Troubleshooting Clock Jitter

Keysight Technologies and Picotest

Quickly identify PDN sensitivities, in-circuit, using a simple probe-based solution

Power distribution network (PDN) noise is one of the most common issues in low power applications, including ADCs and LNAs, as well as in data channels. Troubleshooting these issues can be time consuming. The jitter must be measured in-circuit, where physical access is often limited and these sensitive circuits can be disrupted by 1mV of power supply noise or even less. Even a circuit that appears to be fully functional can have hidden sensitivities that go undiscovered until a particular operating condition is set.

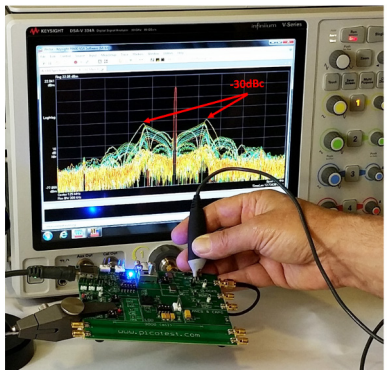
A Picotest J2150A Harmonic Comb paired with the P2100A or P2101A 50Ω transmission line 'PDN' probes and a Keysight spectrum analyzer, signal analyzer or oscilloscope provide an ultra-portable and simple method of locating PDN sensitivities.

The J2150A harmonic comb provides a wideband noise source with a 50Ω output impedance. The harmonic comb covers an ultra-wide range of 1kHz to more than 1GHz in a highly portable USB stick. The P2100A and P2101A probes provide unity gain, 50Ω connections to the PDN in a comfortable browser style probe. The probe is used in conjunction with a Keysight Spectrum Analyzer, such as the N9020A (MXA), a Signal Source Analyzer, such as the E5052B (SSA) or an Infiniium S oscilloscope using the FFT or VSA features.

The P2100A 1-port probe can inject noise into each decoupling capacitor while monitoring the system performance, such as clock jitter. The P2101A 2-port probe can inject the harmonic comb noise through one port while the other port displays the injected noise.

The harmonic comb fits in your pocket while the probes will easily fit in a backpack, briefcase or laptop bag. The harmonic comb only requires the USB connection for 5V power. While there is generally an unused USB slot available in most instruments, the comb can also be powered from cell phone backup batteries.

- Fast, in-circuit identification of PDN sensitivities
- Multi-mode harmonic comb spans 1kHz-1GH
- Frequency & impulse width dithering minimize dead-zones due to sampling effects
- Once a sensitivity frequency is identified, the comb can be locked for single frequency operation
- Convenient, ultra-portable USB stick with single button operation
- The J2150A harmonic comb pairs with Picotest P2100A and P2101A 50Ω transmission line probes



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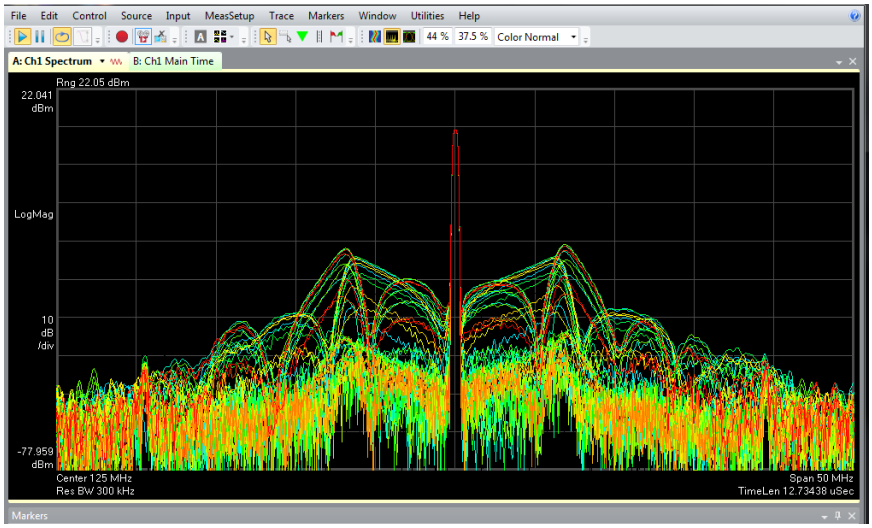

The PDN interrogation using the comb's search mode signal reveals a resonance at approximately 7.5MHz as seen in the spectrum sidebands around the clock fundamental frequency. Note the peaks are approximately -30dBc

System Components

Keysight Technologies

E5052B	SSA Signal Source Analyzer
N9020A	MXA Signal Analyzer
E5061B	ENA Network Analyzer
	Infiniium and Infinivision oscilloscopes

Picotest

Power Integrity Station Bundle for Keysight ENA, SSA or Oscilloscopes:	
J2150A	USB Harmonic Comb Generator
P2100A	1-Port 50 ohm Transmission Line PDN Probe -13dBm typical 1kHz and 100kHz -17dBm typical 8MHz 10kHz square wave 13dBm, typical Duty cycle 50% typical DC coupled 0 to +2.5V pulse into 50Ohms Typical rise/fall time 470ps/270ps Absolute Maximum Voltage < 50VAC and 75VDC
P2101A	2-Port 50 ohm Transmission Line PDN Probe Impedance: 50 ohms, works with all 50 ohm instruments Tip Capacitance, <1pF, 420fF Typical Bandwidth DC – 1.3GHz Variable pitch swivel tip fits multiple caps (0603-1206) Small form factor

To learn how this solution can address your specific needs please contact Keysight's solutions partner, Picotest
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