Gigabit Ethernet Consortium
Clause 38 PMD Conformance Test Suite v.7 Report

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Mr/Ms Vendor
XYZ Networking
123 Anywhere Rd
Somewhere, CA 00000

03-Aug-2009
Report Rev. 1.0

Enclosed are the results from the Clause 38 PMD Conformance testing performed on:

Device Under Test (DUT):	XYZ Networking DUT5000
Hardware Version:	Rev1.1
Firmware Version:	Not Available
Software Version:	Not Available
Miscellaneous:	Not Available
IOL ID:	IOL Label # GE-CMPC-00000050505

The test suite referenced in this report is available at the UNH-IOL website:

ftp://ftp.iol.unh.edu/pub/ethernet/test_suites/CL38_PMD/Clause38_Optical_PMD_testsuite_v0.7.pdf

Issues Observed While Testing
38.1.4 – Average Launch Power – The DUT was observed to have an average launch power less than –9.5dB.
35.1.6 – Transmitter Eye Mask – The DUT was observed to violate the transmit eye mask.

For specific details regarding issues please see the corresponding test result.

Testing Completed 08/03/2009

Review Completed 08/03/2009

Digitally signed by UNH-IOL
Date: 2009.08.03 13:29:28 -04'00'

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Table 1: Hardware Information

DUT Configuration	
Amplitude Setting	Powerup
Emphasis Setting	Not Available/Not Available
Transceiver Model:	Optics123
Transceiver S/N:	Q5550101
Test System Hardware	
Real-time DSO	TEKTRONIX,CSA7404,Q13,CF:91.1CT FV:2.5.3
Optical Spectrum Analyzer	Anritsu Optical Spectrum Analyzer (MS96A)
Test System Software	UNH-IOL Clause 38 Optical PMD Test System v1.4

Test Setup

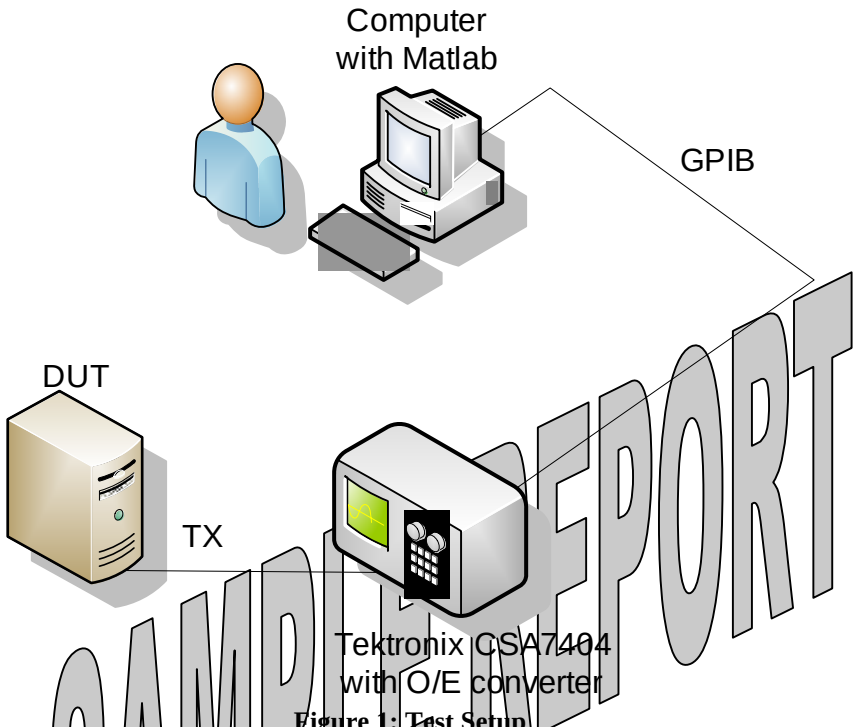


Figure 1: Test Setup

Figure 1 above depicts the test setup employed for the majority of the testing. The test system consists of the Tektronix CSA7404 with an O/E module attached, a computer with Matlab for post processing, and the Device Under Test (DUT).

Report Key

Table 1 contains setup and configuration information for the Device Under Test (DUT), as well as the test system hardware. A best effort is made to record as much information as possible about the DUT, including hardware, software, and firmware versions. The test system hardware information fields display the GPIB device identification strings for each piece of system hardware. These identifiers generally include the manufacturer, model number, serial number, and firmware revision information for the particular piece of equipment, however the amount of detail can vary depending on the instrument.

Table 2 summarizes the electrical conformance requirements and results, listed by IOL test number. A brief description is given for each parameter, along with the range of conformant values and the values measured during testing. There is also a convenient link to the figure that is relevant to the specific test. (Complete test descriptions can be found in the Optical-PMD test suite.)

The remainder of the report contains graphical supplements to the tabulated results. Most of these supplements are informative, and are included to provide insight into the measurement methodologies used to generate the numerical results. A brief explanation of each figure is provided here:

Figure 1 contains the eye pattern for the DUT. It is a persistence waveform generated in MATLAB from the actual waveform data acquired during the jitter test.

Figure 2 shows the TX bit rate deviation from nominal signaling speed versus capture. This is derived from measurements made on the eye. The mean of the rate is the average TX signaling speed.

Figure 3 contains the rise and fall times, which are extracted from measurements from the eye diagram.

Figure 4 contains information pertaining to power, which is extracted from measurements from the eye diagram.

Figure 5 shows the deterministic jitter in red, and random jitter in blue. The jitter is measured by configuring the DUT to transmit the 36A.3 Mixed-frequency test pattern (which is contained in the K28.5 code group) if available.

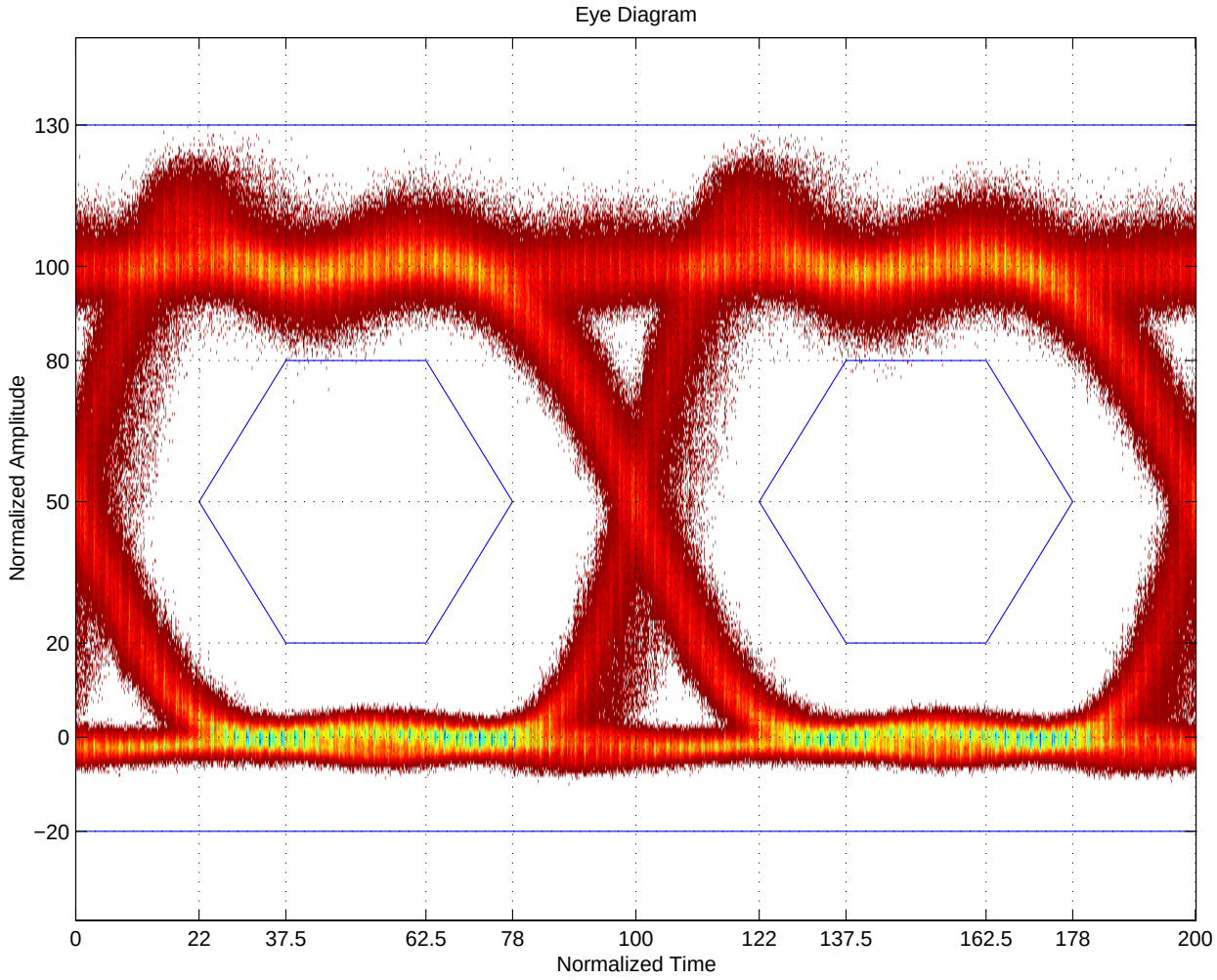
Figure 6 shows the deterministic and random jitter in the frequency domain.

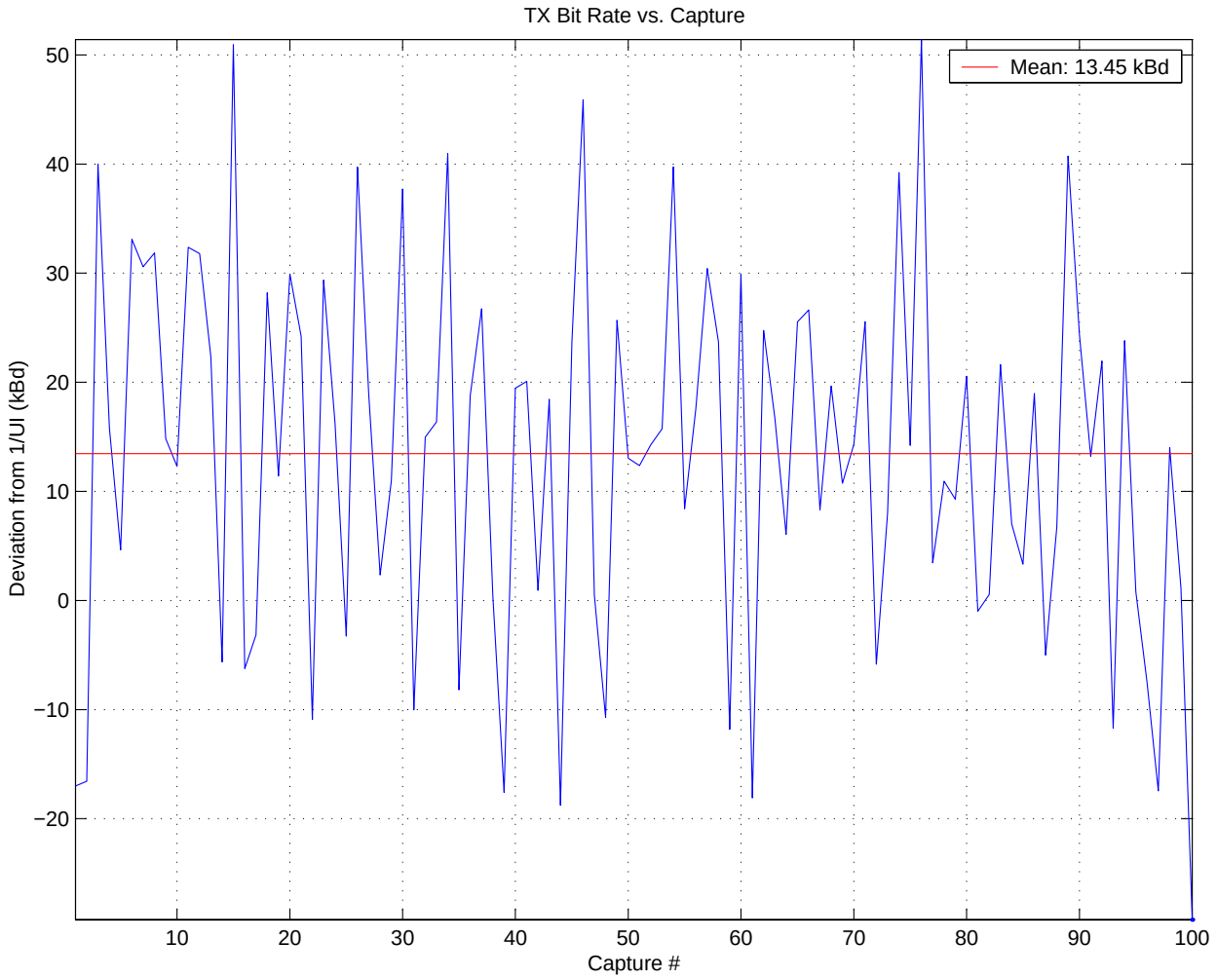
Table 2: Summary of Electrical Requirements and Results

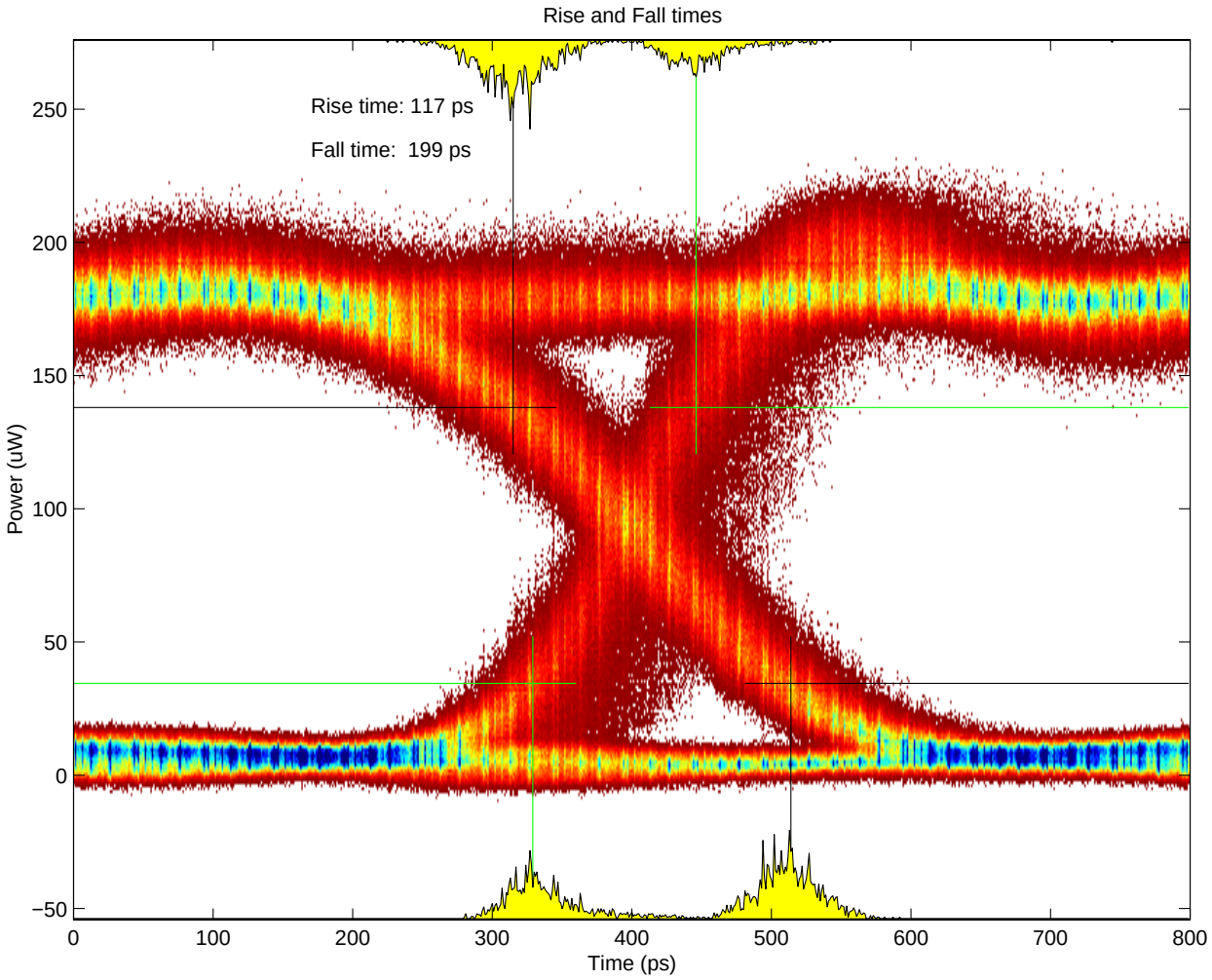
Parameter	Min	Max	Measured	Units	Figure
38.1.1 – Signaling Speed					
Average TX bit rate, difference from 1.25 GBd	-125	125	13.45	kBd	2
38.1.2 – Wavelength					
Midpoint of wavelength spectrum	770	860	858.62	nm	
38.1.3 – Rise and Fall Times					
20%-80% rising edge transition time	0	210, 260*	117.00	ps	3
80%-20% falling edge transition time	0	210, 260*	199.00	ps	3
38.1.4 – Average Launch Power					
Average optical launch power	-9.5	0	(-10.28)	dBm	4
38.1.5 – Extinction Ratio					
The ratio of the average optical energy in a ONE to the average optical energy in a ZERO	9	+Inf	13.88	dBm	4
35.1.6 – Transmitter Eye Mask					
The captured waveform should have no mask violations	0	0	(1)	hits	1
35.1.7 – Transmit Jitter					
Peak-to-peak total jitter (TJ)	0	0.431	0.343	UI	5, 6
Peak-to-peak deterministic (DJ)	0	0.200	0.153	UI	5, 6
Peak-to-peak random jitter (RJ)	0	0.231	0.190	UI	5, 6

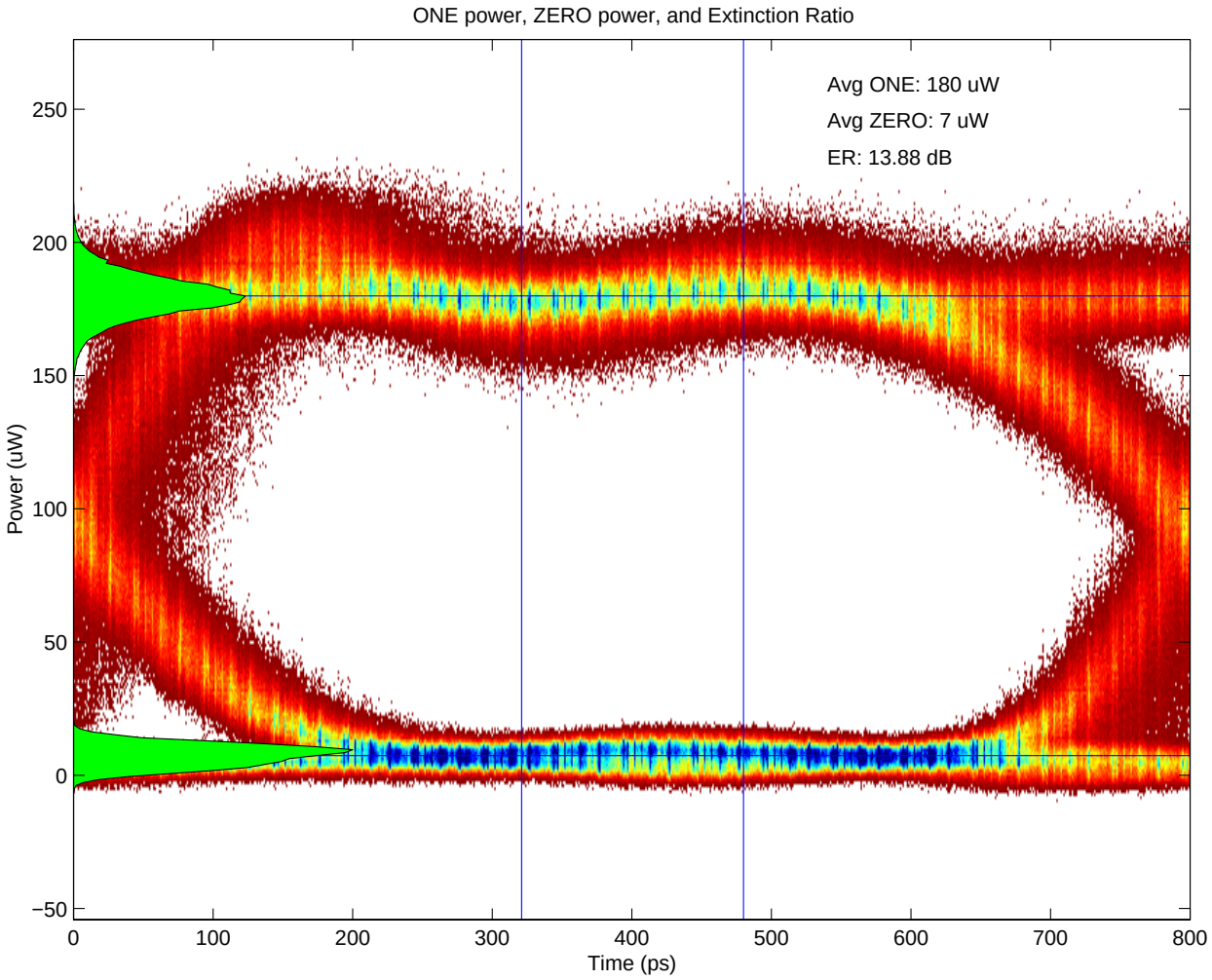
*The rise and fall time specifications for 1000BASE-SX devices are 0.26ns (max, 20% – 80% response time) when the wavelength is greater than 830nm, and 0.21ns when the wavelength is less than or equal to 830nm.

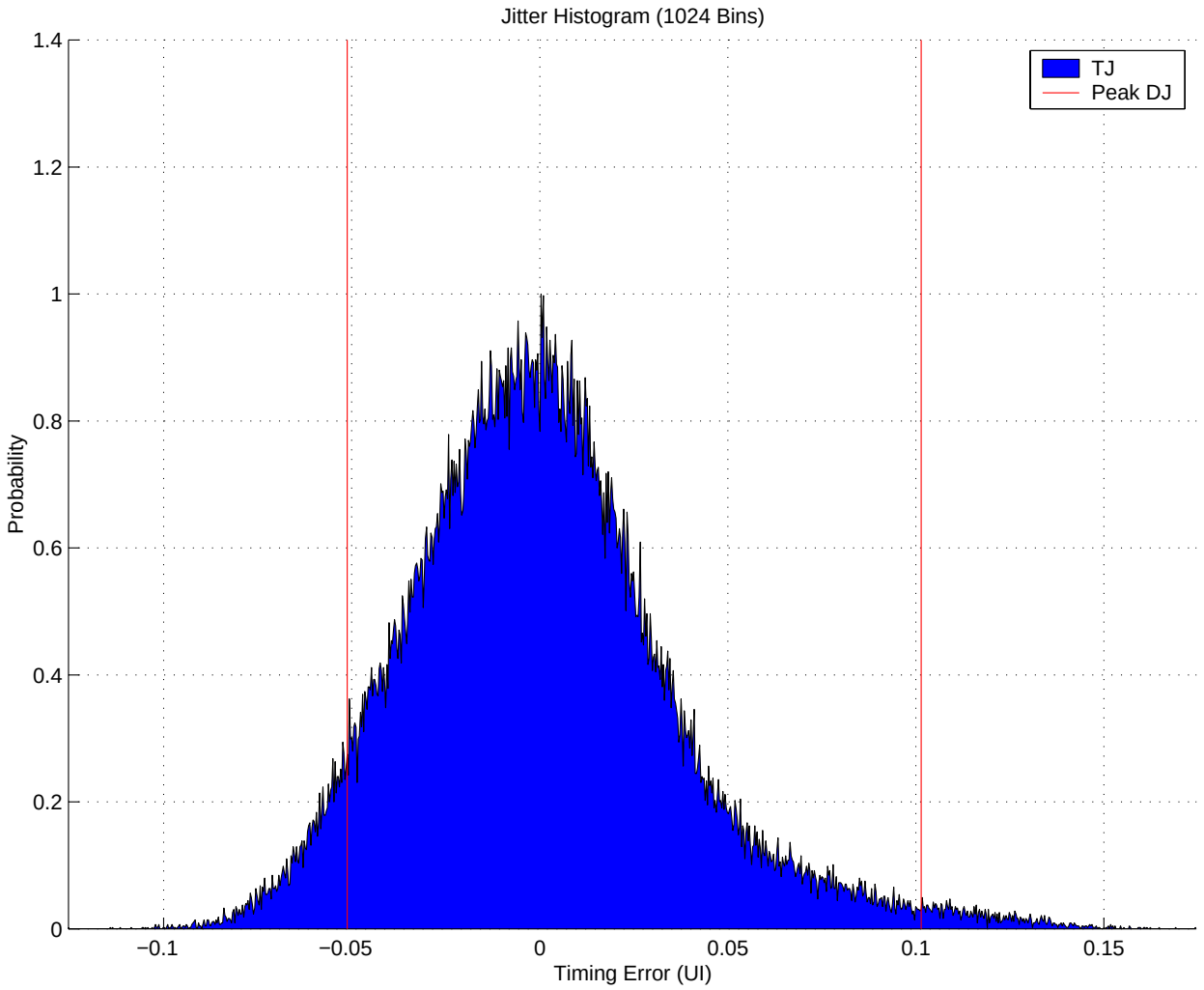
Annex A – Supplemental Figures

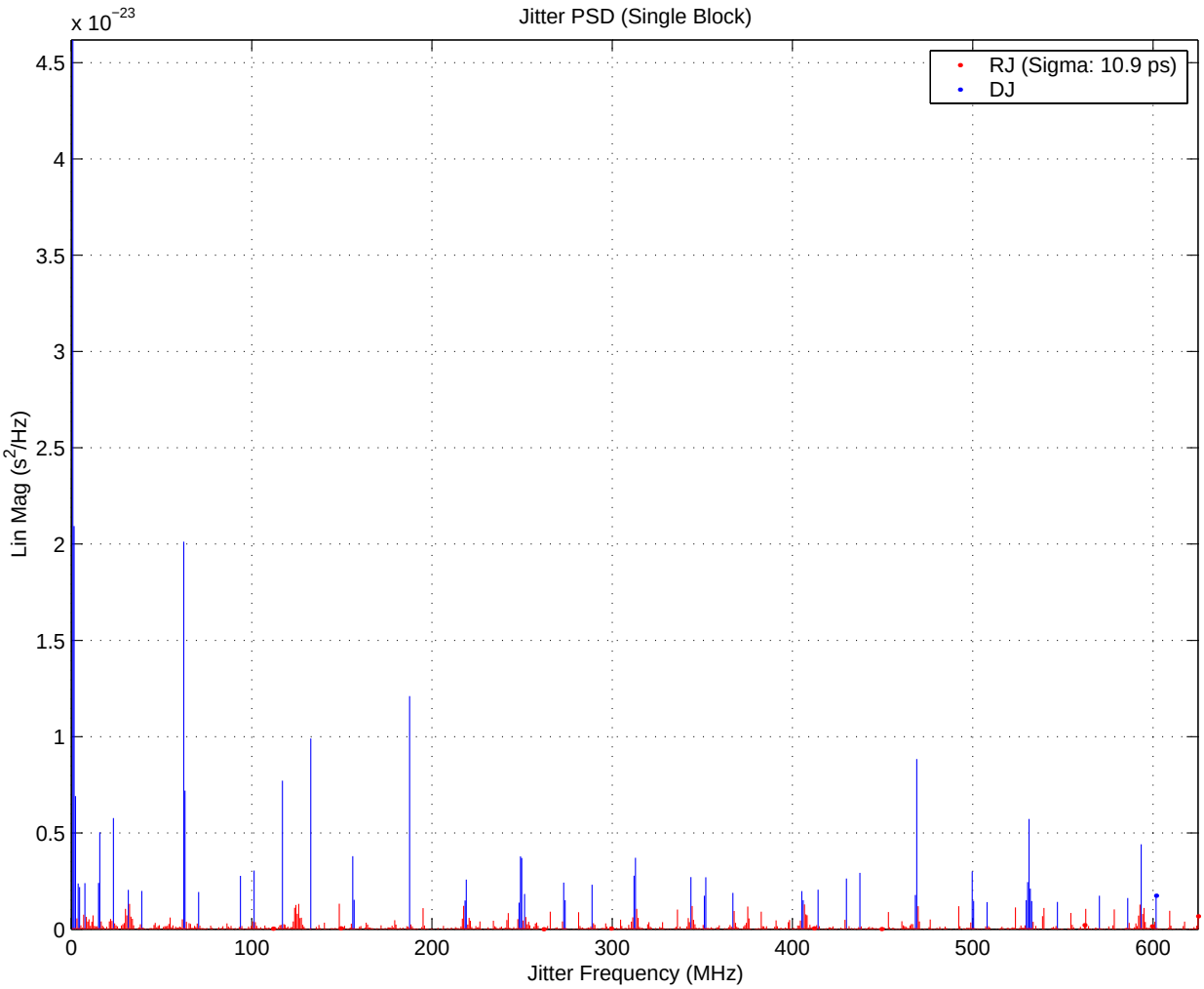



TX Bit Rate vs. Capture
Mean: 13.45 kBd
Deviation from 1/UI (kBd)
Capture #
50
40
30
20
10
0
−10
−20
10
20
30
40
50
60
70
80
90
100


Rise and Fall times
Rise time: 117 ps
Fall time: 199 ps
Power (uW)
Time (ps)
250
200
150
100
50
0
−50
0
100
200
300
400
500
600
700
800


ONE power, ZERO power, and Extinction Ratio
Avg ONE: 180 uW
Avg ZERO: 7 uW
ER: 13.88 dB
Power (uW)
Time (ps)
250
200
150
100
50
0
−50
0
100
200
300
400
500
600
700
800


Jitter Histogram (1024 Bins)
TJ
Peak DJ
Probability
Timing Error (UI)
1.4
1.2
1
0.8
0.6
0.4
0.2
0
−0.1
−0.05
0
0.05
0.1
0.15


Jitter PSD (Single Block)
x 10^-23
RJ (Sigma: 10.9 ps)
DJ
Lin Mag (s^2/Hz)
Jitter Frequency (MHz)
0
0.5
1
1.5
2
2.5
3
3.5
4
4.5
0
100
200
300
400
500
600