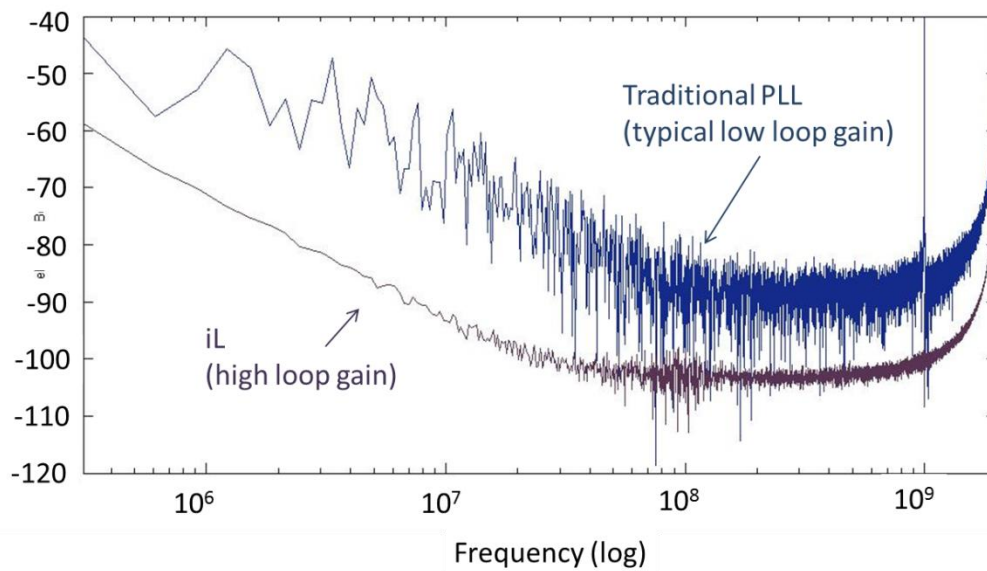


² Time domain showing ideal phase coherence of instantaneous loop.



³ Silicon measurements show 400,000 times less jitter for instantaneous loop with same noise profile, and all else being equal. Instantaneous loop eliminates jitter peaking and jitter accumulation.

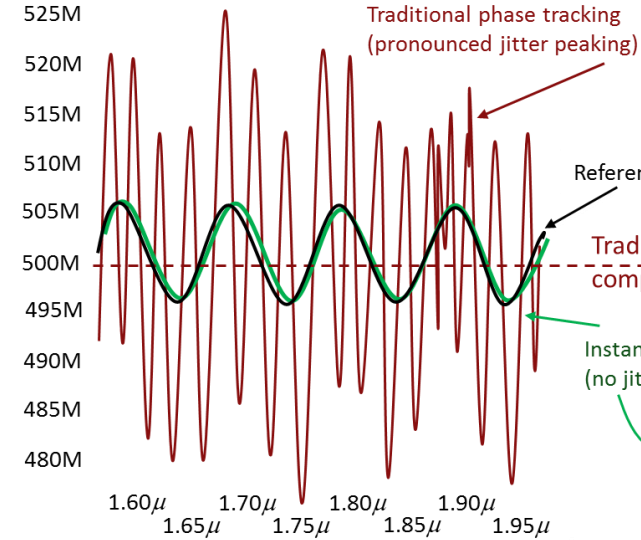
Phase Noise
(dBc/Hz)



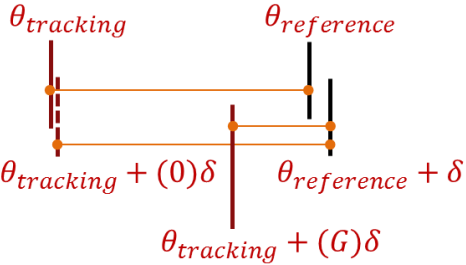
⁴ Phase noise measured with same non-optimized loop elements other than phase detection for both PLLs and under non-ideal operating conditions, showing instantaneous loop 100 times lower than that of typical phase tracking.

Instantaneous Loop versus Far Less Ideal Traditional PLLs

Traditional tracking breaks above 200 kHz
Ceases to operate above 500 MHz



Compromised phase tracking



Ideal phase tracking

