

# **TIDA-00882 – USB Type-C™ HDD with USB Power Delivery Reference Design**

## BERTScope USB 3.0 Receiver Test

### RECEIVER TEST RESULTS

11/12/2015 08:51:18

#### Identification

Name: 10970066\_Texas  
Creator: Tek LabDate/Time: 11/12/2015 08:47:55  
DUT Type: Device

Description:

Comment:

Passed: Passed (8)

#### Test Calibrations

EYE: 20151109  
DPP: 20151109DPP S/N: B010549  
BSC S/N: 281047  
CR S/N: B172091

#### Test Signals

PG: Rate 4.987, RJ 20.7%, Delay 1717.0 pS  
SSC: 5000 PPM, 33 KHZ  
DPP: Ampl 595 mV, Taps [0.00 -3.97 -3.97 -3.97]  
ED: Rate 5.000, Sync UserGrabNGo  
CR: BW 11.00 MHz, Peaking 2.09 dB, Lock Range 30.00 MHz  
PG Pattern: USB3\_A\_CP0wSKP\_B\_Keep.ram  
Det Pattern: USB3\_CP0.ram

#### Jitter Tolerance Configuration

Test Mode: Compliance  
Test Bits: 3.00e010  
Margin: 0.00%

Max Errors: 1

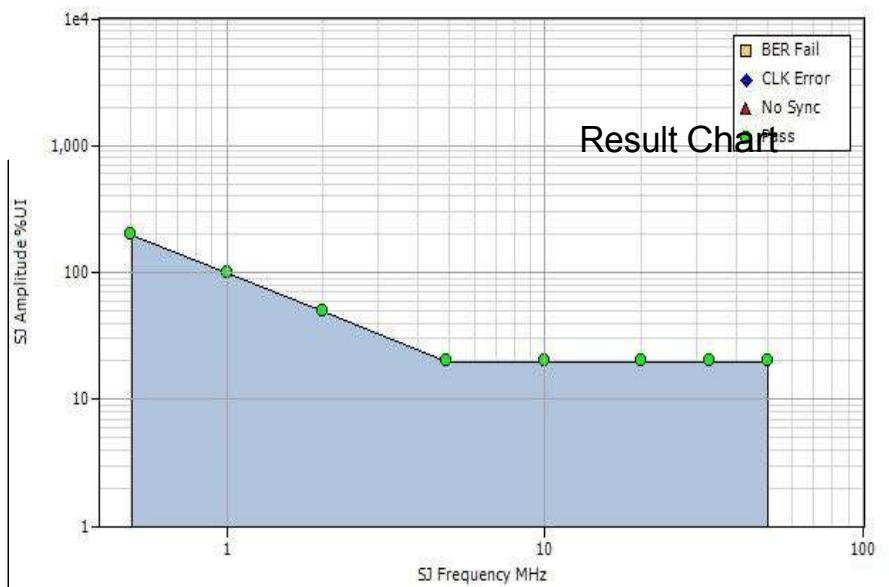
## Stressed Eye

Deemphasis: 3.00 dB (3.00 dB)

Eye Height: 180.00 mV (180.81 mV)

RJ: 2.42 pS (2.25 pS)

(values in parenthesis are calibration verification measurements)



## Jitter Tolerance Summary

MHZ	Test	Template	Bits	Errors	BER	Status	Margin	Cal Target	Cal Meas
0.50	200.00%	200.00%	3.00e010	0	0.00e000	Passed	0.00%	400.00 pS	388.12 pS
1.00	100.00%	100.00%	3.00e010	0	0.00e000	Passed	0.00%	200.00 pS	192.02 pS
2.00	50.00%	50.00%	3.00e010	0	0.00e000	Passed	0.00%	100.00 pS	95.41 pS
4.90	20.00%	20.00%	3.00e010	0	0.00e000	Passed	0.00%	40.00 pS	37.73 pS
10.00	20.00%	20.00%	3.00e010	0	0.00e000	Passed	0.00%	40.00 pS	37.11 pS
20.00	20.00%	20.00%	3.00e010	0	0.00e000	Passed	0.00%	40.00 pS	39.01 pS
33.00	20.00%	20.00%	3.00e010	0	0.00e000	Passed	0.00%	40.00 pS	37.79 pS
50.00	20.00%	20.00%	3.00e010	0	0.00e000	Passed	0.00%	40.00 pS	38.96 pS



## TekExpress USB 3.1 Report

## Test Report

Execution and Setup Information			
DUT ID	10970066	Suite	Device
Date/Time	2015-11-12 08:58:12	Scope Model	MSO73304DX
Connector Type	Standard	Scope Serial Numer	B260121
Test Point	Compliance (TP1) – Far End	Scope FW Version	7.5.0 Build 1
DPOJET Version	"7.1.2.38"	SPC Factory:S/W Calibration	PASS;PASS
SigTest Version	3_2_8	TekExpress Version	USB:6.0.6.6 Framework:3.0.1.88
Total Execution Time	3 Minutes 20 Seconds		
Toggle Tool	Do not use		
Acquisition Mode	Live		
Over All Test Result	Pass		
DUT COMMENT:	General Comment – USB3.1 DUT		

UI-Unit Interval							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
<a href="#">UI-Unit Interval</a>	Gen 1	DPOJET	200.486 ps	Pass	546.169 fs & 573.831 fs	199.94 ps	201.06 ps
UI-Unit Interval	Gen 1	USB-IF	200.476 ps	Pass	536.000 fs & 584.000 fs	199.94 ps	201.06 ps
COMMENTS							

VTx-Diff-PP-Differential PP Tx voltage swing							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
VTx-Diff-PP-Differential PP Tx voltage swing	Gen 1	DPOJET	298.025 mV	Pass	198.025 mV & 901.975 mV	100.0 mV	1.2 V
COMMENTS							

TCDR_Slew_Max-Maximum Slew Rate							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
TCDR_Slew_Max-Maximum Slew Rate	Gen 1	DPOJET	5.147 ms/s	Pass	4.853 ms/s	N.A	10.0 ms/s
COMMENTS							

Rj-Tx random jitter-Dual Dirac							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
Rj-Tx random jitter-Dual Dirac	Gen 1	DPOJET	1.236 ps	Pass	2.034 ps	N.A	3.27 ps
Rj-Tx random jitter-Dual Dirac	Gen 1	USB-IF	1.671 ps	Pass	1.599 ps	N.A	3.27 ps
COMMENTS							

Mask Hits							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
<a href="#">Mask Hits</a>	Gen 1	DPOJET	0.000	Pass	0.000	N.A	0
Mask Hits	Gen 1	USB-IF	0.000	Pass	0.000	N.A	0
COMMENTS							

TSSC-Freq-Dev-Max							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
TSSC-Freq-Dev-Max (Max)	Gen 1	DPOJET	-4.989 kppm (Max)	Pass	310.853 ppm & 1.289 kppm	-5.3 kppm	-3.7 kppm
TSSC-Freq-Dev-Max (Min)	Gen 1	DPOJET	-5.020 kppm (Min)	Pass	279.867 ppm & 1.320 kppm	-5.3 kppm	-3.7 kppm
COMMENTS							

TSSC-Freq-Dev-Min							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
TSSC-Freq-Dev-Min (Max)	Gen 1	DPOJET	106.952 ppm (Max)	Pass	406.952 ppm & 193.048 ppm	-300.0 ppm	300.0 ppm
TSSC-Freq-Dev-Min (Min)	Gen 1	DPOJET	65.191 ppm (Min)	Pass	365.191 ppm & 234.809 ppm	-300.0 ppm	300.0 ppm
COMMENTS							

TSSC-Mod-Rate – SSC Modulation rate							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
TSSC-Mod-Rate – SSC Modulation rate	Gen 1	DPOJET	31.242 kHz	Pass	1.242 kHz & 1.758 kHz	30.0 kHz	33.0 kHz
COMMENTS							

TSSC-USB Profile							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
<a href="#">TSSC-USB Profile</a>	Gen 1	DPOJET	200.504 ps	Pass	200.504 ps	0 s	N.A
COMMENTS							

TJ-Tx total jitter-Dual Dirac at 10E-12 BER							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
TJ-Tx total jitter-Dual Dirac at 10E-12 BER	Gen 1	DPOJET	34.829 ps	Pass	97.171 ps	N.A	132.0 ps
TJ-Tx total jitter-Dual Dirac at 10E-12 BER	Gen 1	USB-IF	51.264 ps	Pass	80.736 ps	N.A	132.0 ps
COMMENTS							

DJ-Tx deterministic jitter-Dual Dirac							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
DJ-Tx deterministic jitter-Dual Dirac	Gen 1	DPOJET	17.279 ps	Pass	68.721 ps	N.A	86.0 ps
DJ-Tx deterministic jitter-Dual Dirac	Gen 1	USB-IF	27.763 ps	Pass	58.237 ps	N.A	86.0 ps
COMMENTS							

Eye Height – Transmitter Eye Mask							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
<a href="#">Eye Height – Transmitter Eye Mask</a>	Gen 1	DPOJET	175.859 mV	Pass	75.859 mV & 1.024 V	100.0 mV	1.2 V
<a href="#">Eye Height – Transmitter Eye Mask</a>	Gen 1	USB-IF	174.802 mV	Pass	74.802 mV & 1.025 V	100.0 mV	1.2 V

COMMENTS							
Width@BER							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
<a href="#">Width@BER</a>	Gen 1	DPOJET	124.034 ps	Pass	56.034 ps	68.0 ps	N.A
Width@BER	Gen 1	USB-IF	148.736 ps	Pass	80.736 ps	68.0 ps	N.A
COMMENTS							

LFPS Duty Cycle							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
LFPS Duty Cycle (Max)	Gen 1	DPOJET	49.893 % (Max)	Pass	9.893 % & 10.107 %	40.0 %	60.0 %
<a href="#">LFPS Duty Cycle (Min)</a>	Gen 1	DPOJET	49.443 % (Min)	Pass	9.443 % & 10.557 %	40.0 %	60.0 %
LFPS Duty Cycle (Max)	Gen 1	USB-IF	50.145 % (Max)	Pass	10.145 % & 9.855 %	40.0 %	60.0 %
LFPS Duty Cycle (Min)	Gen 1	USB-IF	49.660 % (Min)	Pass	9.660 % & 10.340 %	40.0 %	60.0 %
COMMENTS							

LFPS Fall Time							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
LFPS Fall Time	Gen 1	DPOJET	207.304 ps	Pass	3.793 ns	N.A	4.0 ns
LFPS Fall Time	Gen 1	USB-IF	221.241 ps	Pass	3.779 ns	N.A	4.0 ns
COMMENTS							

LFPS Rise Time							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
LFPS Rise Time	Gen 1	DPOJET	211.719 ps	Pass	3.788 ns	N.A	4.0 ns
LFPS Rise Time	Gen 1	USB-IF	228.837 ps	Pass	3.771 ns	N.A	4.0 ns
COMMENTS							

LFPS TPeriod							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
LFPS TPeriod (Max)	Gen 1	DPOJET	33.605 ns (Max)	Pass	13.605 ns & 66.395 ns	20.0 ns	100.0 ns
LFPS TPeriod (Min)	Gen 1	DPOJET	33.393 ns (Min)	Pass	13.393 ns & 66.607 ns	20.0 ns	100.0 ns
LFPS TPeriod (Max)	Gen 1	USB-IF	33.606 ns (Max)	Pass	13.606 ns & 66.394 ns	20.0 ns	100.0 ns
LFPS TPeriod (Min)	Gen 1	USB-IF	33.404 ns (Min)	Pass	13.404 ns & 66.596 ns	20.0 ns	100.0 ns
COMMENTS							

LFPS Vcm-AC							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
LFPS Vcm-AC	Gen 1	DPOJET	67.969 mV	Pass	32.031 mV	N.A	100.0 mV
LFPS Vcm-AC	Gen 1	USB-IF	72.000 mV	Pass	28.000 mV	N.A	100.0 mV
COMMENTS							

LFPS Vtx-DIFF-PP							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
LFPS Vtx-DIFF-PP (Max)	Gen 1	DPOJET	1.160 V (Max)	Pass	360.000 mV & 40.000 mV	800.0 mV	1.2 V
LFPS Vtx-DIFF-PP					276.000 mV &		

(Min)	Gen 1	DPOJET	1.076 V (Min)	Pass	124.000 mV	800.0 mV	1.2 V
LFPS Vtx-DIFF-PP (Max)	Gen 1	USB-IF	1.156 V (Max)	Pass	356.000 mV & 44.000 mV	800.0 mV	1.2 V
LFPS Vtx-DIFF-PP (Min)	Gen 1	USB-IF	1.076 V (Min)	Pass	276.000 mV & 124.000 mV	800.0 mV	1.2 V
COMMENTS							

LFPS TBurst							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
LFPS TBurst (Max)	Gen 1	DPOJET	997.999 ns (Max)	Pass	397.999 ns & 402.001 ns	600.0 ns	1.4 us
LFPS TBurst (Min)	Gen 1	DPOJET	971.423 ns (Min)	Pass	371.423 ns & 428.577 ns	600.0 ns	1.4 us
LFPS TBurst (Max)	Gen 1	USB-IF	1.055 us (Max)	Pass	455.000 ns & 345.000 ns	600.0 ns	1.4 us
LFPS TBurst (Min)	Gen 1	USB-IF	1.051 us (Min)	Pass	451.120 ns & 348.880 ns	600.0 ns	1.4 us
COMMENTS							

LFPS TRepeat							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
LFPS TRepeat (Max)	Gen 1	DPOJET	10.040 us (Max)	Pass	4.040 us & 3.960 us	6.0 us	14.0 us
LFPS TRepeat (Min)	Gen 1	DPOJET	9.627 us (Min)	Pass	3.627 us & 4.373 us	6.0 us	14.0 us
LFPS TRepeat (Max)	Gen 1	USB-IF	10.035 us (Max)	Pass	4.035 us & 3.965 us	6.0 us	14.0 us
LFPS TRepeat (Min)	Gen 1	USB-IF	9.630 us (Min)	Pass	3.630 us & 4.370 us	6.0 us	14.0 us
COMMENTS							

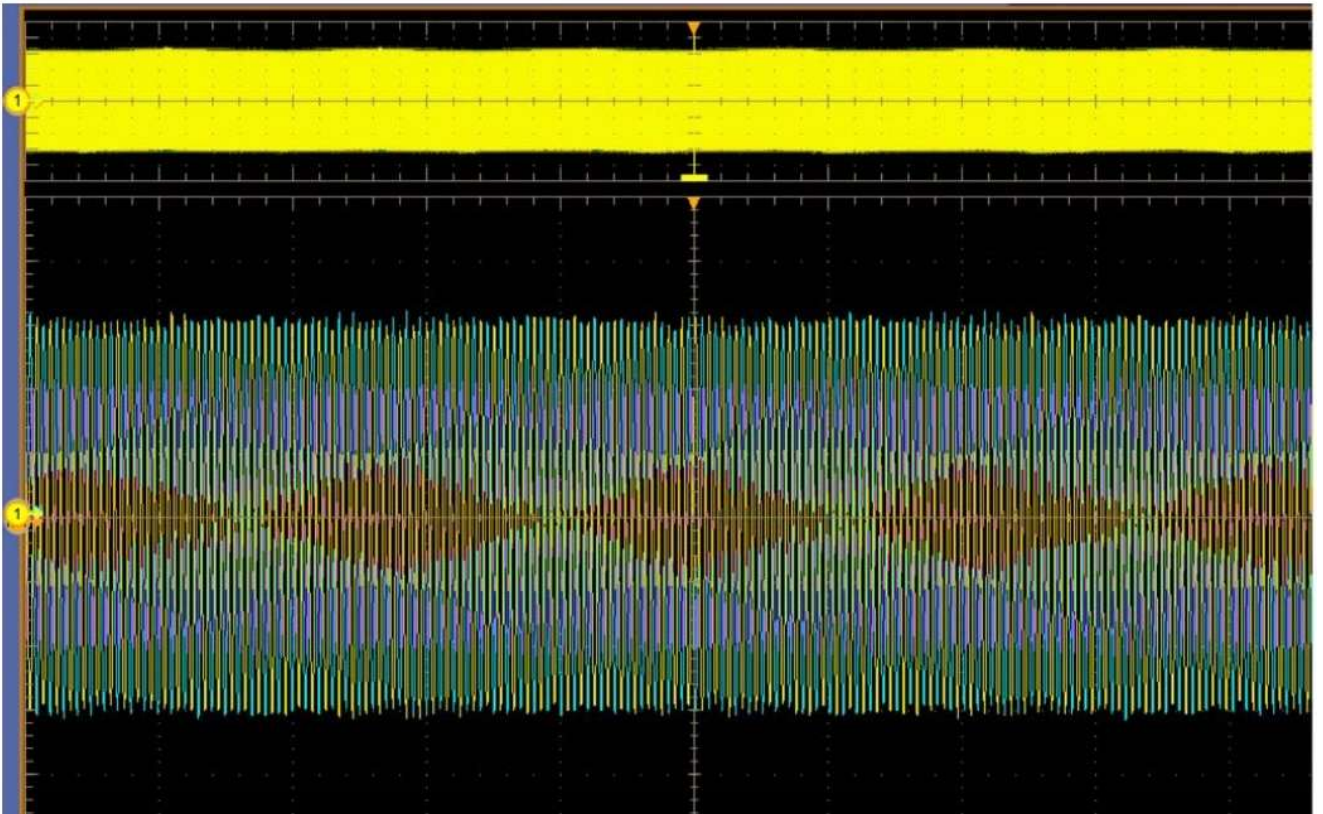
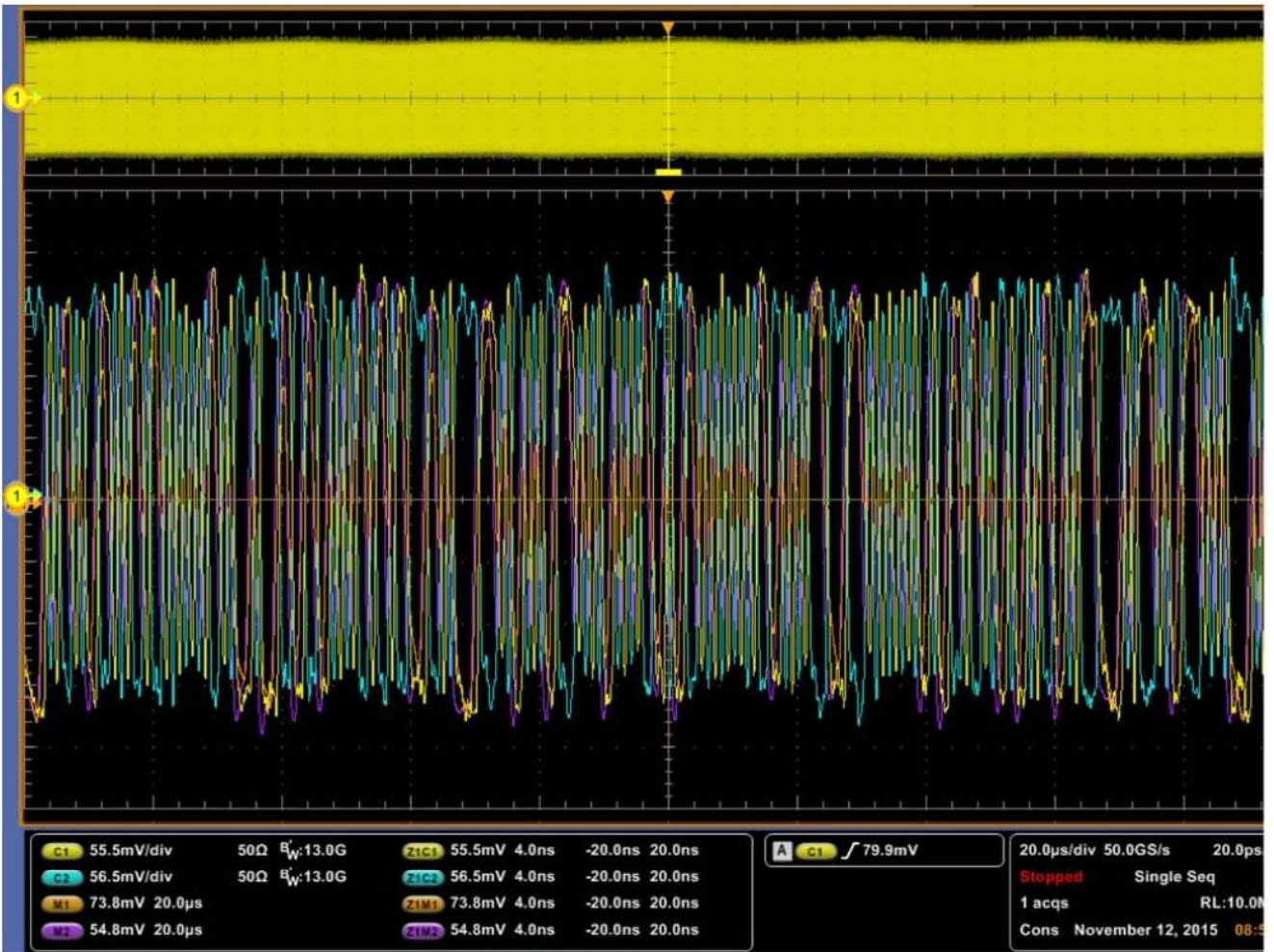
Rj(CP0)							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
Rj(CP0)	Gen 1	DPOJET	4.197 ps	-	N.A	N.A	N.A
COMMENTS							

TJ(CP0)							
Measurement Details	Generation	Method	Measured Value	Test Result	Margin	Low Limit	High Limit
TJ(CP0)	Gen 1	DPOJET	76.879 ps	-	N.A	N.A	N.A
COMMENTS							

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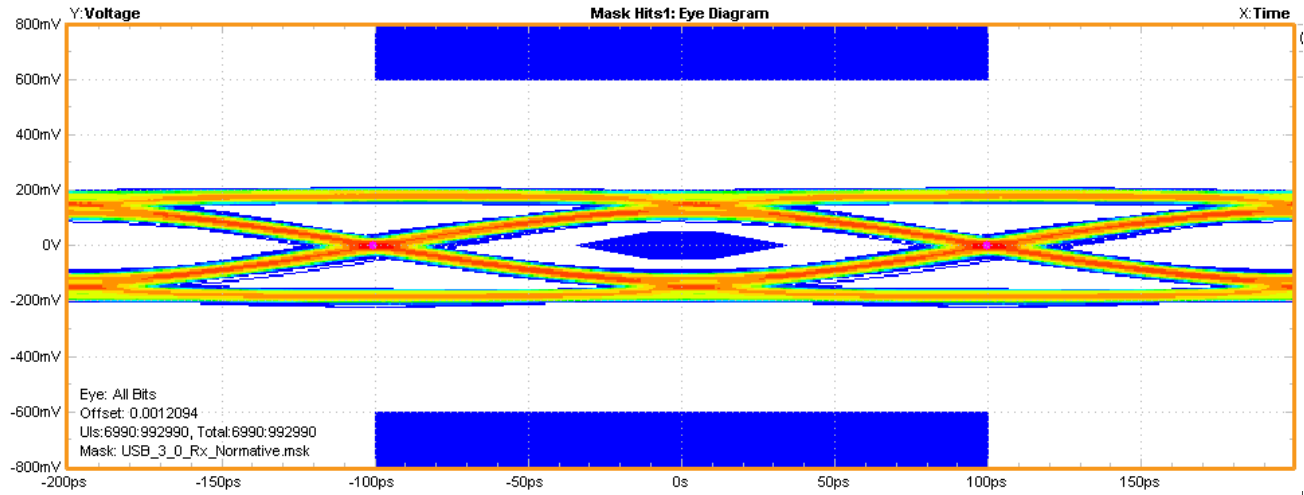
UI-Unit Interval							
<p><a href="#">CP0 waveform</a> <a href="#">CP1 waveform</a></p>							





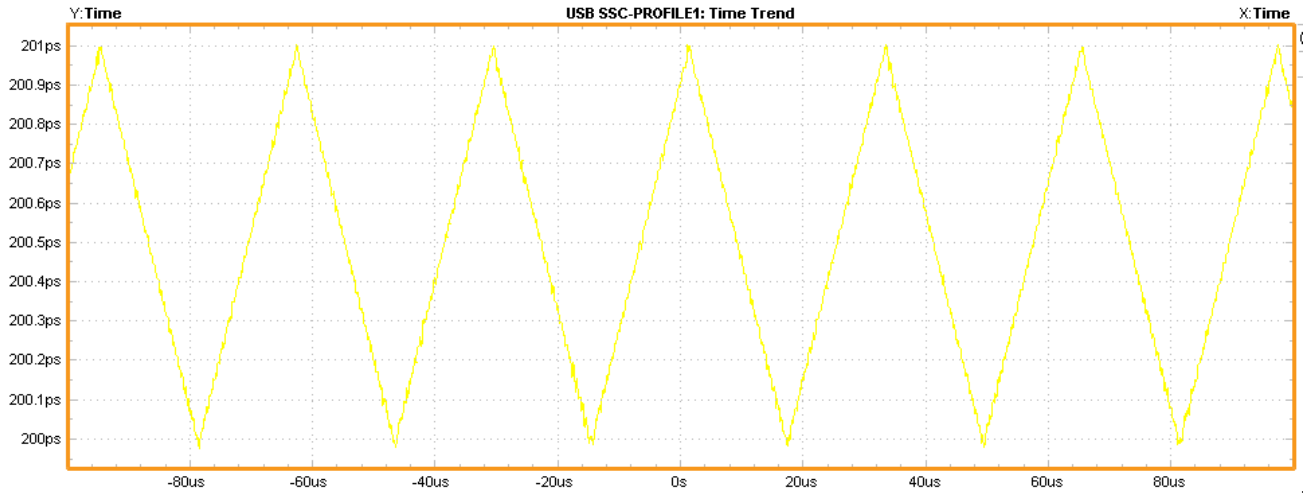
Mask Hits

Mask Hits



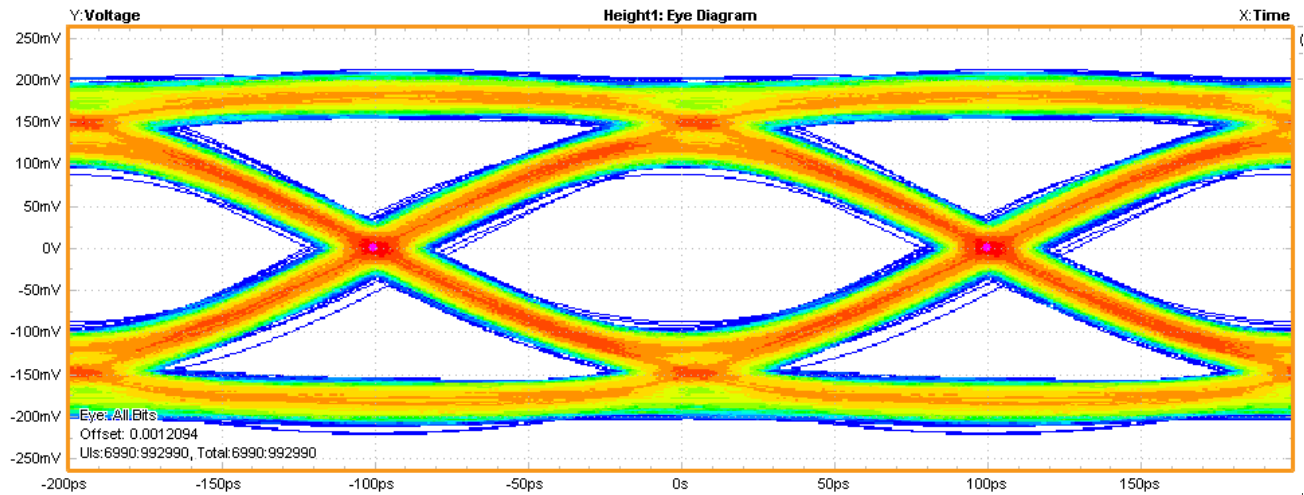
TSSC-USB Profile

TSSC-USB Profile



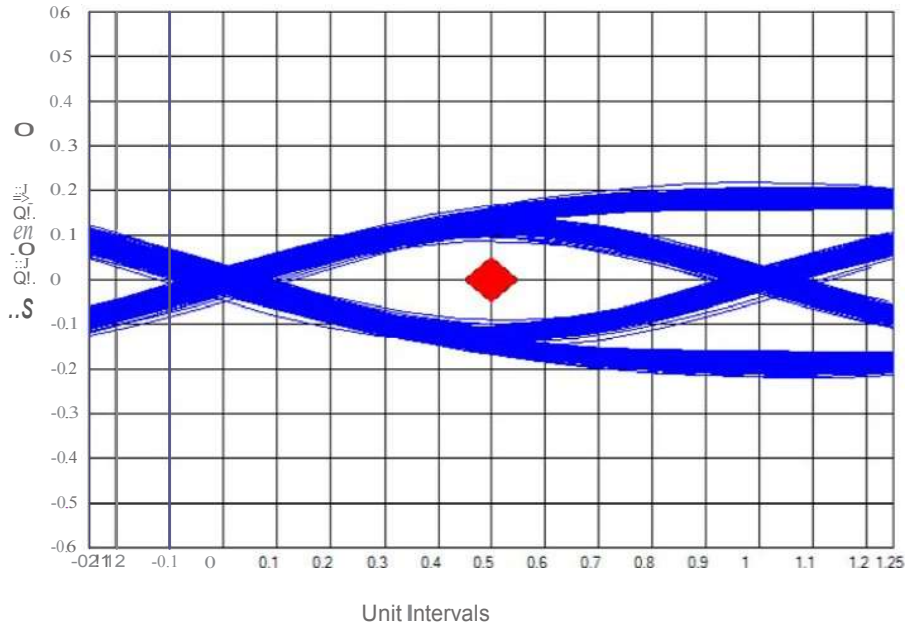
Eye Height - Transmitter Eye Mask

Eye Height - Transmitter Eye Mask

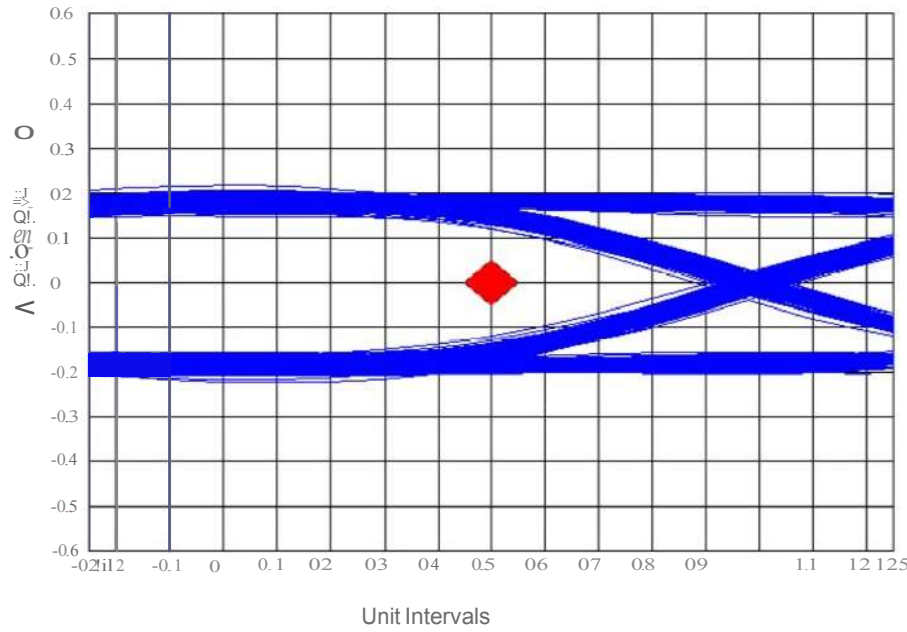




Eye Diagram

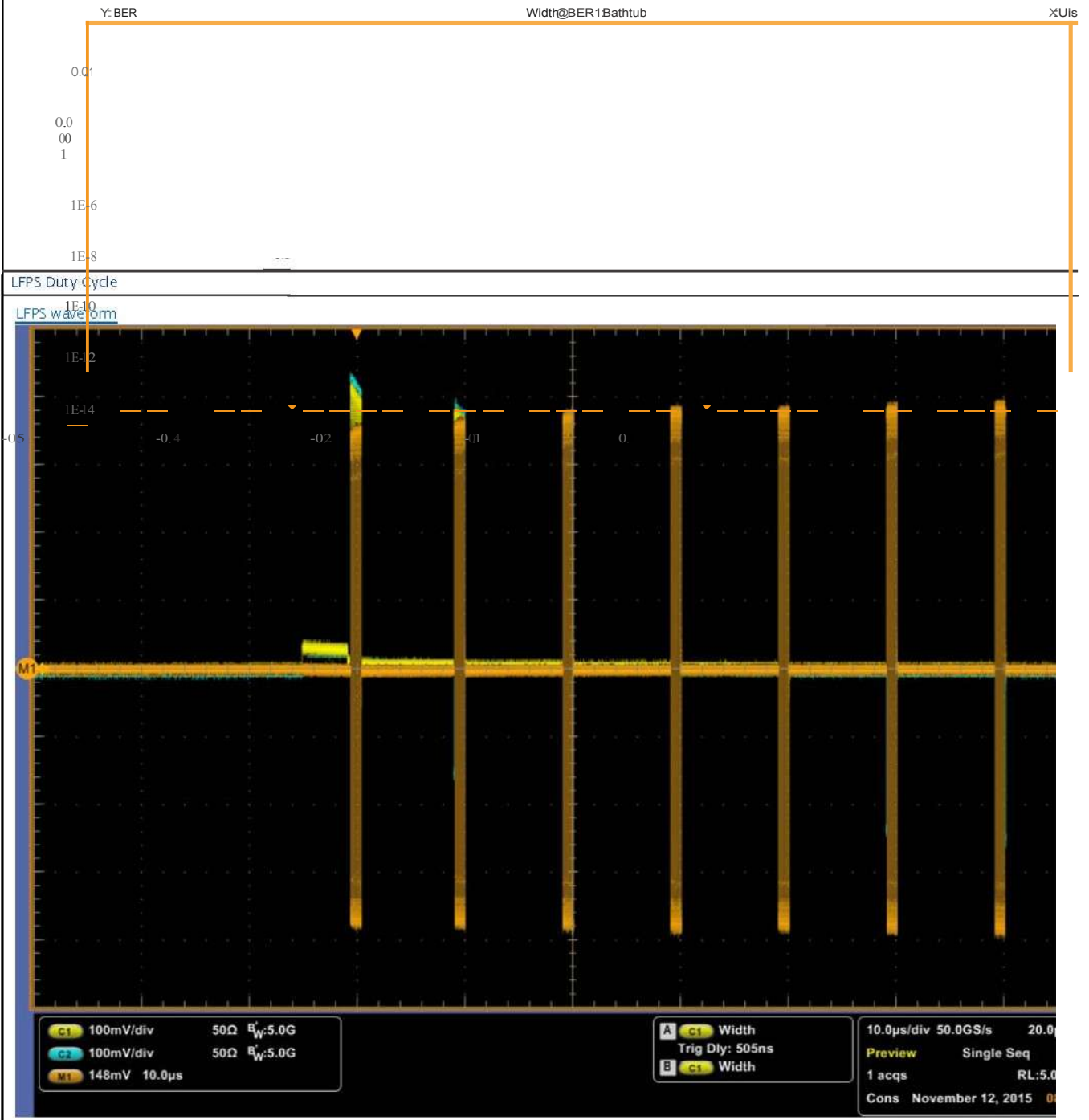


Eye Diagram



Width@BER

Width@BER



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