Application Note

LMKDB1xxx PCI Express Compliance Report

Michael Srinivasan

ABSTRACT

Enterprise systems are demanding cleaner clocks since datacenters are using higher data rates. This report demonstrates PCI Express (PCIe) compliance for the LMKDB1xxx family of buffers, which verify these devices can be used in such systems.

Table of Contents

1 Introduction

This document presents a test report of PCI Express (PCIe) reference clock compliance for the LMKDB1xxx family. The report contains the test setup, test procedure, TI's PCIe Compliance Tool explanation, and the test results demonstrating PCIe compliance. The test setup was arranged to obtain both the phase noise and time domain analysis required for PCIe compliance. Then, the test procedure was followed to obtain the results. The data from this test is then uploaded onto TI's PCIe Compliance Tool within TICS Pro to determine PCIe compliance.

2 Test Setup

TI's PCIe Compliance Reports display the analysis of a device's phase noise or jitter in regards to meeting PCIe requirements. This PCIe compliance report displays test results under typical conditions. For the LMKDB1xxx family the operating temperature is at 25°C and the supply voltage is at 3.3 V.

The hardware setup consists of a device under test, power supply, signal generator, attenuators, limiter, balun (for frequency domain measurement only), thermal force unit, test load board, and phase noise analyzer (PNA, for frequency domain measurement) or oscilloscope (for time domain measurement). The device receives an input clock from an SMA100B signal generator, which outputs a sine wave. However, because TI's clocking parts expect a square wave at a specific amplitude and slew rate for the reference input, the output of the SMA100B is passed through several attenuators and a limiter. The LMKDB1xxx family of parts require a slew rate of 3.5 V/ns and peak-to-peak swing of 1.6 Vpp, which was achieved with said setup.

Note

Adding attenuators and a limiter is not required for the reference clock to any of TI's clocking devices and does not need to be included in a system. Instead, the reference clock for a TI clocking device needs to be a square wave with the required amplitude and slew rate specified on the data sheet of the device.

For the frequency domain measurements, the differential outputs of the device are connected to a balun to convert them to a single-ended signal and then route that signal to a PNA, as shown on Figure 2-1.

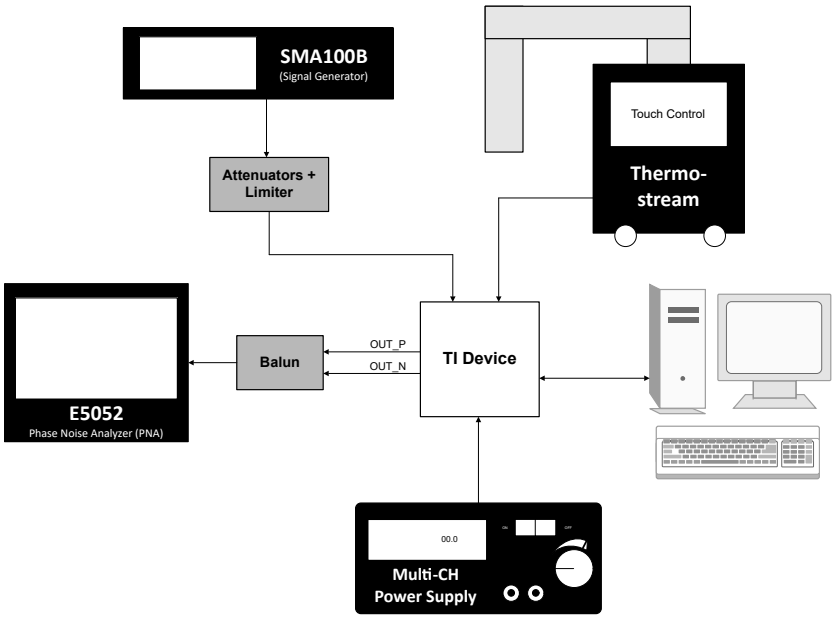

Figure 2-1. TI's PCIe Compliance Test Hardware Setup for Frequency Domain Measurements

For time domain measurements, the differential outputs (both positive and negative pins) of the device are routed directly to an oscilloscope, as shown on Figure 2-2. Also, when obtaining data for the time domain measurements, the PCIe test load is a 15 dB loss trace at 4 GHz.

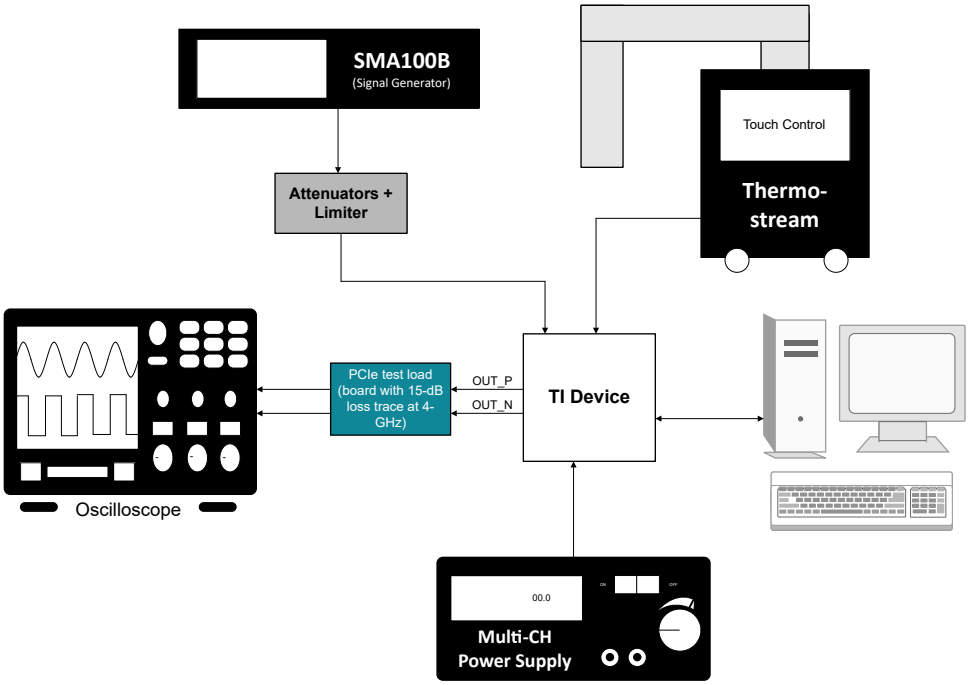

Figure 2-2. TI's PCIe Compliance Test Hardware Setup for Time Domain Measurements

3 Test Procedure

Test procedure used to obtain LMKDB1xxx's PCIe compliance report results is as follows:

1. After powering up the device, the differential outputs are connected directly to an oscilloscope for time domain measurements, or to a PNA through a balun for frequency domain measurements.
2. An output trace file is captured from the PNA or oscilloscope. Note that the oscilloscope capture requires both the positive and negative traces, so two output trace files from the oscilloscope are required.
3. The file/files generated is/are run through TI's PCIe Compliance Tool (Section 4 contains more information about this tool).

4 Explanation of TI's PCIe Compliance Tool

TI's PCIe Compliance Tool can be found within TI's TICS Pro Software. To access the tool, first download TI's TICS Pro Software. Under the *Tools* tab, select *PCIe Report Generator* (steps shown in Figure 4-1). After a few seconds, the tool appears, as shown on Figure 4-2, which can then be used to analyze frequency domain traces (such as Figure 4-3) and time domain traces (such as Figure 4-4) to determine PCIe compliance.

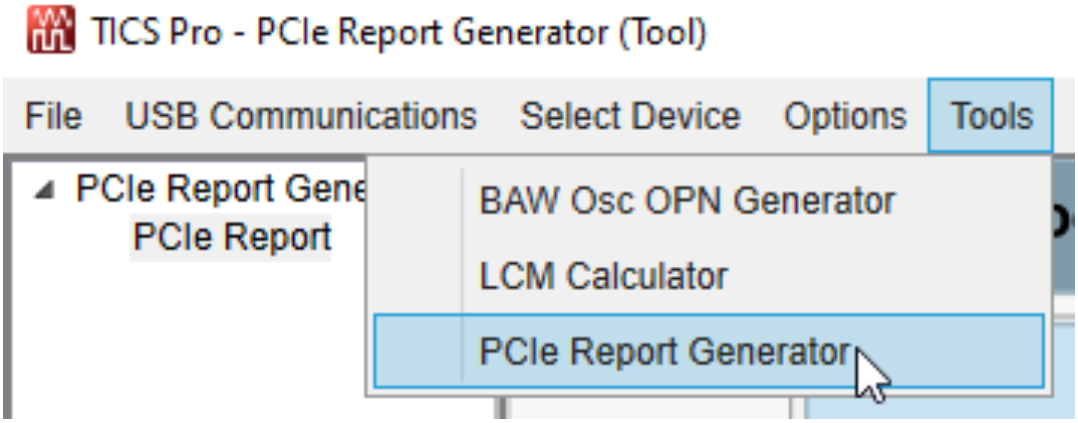

Figure 4-1. TICS Pro Steps to Access the PCIe Reference Clock Analysis Tool

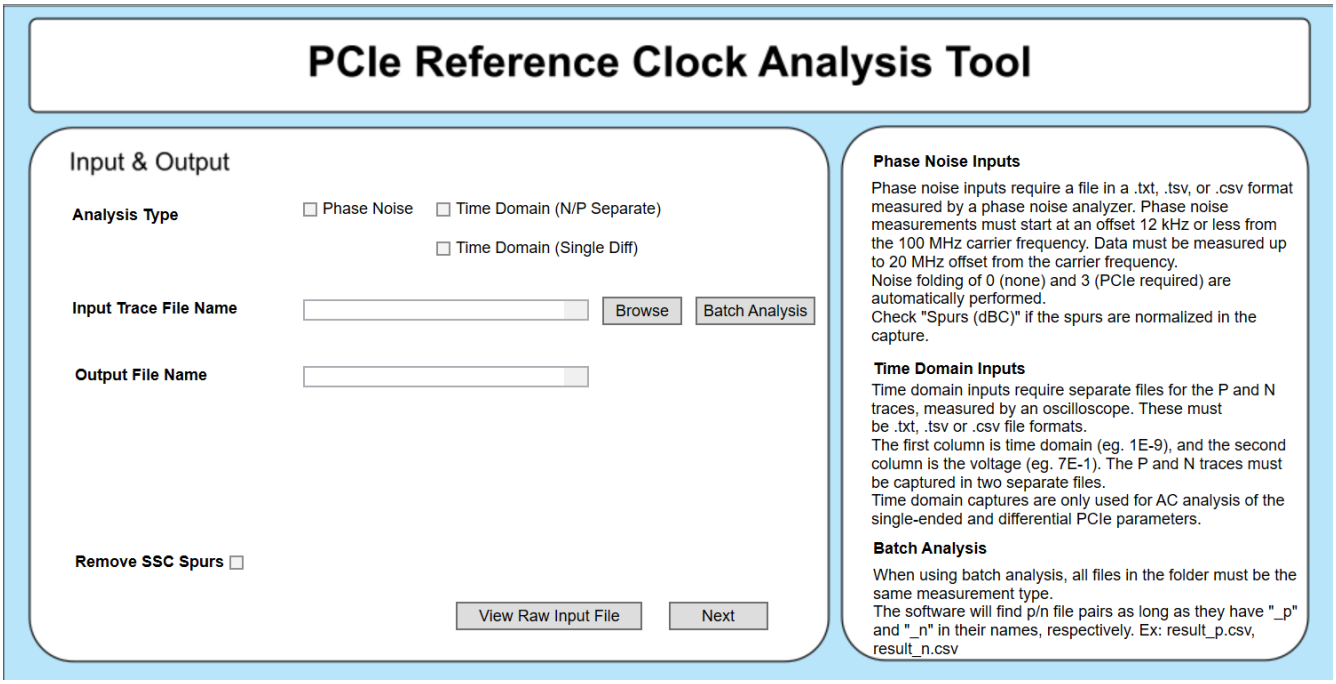

Figure 4-2. PCIe Tool Home Page

For frequency domain data analysis, the tool runs frequency domain input traces through PCIe filters, taking other parameters such as PCIe generation, clock architecture, noise fold, and presence of SSC into considerations to determine if the trace meets PCIe requirements. Then, the tool assign a PASS, FAIL, or N/A status based on the results.

For time domain data analysis, the tool runs time domain input traces, and takes into account Vcross, period, duty cycle, and other parameters specified by PCIe standards to determine and assign a PASS/FAIL to the traces being analyzed.

Figure 4-3. Example of PNA Plot

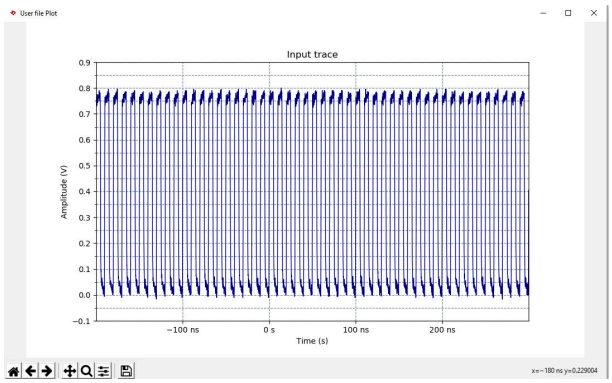

Figure 4-4. Example of Time Domain Plot

5 LMKDB1xxx Test Results

The LMKDB1xxx PCIe Compliance test results are detailed in this section.

5.1 LMKDB1xxx Test Results Summary

Table 5-1 is the PCIe compliance results summary for the LMKDB1xxx phase noise analysis, which demonstrates the jitter compliance of the device for PCIe Gen 1 through 6, noise folds 0 and 3, and clock architectures Common Clock (CC) and Separate Reference No Spread (SRNS).

A PCIe jitter spec or time domain calculation can have one of the following statuses:

- PASS: within specifications/limits
- FAIL: outside specifications/limits
- N/A: no specifications/limits available

Table 5-1. LMKDB1xxx PCIe Tool Test Results Summary - Frequency Domain

Jitter Filter	Clock Arch.	Noise Fold	Min (fs)	Max (fs)	Limit (fs)	Status
PCIe1	CC	0	0.0	627	86,000	PASS
		3	0.0	710	86,000	PASS
	SRNS	0	N/A	N/A	N/A	N/A
		3	N/A	N/A	N/A	N/A
PCIe2	CC	0	20	60	3,100	PASS
		3	23	71	3,100	PASS
	SRNS	0	27	71	N/A	N/A
		3	31	80	N/A	N/A
PCIe3	CC	0	6	18	1,000	PASS
		3	7	21	1,000	PASS
	SRNS	0	18	21	N/A	N/A
		3	21	25	N/A	N/A
PCIe4	CC	0	6.193	17.672	500.0	PASS
		3	7.471	20.997	500.0	PASS
	SRNS	0	7.901	21.219	N/A	N/A
		3	9.082	24.523	N/A	N/A
PCIe5	CC	0	1.344	6.872	150.0	PASS
		3	1.669	8.539	150.0	PASS
	SRNS	0	1.676	8.346	N/A	N/A
		3	1.952	9.747	N/A	N/A
PCIe6	CC	0	1.564	4.456	100.0	PASS
		3	1.878	5.353	100.0	PASS
	SR	0	2.343	6.621	N/A	N/A
		3	2.659	7.517	N/A	N/A
PCIe7	CC	0	1.194	3.408	67.0	PASS
		3	1.397	3.987	67.0	PASS
	SR	0	1.767	5.021	N/A	N/A
		3	1.973	5.606	N/A	N/A

Table 5-2 is the PCIe compliance summary for the LMKDB1xxx time domain analysis which demonstrates the time domain compliance of the device.

Table 5-2. LMKDB1xxx PCIe Tool Test Results Summary - Time Domain

Calculation	Min	Avg	Max	Limit	Status
V_{cross}	330.09mV	343.67mV	357.31mV	250mV to 550mV	PASS
V_{high}	758.527mV	758.527mV		150mV mV	PASS
V_{low}		–42.394 mV	–42.394 mV	–150 mV mV	PASS
Period	9.971ns	10.0ns	10.022ns	9.847ns to 10.203ns	PASS
Duty Cycle	49.441%	49.624%	49.825%	40% to 60%	PASS
Overshoot Voltage		72.83mV	91.34mV	300mV	PASS
Undershoot Voltage		–57.47mV	–70.69mV	–300mV	PASS
Rising Edge Rate	2.14V/ns	2.419V/ns	2.718V/ns	0.6V/ns to 4.0V/ns	PASS
Falling Edge Rate	2.24V/ns	2.508V/ns	2.818V/ns	0.6V/ns to 4.0V/ns	PASS

5.2 PCIe Tool Input File Waveforms for the LMKDB1xxx Family

Figure 5-1 illustrates the output phase noise curve of the LMKDB1120 with a reference input of 100MHz, slew rate = 3.5V/ns, and peak-to-peak swing = 1.6Vpp. Figure 5-2 illustrates the output time domain trace waveform. All of these waveforms are inputted into TI's PCIe Compliance Tool (found within TI's TICS Pro Software, more information in Section 4) to determine PCIe compliance. These results and waveforms apply for all LMKDB1xxx devices.

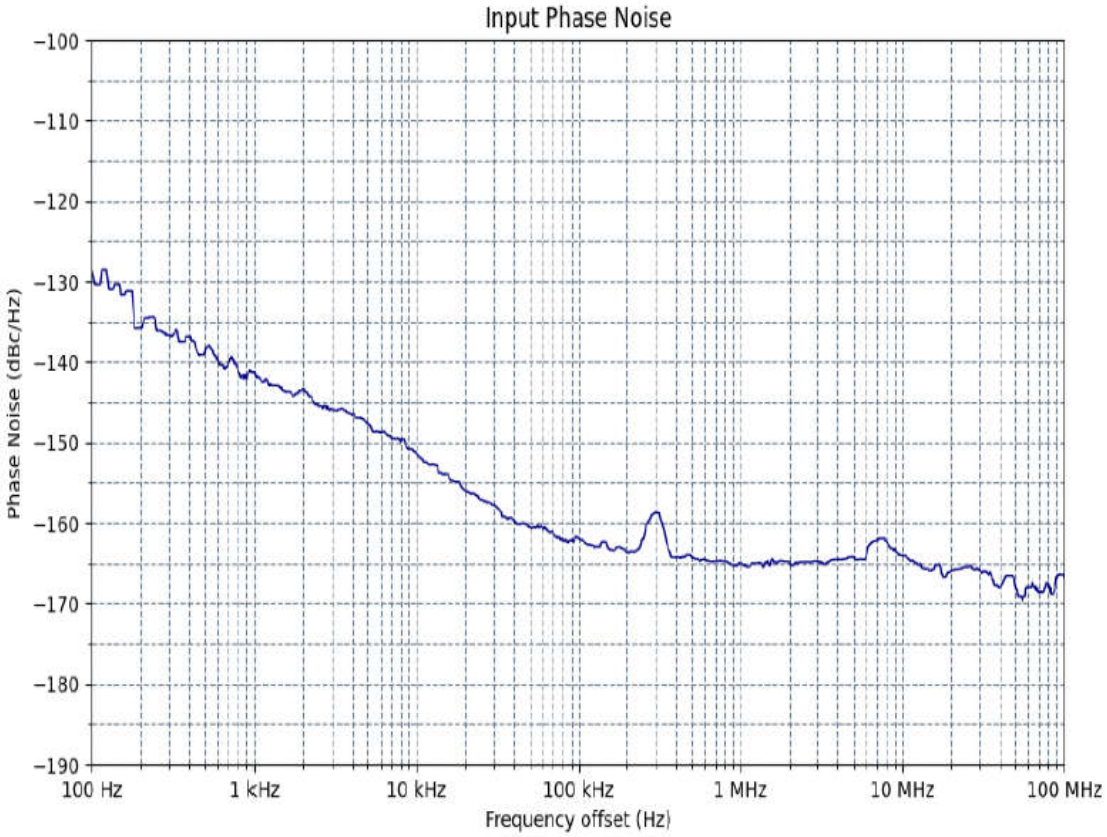

Figure 5-1. Output Phase Noise Curve From the LMKDB1120 Having a 100MHz Reference Input Signal Into the LMKDB1xxx Device With Slew Rate = 3.5V/ns and Peak-to-Peak Swing = 1.6Vpp

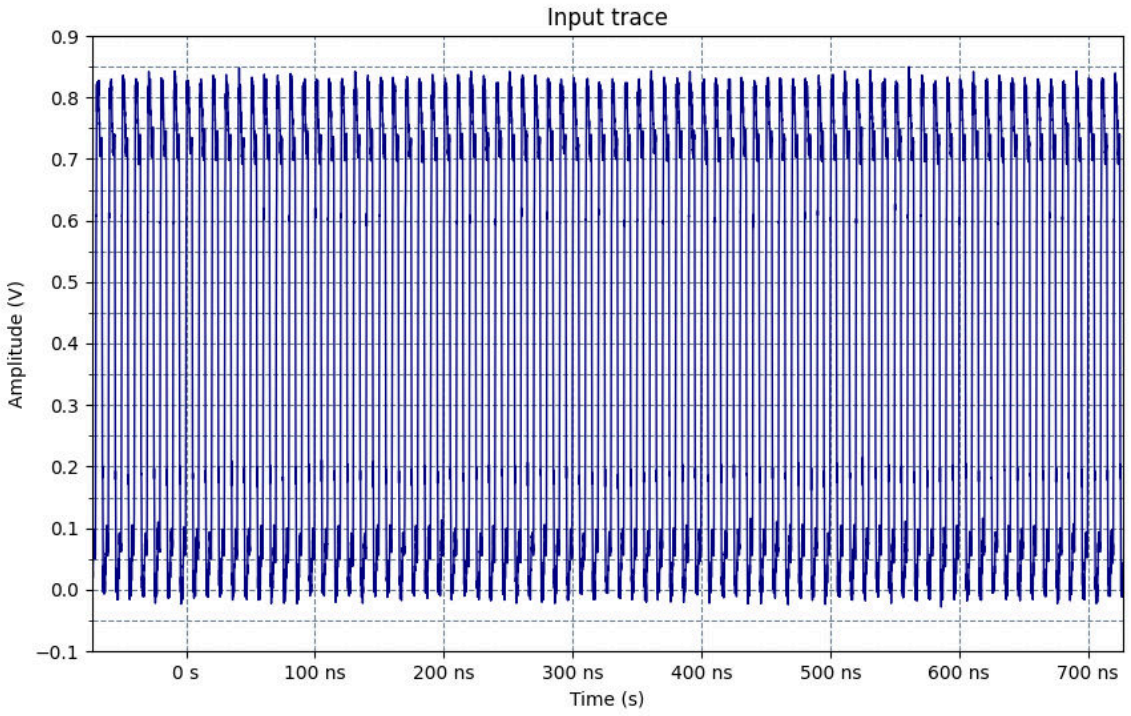

Figure 5-2. Output Time Domain Plot from the LMKDB1120 having a 100-MHz Reference Input Signal into the LMKDB1xxx Device with Slew Rate = 3.5 V/ns and Peak-to-Peak Swing = 1.6 Vpp

5.3 LMKDB1xxx Detailed Jitter Measurements

Table 5-3 outlines specific jitter measurement results for PCIe generations 1 through 6 with noise folds 0 and 3 and clock architectures Common Clock (CC) and Separate Reference No Spread (SRNS).

Table 5-3. LMKDB1xxx Detailed Jitter Measurements

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
1	CC	0	1	1.50E+06	0.54	1.50E+06	0.54	1.50E+06	32.47299957	86,000	PASS
1	CC	0	2	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	626.8123833	86,000	PASS
1	CC	0	3	2.20E+07	0.54	1.50E+06	0.54	1.50E+06	626.8123833	86,000	PASS
1	CC	0	4	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	503.8823545	86,000	PASS
1	CC	0	5	1.50E+06	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	6	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	7	2.20E+07	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	8	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	9	1.50E+06	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	10	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	11	2.20E+07	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	12	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	13	1.50E+06	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	14	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	15	2.20E+07	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	16	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	17	1.50E+06	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	18	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	19	2.20E+07	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	0	20	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS

Table 5-3. LMKDB1xxx Detailed Jitter Measurements (continued)

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
1	CC	3	1	1.50E+06	0.54	1.50E+06	0.54	1.50E+06	38.6877925	86,000	PASS
1	CC	3	2	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	709.7042912	86,000	PASS
1	CC	3	3	2.20E+07	0.54	1.50E+06	0.54	1.50E+06	709.7042912	86,000	PASS
1	CC	3	4	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	605.1056421	86,000	PASS
1	CC	3	5	1.50E+06	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	6	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	7	2.20E+07	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	8	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	9	1.50E+06	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	10	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	11	2.20E+07	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	12	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	13	1.50E+06	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	14	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	15	2.20E+07	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	16	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	17	1.50E+06	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	18	1.50E+06	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	19	2.20E+07	14	2.20E+07	0.54	1.50E+06	0	86,000	PASS
1	CC	3	20	2.20E+07	0.54	2.20E+07	0.54	1.50E+06	0	86,000	PASS
2	CC	0	10	5.00E+06	14	5.00E+06	14	5.00E+06	20.14990315	3,100	PASS
2	CC	0	11	5.00E+06	14	5.00E+06	0.54	5.00E+06	23.17411154	3,100	PASS
2	CC	0	12	5.00E+06	14	1.60E+07	14	5.00E+06	46.84650419	3,100	PASS
2	CC	0	13	5.00E+06	14	1.60E+07	0.54	5.00E+06	46.19310476	3,100	PASS
2	CC	0	14	5.00E+06	1.16	5.00E+06	14	5.00E+06	20.79660802	3,100	PASS
2	CC	0	15	5.00E+06	1.16	5.00E+06	0.54	5.00E+06	19.73541601	3,100	PASS
2	CC	0	16	5.00E+06	1.16	1.60E+07	14	5.00E+06	47.70910004	3,100	PASS
2	CC	0	17	5.00E+06	1.16	1.60E+07	0.54	5.00E+06	48.4853524	3,100	PASS
2	CC	0	18	1.60E+07	14	5.00E+06	14	5.00E+06	46.84650419	3,100	PASS
2	CC	0	19	1.60E+07	14	5.00E+06	0.54	5.00E+06	49.42728539	3,100	PASS
2	CC	0	20	1.60E+07	14	1.60E+07	14	5.00E+06	49.53157218	3,100	PASS
2	CC	0	21	1.60E+07	14	1.60E+07	0.54	5.00E+06	60.29507034	3,100	PASS
2	CC	0	22	1.60E+07	1.16	5.00E+06	14	5.00E+06	45.39817977	3,100	PASS
2	CC	0	23	1.60E+07	1.16	5.00E+06	0.54	5.00E+06	49.33479028	3,100	PASS
2	CC	0	24	1.60E+07	1.16	1.60E+07	14	5.00E+06	52.47068363	3,100	PASS
2	CC	0	25	1.60E+07	1.16	1.60E+07	0.54	5.00E+06	55.49289225	3,100	PASS
2	CC	3	10	5.00E+06	14	5.00E+06	14	5.00E+06	24.35390067	3,100	PASS
2	CC	3	11	5.00E+06	14	5.00E+06	0.54	5.00E+06	26.93456881	3,100	PASS
2	CC	3	12	5.00E+06	14	1.60E+07	14	5.00E+06	55.66305513	3,100	PASS
2	CC	3	13	5.00E+06	14	1.60E+07	0.54	5.00E+06	53.14943276	3,100	PASS
2	CC	3	14	5.00E+06	1.16	5.00E+06	14	5.00E+06	24.78459655	3,100	PASS
2	CC	3	15	5.00E+06	1.16	5.00E+06	0.54	5.00E+06	23.05121022	3,100	PASS
2	CC	3	16	5.00E+06	1.16	1.60E+07	14	5.00E+06	56.34507378	3,100	PASS
2	CC	3	17	5.00E+06	1.16	1.60E+07	0.54	5.00E+06	55.47872276	3,100	PASS
2	CC	3	18	1.60E+07	14	5.00E+06	14	5.00E+06	55.66305513	3,100	PASS
2	CC	3	19	1.60E+07	14	5.00E+06	0.54	5.00E+06	57.79162262	3,100	PASS
2	CC	3	20	1.60E+07	14	1.60E+07	14	5.00E+06	61.67006825	3,100	PASS
2	CC	3	21	1.60E+07	14	1.60E+07	0.54	5.00E+06	71.38626971	3,100	PASS
2	CC	3	22	1.60E+07	1.16	5.00E+06	14	5.00E+06	53.55993673	3,100	PASS
2	CC	3	23	1.60E+07	1.16	5.00E+06	0.54	5.00E+06	57.21218379	3,100	PASS

Table 5-3. LMKDB1xxx Detailed Jitter Measurements (continued)

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
2	CC	3	24	1.60E+07	1.16	1.60E+07	14	5.00E+06	64.23220998	3,100	PASS
2	CC	3	25	1.60E+07	1.16	1.60E+07	0.54	5.00E+06	65.78996905	3,100	PASS
2	SRNS	0	10	5.00E+06	14	5.00E+06	14	5.00E+06	32.30536183	N/A	N/A
2	SRNS	0	11	5.00E+06	14	5.00E+06	0.54	5.00E+06	28.0008018	N/A	N/A
2	SRNS	0	12	5.00E+06	14	1.60E+07	14	5.00E+06	48.81251194	N/A	N/A
2	SRNS	0	13	5.00E+06	14	1.60E+07	0.54	5.00E+06	58.25986316	N/A	N/A
2	SRNS	0	14	5.00E+06	1.16	5.00E+06	14	5.00E+06	30.95794231	N/A	N/A
2	SRNS	0	15	5.00E+06	1.16	5.00E+06	0.54	5.00E+06	27.25480625	N/A	N/A
2	SRNS	0	16	5.00E+06	1.16	1.60E+07	14	5.00E+06	47.39786277	N/A	N/A
2	SRNS	0	17	5.00E+06	1.16	1.60E+07	0.54	5.00E+06	57.10230745	N/A	N/A
2	SRNS	0	18	1.60E+07	14	5.00E+06	14	5.00E+06	48.81251194	N/A	N/A
2	SRNS	0	19	1.60E+07	14	5.00E+06	0.54	5.00E+06	45.14697637	N/A	N/A
2	SRNS	0	20	1.60E+07	14	1.60E+07	14	5.00E+06	64.00740358	N/A	N/A
2	SRNS	0	21	1.60E+07	14	1.60E+07	0.54	5.00E+06	68.21118499	N/A	N/A
2	SRNS	0	22	1.60E+07	1.16	5.00E+06	14	5.00E+06	51.16813886	N/A	N/A
2	SRNS	0	23	1.60E+07	1.16	5.00E+06	0.54	5.00E+06	47.37132644	N/A	N/A
2	SRNS	0	24	1.60E+07	1.16	1.60E+07	14	5.00E+06	65.00318377	N/A	N/A
2	SRNS	0	25	1.60E+07	1.16	1.60E+07	0.54	5.00E+06	70.73342401	N/A	N/A
2	SRNS	3	10	5.00E+06	14	5.00E+06	14	5.00E+06	36.67921599	N/A	N/A
2	SRNS	3	11	5.00E+06	14	5.00E+06	0.54	5.00E+06	31.73472385	N/A	N/A
2	SRNS	3	12	5.00E+06	14	1.60E+07	14	5.00E+06	56.5792607	N/A	N/A
2	SRNS	3	13	5.00E+06	14	1.60E+07	0.54	5.00E+06	65.59031551	N/A	N/A
2	SRNS	3	14	5.00E+06	1.16	5.00E+06	14	5.00E+06	35.11243437	N/A	N/A
2	SRNS	3	15	5.00E+06	1.16	5.00E+06	0.54	5.00E+06	30.81479841	N/A	N/A
2	SRNS	3	16	5.00E+06	1.16	1.60E+07	14	5.00E+06	55.00716411	N/A	N/A
2	SRNS	3	17	5.00E+06	1.16	1.60E+07	0.54	5.00E+06	64.26363197	N/A	N/A
2	SRNS	3	18	1.60E+07	14	5.00E+06	14	5.00E+06	56.5792607	N/A	N/A
2	SRNS	3	19	1.60E+07	14	5.00E+06	0.54	5.00E+06	52.51228963	N/A	N/A
2	SRNS	3	20	1.60E+07	14	1.60E+07	14	5.00E+06	74.35443341	N/A	N/A
2	SRNS	3	21	1.60E+07	14	1.60E+07	0.54	5.00E+06	77.69864153	N/A	N/A
2	SRNS	3	22	1.60E+07	1.16	5.00E+06	14	5.00E+06	58.72452689	N/A	N/A
2	SRNS	3	23	1.60E+07	1.16	5.00E+06	0.54	5.00E+06	54.46880208	N/A	N/A
2	SRNS	3	24	1.60E+07	1.16	1.60E+07	14	5.00E+06	75.08425981	N/A	N/A
2	SRNS	3	25	1.60E+07	1.16	1.60E+07	0.54	5.00E+06	80.24070553	N/A	N/A
3	CC	0	1	2.00E+06	14	2.00E+06	14	1.00E+07	7.473947897	1,000	PASS
3	CC	0	2	2.00E+06	14	2.00E+06	1.15	1.00E+07	7.290098264	1,000	PASS
3	CC	0	3	2.00E+06	14	5.00E+06	14	1.00E+07	16.5636283	1,000	PASS
3	CC	0	4	2.00E+06	14	5.00E+06	1.15	1.00E+07	14.25616694	1,000	PASS
3	CC	0	5	2.00E+06	0.73	2.00E+06	14	1.00E+07	7.267502979	1,000	PASS
3	CC	0	6	2.00E+06	0.73	2.00E+06	1.15	1.00E+07	6.193246745	1,000	PASS
3	CC	0	7	2.00E+06	0.73	5.00E+06	14	1.00E+07	17.08076602	1,000	PASS
3	CC	0	8	2.00E+06	0.73	5.00E+06	1.15	1.00E+07	14.9341335	1,000	PASS
3	CC	0	9	4.00E+06	14	2.00E+06	14	1.00E+07	13.46486059	1,000	PASS
3	CC	0	10	4.00E+06	14	2.00E+06	1.15	1.00E+07	13.69261529	1,000	PASS
3	CC	0	11	4.00E+06	14	5.00E+06	14	1.00E+07	17.10582012	1,000	PASS
3	CC	0	12	4.00E+06	14	5.00E+06	1.15	1.00E+07	15.49378	1,000	PASS
3	CC	0	13	4.00E+06	0.73	2.00E+06	14	1.00E+07	9.936395096	1,000	PASS
3	CC	0	14	4.00E+06	0.73	2.00E+06	1.15	1.00E+07	9.761661562	1,000	PASS
3	CC	0	15	4.00E+06	0.73	5.00E+06	14	1.00E+07	17.67243228	1,000	PASS
3	CC	0	16	4.00E+06	0.73	5.00E+06	1.15	1.00E+07	15.10415368	1,000	PASS

Table 5-3. LMKDB1xxx Detailed Jitter Measurements (continued)

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
3	CC	3	1	2.00E+06	14	2.00E+06	14	1.00E+07	9.108821356	1,000	PASS
3	CC	3	2	2.00E+06	14	2.00E+06	1.15	1.00E+07	8.811804619	1,000	PASS
3	CC	3	3	2.00E+06	14	5.00E+06	14	1.00E+07	19.58534068	1,000	PASS
3	CC	3	4	2.00E+06	14	5.00E+06	1.15	1.00E+07	16.91282569	1,000	PASS
3	CC	3	5	2.00E+06	0.73	2.00E+06	14	1.00E+07	8.691298099	1,000	PASS
3	CC	3	6	2.00E+06	0.73	2.00E+06	1.15	1.00E+07	7.470827551	1,000	PASS
3	CC	3	7	2.00E+06	0.73	5.00E+06	14	1.00E+07	19.96911842	1,000	PASS
3	CC	3	8	2.00E+06	0.73	5.00E+06	1.15	1.00E+07	17.46337906	1,000	PASS
3	CC	3	9	4.00E+06	14	2.00E+06	14	1.00E+07	16.01236749	1,000	PASS
3	CC	3	10	4.00E+06	14	2.00E+06	1.15	1.00E+07	16.16140783	1,000	PASS
3	CC	3	11	4.00E+06	14	5.00E+06	14	1.00E+07	20.78246547	1,000	PASS
3	CC	3	12	4.00E+06	14	5.00E+06	1.15	1.00E+07	18.85363954	1,000	PASS
3	CC	3	13	4.00E+06	0.73	2.00E+06	14	1.00E+07	11.93132189	1,000	PASS
3	CC	3	14	4.00E+06	0.73	2.00E+06	1.15	1.00E+07	11.64453467	1,000	PASS
3	CC	3	15	4.00E+06	0.73	5.00E+06	14	1.00E+07	20.99700858	1,000	PASS
3	CC	3	16	4.00E+06	0.73	5.00E+06	1.15	1.00E+07	18.05722374	1,000	PASS
3	SRNS	0	1	2.00E+06	14	2.00E+06	14	1.00E+07	10.02539061	N/A	N/A
3	SRNS	0	2	2.00E+06	14	2.00E+06	1.15	1.00E+07	9.319436146	N/A	N/A
3	SRNS	0	3	2.00E+06	14	5.00E+06	14	1.00E+07	17.72974777	N/A	N/A
3	SRNS	0	4	2.00E+06	14	5.00E+06	1.15	1.00E+07	16.15275828	N/A	N/A
3	SRNS	0	5	2.00E+06	0.73	2.00E+06	14	1.00E+07	8.690884817	N/A	N/A
3	SRNS	0	6	2.00E+06	0.73	2.00E+06	1.15	1.00E+07	7.900541184	N/A	N/A
3	SRNS	0	7	2.00E+06	0.73	5.00E+06	14	1.00E+07	16.99123359	N/A	N/A
3	SRNS	0	8	2.00E+06	0.73	5.00E+06	1.15	1.00E+07	15.32570622	N/A	N/A
3	SRNS	0	9	4.00E+06	14	2.00E+06	14	1.00E+07	15.18411162	N/A	N/A
3	SRNS	0	10	4.00E+06	14	2.00E+06	1.15	1.00E+07	14.70090165	N/A	N/A
3	SRNS	0	11	4.00E+06	14	5.00E+06	14	1.00E+07	21.21948628	N/A	N/A
3	SRNS	0	12	4.00E+06	14	5.00E+06	1.15	1.00E+07	19.85344334	N/A	N/A
3	SRNS	0	13	4.00E+06	0.73	2.00E+06	14	1.00E+07	12.39561431	N/A	N/A
3	SRNS	0	14	4.00E+06	0.73	2.00E+06	1.15	1.00E+07	11.84030677	N/A	N/A
3	SRNS	0	15	4.00E+06	0.73	5.00E+06	14	1.00E+07	19.00112388	N/A	N/A
3	SRNS	0	16	4.00E+06	0.73	5.00E+06	1.15	1.00E+07	17.65429776	N/A	N/A
3	SRNS	3	1	2.00E+06	14	2.00E+06	14	1.00E+07	11.53533247	N/A	N/A
3	SRNS	3	2	2.00E+06	14	2.00E+06	1.15	1.00E+07	10.72033646	N/A	N/A
3	SRNS	3	3	2.00E+06	14	5.00E+06	14	1.00E+07	20.4990665	N/A	N/A
3	SRNS	3	4	2.00E+06	14	5.00E+06	1.15	1.00E+07	18.61571105	N/A	N/A
3	SRNS	3	5	2.00E+06	0.73	2.00E+06	14	1.00E+07	9.997071395	N/A	N/A
3	SRNS	3	6	2.00E+06	0.73	2.00E+06	1.15	1.00E+07	9.081757781	N/A	N/A
3	SRNS	3	7	2.00E+06	0.73	5.00E+06	14	1.00E+07	19.65363232	N/A	N/A
3	SRNS	3	8	2.00E+06	0.73	5.00E+06	1.15	1.00E+07	17.66662477	N/A	N/A
3	SRNS	3	9	4.00E+06	14	2.00E+06	14	1.00E+07	17.51928081	N/A	N/A
3	SRNS	3	10	4.00E+06	14	2.00E+06	1.15	1.00E+07	16.96505079	N/A	N/A
3	SRNS	3	11	4.00E+06	14	5.00E+06	14	1.00E+07	24.52289345	N/A	N/A
3	SRNS	3	12	4.00E+06	14	5.00E+06	1.15	1.00E+07	22.89935103	N/A	N/A
3	SRNS	3	13	4.00E+06	0.73	2.00E+06	14	1.00E+07	14.24855815	N/A	N/A
3	SRNS	3	14	4.00E+06	0.73	2.00E+06	1.15	1.00E+07	13.60624246	N/A	N/A
3	SRNS	3	15	4.00E+06	0.73	5.00E+06	14	1.00E+07	21.95808325	N/A	N/A
3	SRNS	3	16	4.00E+06	0.73	5.00E+06	1.15	1.00E+07	20.33577639	N/A	N/A
4	CC	0	1	2.00E+06	14	2.00E+06	14	1.00E+07	7.473947897	500	PASS
4	CC	0	2	2.00E+06	14	2.00E+06	1.15	1.00E+07	7.290098264	500	PASS

Table 5-3. LMKDB1xxx Detailed Jitter Measurements (continued)

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
4	CC	0	3	2.00E+06	14	5.00E+06	14	1.00E+07	16.5636283	500	PASS
4	CC	0	4	2.00E+06	14	5.00E+06	1.15	1.00E+07	14.25616694	500	PASS
4	CC	0	5	2.00E+06	0.73	2.00E+06	14	1.00E+07	7.267502979	500	PASS
4	CC	0	6	2.00E+06	0.73	2.00E+06	1.15	1.00E+07	6.193246745	500	PASS
4	CC	0	7	2.00E+06	0.73	5.00E+06	14	1.00E+07	17.08076602	500	PASS
4	CC	0	8	2.00E+06	0.73	5.00E+06	1.15	1.00E+07	14.9341335	500	PASS
4	CC	0	9	4.00E+06	14	2.00E+06	14	1.00E+07	13.46486059	500	PASS
4	CC	0	10	4.00E+06	14	2.00E+06	1.15	1.00E+07	13.69261529	500	PASS
4	CC	0	11	4.00E+06	14	5.00E+06	14	1.00E+07	17.10582012	500	PASS
4	CC	0	12	4.00E+06	14	5.00E+06	1.15	1.00E+07	15.49378	500	PASS
4	CC	0	13	4.00E+06	0.73	2.00E+06	14	1.00E+07	9.936395096	500	PASS
4	CC	0	14	4.00E+06	0.73	2.00E+06	1.15	1.00E+07	9.761661562	500	PASS
4	CC	0	15	4.00E+06	0.73	5.00E+06	14	1.00E+07	17.67243228	500	PASS
4	CC	0	16	4.00E+06	0.73	5.00E+06	1.15	1.00E+07	15.10415368	500	PASS
4	CC	3	1	2.00E+06	14	2.00E+06	14	1.00E+07	9.108821356	500	PASS
4	CC	3	2	2.00E+06	14	2.00E+06	1.15	1.00E+07	8.811804619	500	PASS
4	CC	3	3	2.00E+06	14	5.00E+06	14	1.00E+07	19.58534068	500	PASS
4	CC	3	4	2.00E+06	14	5.00E+06	1.15	1.00E+07	16.91282569	500	PASS
4	CC	3	5	2.00E+06	0.73	2.00E+06	14	1.00E+07	8.691298099	500	PASS
4	CC	3	6	2.00E+06	0.73	2.00E+06	1.15	1.00E+07	7.470827551	500	PASS
4	CC	3	7	2.00E+06	0.73	5.00E+06	14	1.00E+07	19.96911842	500	PASS
4	CC	3	8	2.00E+06	0.73	5.00E+06	1.15	1.00E+07	17.46337906	500	PASS
4	CC	3	9	4.00E+06	14	2.00E+06	14	1.00E+07	16.01236749	500	PASS
4	CC	3	10	4.00E+06	14	2.00E+06	1.15	1.00E+07	16.16140783	500	PASS
4	CC	3	11	4.00E+06	14	5.00E+06	14	1.00E+07	20.78246547	500	PASS
4	CC	3	12	4.00E+06	14	5.00E+06	1.15	1.00E+07	18.85363954	500	PASS
4	CC	3	13	4.00E+06	0.73	2.00E+06	14	1.00E+07	11.93132189	500	PASS
4	CC	3	14	4.00E+06	0.73	2.00E+06	1.15	1.00E+07	11.64453467	500	PASS
4	CC	3	15	4.00E+06	0.73	5.00E+06	14	1.00E+07	20.99700858	500	PASS
4	CC	3	16	4.00E+06	0.73	5.00E+06	1.15	1.00E+07	18.05722374	500	PASS
4	SRNS	0	1	2.00E+06	14	2.00E+06	14	1.00E+07	10.02539061	N/A	N/A
4	SRNS	0	2	2.00E+06	14	2.00E+06	1.15	1.00E+07	9.319436146	N/A	N/A
4	SRNS	0	3	2.00E+06	14	5.00E+06	14	1.00E+07	17.72974777	N/A	N/A
4	SRNS	0	4	2.00E+06	14	5.00E+06	1.15	1.00E+07	16.15275828	N/A	N/A
4	SRNS	0	5	2.00E+06	0.73	2.00E+06	14	1.00E+07	8.690884817	N/A	N/A
4	SRNS	0	6	2.00E+06	0.73	2.00E+06	1.15	1.00E+07	7.900541184	N/A	N/A
4	SRNS	0	7	2.00E+06	0.73	5.00E+06	14	1.00E+07	16.99123359	N/A	N/A
4	SRNS	0	8	2.00E+06	0.73	5.00E+06	1.15	1.00E+07	15.32570622	N/A	N/A
4	SRNS	0	9	4.00E+06	14	2.00E+06	14	1.00E+07	15.18411162	N/A	N/A
4	SRNS	0	10	4.00E+06	14	2.00E+06	1.15	1.00E+07	14.70090165	N/A	N/A
4	SRNS	0	11	4.00E+06	14	5.00E+06	14	1.00E+07	21.21948628	N/A	N/A
4	SRNS	0	12	4.00E+06	14	5.00E+06	1.15	1.00E+07	19.85344334	N/A	N/A
4	SRNS	0	13	4.00E+06	0.73	2.00E+06	14	1.00E+07	12.39561431	N/A	N/A
4	SRNS	0	14	4.00E+06	0.73	2.00E+06	1.15	1.00E+07	11.84030677	N/A	N/A
4	SRNS	0	15	4.00E+06	0.73	5.00E+06	14	1.00E+07	19.00112388	N/A	N/A
4	SRNS	0	16	4.00E+06	0.73	5.00E+06	1.15	1.00E+07	17.65429776	N/A	N/A
4	SRNS	3	1	2.00E+06	14	2.00E+06	14	1.00E+07	11.53533247	N/A	N/A
4	SRNS	3	2	2.00E+06	14	2.00E+06	1.15	1.00E+07	10.72033646	N/A	N/A
4	SRNS	3	3	2.00E+06	14	5.00E+06	14	1.00E+07	20.4990665	N/A	N/A
4	SRNS	3	4	2.00E+06	14	5.00E+06	1.15	1.00E+07	18.61571105	N/A	N/A

Table 5-3. LMKDB1xxx Detailed Jitter Measurements (continued)

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
4	SRNS	3	5	2.00E+06	0.73	2.00E+06	14	1.00E+07	9.997071395	N/A	N/A
4	SRNS	3	6	2.00E+06	0.73	2.00E+06	1.15	1.00E+07	9.081757781	N/A	N/A
4	SRNS	3	7	2.00E+06	0.73	5.00E+06	14	1.00E+07	19.65363232	N/A	N/A
4	SRNS	3	8	2.00E+06	0.73	5.00E+06	1.15	1.00E+07	17.66662477	N/A	N/A
4	SRNS	3	9	4.00E+06	14	2.00E+06	14	1.00E+07	17.51928081	N/A	N/A
4	SRNS	3	10	4.00E+06	14	2.00E+06	1.15	1.00E+07	16.96505079	N/A	N/A
4	SRNS	3	11	4.00E+06	14	5.00E+06	14	1.00E+07	24.52289345	N/A	N/A
4	SRNS	3	12	4.00E+06	14	5.00E+06	1.15	1.00E+07	22.89935103	N/A	N/A
4	SRNS	3	13	4.00E+06	0.73	2.00E+06	14	1.00E+07	14.24855815	N/A	N/A
4	SRNS	3	14	4.00E+06	0.73	2.00E+06	1.15	1.00E+07	13.60624246	N/A	N/A
4	SRNS	3	15	4.00E+06	0.73	5.00E+06	14	1.00E+07	21.95808325	N/A	N/A
4	SRNS	3	16	4.00E+06	0.73	5.00E+06	1.15	1.00E+07	20.33577639	N/A	N/A
5	CC	0	1	5.00E+05	14	5.00E+05	14	2.00E+07	1.918867979	150	PASS
5	CC	0	2	5.00E+05	14	5.00E+05	0.73	2.00E+07	1.704404244	150	PASS
5	CC	0	3	5.00E+05	14	1.80E+06	14	2.00E+07	5.710155308	150	PASS
5	CC	0	4	5.00E+05	14	1.80E+06	0.73	2.00E+07	4.013147186	150	PASS
5	CC	0	5	5.00E+05	0.73	5.00E+05	14	2.00E+07	1.704404244	150	PASS
5	CC	0	6	5.00E+05	0.73	5.00E+05	0.73	2.00E+07	1.343949572	150	PASS
5	CC	0	7	5.00E+05	0.73	1.80E+06	14	2.00E+07	5.744066817	150	PASS
5	CC	0	8	5.00E+05	0.73	1.80E+06	0.73	2.00E+07	4.040101855	150	PASS
5	CC	0	9	1.80E+06	14	5.00E+05	14	2.00E+07	5.710155308	150	PASS
5	CC	0	10	1.80E+06	14	5.00E+05	0.73	2.00E+07	5.744066817	150	PASS
5	CC	0	11	1.80E+06	14	1.80E+06	14	2.00E+07	6.871539864	150	PASS
5	CC	0	12	1.80E+06	14	1.80E+06	0.73	2.00E+07	6.277780793	150	PASS
5	CC	0	13	1.80E+06	0.73	5.00E+05	14	2.00E+07	4.013147186	150	PASS
5	CC	0	14	1.80E+06	0.73	5.00E+05	0.73	2.00E+07	4.040101855	150	PASS
5	CC	0	15	1.80E+06	0.73	1.80E+06	14	2.00E+07	6.277780793	150	PASS
5	CC	0	16	1.80E+06	0.73	1.80E+06	0.73	2.00E+07	4.840158112	150	PASS
5	CC	3	1	5.00E+05	14	5.00E+05	14	2.00E+07	2.382591982	150	PASS
5	CC	3	2	5.00E+05	14	5.00E+05	0.73	2.00E+07	2.100597509	150	PASS
5	CC	3	3	5.00E+05	14	1.80E+06	14	2.00E+07	6.836106024	150	PASS
5	CC	3	4	5.00E+05	14	1.80E+06	0.73	2.00E+07	4.851924269	150	PASS
5	CC	3	5	5.00E+05	0.73	5.00E+05	14	2.00E+07	2.100597509	150	PASS
5	CC	3	6	5.00E+05	0.73	5.00E+05	0.73	2.00E+07	1.668612842	150	PASS
5	CC	3	7	5.00E+05	0.73	1.80E+06	14	2.00E+07	6.823207284	150	PASS
5	CC	3	8	5.00E+05	0.73	1.80E+06	0.73	2.00E+07	4.827763641	150	PASS
5	CC	3	9	1.80E+06	14	5.00E+05	14	2.00E+07	6.836106024	150	PASS
5	CC	3	10	1.80E+06	14	5.00E+05	0.73	2.00E+07	6.823207284	150	PASS
5	CC	3	11	1.80E+06	14	1.80E+06	14	2.00E+07	8.538549126	150	PASS
5	CC	3	12	1.80E+06	14	1.80E+06	0.73	2.00E+07	7.710452629	150	PASS
5	CC	3	13	1.80E+06	0.73	5.00E+05	14	2.00E+07	4.851924269	150	PASS
5	CC	3	14	1.80E+06	0.73	5.00E+05	0.73	2.00E+07	4.827763641	150	PASS
5	CC	3	15	1.80E+06	0.73	1.80E+06	14	2.00E+07	7.710452629	150	PASS
5	CC	3	16	1.80E+06	0.73	1.80E+06	0.73	2.00E+07	6.009079697	150	PASS
5	SRNS	0	1	5.00E+05	14	5.00E+05	14	2.00E+07	2.383109136	N/A	N/A
5	SRNS	0	2	5.00E+05	14	5.00E+05	0.73	2.00E+07	2.058907452	N/A	N/A
5	SRNS	0	3	5.00E+05	14	1.80E+06	14	2.00E+07	6.125339072	N/A	N/A
5	SRNS	0	4	5.00E+05	14	1.80E+06	0.73	2.00E+07	4.583363841	N/A	N/A
5	SRNS	0	5	5.00E+05	0.73	5.00E+05	14	2.00E+07	2.058907452	N/A	N/A
5	SRNS	0	6	5.00E+05	0.73	5.00E+05	0.73	2.00E+07	1.676483569	N/A	N/A

Table 5-3. LMKDB1xxx Detailed Jitter Measurements (continued)

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
5	SRNS	0	7	5.00E+05	0.73	1.80E+06	14	2.00E+07	6.008428606	N/A	N/A
5	SRNS	0	8	5.00E+05	0.73	1.80E+06	0.73	2.00E+07	4.422078755	N/A	N/A
5	SRNS	0	9	1.80E+06	14	5.00E+05	14	2.00E+07	6.125339072	N/A	N/A
5	SRNS	0	10	1.80E+06	14	5.00E+05	0.73	2.00E+07	6.008428606	N/A	N/A
5	SRNS	0	11	1.80E+06	14	1.80E+06	14	2.00E+07	8.345889583	N/A	N/A
5	SRNS	0	12	1.80E+06	14	1.80E+06	0.73	2.00E+07	7.25324351	N/A	N/A
5	SRNS	0	13	1.80E+06	0.73	5.00E+05	14	2.00E+07	4.583363841	N/A	N/A
5	SRNS	0	14	1.80E+06	0.73	5.00E+05	0.73	2.00E+07	4.422078755	N/A	N/A
5	SRNS	0	15	1.80E+06	0.73	1.80E+06	14	2.00E+07	7.25324351	N/A	N/A
5	SRNS	0	16	1.80E+06	0.73	1.80E+06	0.73	2.00E+07	6.030098843	N/A	N/A
5	SRNS	3	1	5.00E+05	14	5.00E+05	14	2.00E+07	2.775684045	N/A	N/A
5	SRNS	3	2	5.00E+05	14	5.00E+05	0.73	2.00E+07	2.3977996	N/A	N/A
5	SRNS	3	3	5.00E+05	14	1.80E+06	14	2.00E+07	7.153204405	N/A	N/A
5	SRNS	3	4	5.00E+05	14	1.80E+06	0.73	2.00E+07	5.337144995	N/A	N/A
5	SRNS	3	5	5.00E+05	0.73	5.00E+05	14	2.00E+07	2.3977996	N/A	N/A
5	SRNS	3	6	5.00E+05	0.73	5.00E+05	0.73	2.00E+07	1.951537075	N/A	N/A
5	SRNS	3	7	5.00E+05	0.73	1.80E+06	14	2.00E+07	7.017164375	N/A	N/A
5	SRNS	3	8	5.00E+05	0.73	1.80E+06	0.73	2.00E+07	5.149309846	N/A	N/A
5	SRNS	3	9	1.80E+06	14	5.00E+05	14	2.00E+07	7.153204405	N/A	N/A
5	SRNS	3	10	1.80E+06	14	5.00E+05	0.73	2.00E+07	7.017164375	N/A	N/A
5	SRNS	3	11	1.80E+06	14	1.80E+06	14	2.00E+07	9.746506724	N/A	N/A
5	SRNS	3	12	1.80E+06	14	1.80E+06	0.73	2.00E+07	8.464669661	N/A	N/A
5	SRNS	3	13	1.80E+06	0.73	5.00E+05	14	2.00E+07	5.337144995	N/A	N/A
5	SRNS	3	14	1.80E+06	0.73	5.00E+05	0.73	2.00E+07	5.149309846	N/A	N/A
5	SRNS	3	15	1.80E+06	0.73	1.80E+06	14	2.00E+07	8.464669661	N/A	N/A
5	SRNS	3	16	1.80E+06	0.73	1.80E+06	0.73	2.00E+07	7.021230257	N/A	N/A
6	CC	0	1	5.00E+05	14	5.00E+05	14	1.00E+07	2.232848296	100	PASS
6	CC	0	2	5.00E+05	14	5.00E+05	0.73	1.00E+07	2.036406183	100	PASS
6	CC	0	3	5.00E+05	14	1.00E+06	14	1.00E+07	4.009418208	100	PASS
6	CC	0	4	5.00E+05	14	1.00E+06	0.73	1.00E+07	2.832999909	100	PASS
6	CC	0	5	5.00E+05	0.73	5.00E+05	14	1.00E+07	2.036406183	100	PASS
6	CC	0	6	5.00E+05	0.73	5.00E+05	0.73	1.00E+07	1.564275297	100	PASS
6	CC	0	7	5.00E+05	0.73	1.00E+06	14	1.00E+07	4.1228743	100	PASS
6	CC	0	8	5.00E+05	0.73	1.00E+06	0.73	1.00E+07	2.789050322	100	PASS
6	CC	0	9	1.00E+06	14	5.00E+05	14	1.00E+07	4.009418208	100	PASS
6	CC	0	10	1.00E+06	14	5.00E+05	0.73	1.00E+07	4.1228743	100	PASS
6	CC	0	11	1.00E+06	14	1.00E+06	14	1.00E+07	4.456269608	100	PASS
6	CC	0	12	1.00E+06	14	1.00E+06	0.73	1.00E+07	4.137758815	100	PASS
6	CC	0	13	1.00E+06	0.73	5.00E+05	14	1.00E+07	2.832999909	100	PASS
6	CC	0	14	1.00E+06	0.73	5.00E+05	0.73	1.00E+07	2.789050322	100	PASS
6	CC	0	15	1.00E+06	0.73	1.00E+06	14	1.00E+07	4.137758815	100	PASS
6	CC	0	16	1.00E+06	0.73	1.00E+06	0.73	1.00E+07	3.129064798	100	PASS
6	CC	3	1	5.00E+05	14	5.00E+05	14	1.00E+07	2.681563163	100	PASS
6	CC	3	2	5.00E+05	14	5.00E+05	0.73	1.00E+07	2.423580474	100	PASS
6	CC	3	3	5.00E+05	14	1.00E+06	14	1.00E+07	4.714288005	100	PASS
6	CC	3	4	5.00E+05	14	1.00E+06	0.73	1.00E+07	3.377571825	100	PASS
6	CC	3	5	5.00E+05	0.73	5.00E+05	14	1.00E+07	2.423580474	100	PASS
6	CC	3	6	5.00E+05	0.73	5.00E+05	0.73	1.00E+07	1.878457089	100	PASS
6	CC	3	7	5.00E+05	0.73	1.00E+06	14	1.00E+07	4.790512222	100	PASS
6	CC	3	8	5.00E+05	0.73	1.00E+06	0.73	1.00E+07	3.28116958	100	PASS

Table 5-3. LMKDB1xxx Detailed Jitter Measurements (continued)

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
6	CC	3	9	1.00E+06	14	5.00E+05	14	1.00E+07	4.714288005	100	PASS
6	CC	3	10	1.00E+06	14	5.00E+05	0.73	1.00E+07	4.790512222	100	PASS
6	CC	3	11	1.00E+06	14	1.00E+06	14	1.00E+07	5.353172449	100	PASS
6	CC	3	12	1.00E+06	14	1.00E+06	0.73	1.00E+07	4.915403236	100	PASS
6	CC	3	13	1.00E+06	0.73	5.00E+05	14	1.00E+07	3.377571825	100	PASS
6	CC	3	14	1.00E+06	0.73	5.00E+05	0.73	1.00E+07	3.28116958	100	PASS
6	CC	3	15	1.00E+06	0.73	1.00E+06	14	1.00E+07	4.915403236	100	PASS
6	CC	3	16	1.00E+06	0.73	1.00E+06	0.73	1.00E+07	3.757457287	100	PASS
6	SRNS	0	1	5.00E+05	14	5.00E+05	14	1.00E+07	3.336076581	N/A	N/A
6	SRNS	0	2	5.00E+05	14	5.00E+05	0.73	1.00E+07	2.88118539	N/A	N/A
6	SRNS	0	3	5.00E+05	14	1.00E+06	14	1.00E+07	5.238725807	N/A	N/A
6	SRNS	0	4	5.00E+05	14	1.00E+06	0.73	1.00E+07	4.068337143	N/A	N/A
6	SRNS	0	5	5.00E+05	0.73	5.00E+05	14	1.00E+07	2.88118539	N/A	N/A
6	SRNS	0	6	5.00E+05	0.73	5.00E+05	0.73	1.00E+07	2.342978214	N/A	N/A
6	SRNS	0	7	5.00E+05	0.73	1.00E+06	14	1.00E+07	4.959874495	N/A	N/A
6	SRNS	0	8	5.00E+05	0.73	1.00E+06	0.73	1.00E+07	3.70525652	N/A	N/A
6	SRNS	0	9	1.00E+06	14	5.00E+05	14	1.00E+07	5.238725807	N/A	N/A
6	SRNS	0	10	1.00E+06	14	5.00E+05	0.73	1.00E+07	4.959874495	N/A	N/A
6	SRNS	0	11	1.00E+06	14	1.00E+06	14	1.00E+07	6.621487451	N/A	N/A
6	SRNS	0	12	1.00E+06	14	1.00E+06	0.73	1.00E+07	5.727298172	N/A	N/A
6	SRNS	0	13	1.00E+06	0.73	5.00E+05	14	1.00E+07	4.068337143	N/A	N/A
6	SRNS	0	14	1.00E+06	0.73	5.00E+05	0.73	1.00E+07	3.70525652	N/A	N/A
6	SRNS	0	15	1.00E+06	0.73	1.00E+06	14	1.00E+07	5.727298172	N/A	N/A
6	SRNS	0	16	1.00E+06	0.73	1.00E+06	0.73	1.00E+07	4.688045366	N/A	N/A
6	SRNS	3	1	5.00E+05	14	5.00E+05	14	1.00E+07	3.786087859	N/A	N/A
6	SRNS	3	2	5.00E+05	14	5.00E+05	0.73	1.00E+07	3.269733687	N/A	N/A
6	SRNS	3	3	5.00E+05	14	1.00E+06	14	1.00E+07	5.947182033	N/A	N/A
6	SRNS	3	4	5.00E+05	14	1.00E+06	0.73	1.00E+07	4.616612073	N/A	N/A
6	SRNS	3	5	5.00E+05	0.73	5.00E+05	14	1.00E+07	3.269733687	N/A	N/A
6	SRNS	3	6	5.00E+05	0.73	5.00E+05	0.73	1.00E+07	2.658588864	N/A	N/A
6	SRNS	3	7	5.00E+05	0.73	1.00E+06	14	1.00E+07	5.630845853	N/A	N/A
6	SRNS	3	8	5.00E+05	0.73	1.00E+06	0.73	1.00E+07	4.204395825	N/A	N/A
6	SRNS	3	9	1.00E+06	14	5.00E+05	14	1.00E+07	5.947182033	N/A	N/A
6	SRNS	3	10	1.00E+06	14	5.00E+05	0.73	1.00E+07	5.630845853	N/A	N/A
6	SRNS	3	11	1.00E+06	14	1.00E+06	14	1.00E+07	7.517204797	N/A	N/A
6	SRNS	3	12	1.00E+06	14	1.00E+06	0.73	1.00E+07	6.501402061	N/A	N/A
6	SRNS	3	13	1.00E+06	0.73	5.00E+05	14	1.00E+07	4.616612073	N/A	N/A
6	SRNS	3	14	1.00E+06	0.73	5.00E+05	0.73	1.00E+07	4.204395825	N/A	N/A
6	SRNS	3	15	1.00E+06	0.73	1.00E+06	14	1.00E+07	6.501402061	N/A	N/A
6	SRNS	3	16	1.00E+06	0.73	1.00E+06	0.73	1.00E+07	5.319514125	N/A	N/A
7	CC	0	1	3.50E+05	14	3.50E+05	14	1.00E+07	1.705570320	67	PASS
7	CC	0	2	3.50E+05	14	3.50E+05	0.73	1.00E+07	1.543907634	67	PASS
7	CC	0	3	3.50E+05	14	7.00E+05	14	1.00E+07	3.037294256	67	PASS
7	CC	0	4	3.50E+05	14	7.00E+05	0.73	1.00E+07	2.153892350	67	PASS
7	CC	0	5	3.50E+05	0.73	3.50E+05	14	1.00E+07	1.543907634	67	PASS
7	CC	0	6	3.50E+05	0.73	3.50E+05	0.73	1.00E+07	1.194394570	67	PASS
7	CC	0	7	3.50E+05	0.73	7.00E+05	14	1.00E+07	3.114933252	67	PASS
7	CC	0	8	3.50E+05	0.73	7.00E+05	0.73	1.00E+07	2.113888513	67	PASS

Table 5-3. LMKDB1xxx Detailed Jitter Measurements (continued)

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
7	CC	0	9	7.00E+05	14	3.50E+05	14	1.00E+07	3.037294256	67	PASS
7	CC	0	10	7.00E+05	14	3.50E+05	0.73	1.00E+07	3.114933252	67	PASS
7	CC	0	11	7.00E+05	14	7.00E+05	14	1.00E+07	3.407673048	67	PASS
7	CC	0	12	7.00E+05	14	7.00E+05	0.73	1.00E+07	3.123542347	67	PASS
7	CC	0	13	7.00E+05	0.73	3.50E+05	14	1.00E+07	2.153892350	67	PASS
7	CC	0	14	7.00E+05	0.73	3.50E+05	0.73	1.00E+07	2.113888513	67	PASS
7	CC	0	15	7.00E+05	0.73	7.00E+05	14	1.00E+07	3.123542347	67	PASS
7	CC	0	16	7.00E+05	0.73	7.00E+05	0.73	1.00E+07	2.388978319	67	PASS
7	CC	3	1	3.50E+05	14	3.50E+05	14	1.00E+07	2.388978319	67	PASS
7	CC	3	2	3.50E+05	14	3.50E+05	0.73	1.00E+07	1.793806532	67	PASS
7	CC	3	3	3.50E+05	14	7.00E+05	14	1.00E+07	3.492987850	67	PASS
7	CC	3	4	3.50E+05	14	7.00E+05	0.73	1.00E+07	2.505569608	67	PASS
7	CC	3	5	3.50E+05	0.73	3.50E+05	14	1.00E+07	1.793806532	67	PASS
7	CC	3	6	3.50E+05	0.73	3.50E+05	0.73	1.00E+07	1.397193901	67	PASS
7	CC	3	7	3.50E+05	0.73	7.00E+05	14	1.00E+07	3.547083448	67	PASS
7	CC	3	8	3.50E+05	0.73	7.00E+05	0.73	1.00E+07	2.432198869	67	PASS
7	CC	3	9	7.00E+05	14	3.50E+05	14	1.00E+07	3.492987850	67	PASS
7	CC	3	10	7.00E+05	14	3.50E+05	0.73	1.00E+07	3.547083448	67	PASS
7	CC	3	11	7.00E+05	14	7.00E+05	14	1.00E+07	3.986827152	67	PASS
7	CC	3	12	7.00E+05	14	7.00E+05	0.73	1.00E+07	3.625011577	67	PASS
7	CC	3	13	7.00E+05	0.73	3.50E+05	14	1.00E+07	2.505569608	67	PASS
7	CC	3	14	7.00E+05	0.73	3.50E+05	0.73	1.00E+07	2.432198869	67	PASS
7	CC	3	15	7.00E+05	0.73	7.00E+05	14	1.00E+07	3.625011577	67	PASS
7	CC	3	16	7.00E+05	0.73	7.00E+05	0.73	1.00E+07	2.794586843	67	PASS
7	SR	0	1	3.50E+05	14	3.50E+05	14	1.00E+07	2.520421660	N/A	N/A
7	SR	0	2	3.50E+05	14	3.50E+05	0.73	1.00E+07	2.176096743	N/A	N/A
7	SR	0	3	3.50E+05	14	7.00E+05	14	1.00E+07	3.970922285	N/A	N/A
7	SR	0	4	3.50E+05	14	7.00E+05	0.73	1.00E+07	3.069967317	N/A	N/A
7	SR	0	5	3.50E+05	0.73	3.50E+05	14	1.00E+07	2.176096743	N/A	N/A
7	SR	0	6	3.50E+05	0.73	3.50E+05	0.73	1.00E+07	1.767188480	N/A	N/A
7	SR	0	7	3.50E+05	0.73	7.00E+05	14	1.00E+07	3.761217293	N/A	N/A
7	SR	0	8	3.50E+05	0.73	7.00E+05	0.73	1.00E+07	2.794526878	N/A	N/A
7	SR	0	9	7.00E+05	14	3.50E+05	14	1.00E+07	3.970922285	N/A	N/A
7	SR	0	10	7.00E+05	14	3.50E+05	0.73	1.00E+07	3.761217293	N/A	N/A
7	SR	0	11	7.00E+05	14	7.00E+05	14	1.00E+07	5.020930947	N/A	N/A
7	SR	0	12	7.00E+05	14	7.00E+05	0.73	1.00E+07	4.338284904	N/A	N/A
7	SR	0	13	7.00E+05	0.73	3.50E+05	14	1.00E+07	3.069967317	N/A	N/A
7	SR	0	14	7.00E+05	0.73	3.50E+05	0.73	1.00E+07	2.794526878	N/A	N/A
7	SR	0	15	7.00E+05	0.73	7.00E+05	14	1.00E+07	4.338284904	N/A	N/A

Table 5-3. LMKDB1xxx Detailed Jitter Measurements (continued)

PCIe Gen	Clock Arch.	Noise Fold	Filter Comb	PLL1 f1	PLL1 zeta 1	PLL2 f2	PLL2 zeta 2	CDR f3	Value (fs)	Limit (fs)	Status
7	SR	0	16	7.00E+05	0.73	7.00E+05	0.73	1.00E+07	3.535286700	N/A	N/A
7	SR	3	1	3.50E+05	14	3.50E+05	14	1.00E+07	2.813611401	N/A	N/A
7	SR	3	2	3.50E+05	14	3.50E+05	0.73	1.00E+07	2.429214767	N/A	N/A
7	SR	3	3	3.50E+05	14	7.00E+05	14	1.00E+07	4.433244533	N/A	N/A
7	SR	3	4	3.50E+05	14	7.00E+05	0.73	1.00E+07	3.426991005	N/A	N/A
7	SR	3	5	3.50E+05	0.73	3.50E+05	14	1.00E+07	2.429214767	N/A	N/A
7	SR	3	6	3.50E+05	0.73	3.50E+05	0.73	1.00E+07	1.972678895	N/A	N/A
7	SR	3	7	3.50E+05	0.73	7.00E+05	14	1.00E+07	4.199171816	N/A	N/A
7	SR	3	8	3.50E+05	0.73	7.00E+05	0.73	1.00E+07	3.119478848	N/A	N/A
7	SR	3	9	7.00E+05	14	3.50E+05	14	1.00E+07	4.433244533	N/A	N/A
7	SR	3	10	7.00E+05	14	3.50E+05	0.73	1.00E+07	4.199171816	N/A	N/A
7	SR	3	11	7.00E+05	14	7.00E+05	14	1.00E+07	5.605555786	N/A	N/A
7	SR	3	12	7.00E+05	14	7.00E+05	0.73	1.00E+07	4.843306328	N/A	N/A
7	SR	3	13	7.00E+05	0.73	3.50E+05	14	1.00E+07	3.426991005	N/A	N/A
7	SR	3	14	7.00E+05	0.73	3.50E+05	0.73	1.00E+07	3.119478848	N/A	N/A
7	SR	3	15	7.00E+05	0.73	7.00E+05	14	1.00E+07	4.843306328	N/A	N/A
7	SR	3	16	7.00E+05	0.73	7.00E+05	0.73	1.00E+07	3.946364609	N/A	N/A

6 Summary

This report outlines TI's PCIe Compliance Tool, how the test results are obtained, and demonstrates PCIe compliance based on the results in Section 5.1. This report demonstrates that the LMKDB1xxx buffer family of devices is an excellent choice for PCIe clocking in enterprise systems.

7 References

- Texas Instruments, *LMKDB1120 and LMKDB1108 Ultra-Low Jitter PCIe Gen 1 to Gen 6 LP-HCSL Clock Buffers*, data sheet.
- Texas Instruments, *TICSPRO-SW*, Clocks and Synthesizers (TICS) Pro Software.

8 Revision History

Changes from Revision * (November 2023) to Revision A (April 2025)	Page
• Updated the numbering format for tables, figures, and cross-references throughout the document	1
• Changed *PCIe Tool Home Page* image	3
• Changed *LMKDB1xxx PCIe Tool Test Results Summary - Frequency Domain* table	4
• Updated the *Output Phase Noise Curve From the LMKDB1120 Having a 100MHz Reference Input Signal Into the LMKDB1xxx Device With Slew Rate = 3.5V/ns and Peak-to-Peak Swing = 1.6Vpp* image	6

IMPORTANT NOTICE AND DISCLAIMER

TI PROVIDES TECHNICAL AND RELIABILITY DATA (INCLUDING DATA SHEETS), DESIGN RESOURCES (INCLUDING REFERENCE DESIGNS), APPLICATION OR OTHER DESIGN ADVICE, WEB TOOLS, SAFETY INFORMATION, AND OTHER RESOURCES “AS IS” AND WITH ALL FAULTS, AND DISCLAIMS ALL WARRANTIES, EXPRESS AND IMPLIED, INCLUDING WITHOUT LIMITATION ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF THIRD PARTY INTELLECTUAL PROPERTY RIGHTS.

These resources are intended for skilled developers designing with TI products. You are solely responsible for (1) selecting the appropriate TI products for your application, (2) designing, validating and testing your application, and (3) ensuring your application meets applicable standards, and any other safety, security, regulatory or other requirements.

These resources are subject to change without notice. TI grants you permission to use these resources only for development of an application that uses the TI products described in the resource. Other reproduction and display of these resources is prohibited. No license is granted to any other TI intellectual property right or to any third party intellectual property right. TI disclaims responsibility for, and you will fully indemnify TI and its representatives against, any claims, damages, costs, losses, and liabilities arising out of your use of these resources.

TI’s products are provided subject to TI’s Terms of Sale or other applicable terms available either on ti.com or provided in conjunction with such TI products. TI’s provision of these resources does not expand or otherwise alter TI’s applicable warranties or warranty disclaimers for TI products.

TI objects to and rejects any additional or different terms you may have proposed.

Mailing Address: Texas Instruments, Post Office Box 655303, Dallas, Texas 75265