Technical Reference

Tektronix

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1 Introduction to the RT-Eye Standards Support Library

This document provides the procedures for making high speed serial standard measurements with Tektronix TDS/CSA7000, DSA/DPO70000 and TDS6000 series real time oscilloscopes and probing solutions. The Serial Analysis module in RT-Eye provides clock recovery, eye diagram, amplitude, and jitter measurements found in most high speed serial data specifications. The Serial Analysis module also supports waveform mask testing and measurement limit testing with Pass/Fail indication. Pass/Fail criteria for the signal under test is called out in the electrical specifications of industry standards.

The Standards Support Library consists of a library of setup folders under the File > Recall selection from the RT-Eye menu. The library of setup files provides testing for the following standards:

- DisplayPort
- FibreChannel
- Ethernet (XAUI and 10GBaseCX4)
- InfiniBand (DDR and QDR)
- OBSAI (Open Base Station Architecture Initiative)
- SAS (Serial Attached SCSI)
- Serial RapidIO

The setup files are consistent with the 'compliance points' called out in the standards. The proper waveform mask (.msk) and measurement limits (.lim) file are recalled as part of the setup file. Once the file is recalled, Pass/Fail testing on the signal under test can be completed by simply pressing Autoset and Run from the RT-Eye menu.

2 Connecting to the Device Under Test (DUT)

There are four fundamental probing techniques to perform standards-based 'compliance' measurements using the Standards Support Library. These probing techniques are described below. Probe configurations A and C represent the **Probe Type: Single Ended** in the RT-Eye Measurement Select Menu. This is the default configuration of the setup files in the library. The probe type can be changed to **Probe Type: Differential** if a differential probing solution (Probe configuration B or D) is used.

2.1 SMA Connection to the DUT

A. Two TCA-SMA inputs using SMA cables (Ch1) and (Ch3) The differential signal is created by the RT-Eye SW from the math waveform Ch1-Ch3. The Common mode AC measurement is also available in this configuration from the common mode waveform (Ch1+Ch3)/2. This probing technique requires breaking the link and terminating into the 50 Ω/side termination into the oscilloscope. Ch-Ch deskew is required using this technique because two channels are used.

B. One P7350SMA differential active probe (Ch1)

The differential signal is measured across the termination resistors inside the P7350SMA probe. This probing technique requires breaking the link. Matched cables are provided with the P7350 probe to avoid introducing de-skew into the system. Only one channel of the oscilloscope is used.



Probe Configuration A

SMA Psuedo-differential



Probe Configuration B SMA Input Differential Probe

2.2 ECB probe connection to the DUT

C. Two single ended active probes (Ch1) and (Ch3)

The differential signal is created by the RT-Eye SW from the math waveform Ch1-Ch3. The Common mode AC measurement is also available in this configuration from the common mode waveform (Ch1+Ch3)/2. This probing technique can be used for either a live link that is transmitting data, or a link terminated into a "dummy load". In both cases, the single ended signals should be probed as close as possible to the termination resistors on both sides with the shortest ground connection possible. Ch-Ch deskew is required using this technique because two channels are used.

D. One Differential probe

The differential signal is measured directly across the termination resistors. This probing technique can be used for either a live link that is transmitting data, or a link terminated into a "dummy load." In both cases, the signals should be probed as close as possible to the termination resistors. A single channel of the oscilloscope is used, so de-skew is not necessary. Two differential probes can be used to create the probing configuration shown in configuration "C" above.



Probe Configuration C Two Single Ended Active Probes



Probe Configuration D One Differential Active Probe

3 Configuring a DUT for Compliance Measurements

To perform measurements to an industry standard, the device under test must be placed in a state where the device is transmitting the specification compliant test pattern. Mechanisms for this are standard specific. Refer to details in the specifications on which patterns are to be used. To ensure that a measurement can be displayed with multiple patterns, the Standards Support Library setup files use the RT-Eye 'Arbitrary Pattern' method. This can be changed to the 'Repeating Pattern' method if desired by the user. To insure accurate jitter measurements, it's recommended that 100 repeats of the pattern under test be captured in the acquisition. The record length may need to be increased to capture enough repeats for accurate and repeatable measurements regardless of which jitter method is used.

4 Taking Measurements

4.1 Initial Oscilloscope Setup

After connecting the DUT by following the proper probing configuration for the test, click DEFAULT SETUP.

4.2 Running the RT-Eye Software

On non-B or non-C model oscilloscopes (Example: TDS6604), go to File > Run Application > RT-Eye Serial Compliance and Analysis. For B and C models (Example: TDS7704B, TDS6154C), go to App > RT-Eye Serial Compliance and Analysis. On DPO/DSA70000 series, go to Analysis > RT-Eye Serial Compliance and Analysis. When the RT-Eye Wizard dialog appears, select Cancel. The RT-Eye menu will appear.

<u>F</u> ile	Mo <u>d</u> ules <u>M</u> ea	asurements <u>P</u> lo	ts <u>R</u> esults <u>L</u> og	<u>U</u> tilities Help		XOX RT-Eye®		₩ X
	Probe Type	Differenti	al 🔻			Select	Serial A	nalysis
1					littor	All	Start	Stop
	Eye Width/ Eye Height	Unit Interval	Differential Voltage	De- Emphasis	Jitter @ BER	Autoset	Clear F	Results
	Rise Time	Bit Rate	High Amplitude		TIE Jitter	Select Plots	123	IJ
	Fall Time		Low Amplitude			Configure	Mo Single F	de Run 🔻
Men	u: Meas->Select							

Figure 1 – Default menu of the RT-Eye software

4.3 Selecting a Setup File from the Library

From the RT-Eye default menu, select File > Recall to view the Standards Support Library folders. Select the desired Standard.

X	Open		
	Lookjn	🟲 setup 🗸 👻	3 📁 🖽 📼
	My Rece Desktop My Docu My Comp	E DisplayPort E Etrenet Fibre Channel MonfinBand OBSAI E Serial RapidiO	
		File name:	Open
		Files of type: Setup Files (*.ini)	Cancel

Figure 2 – Standards Support Library Folders

4.4 Selecting a Compliance Test Point from the Library

From the selected folder, select the desired Compliance Test Point. In this example, InfiniBand DDR (Dual Data Rate) TP6 is selected.

X	Open			X
	Lookjn	infiniBand	-	2 😕 🖽 📼
	My Rece Desktop My Docu My Docu My Comp	Kallo DOR_TP1 ini Kale DOR_TP6 ini Kale DOR_TP3 ini Kale COR_TP1 ini Kale COR_TP6 ini Kale COR_TX_PINS ini		
		File name: IB_DDR_TP6.ini		Open
		Files of type: Setup Files (*.ini)	-	Cancel

Figure 3 – Compliance Test Point Selection

4.5 Configuring the Probe Type

If Ch1 and Ch3 are the desired source waveforms, this step can be skipped. If the signal being acquired is a Differential signal or a pseudo-differential Math (for example, Math1 = Ch1 - Ch3), change the Probe Type to Differential and then select the appropriate source.

Source Time	Salact	Autorot	
Source Type	Difference	Autoset	Start Stop
Live/Ref	Ch1 -	Vertical Horizontal Vertical & Scale Resolution Horizontal	<u>*</u>
	Ch1		
File	Ch2		100
· · · · · · · · · · · · · · · · · · ·	Ch3		1
	Not Ch4 = D+		
	Math1 node =	Sele	ict mute
	Math2	(0++0-)2	Single Run

Figure 4 - Selecting Math as a Source of the Measurement

4.6 Selecting Autoset

Press **Autoset** from the RT-Eye Measurement Select Menu. The Horizontal Resolution will be set to full sample rate, and the Vertical Scale will be set to optimize the signal for an accurate measurement.



Figure 5 – Oscilloscope settings after Autoset is pressed

4.7 Selecting Start and Viewing Test Results

Select **Start** from the RT-Eye Sequence Control menu. Once the measurements have completed, select **Limits Summary** from the Result Summary View drop-down menu.

🛃 RT-Eye Plot Sumr	nary								
	20 69 10 1	R 🛉 🗆	+						
		₩ ↑							
. –				_					
1	Eve: All bits		x 17999/99999		10 ⁰				
0.8						5			
0.6									
2. 0.4				, Š		٦.			
\$ na				9	10 ⁻⁶				
₹"1	- V/		. V/	18th					
i≦ ⁰				8					
j≩ -0.2				ä					
× -0.4				e e	10 ^{.10}				
an. ^W									
-0.0									
-1		Oser marsk. is	a contention	_	10'18	<u> </u>			
-200ps	s -100ps	ups	100ps 200	he	-0.2	0.2			
File Modules Meas	urements Plo	ts <u>R</u> esults L	og <u>U</u> tilities He	мр			CON RT-Eye	D	APH X
		Decult Ourses	n c. Coloct Mary	1 100 100	-			Serial	Analysis
		Result Summa	ry. Select view	Limits St	atus		Show Plot		
Measurement	Statistic	Value	Lower Lim	Upper Lim	Status		OTON PTOL	Start	Stop
Eye H: All Bits	Min	761.79mV	650.00mV		PASS	-	Export	Ľ,	
Eye H: All Bits	Mask Hits	0		0	PASS		To CSV		
Eye H: Non-Tr Bits	Mask Hits			0		_		clea	Results
Eye H: Trans Bits	Mask Hits			0			Details	12	3 9
Rise Time	Min	43.863ps	30.000ps		PASS				
Fall Time	Min	43.058ps	30.000ps		PASS		Time Units		lode
Unit Interval	Mean	200.00ps	199.98ps	200.02ps	PASS			Single	Run 🔻
Diff Amplitude	Max	865.59mV		11.6000V	PASS				
Menu: Results->Summ	arv								

Figure 6a - Results of Analysis with the plots

ile Mo <u>d</u> ules <u>M</u> eas	surements <u>P</u> lo	its <u>R</u> esults <u>L</u>	og <u>U</u> tilities He	elp			RT-Eye®	Ľ	×
		Result Summa	ry: Select View	Limits Sta	atus	-		Serial An:	alysis
Measurement	Statistic	Value	Lower Lim	Upper Lim	Status		Show Plot	Start	Stop
Eye H: All Bits	Min	761.79m∨	650.00m∨		PASS		Export	St 1	
Eye H: All Bits	Mask Hits	0		0	PASS		To CSV		
Eye H: Non-Tr Bits	Mask Hits			0				Clear Re	sults
Eye H: Trans Bits	Mask Hits			0			Details	1926	//
Rise Time	Min	43.863ps	30.000ps		PASS			1400	
Fall Time	Min	43.058ps	30.000ps		PASS		Time Linite	Mod	
Unit Interval	Mean	200.00ps	199.98ps	200.02ps	PASS		Time Onits	Cincle Du	
Diff Amplitude	Мах	865.59mV		1.6000V	PASS	*	Seconds 🗸	Single Ru	n 🔻

Figure 6b - Results of Analysis with Pass/Fail Indication

5 Creating, Saving, and Sharing Reports

To create a compliance report, select **Utilities > Reports**. The Report Generator utility can create a complete report of the test. The report can be saved as a .rpt file for later viewing with the report generator utility. The report can also be saved as a .rtf file for viewing from MS Word. Another convenient way to share reports with your work group is to install a PDF Distiller onto the oscilloscope and print the report to a PDF.



Figure 7 - Report Formats .rpt and .pdf

6 Supported Measurements by Standard

The following sections show the measurements supported by the RT-Eye Standards Support Library. These are listed in table format and intended as an easy cross-reference from what is written in the specification and what the RT-Eye Serial Analysis measurements support. Note that not all measurements called out in the supported standards are supported by RT-Eye. For example, the DisplayPort definition of Rise/Fall time and Differential Skew are different than these same measurements offered in the RT-Eye Serial Analysis Module. Thus, only the measurements supported directly by RT-Eye are selected in the DisplayPort library setup file. More complete testing is left to other methods of implementation documents.

6.1 DisplayPort

Table 1 – DisplayPort Compliance Test Points

Derived from Display port CTS draft 11 version document									
Display port	RT-Eye Measurement	Reduced Bit Rate (RBR)	High Bit rate (HBR)						
Nominal Bit Bate	Bit Rate	1.620	2.700	Gb/s					
Unit Interval	Unit Interval	617.2840	370.3704	ps					
Frequency accuracy	Bit Rate Limits	300	300	PPM					
	2nd Order PLL with damping								
Golden PLL Frequency	factor 1.43 Loop BW	20.00	20.00	MHz					

Section 3 Display port Source Compliance tests						
		Reduced				
Display Port specification	RT-Ege	Bit Rate (High Bit rate			
version 1.1	Measurement	RBR)	(HBR)			
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	616.92	369.39	ps		
		0.78	0.64	U		
Total Jitter at 10-9 BER	Jitter@BER; TJ	0.36	0.98	ps		
		0.22	0.36	Û		
Non ISI Jitter		98.7654321	96.2962963	ps		
		0.16	0.26	UI		
Intra Iane Skew		<	:/= 30	ps		
Inter Iane Skew test			<ł= 2	UI		
		min	max			
Pre-Emphasis	3.5dB	1.20	1.8			
	6dB	1.60	2.4			
	9.5dB	2.40	3.6			
Non Pre Emphasis Level Verification		min	max			
	400mV	0.34	0.46	٧		
	600mV	0.51	0.68	٧		
	800mV	0.69	0.92	٧		
	1200mV	1.02	1.38	٧		
A2	Mask Seg 1 and 3					
	400mV		0.46	٧		
	600mV		0.68	٧		
	800mV		0.92	٧		
	1200mV		1.38	٧		
		RBR	HBR			
A1	400m¥ <mark>0dB</mark> Mask Seg2	63.6	39.6	m۷		
	400m¥ 3.5dB Mask Seg2	95.09	59.24	m۷		
	400m¥ 6dB Mask Seg2	126.89	79	m۷		
	400m¥ 9.5dB Mask Seg2	189.84	118.2	m۷		
A1	600m¥ 0dB Mask Seg2	95.4	59.4	m۷		
	600m¥ 3.5dB Mask Seg2	142.64	88.86	m۷		
	600m¥ 6dB Mask Seg2	190.43	118.51	m۷		
	600m¥ 9.5dB Mask Seg2	284.76	177.3	m۷		
A1	800m¥ 0dB Mask Seg2	127.2	79.2	m۷		
	800m¥ 3.5dB Mask Seg2	190.2	118.48	m۷		
	800m¥ 6dB Mask Seg2	253.91	158.02	m٧		
	800m¥ 9.5dB Mask Seg2	379.69	236.41	m۷		
A1	1200m¥ 0dB Mask Seg2	190.8	118.8	m۷		
	1200m¥ 3.5dB Mask Seg2	285.28	177.72	m۷		
	1200mV 6dB Mask Seg2	380.87	237.03	m۷		
	1200m¥ 9.5dB Mask Seg2	569.53	354.61	m٧		

1 2 1				
X1 (relative to 0.501)	Mask Seg2	245.00	127.00	ps
		0.102	0.159	UI
X2 (relative to 0.5UI)	Mask Seg2	0.00	0.00	ps
		-0.110	-0.100	UI
2*A1(Min Eye height)	400m¥ 0dB Mask Seg2	127.2 79.2		m٧
2*A1(Min Eye height)	400m¥ 3.5dB Mask Seg2	190.18	118.48	m٧
2*A1(Min Eye height)	400m¥ 6dB Mask Seg2	253.78	158	m٧
2*A1(Min Eye height)	400m¥ 9.5dB Mask Seg2	379.68	236.4	m٧
2*A1(Min Eye height)	600m¥ 0dB Mask Seg2	190.8	118.8	m٧
2*A1(Min Eye height)	600m¥ 3.5dB Mask Seg2	285.28	177.72	m٧
2*A1(Min Eye height)	600m¥ 6dB Mask Seg2	380.86	237.02	m٧
2*A1(Min Eye height)	600m¥ 9.5dB Mask Seg2	569.52	354.6	m۷
2*A1(Min Eye height)	800m¥ 0dB Mask Seg2	254.4	158.4	m۷
2*A1(Min Eye height)	800m¥ 3.5dB Mask Seg2	380.4	236.96	m۷
2*A1(Min Eye height)	800m¥ 6dB Mask Seg2	507.82	316.04	m۷
2*A1(Min Eye height)	800m¥ 9.5dB Mask Seg2	759.38	472.82	m٧
2*A1(Min Eye height)	1200m¥ 0dB Mask Seg2	381.6	237.6	m۷
2*A1(Min Eye height)	1200m¥ 3.5dB Mask Seg2	570.56	355.44	m٧
2*A1(Min Eye height)	1200m¥ 6dB Mask Seg2	761.74	474.06	m٧
2*A1(Min Eye height)	1200m¥ 9.5dB Mask Seg2	1139.06	709.22	m۷
2*X1	Min Eye Width	490.00	254.00	ps
		0.20	0.32	UI
Diff Rise/Fall Time 20-80%	Max Rise/Fall Time		160	ps
Diff Rise/Fall Time 20-80%	Min Rise/Fall Time		50	ps
SE Rise time mismatch		> <i>l</i> = 15% c	of SE rise time	
SE Fall time mismatch			of SE fall time	
Overshoot			Differential swing	
Undershoot			Differential swing	
AC Common Mode Noise		<t= 2<="" td=""><td>0mV rms</td><td></td></t=>	0mV rms	
SSC frequency	min		30	kHz
	max		33	kHz
SSC modulation deviation	min		-5000	ppm
	max		0	ppm
dF/dt			i0ppm/usec	
These tests can be done using RT-Eye				
These tests can be done manually using	JIT3			

Table 1 – Dis	playPort Com	pliance Test F	Points (Contd.)

6.2 Fibre Channel

Table 2 - Fibre Channel 'Beta' Test Points

	Derived from FC-PI4 Rev 6.01- February 27th, 2007 - Chapter 9									
FibreChannel	RT-Eye	100-SE-EL-S	200-SE-EL-S							
Specification	Measurement	100-DF-EL-S*	200-DF-EL-S*	400-DF-EL-S	800-DF-EL-S	800-DF-EA-S				
Nominal Bit Rate	Bit Rate	1.0625	2.125	4.250	8.500	8.500	Gb/s			
Unit Interval	Unit Interval	941.1765	470.5882	235.2941	117.6471	117.6471	ps			
Bit Rate Tolerance	Bit Rate Limits	100	100	100	100	100	PPM			
Golden PLL Frequency	1st Order PLL Loop BW	0.64	1.27	2.55	5.10	5.10	MHz			
	B	eta-Tx Test Po	int							
FibreChannel	RT-Eye	100-SE-EL-S	200-SE-EL-S							
Specification	Measurement	100-DF-EL-S*	200-DF-EL-S*	400-DF-EL-S	800-DF-EL-S	800-DF-EA-S				
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	724.71	315.29	112.94	56.47	NA	ps			
		0.77	0.67	0.48	0.48	NA	UI			
Total Jitter at 10-12 BER	Jitter@BER; TJ	216.47	155.29	122.35	61.18	NA	ps			
	_	0.23	0.33	0.52	0.52	NA	Ū			
Deterministic Jitter	Jitter@BER; DJ	103.53	94.12	77.65	38.82	NA	ps			
		0.11	0.20	0.33	0.33	NA	ÚI			
В	Mask Seq1, Seq3	1000	1000	800	???	???	m∨			
A	Mask Seg2	300	300	155	???	???	m∨			
X1 (relative to 0.5UI)	Mask Seg2	-362.35	-157.65	-56.47	???	???	ps			
, <i>, ,</i>	Ŭ	-0.39	-0.34	-0.24	???	???	ÚI			
X2 (relative to 0.5UI)	Mask Seg2	-183.53	-68.24	0.00	???	???	ps			
		-0.20	-0.15	0.00	222	222	U			
2*A	Min Eve Height	600	600	310	222	222	m∨			
2*X1	Min Eve Width	724.71	315.29	112.94	222	222	ns			
		0.77	0.67	0.48	222	222	UI			
2*B	Differential Amplitude	2000	2000	1600	222	222	mV			
Rise/Fall Time 20-80%	Max Rise/Fall Time	385.00	192.00	NA	NA	NA	ns			
Rise/Fall Time 20-80%	Min Rise/Fall Time	100	75	60	30	NA	ns			
Skew	Differential Skew*	25	15	NA	NA	222	ns			
Common Mode Voltage RMS	AC CM Voltage	NA	NA	15	15	222	mV			
	Be	eta-Rx Test Po	int							
FibreChannel	RT-Eve	100-SE-EL-S	200-SE-EL-S							
Specification	Measurement	100-DF-EL-S*	200-DF-EL-S*	400-DF-EL-S	800-DF-EL-S	800-DF-EA-S				
1UI - Total Jitter	Jitten@BER: Jitter Eve Opening	395.29	225.88	112.94	56.47	NA	ps			
		0.42	0.48	0.48	0.48	NA	ίυ			
Total Jitter at 10-12 BER	Jitten@BER: TJ	545.88	244.71	122.35	61.18	NA	ps			
		0.58	0.52	0.52	0.52	NA	ίυι			
Deterministic Jitter	Jitten@BER: DJ	348.24	155.29	77.65	38.82	NA	ps			
		0.37	0.33	0.33	0.33	NA	UI			
В	Mask Seq1, Seq3	1000	1000	800	222	222	m∨			
A	Mask Seg2	200	200	138	222	222	mV			
X1 (relative to 0.5Ul)	Mask Seg2	-197.65	-112.94	-56.47	222	222	ps			
	index obje	-0.21	-0.24	-0.24	222	222	lui -			
X2 (relative to 0.5U)	Mask Seg2	0.00	0.00	0.00	222	222	ns			
	mack cogr	0.00	0.00	0.00	222	222	1ÚÎ			
2*A	Min Eve Height	400	400	276	222	222	mV			
2*21	Min Eye Width	395.29	225.88	112.94	222	222	Ins			
2.00	min Eje widen	0.42	0.48	0.48	222	222	10			
2*B	Differential Amplitude	2000	2000	1600	222	222	mV			
Skow	Differential Skew*	2000	100	NA	NA	222	ne			
Common Mode Voltage BMS		NA	NA	20	20	222	ps mV			
Common wode voltage, RMS	AC CIVI VUITage	NA	INA	20	20	111	pnv			

Decoding the Spec: Speed-TxMedia-InteropPoint-Distance

 Speed

 800 - 800 -- 800 MBytes/second

 400 - 400 -- 400 MBytes/second

 200 - 200 -- 200 MBytes/second

100 - 100 -- 100 MBytes/second

Tx Media

SE - unbalanced copper connecting to any interoperability point DF - balanced copper connecting to any interoperability point

- InteropPoint EL any electrical point except an EA delta point (includes SN PMD delta points) that assumes a non-equalizing
 - EA any electrical point that assumes a specified equalizing reference receiver for measurement

Distance S - Short

	Derived from FC-PI4 Rev 6.01- February 27th, 2007 - Chapter 9									
FibreChannel Specification	RT-Eye Measurement	100-SE-EL-S	200-SE-EL-S 200-DE-EL-S*	400-DE-EL-S	800-DE-EL-S	800_DE_EA_S				
Nominal Bit Rate	Bit Pote	1.0625	2 125	4 250	8 500	8 500	Gh/e			
Linit Interval	Unit Interval	941 1765	470 5882	235 2941	117 6471	117 6471	ne			
Bit Rate Tolerance	Bit Rate Limits	100	100	100	100	100	PPM			
Golden PLL Frequency	1st Order PLL Loon BW	0.64	1.27	2.55	5.10	5.10	MHz			
Coldent LET requeries		0.04	1.21	2.00	3.10	0.10	INNE			
	De	elta-Tx Test Po	int							
FibreChannel	RT-Eve	100-SE-EL-S	200-SE-EL-S							
Specification	Measurement	100-DF-EL-S*	200-DF-EL-S*	400-DF-EL-S	800-DF-EL-S	800-DF-EA-S				
1UI - Total Jitter	Jitter@BER; Jitter Eve Opening	705.88	348.24	174.12	81.18	NA	ps			
		0.75	0.74	0.74	0.69	NA	ÜI 🛛			
Total Jitter at 10-12 BER	Jitter@BER; TJ	235.29	122.35	61.18	36.47	36.47	ps			
		0.25	0.26	0.26	0.31	0.31	ÜI 🛛			
Deterministic Jitter	Jitter@BER; DJ	112.94	65.88	32.94	20.00	20.00	ps			
	<u> </u>	0.12	0.14	0.14	0.17	0.17	ΰI			
В	Mask Seg1, Seg3	1000	1000	800	350	350	m٧			
А	Mask Seg2	325	325	325	90	90	mΥ			
X1 (relative to 0.5UI)	Mask Seg2	-352.94	-174.12	-87.06	-40.59	-40.59	ps			
, ,	ÿ	-0.38	-0.37	-0.37	-0.35	-0.35	ΰI			
X2 (relative to 0.5UI)	Mask Seg2	-174.12	-84.71	-42.35	-18.24	-18.24	ps			
, , , , , , , , , , , , , , , , , , ,	, , , , , , , , , , , , , , , , , , ,	-0.19	-0.18	-0.18	-0.16	-0.16	ίυ.			
2*A	Min Eye Height	650	650	650	180	???	mΥ			
2*X1	Min Eve Width	705.88	348.24	174.12	81.18	???	ps			
		0.75	0.74	0.74	0.69	222	lui			
2*B	Differential Amplitude	2000	2000	1600	700	700	mV			
Rise/Fall Time 20-80%	Max Rise/Fall Time	385	NA	NA	NA	NA	ps			
Rise/Fall Time 20-80%	Min Rise/Fall Time	100	NA	NA	NA	NA	ps			
Skew	Differential Skew*	20	NA	NA	NA	NA	bs			
Common Mode Voltage, RMS	AC CM Voltage	NA	NA	15	15	15	mV			
	De	elta-Rx Test Po	int							
FibreChannel	RT-Eye	100-SE-EL-S	200-SE-EL-S							
Specification	Measurement	100-DF-EL-S*	200-DF-EL-S*	400-DF-EL-S	800-DF-EL-S	800-DF-EA-S				
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	414.12	192.94	96.47	34.12	NA	ps			
		0.44	0.41	0.41	0.29	NA	UI			
Total Jitter at 10-12 BER	Jitter@BER; TJ	527.06	277.65	138.82	83.53	NA	ps			
		0.56	0.59	0.59	0.71	NA	UI			
Deterministic Jitter	Jitter@BER; DJ	338.82	183.53	91.76	49.41	NA	ps			
		0.36	0.39	0.39	0.42	NA	UI			
В	Mask Seg1, Seg3	1000	1000	800	425	425	mΥ			
A	Mask Seg2	185	185	185	170	112.5	mΥ			
X1 (relative to 0.5UI)	Mask Seg2	-207.06	-96.47	-48.24	-17.06	NA	ps			
		-0.22	-0.21	-0.21	-0.15	NA	UI			
X2 (relative to 0.5UI)	Mask Seg2	0.00	0.00	0.00	0.00	NA	ps			
		0.00	0.00	0.00	0.00	NA	UI			
2*A	Min Eye Height	370	370	370	340	225	mV			
2*X1	Min Eye Width	414.12	192.94	96.47	34.12	NA	ps			
		0.44	0.41	0.41	0.29	NA	UI			
2*B	Differential Amplitude	2000	2000	1600	850	850	mV			
Skew	Differential Skew*	205	105	NA	NA	???	ps			
	1 10 01 11 1	b L A	61.0	45	47	4.5	Imv/			

Table 3 – Fibre Channel 'Delta' Test Points

	Derived from FC-Pl4 Rev 6.01- February 27th, 2007 - Chapter 9									
FibreChannel	RT-Eye	100-SE-EL-S	200-SE-EL-S							
Specification	Measurement	100-DF-EL-S*	200-DF-EL-S*	400-DF-EL-S	800-DF-EL-S	800-DF-EA-S				
Nominal Bit Rate	Bit Rate	1.0625	2.125	4.250	8.500	8.500	Gb/s			
Unit Interval	Unit Interval	941.1765	470.5882	235.2941	117.6471	117.6471	ps			
Bit Rate Tolerance	Bit Rate Limits	100	100	100	100	100	PPM			
Golden PLL Frequency	1st Order PLL Loop BW	0.64	1.27	2.55	5.10	5.10	MHz			
	Gar	nma-Tx Test P	oint							
FibreChannel	RT-Eye	100-SE-EL-S	200-SE-EL-S							
Specification	Measurement	100-DF-EL-S*	200-DF-EL-S*	400-DF-EL-S	800-DF-EL-S	800-DF-EA-S				
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	687.06	329.41	101.18	NA	NA	ps			
		0.73	0.70	0.43	NA	NA	UΙ			
Total Jitter at 10-12 BER	Jitter@BER; TJ	254.12	141.18	134.12	NA	NA	ps			
		0.27	0.30	0.57	NA	NA	ŪΙ			
Deterministic Jitter	Jitter@BER; DJ	122.35	75.29	87.06	NA	NA	ps			
		0.13	0.16	0.37	NA	NA	ŪΙ			
В	Mask Seg1, Seg3	1000	1000	800	???	???	mV			
A	Mask Seg2	550	550	155	???	???	mV			
X1 (relative to 0.5UI)	Mask Seg2	-343.53	-164.71	-50.59	???	???	ps			
· · ·		-0.37	-0.35	-0.22	???	???	υ			
X2 (relative to 0.5UI)	Mask Seg2	-164.71	-75.29	0.00	???	???	ps			
· · · ·		-0.18	-0.16	0.00	???	???	ίι			
2*A	Min Eye Height	1100	1100	310	???	???	m٧			
2*X1	Min Eye Width	687.06	329.41	101.18	???	???	ps			
		0.73	0.70	0.43	???	???	υ			
2*B	Differential Amplitude	2000	2000	1600	???	???	m٧			
Rise/Fall Time 20-80%	Max Rise/Fall Time	385.00	192.00	NA	???	???	ps			
Rise/Fall Time 20-80%	Min Rise/Fall Time	100	75	60	???	???	ps			
Skew	Differential Skew*	25	15	NA	???	???	ps			
Common Mode Voltage, RMS	AC CM Voltage	NA	NA	15	15	???	m∨			
	Gar	nma-Rx Test P	Point							
FibreChannel	RT-Eye	100-SE-EL-S	200-SE-EL-S							
Specification	Measurement	100-DF-EL-S*	200-DF-EL-S*	400-DF-EL-S	800-DF-EL-S	800-DF-EA-S				
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	432.94	202.35	101.18	???	NA	ps			
		0.46	0.43	0.43	???	NA	ÛΙ			
Total Jitter at 10-12 BER	Jitter@BER; TJ	508.24	268.24	134.12	???	NA	ps			
		0.54	0.57	0.57	???	NA	ŪΙ			
Deterministic Jitter	Jitter@BER; DJ	329.41	174.12	87.06	???	NA	ps			
		0.35	0.37	0.37	???	NA	ŪΙ			
В	Mask Seg1, Seg3	1000	1000	800	???	NA	m٧			
A	Mask Seg2	200	200	138	???	NA	m∨			
X1 (relative to 0.5UI)	Mask Seg2	-216.47	-101.18	-50.59	???	NA	ps			
, , ,		-0.23	-0.22	-0.22	???	NA	ŪΙ			
X2 (relative to 0.5UI)	Mask Seg2	0.00	0.00	0.00	???	???	ps			
		0.00	0.00	0.00	???	???	UI			
2*A	Min Eye Height	400	400	276	???	???	m٧			
2*X1	Min Eye Width	432.94	202.35	101.18	???	???	ps			
		0.46	0.43	0.43	???	???	UI			
2*B	Differential Amplitude	2000	2000	1600	???	???	mV			
Skew	Differential Skew*	200	100	NA	NA	???	ps			
Common Mode Voltage, RMS	AC CM Voltage	NA	NA	20	???	???	mV			
	· · ·									

Table 4 – Fibre Channel 'Gamma' Test Points

6.3 Ethernet (XAUI and 10GBaseCX4)

Table 5 – XAUI Compliance Test Points

Derived from IEEE	802.3ae-2002 (XAUI - 10G Attac	hment Unit In:	terface)							
IEEE 802.3ae 'XAUI'	RT-Eye	XAUI	XAUI							
Specification	Measurement	Near End	Far End							
Nominal Bit Rate	Bit Rate	3.125	3.125	Gb/s						
Unit Interval	Unit Interval	320.0000	320.0000	ps						
Bit Rate Tolerance	Bit Rate Limits 100		100	PPM						
Golden PLL Frequency	1st Order PLL Loop BW	1.87	1.87	MHz						
Section 47.3 XAUI Dr	Section 47.3 XAUI Driver Electrical characteristics (Table 47-1 & Figure 47-4)									
IEEE 802.3ae 'XAUI'	RT-Eye	XAUI	XAUI							
Specification	Measurement	Near End	Far End							
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	208.00	144.00	ps						
		0.65	0.45	UI						
Total Jitter at 10-12 BER	Jitter@BER; TJ	112.00	176.00	ps						
		0.35	0.55	UI						
Deterministic Jitter	Jitten@BER; DJ	54.40	118.40	ps						
		0.17	0.37	UI						
A2	Mask Seg1, Seg3	800	800	m∨						
A1	Mask Seg2	400	100	m∨						
X1 (relative to 0.5UI)	Mask Seg2	-104.00	-72.00	ps						
		-0.325	-0.225	UI						
X2 (relative to 0.5UI)	Mask Seg2	-35.20	-32.00	ps						
		-0.110	-0.100	UI						
2*A1	Min Eye Height	800	200	m∨						
2*X1	Min Eye Width	208.00	144.00	ps						
		0.65	0.45	UI						
2*VDIFFmax	Differential Amplitude	1600	1600	m∨						
Rise/Fall Time 20-80%	Max Rise/Fall Time	130	130							
Rise/Fall Time 20-80%	Min Rise/Fall Time	60	60	ps						

Table 6 – 10GBaseCX4 Compliance Test Points

Derived from IEEE Std. 802.3ak-2004							
10GBASE-CX4	10GBASE-CX4 RT-Eye						
Specification	Measurement	3.125Gb/s					
Nominal Bit Rate	Bit Rate	3.1250	Gb/s				
Unit Interval	Unit Interval	320.0000	ps				
Bit Rate Tolerance	Bit Rate Limits	100	PPM				
Golden PLL Frequency	1st Order PLL Loop BW	1.875	MHz				

From Table 54-3 MDI Tran	smitter Specification (at TP2 ir	n Figure 54-2)	
10GBASE-CX4	RT-Eye	1.25Gb/s	
Specification	Measurement	Short Run	
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	208.00	ps
		0.65	UI
Total Jitter at 10-12 BER	Jitter@BER; TJ	112.00	ps
		0.35	UI
Deterministic Jitter	Jitter@BER; DJ	54.40	ps
		0.17	UI
Deterministic Jitter	Jitter@BER; RJ	86.40	ps
		0.27	UI
Differential Pk-Pk/2 max	Mask Seg1, Seg3	600	mΥ
Differential Pk-Pk/2 min	Mask Seg2	400	mΥ
Jitter Mask	Mask Seg2	-104	ps
		-0.33	UI
2*VDIFFmax	Min Eye Height	800	mΥ
2*Jitter Mask	Min Eye Width	208	ps
		0.65	UI
Differential Pk-Pk Output Voltage	Differential Amplitude	1200	mν
Rise/Fall Time 20-80%	Max Rise/Fall Time	130	ps
Rise/Fall Time 20-80%	Min Rise/Fall Time	60	ps

6.4 InfiniBand DDR (Dual Data Rate) and QDR (Quad Data Rate)

Table 7 – InfiniBand Compliance Test Points

Derived from InfiniBand Architecture Specification Volume 2 - Release 1.2 - October, 2004							
RT-Eye	5.0Gb/s DDR	5.0Gb/s DDR	5.0Gb/s DDR	5.0Gb/s QDR	10.0Gb/s QDR	10.0Gb/s QDR	
Measurement	TX_PINS	TP6	TP1	TX_PINS	TP6	TP1	
Bit Rate	5.0000	5.0000	5.000	10.000	10.000	10.000	Gb/s
Unit Interval	200.0000	200.0000	200.0000	100.0000	100.0000	100.0000	ps
Bit Rate Limits	100	100	100	100	100	100	PPM
1st Order PLL Loop BW	3.00	3.00	3.00	6.00	6.00	6.00	MHz
	Derived from Intinuisand Arc RT-Eye Measurement Bit Rate Unit Interval Bit Rate Limits 1st Order PLL Loop BW	Derived from InfiniBand Architecture Spect RT-Eye 5.0 Gb/s DDR Measurement TX PINS Bit Rate 5.0000 Unit Interval 200.0000 Bit Rate Limits 100 1st Order PLL Loop BW 3.00	Berived from InfiniBand Architecture Specification Volume RT-Eye 5.0 Gb/s DDR 5.0 Gb/s DDR Measurement TX_PINS TP6 Bit Rate 5.0000 5.0000 Unit Interval 200.0000 200.0000 Bit Rate Limits 100 100 1st Order PLL Loop BW 3.00 3.00	Derived from InfiniBand Architecture Spectrication Volume 2 - Release RT.Eye 5.0Gb/s DDR 5.0Gb/s DDR 5.0Gb/s DDR Measurement TX PINS TP6 TP1 Bit Rate 5.0000 5.0000 5.000 Unit Interval 200.0000 200.0000 200.0000 Bit Rate Limits 100 100 100 1st Order PLL Loop BW 3.00 3.00 3.00	Berived from Infinit/Band Architecture Spectrication Volume 2 - Release 1.2 - October, J. Oc	Derived from InfiniBand Architecture Specification volume 2 - Release 1.2 - October, 2004 RT-Eye 5.06b/s DDR 100.06b/s ODR 100.00b/s ODR 100.000 100.000 100.000 100.000 100.0000 10	Derived from InfiniBand Architecture Specification Volume 2 - Kelease 1.2 - October, 2004 RT-Eye 5.0Gb/s DDR 5.0Gb/s DDR 5.0Gb/s DDR 5.0Gb/s DDR 10.0Gb/s ODR 10.0G

	Table	18 and Table	19 Driver Char	acteristics				
InfiniBand	RT-Eye	5.0Gb/s DDR	5.0Gb/s DDR	5.0Gb/s DDR	5.0Gb/s QDR	10.0Gb/s QDR	10.0Gb/s QDR	
Specification	Measurement	TX_PINS	TP6	TP1	TX_PINS	TP6	TP1	
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	140.00	140.00	140.00	70.00	70.00	70.00	ps
		0.70	0.70	0.70	0.70	0.70	0.70	UI
Total Jitter at 10-12 BER	Jitter@BER; TJ	60.00	60.00	60.00	30.00	30.00	30.00	ps
		0.30	0.30	0.30	0.30	0.30	0.30	UI
Deterministic Jitter	Jitter@BER; DJ	30.00	30.00	30.00	15.00	15.00	15.00	ps
		0.15	0.15	0.15	0.15	0.15	0.15	ŪI
Vdiff (TX_PINS)	Min Eye Height	800			600			mΥ
Vdiffc (TP6)	Min Eye Height		650			500		mΥ
Vdiff (TP1)	Min Eye Height			600			450	mΥ
∨diff	Differential Amplitude	800	650	600	600	500	450	mΥ
Rise/Fall Time 20-80%	Min Rise/Fall Time	30	30	30	30	30	30	ps
Common Mode Voltage, RMS	AC CM Voltage	25	25	25	25	25	25	m∨

6.5 Open Base Station Architecture Initiative (OBSAI)

Table 8 – OBSAI Compliance Test Points

OBSAI (Open Base St	tation Achritecture Initiative) R	eference Poin	t 3 Specificat	on Ver. 1.3					
	RT-Eye								
OBSAI Specification	Measurement	768Mb/s	1.536Gb/s	3.072Gb/s					
Nominal Bit Rate	Bit Rate	0.7680	1.536	3.072	Gb/s				
Unit Interval	Unit Interval	1302.0833	651.0417	325.5208	ps				
Bit Rate Tolerance	Bit Rate Limits	100	100	100	PPM				
	Min Unit Interval	1301.95313	650.97656	325.48828	ps				
	Max Unit Interval	1302.21354	651.10677	325.55339	ps				
Golden PLL Frequency	1st Order PLL Loop BW	0.46	0.92	1.84	MHz				
		651.04	325.52	162.76					
Section 5.3 Transmitter Specifications									
	RT-Eye								
OBSAI Specification	Measurement	768Mb/s	1.536Gb/s	3.072Gb/s					
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	846.35	423.18	211.59	ps				
		0.65	0.65	0.65	UI				
Total Jitter at 10-15 BER	Jitter@BER; TJ	455.73	227.86	113.93	ps				
		0.35	0.35	0.35	UI				
Deterministic Jitter	Jitter@BER; DJ	221.35	110.68	55.34	ps				
		0.17	0.17	0.17	UI				
A2	Mask Seg1, Seg3	800	800	800	m∨				
A1	Mask Seg2	200	200	200	m∨				
X1 (relative to 0.5UI)	Mask Seg2	-423.18	-211.59	-105.79	ps				
		-0.325	-0.325	-0.325	UI				
X2 (relative to 0.5UI)	Mask Seg2	-143.23	-71.61	-35.81	ps				
		-0.11	-0.11	-0.11	UI				
Min Differential Voltage (2*A1)	Min Eye Height	400	400	400	mΫ				
Eye Width	Min Eye Width	846.35	423.18	211.59	ps				
		0.65	0.65	0.65	UI				
Max Differential Voltage (2*A2)	Differential Amplitude	1600	1600	1600	mV				

	Section 8.7 Receiver Eye	e Diagrams			
	RT-Eye				
OBSAI Specification	Measurement	768Mb/s	1.536Gb/s	3.072Gb/s	
1UI - Total Jitter	Jitter@BER; Jitter Eye Opening	585.94	292.97	146.48	ps
		0.45	0.45	0.45	UI
Total Jitter at 10-15 BER	Jitter@BER; TJ	716.15	358.07	179.04	ps
		0.55	0.55	0.55	UI
Deterministic Jitter	Jitter@BER; DJ	481.77	240.89	120.44	ps
		0.37	0.37	0.37	UI
A2	Mask Seg1, Seg3	800	800	800	mΥ
A1	Mask Seg2	100	100	100	mV
X1 (relative to 0.5UI)	Mask Seg2	-292.97	-146.48	-73.24	ps
		-0.225	-0.225	-0.225	UI
X2 (relative to 0.5UI)	Mask Seg2	0.00	0.00	0.00	ps
		0.00	0.00	0.00	UI
Max Differential Voltage (2*A2)	Differential Amplitude	1600	1600	1600	mΥ
Min Differential Voltage (2*A1)	Min Eye Height	200	200	200	mΥ
Eye Width	Min Eye Width	585.94	292.97	146.48	ps

6.6 Serial Attached SCSI (SAS)

Table 9 – SAS Compliance Test Points

	Derived from ANSI I	NCITS 417-2006	SAS-1.1 Spec	ification			
	and T1	0/07-063r7 May	/ 21, 2007				
	RT-Eye						
SAS Specification	Measurement	1.5Gb/s	1.5Gb/s	3.0Gb/s	3.0Gb/s	6Gb/s	
Nominal Bit Rate	Bit Rate	1.5000	1.5000	3.000	3.000	6.000	Gb/s
Unit Interval	Unit Interval	666.6667	666.6667	333.3333	333.3333	166.6667	ps
Bit Rate Tolerance	Bit Rate Limits	100	100	100	100	100	PPM
	Min Unit Interval	666.60000	666.60000	333.30000	333.30000	166.65000	ps
	Max Unit Interval	666.73333	666.73333	333.36667	333.36667	166.68333	ps
Golden PLL Frequency	1st Order PLL Loop BW	0.90	0.90	1.80	1.80	3.60	MHz
		333.33	333.33	166.67	166.67	83.33	
	Section 5.3.3 Tra	nsmitter with z	ero length test	load			
	RT-Eye	IT Test Point	CT Test Point	IT Test Point	CT Test Point		
SAS Specification	Measurement	1.5Gb/s	1.5Gb/s	3.0Gb/s	3.0Gb/s	6Gb/s	
1UI - Total Jitter	Jitten@BER: Jitter Eve Opening	300.00	300.00	150.00	150.00	66.67	ps
		0.45	0.45	0.45	0.45	0.40	UI
Total Jitter at 10-15 BER	Jitten@BER:TJ	366.67	366.67	183.33	183.33	100.00	ps
	<u> </u>	0.55	0.55	0.55	0.55	0.60	Ū.
Deterministic Jitter	Jitter@BER: DJ	233.33	233.33	116.67	116.67	58.33	ps
		0.35	0.35	0.35	0.35	0.35	U
72	Mask Seg1, Seg3	800	800	800	800	600	mΥ
 Z1	Mask Seg2	162.5	137.5	162.5	137.5	50	mΥ
X1 (relative to 0.5UI)	Mask Seg2	-150.00	-150.00	-75.00	-75.00	-33.33	ns
		-0.225	-0.225	-0.225	-0.225	-0.200	UI
Min Differential Voltage (2*71)	Min Eve Height	325	275	275	275	100	mV
Eve Width	Min Eve Width	300.00	300.00	150.00	150.00	66.67	ns
		0.45	0.45	0.45	0.45	0.40	UI I
AC CM Voltage (pk-Pk)	AC CM Voltage (pk-Pk)	150	150	150	150	150	mV
Rise/Fall Time 20-80%	Max Rise/Fall Time	273	273	137	137	68.33	ps
Rise/Fall Time 20-80%	Min Rise/Fall Time	67	67	67	67	41.67	ns
Skew	Max Differential Skew*	20	20	15	15	NA	ns
							11
Sectio	n 5.3.5 Transmitter/Receiver v	vith TCTF (Trai	nsmitter Comp	liance Transfe	r Function)		
	BT.Eve	IT Test Point	CT Test Point	IT Test Point	CT Test Point		
SAS Specification	Measurement	15Gh/s	15Gh/s	3.0Gh/s	3.0Gh/s		
111 Total littor	littor@REB: littor Euc Opening	200.00	200.00	150.00	150.00		-
TOI - TOLAI SILLEI	Sitter@DER, Sitter Eye Opening	0.45	0.45	0.45	0.45		l l l
Total littar at 10 15 PED		0.43	0.43	102.22	102.22		101
Total Jiller at 10-15 BER	JILLENQUER, IJ	0.65	0.65	103.33	0.55		lps IIII
Deterministic litter	Littor@PEP: D.I	0.00	0.00	116.67	0.00		0
Deterministic Jitter	JILLENQUER, DJ	233.33	233.33	0.25	0.25		lps Iu
70	Maak Saat Saa2	0.00	0.00	0.35	0.00		m
71	Maak Seg1, Seg3	162.5	127 5	127 5	127 5		mV
V1 (valative to 0.51.0)	Maak Seg2	162.5	137.5	75.00	75.00		mo
∧1 (relative to 0.501)	iviask öeg∠	-150.00	- 150.00	-75.00	-/5.00		lps IIII
Min Differential Valtage (2*74)	Min Eus Height	-0.225	-0.225	-0.225	-0.225		101
Fue Modth	Min Eye neight	200.00	2/5	2/5	2/5		mv
Eye vvidtn	Iviin Eye vviatn	300.00	300.00	150.00	150.00		lps IIII
AC CMAX/altage (all DIA	AC CM Veltage (el: DU)	150	0.45	0.45	0.45		
AC CIVI VOItage (pk-Pk)	AC CIVI VOITage (pk-Pk)	150	150	150	150		mv
Rise/Fall Time 20-80%	Min Dise/Fall Time	2/3	2/3	13/	137		lbs
Rise/Fall Time 20-60%	Min Rise/Fail Time	00	0/	6/	0/		ps
May Bk Bk Maleace (2*72)	Differential Amelitude	100	100	100	100		ps m ^V
IVIAX FK-FK VUILAGE (Z"ZZ)	L Dillerential Amplitude	1 1000	1000	1000	1 1000		TULA

6.7 Serial RapidIO

Table	10 -	Serial	RapidIO	Compliance	Test	Points
Tuble	10	oonui	nupiulo	oompnunoe	1050	1 011113

	Derived from RapidIO Interconnect Specification - Rev1.3 - June 2005								
RapidIO	RT-Eye	1.25Gb/s	1.25Gb/s	2.5Gb/s	2.5Gb/s	3.125Gb/s	3.125Gb/s		
Specification	Measurement	Short Run	Long Run	Short Run	Long Run	Short Run	Long Run		
Nominal Bit Rate	Bit Rate	1.2500	1.250	2.500	2.500	3.125	3.125	Gb/s	
Unit Interval	Unit Interval	800.0000	800.0000	400.0000	400.0000	320.0000	320.0000	ps	
Bit Rate Tolerance	Bit Rate Limits	100	100	100	100	100	100	PPM	
Golden PLL Frequency	1st Order PLL Loop BW	0.75	0.75	1.50	1.50	1.87	1.87	MHz	
	6	0.6 T	····	4					
BanidlO	DT Evo	00 8.5 Transm	inter Specifica	1000S	2.5Ch/c	3 125Ch/c	3 125Ch/e		
Specification	Moseuromont	Short Pun	Long Dun	Short Dun	Long Dun	Short Pup	Long Dun		
11 II - Total Jitter	Jitter@BER: Jitter Eve Onening	520.00	520.00	260.00	260.00	208.00	208.00	ns	
	ontel@bert, ontel Eye opening	0.65	0.65	0.65	0.65	0.65	0.65	11	
Total litter at 10-12 BER	.litter@BER: T.I	280.00	280.00	140.00	140.00	112.00	112.00	ns	
		0.35	0.35	0.35	0.35	0.35	0.35	UI	
Deterministic Jitter	.litter@BER: D.I	136.00	136.00	68.00	68.00	54.40	54.40	ns	
		0.17	0.17	0.17	0.17	0.17	0.17	UI	
VDIFFmax	Mask Seg1, Seg3	500	800	500	800	500	800	mΥ	
VDIFFmin	Mask Seg2	250	400	250	400	250	400	mΥ	
A (relative to 0.5UI)	Mask Seg2	-260.00	-260.00	-130.00	-130.00	-104.00	-104.00	ps	
, , , , , , , , , , , , , , , , , , , ,	3	-0.33	-0.33	-0.33	-0.33	-0.33	-0.33	UI	
B (relative to 0.5UI)	Mask Seg2	-88.00	-88.00	-44.00	-44.00	-35.20	-35.20	ps	
, , , , , , , , , , , , , , , , , , ,	Ŭ	-0.11	-0.11	-0.11	-0.11	-0.11	-0.11	UI	
2*√DIFFmax	Min Eye Height	500	800	500	800	500	800	mΥ	
2A	Min Eye Width	520.00	520.00	260.00	260.00	208.00	208.00	ps	
		0.65	0.65	0.65	0.65	0.65	0.65	UΙ	
2*√DIFFmax	Differential Amplitude	1000	1600	1000	1600	1000	1600	mΥ	
Rise/Fall Time 20-80%	Min Rise/Fall Time	60	60	60	60	60	60	ps	
Skew	Differential Skew*	25	25	20	20	15	15	ps	
B140	Sec	tion 8.7 Recei	ver Eye Diagra	ims		1	1		
Rapidio	RI-Eye	4.25 Ch/a		2506/2		2.425 Ch/a			
Specification	Measurement	1.23GB/S		Z.3GD/S		3.123GB/S			
TOT - Total Jitter	Jitten@/BER; Jitter Eye Opening	360.00		180.00		144.00		ps	
Total little at 10 12 DED		0.45		0.45		0.45		01	
Total Jitter at 10-12 BER	JITTERQ/BER; IJ	440.00		220.00		176.00		ps	
VDIEEmax	Maak Saat Saa2	0.00		0.00		0.00		UI mV	
VDIFFMIAX	Mask Seg1, Seg5	100		100		100		mV	
VDIFFMIN V1 (relative to 0 EUI)	Mask Seg2	190.00		90.00		72.00		no	
XT (relative to 0.501)	iviask Seg∠	-100.00		-90.00		-72.00		ps	
V2 (relative to 0.5UI)	Mook Sog2	-0.23		-0.23		-0.23		01	
72 (relative to 0.50l)	Iviask Geyz	-00.00		-40.00		-0.10		In In	
2*VDIEEmin	Min Eve Height	200		200		200		mV	
2 401111111	Min Eye Width	360.00		180.00		144.00		Ins	
40	with Lye width	0.45		0.45		0.45		100	
2*B	Differential Amplitude	1600		1600		1600		mV	
Skew	Differential Skew*	200		202		204		ins	
OKOW	Differential Orea	200		202		204		100	

7 Appendix A - Customizing Standards Support Library Files

Each standard support setup file consists of three files; the RT-Eye Serial Analysis setup file *<filename.ini>*, the Mask file *<filename.msk>*, and the limits file *<filename.lim>*. All three of these files can be customized if the user chooses to do so.

7.1 Customizing Setup Files

The setup file can be changed by the user and resaved if desired. For example, the default configuration is Single Ended Ch1, Ch3. If a differential probe is being used it may be desirable to save a file in the library that has Differential Ch1 as the source.

7.2 Customizing Mask Files

The .msk files follow the Tektronix format that defines the mask geometries into three absolute segments. The Mask geometries of interest in the InfiniBand DDR TP6 example are highlighted in the following figure. The mask file is a text file and can be edited with a text editor program such as MS Notepad.



Figure 8 – InfiniBand TP6 Mask File

It is recommended that a Standards Support Library Mask file is copied and renamed before editing.

7.3 Customizing Limits Files

The .lim files follow the Tektronix format that defines the measurement limits in the Serial Analysis Module.

Limits files can be customized by going to the Measurement > Limits menu in the RT-Eye Serial Analysis Module. The current Limits file can be opened and resaved with new limits.

RT-Eye Limits Editor					X
File Add					
🕒 🗀 + 1250					
Measu	Measurement		Lower Lim	Upper Lim	
				6	<u> </u>
Unit Interval	-	Mean 🔻	199.98ps	200.02ps	
				۲	
Eye Opening	▼	Min 🔻	140ps	Os	
			٥	۲	
Total Jitter	-	Max 👻	Os	60ps 📍	
Dico Timo	_	Min	30ns	Os	
				•	
Fall Time	· · ·	Min 🔻	3ups	Us	
Eye Height	~	Min 🔻	650m∨	0V	
			9	8	
Differential Amplitu	ude 🔻	Min 🔻	650m∨		
			٥	۲	_
	date	Compact		ancel	
Van	uate	Compact	Save As		

Figure 9 – InfiniBand TP6 Limits File

It is recommended that a Standards Support Library limits file is copied and renamed before editing.

8 Appendix B – Measurement Algorithms

Refer to the RT-Eye OLH Measurement Algorithms section.