nAUI Ad Hoc

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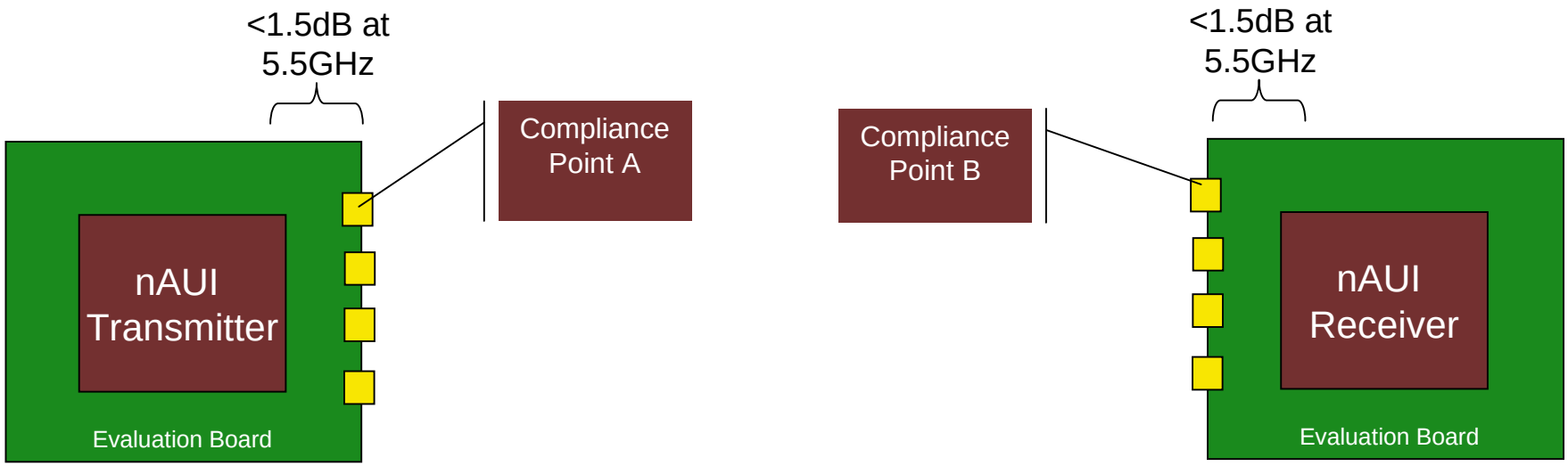
Agenda

1. Call for patents
    1. (http://standards.ieee.org/board/pat/pat-slideset.ppt)
2. Agenda
    1. Altera Presentation from Last Telecon – Mike P.
    2. Compliance Test Point Definition
    3. Link BER requirements
3. Path Forward

Compliance Point Definition – Chip Level Verification

- nAUI Transmit / Receive wave form verification
  - All channels active
  - Minimal evaluation board loss (recommendation of <1.5dB at 5.5GHz, additional loss will result in overstress)
    - Actual layout of board up to implementer



Compliance Point A & B Measurements

Table 83A–1—Transmitter characteristics

Parameter	Value	Units
Signalling speed per lane (range)	10.3125 GBd +- 100 ppm	GBd
Unit interval nominal	96.96969697	ps
Single-ended output voltage range maximum minimum	4.0 −0.4	V V
Maximum Differential Output Voltage, peak-to-peak	760	mV
Maximum Termination Mismatch at 1MHz	5	%
Maximum Output AC Common Mode Voltage, RMS	15	mV
Minimum Output Rise and Fall time (20% to 80%)	24	ps
Differential Output S-parameters	(see "Equation 83A-1")	dB
Common Mode Output S-parameters	(see "Equation 83A-2")	dB
Maximum Total Jitter[a]	0.32	UI
Maximum Deterministic Jitter[b]	0.17	UI
Transmitter eye mask definition X1[c]	0.16	UI
Transmitter eye mask definition X2[c]	0.38	UI
Transmitter eye mask definition Y1[c]	190	mV
Transmitter eye mask definition Y2[c]	380	mV

[a] Total Jitter Measurement Methodology defined in section 83A.4.3
[b] Deterministic Jitter Measurement Methodology defined in section 83A.4.3
[c] Transmitter Eye Mask illustrated in Figure 83A–5

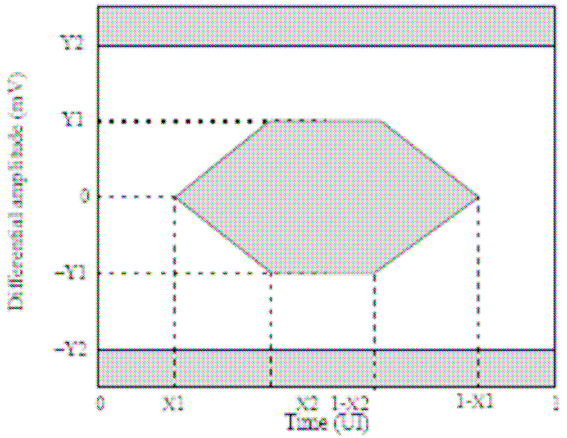


Figure 83A–5—Driver template

Verify Tx Output waveform

Table 83A–2—Receiver characteristics

Parameter	Value	Units
Signalling speed per lane (range)	10.3125 GBd +- 100 ppm	GBd
Unit interval nominal	96.96969697	ps
Maximum Differential Input Voltage, p-p	See receiver eye mask definition	mV
Maximum Input AC Common Mode Voltage, RMS	20	mV
Minimum Input Rise and Fall Time (20% to 80%)	24	ps
Differential Input S-parameters	(see "Equation 83A-3")	dB
Differential Common Mode Input Conversion S-parameters	(see "Equation 83A-4")	dB
Maximum Total Jitter[a]	0.62	UI
Maximum non-EQ Jitter (TJ - HJ)[b]	0.42	UI
Receiver eye mask definition X1[c]	0.31	UI
Receiver eye mask definition X2[c]	0.5	UI
Receiver eye mask definition Y1[c]	45	mV
Receiver eye mask definition Y2[c]	425	mV

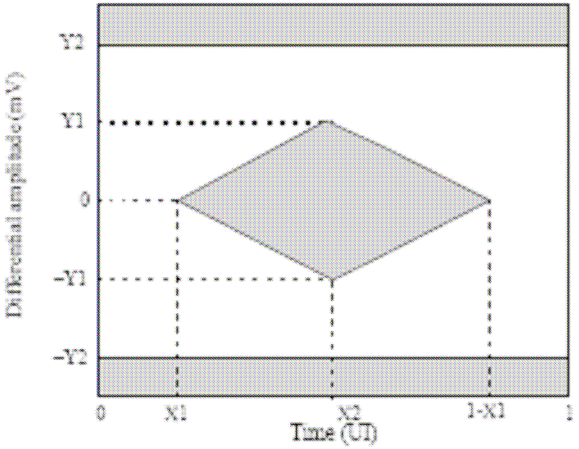
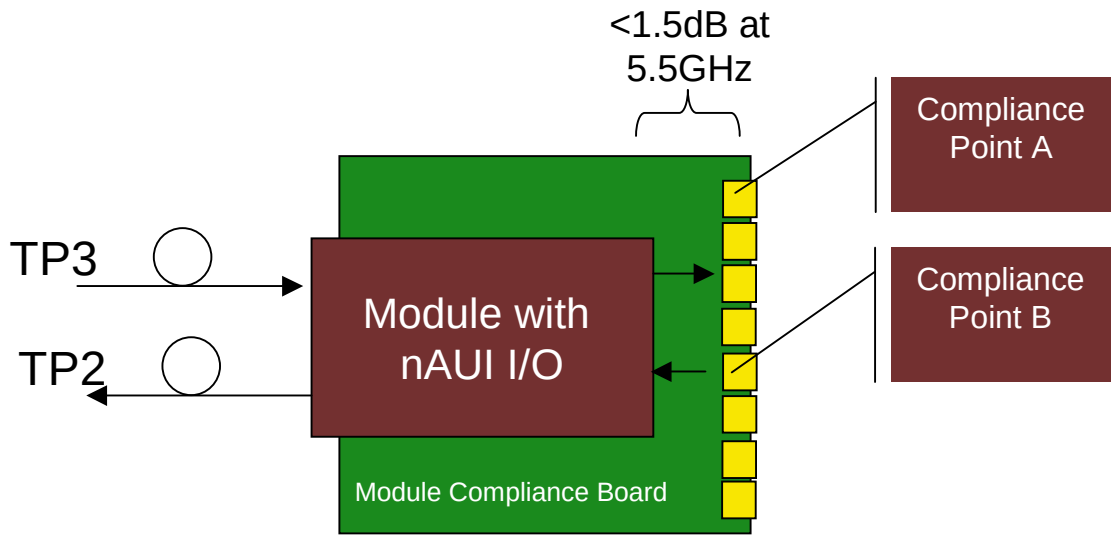


Figure 83A–6—Receiver template

Verify Rx Input can handle receiver template

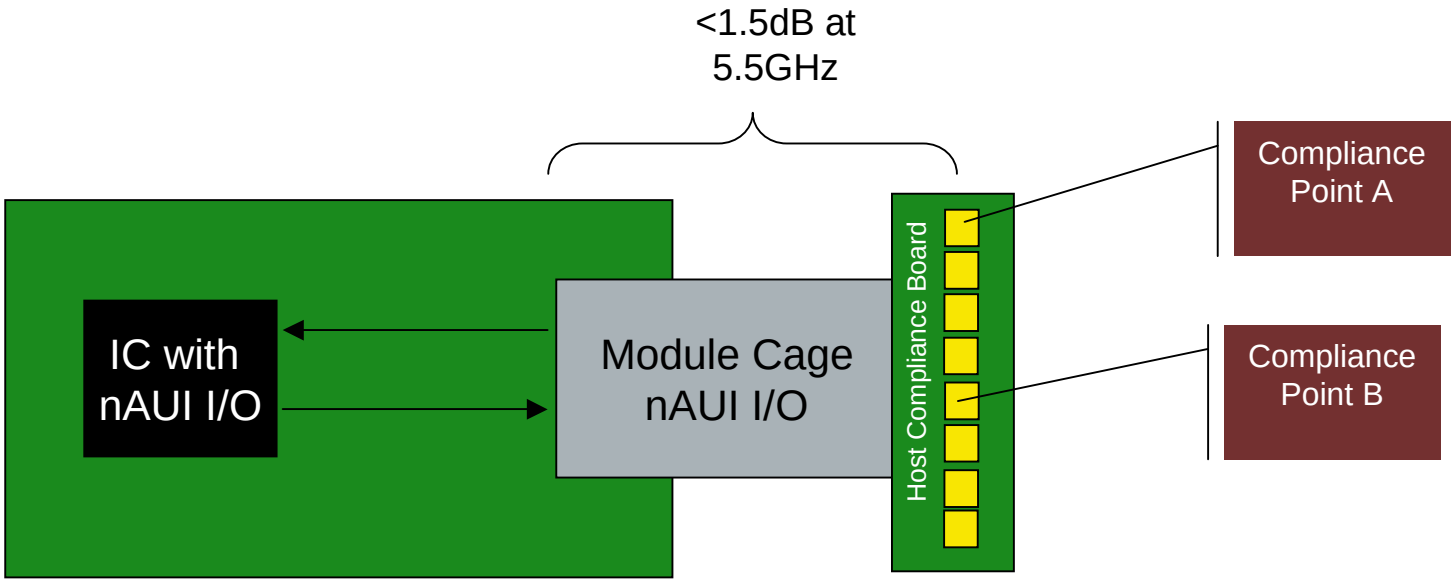
Compliance Point Definition – Module Level Verification

- nAUI Transmit & Receive wave form verification
  - All channels active
    - Unused Compliance Point A Channels Terminated
    - All Compliance point B channels active
  - Minimal compliance board loss (recommendation of <1.5dB at 5.5GHz, additional loss will result in overstress)
    - Actual layout of board up to implementer



Compliance Point Definition – Host Level Verification

- nAUI Transmit & Receive wave form verification
  - All channels active
    - Unused Compliance Point A Channels Terminated
    - All Compliance point B channels active
  - Minimal compliance board loss (recommendation of <1.5dB at 5.5GHz, additional loss will result in overstress)
    - Actual layout of board up to implementer



Compliance Point A & B Measurements

Table 83A–1—Transmitter characteristics

Parameter	Value	Units
Signalling speed per lane (range)	10.3125 GBd +- 100 ppm	GBd
Unit interval nominal	96.96969697	ps
Single-ended output voltage range maximum minimum	4.0 −0.4	V V
Maximum Differential Output Voltage, peak-to-peak	760	mV
Maximum Termination Mismatch at 1MHz	5	%
Maximum Output AC Common Mode Voltage, RMS	15	mV
Minimum Output Rise and Fall time (20% to 80%)	24	ps
Differential Output S-parameters	(see "Equation 83A-1")	dB
Common Mode Output S-parameters	(see "Equation 83A-2")	dB
Maximum Total Jitter[a]	0.32	UI
Maximum Deterministic Jitter[b]	0.17	UI
Transmitter eye mask definition X1[c]	0.16	UI
Transmitter eye mask definition X2[c]	0.38	UI
Transmitter eye mask definition Y1[c]	190	mV
Transmitter eye mask definition Y2[c]	380	mV

[a] Total Jitter Measurement Methodology defined in section 83A.4.3
[b] Deterministic Jitter Measurement Methodology defined in section 83A.4.3
[c] Transmitter Eye Mask illustrated in Figure 83A–5

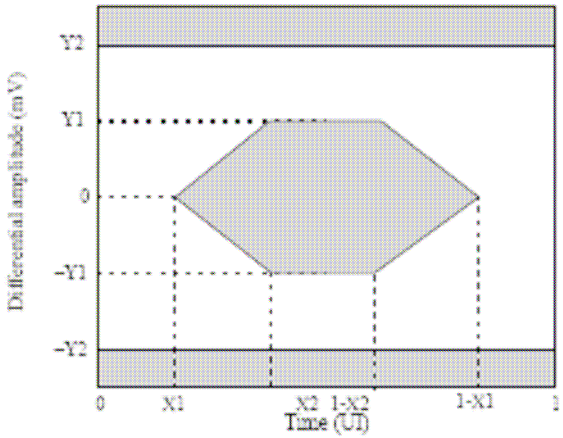


Figure 83A–5—Driver template

Table 83A–2—Receiver characteristics

Parameter	Value	Units
Signalling speed per lane (range)	10.3125 GBd +- 100 ppm	GBd
Unit interval nominal	96.96969697	ps
Maximum Differential Input Voltage, p-p	See receiver eye mask definition	mV
Maximum Input AC Common Mode Voltage, RMS	20	mV
Minimum Input Rise and Fall Time (20% to 80%)	24	ps
Differential Input S-parameters	(see "Equation 83A-3")	dB
Differential Common Mode Input Conversion S-parameters	(see "Equation 83A-4")	dB
Maximum Total Jitter[a]	0.62	UI
Maximum non-EQ Jitter (TJ - 1E[-12])[b]	0.42	UI
Receiver eye mask definition X1[c]	0.31	UI
Receiver eye mask definition X2[c]	0.5	UI
Receiver eye mask definition Y1[c]	45	mV
Receiver eye mask definition Y2[c]	425	mV

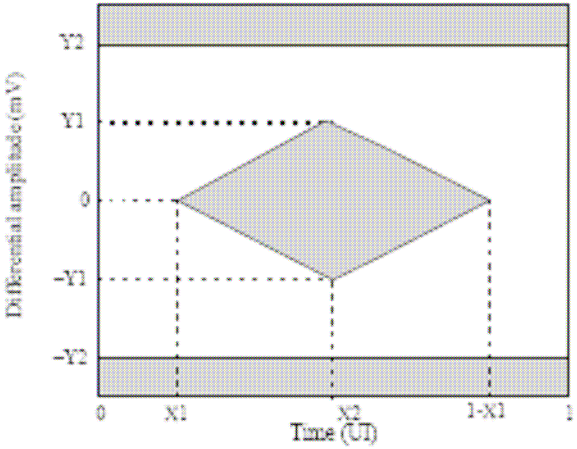


Figure 83A–6—Receiver template

BER 1E-15 Transmit

Parameter	Value	Units
Signaling speed per lane (range)	10.3125 GBd +- 100 ppm	GBd
Unit interval nominal	96.96969697	ps
Single-ended output voltage range maximum minimum	 4.0 –0.4	 V V
Maximum Differential Output Voltage, peak-to-peak	760	mV
Maximum Termination Mismatch at 1MHz	5	%
Maximum Output AC Common Mode Voltage, RMS	15	mV
Minimum Output Rise and Fall time (20% to 80%)	24	ps
Differential Output S-parameters	(see "Equation 83A-1")	dB
Common Mode Output S-parameters	(see "Equation 83A-2")	dB
Maximum Total Jitter[a]	~~0.32~~ 0.34	UI
Maximum Deterministic Jitter[b]	0.17	UI
Transmitter eye mask definition X1[c]	~~0.16~~ 0.17	UI
Transmitter eye mask definition X2[c]	~~0.38~~ 0.40	UI
Transmitter eye mask definition Y1[c]	190	mV
Transmitter eye mask definition Y2[c]	380	mV

$RJ_{1E-12} = 0.32 – 0.17$
$= 0.15$

$RJ_{1E-15} = 0.15*16/14$
$= 0.171$

$TJ = 0.171 + 0.17$
$= 0.34$

BER 1E-15 Receive

Parameter	Value	Units
Signalling speed per lane (range)	10.3125 GBd +- 100 ppm	GBd
Unit interval nominal	96.96969697	ps
Minimum Differential Input Voltage, p-p	See receiver eye mask definition	mV
Maximum Input AC Common Mode Voltage, RMS	20	mV
Minimum Input Rise and Fall Time (20% to 80%)	24	ps
Differential Input S-parameters	(see "Equation 83A-3")	dB
Differential Common Mode Input Conversion S-parameters	(see "Equation 83A-4")	dB
Maximum Total Jitter[a]	~~0.62~~ 0.66	UI
Maximum non-EQ Jitter (TJ - ISI)[b]	~~0.42~~ 0.46	UI
Receiver eye mask definition X1[c]	~~0.31~~ 0.33	UI
Receiver eye mask definition X2[c]	0.5	UI
Receiver eye mask definition Y1[c]	45	mV
Receiver eye mask definition Y2[c]	425	mV

Assumption:
DJ in Non-EQ Jitter = Tx DJ
No other DJ is added due to channel

$RJ_{1E-12} = 0.42 – 0.17$
$= 0.25$

$RJ_{1E-15} = 0.25*16/14$
$= 0.285$

$TJ = 0.62 + 0.035$
$= 0.66UI$

Path Forward

- Next Telecon
  - Tentative: Oct 31 2008, 8:30am PT
  - Subject: Channel Definition