

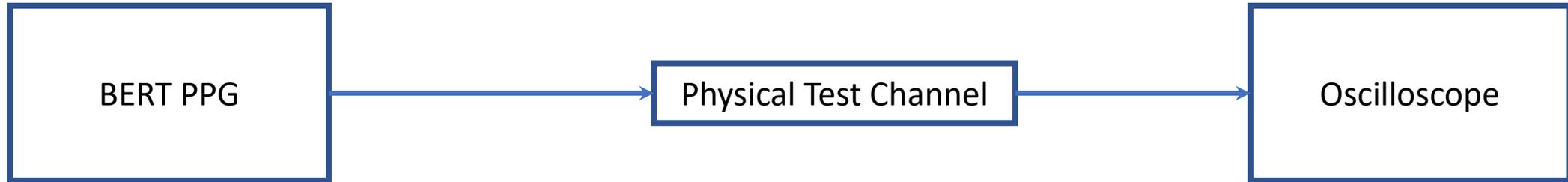
J3u Measurement for CL162

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Introduction

- J3u measurements at TP2 are highly dependent on effects of slew rate and noise and do not reflect actual uncorrelated jitter.
- Current J3u limit is marginal even for test equipment.
- Similar issue was reported in calvin_3ck_adhoc_01_092221 for longer test channels. We observe the J3u marginality for a combination of COM package with recommended TP0-TP2 PCB loss.
- Relates to comments 156 and 171 against D3.0.

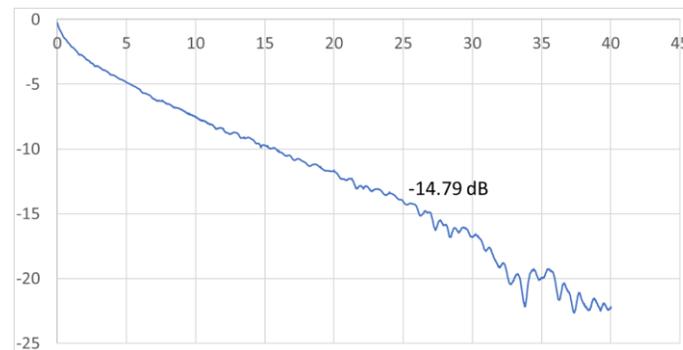
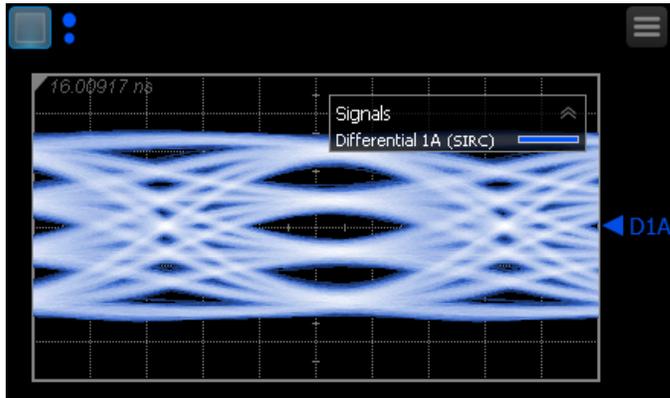
Test setup 1



Signal amplitude: 800 mV
J3u: 71.5 mUI
Jrms: 11.1 mUI

PCB trace + OSFP connector + HCB

Total IL – 14.8dB @26.56 GHz
(3.9 dB for COM package +
10.975 dB for recommended loss
between TP0 and TP2)



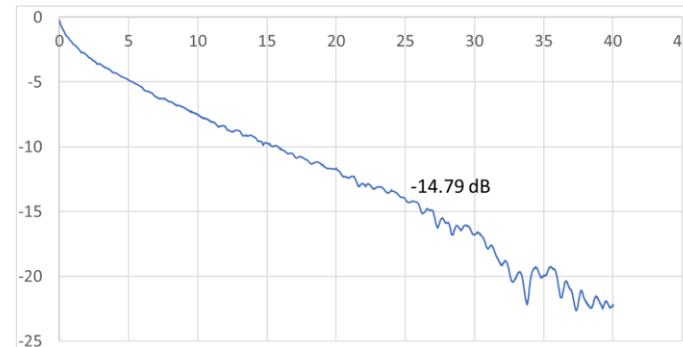
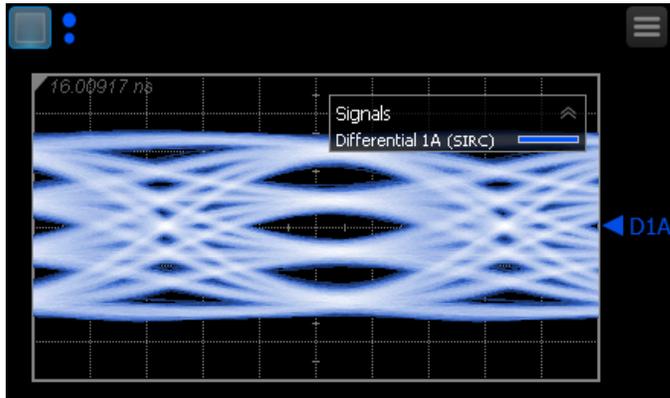
Test setup 2



Signal amplitude: 800 mV
J3u: 71.5 mUI
Jrms: 11.1 mUI

Mathematically embedded channel:
PCB trace + OSFP connector + HCB

Total IL – 14.8dB @26.56 GHz
(3.9 dB for COM package + 10.975 dB for recommended
loss between TP0 and TP2)



Measurement results

Test setup	Measured J3u [mUI]	Measured Jrms [mUI]	A_{DD}	σ_{RJ}
No channel	71.5	11.1	0.005	0.01
Physical channel	105.5*	15.45	0.00045**	0.015**
Embedded channel	75	11.3	0.003**	0.01**

*Applying TX FIR to equalize the channel loss worsens measured J3u

** Negative discriminant in A_{DD} calculation. Calculated based on hidaka_3ck_adhoc_01_041421.

Test setup 3

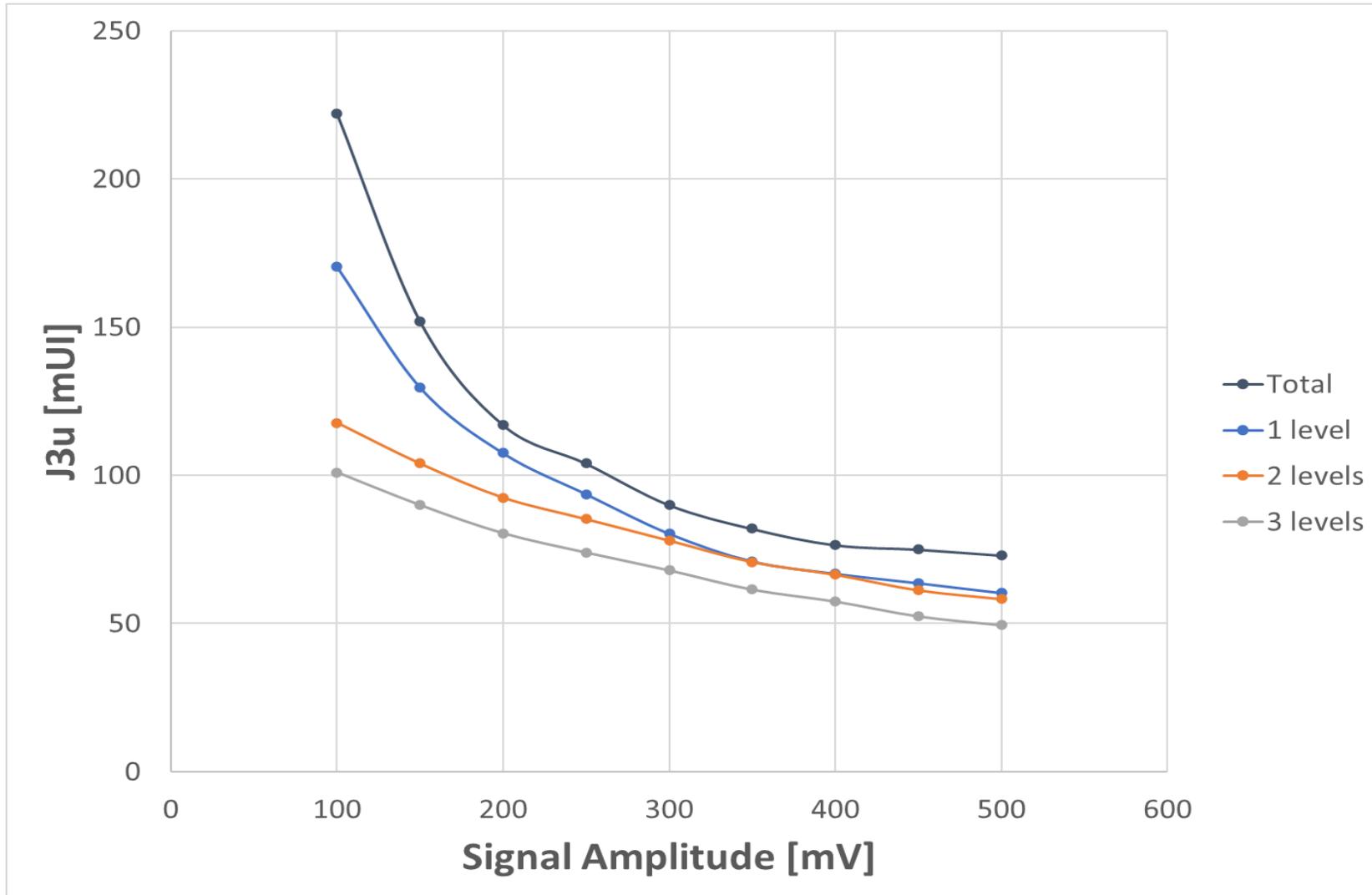


Signal amplitude: 200 - 1000 mV

J3u: 71.5 mUI

Jrms: 11.1 mUI

Measurement Results – Setup 3



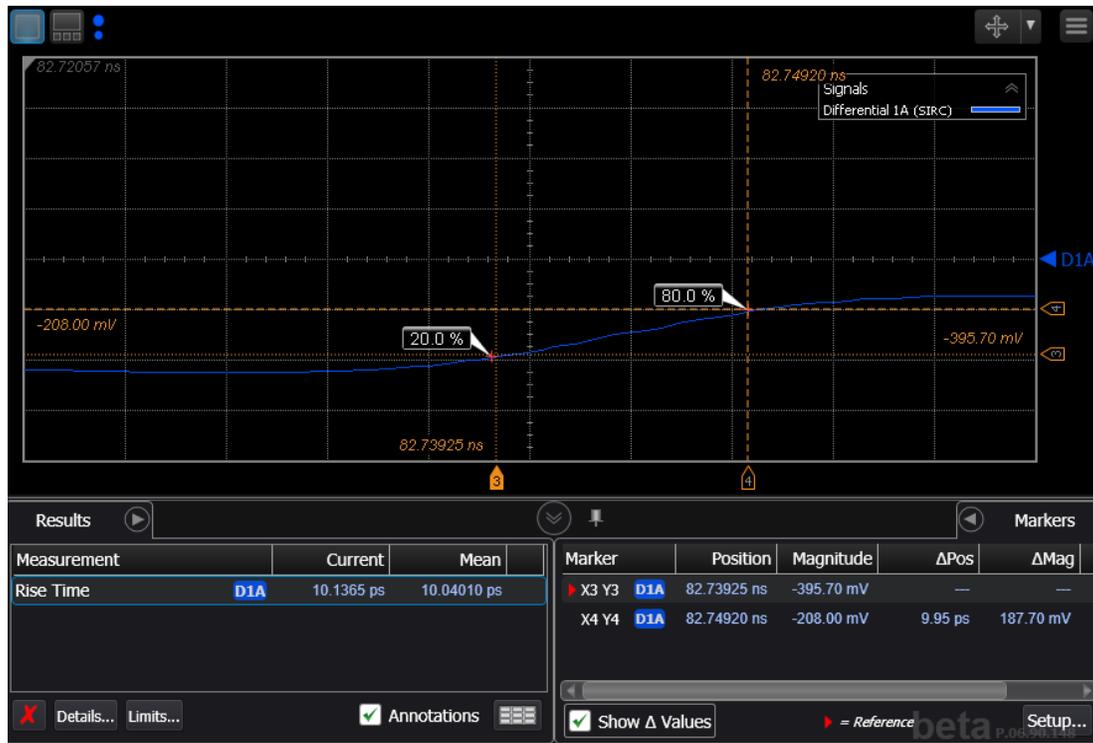
1 level – Average J3u of transitions between adjacent levels (0->1, 3->2, etc.)

2 levels – Average J3u of 0->2, 1->3, 2->0, 3->1)

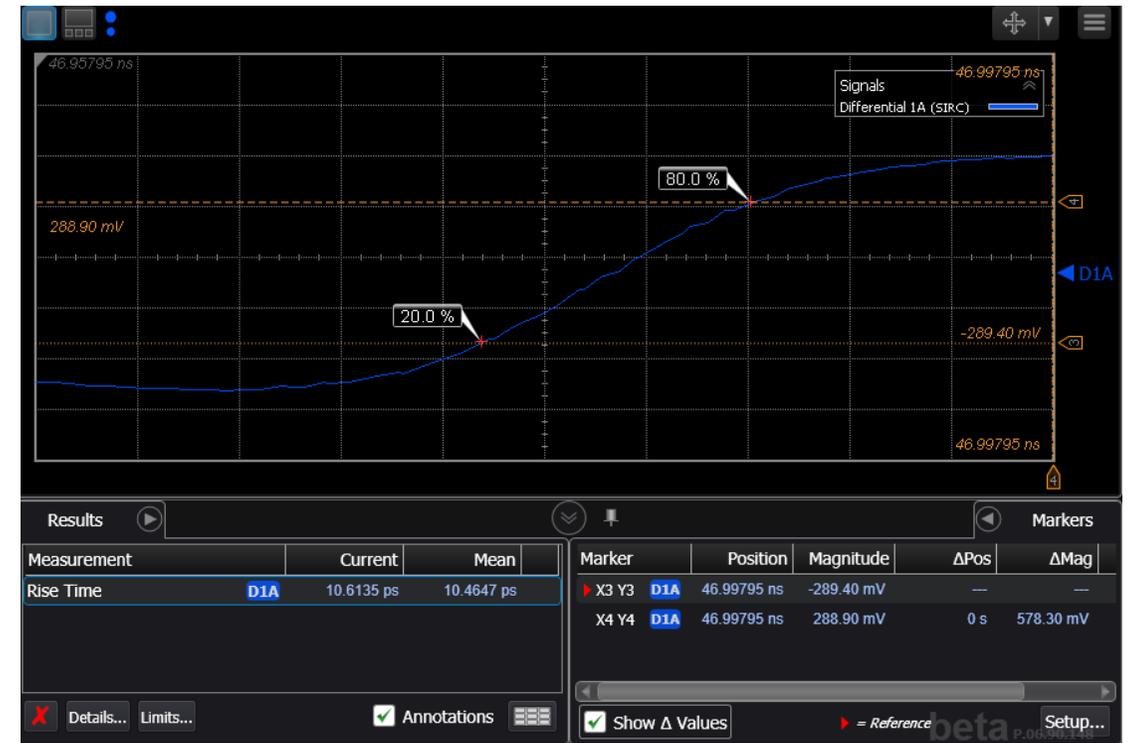
3 levels – Average J3u of 0->3, 3->0)

Edge snapshots – 1000 mV amplitude

0 ->1



0 ->3

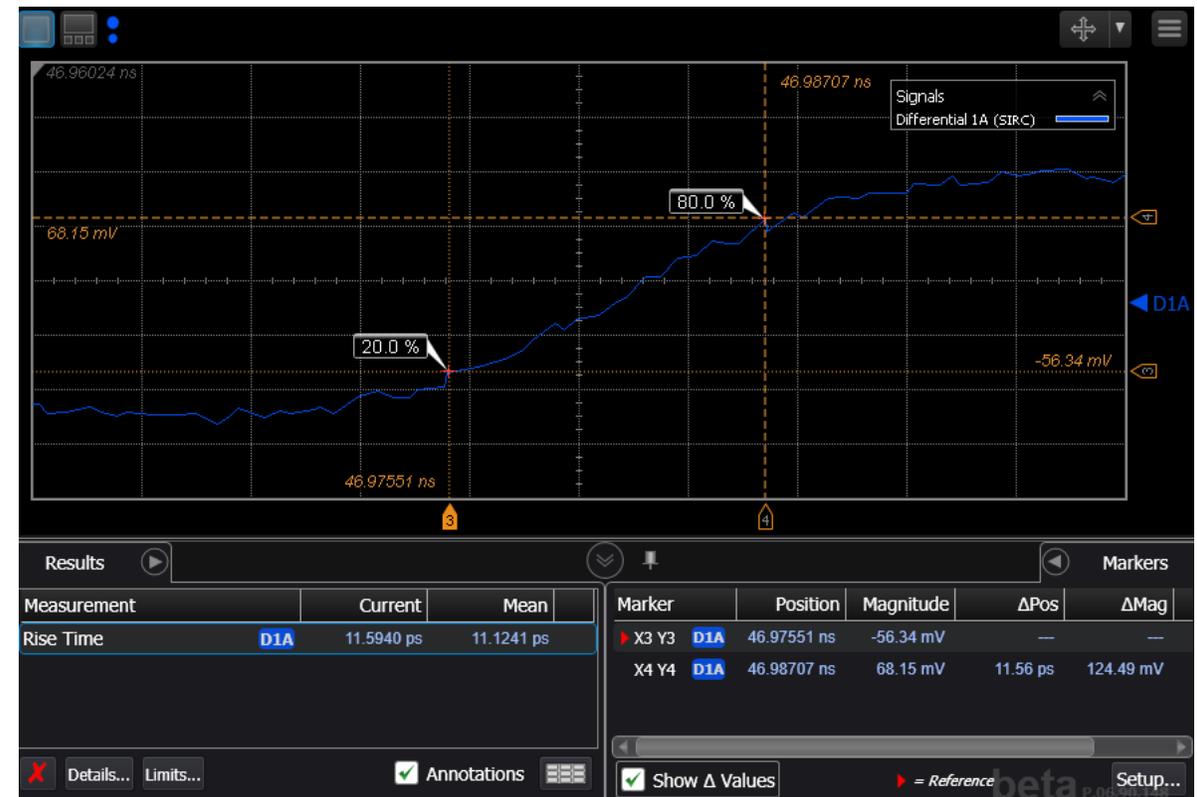


Edge snapshots – 200 mV amplitude

0 ->1



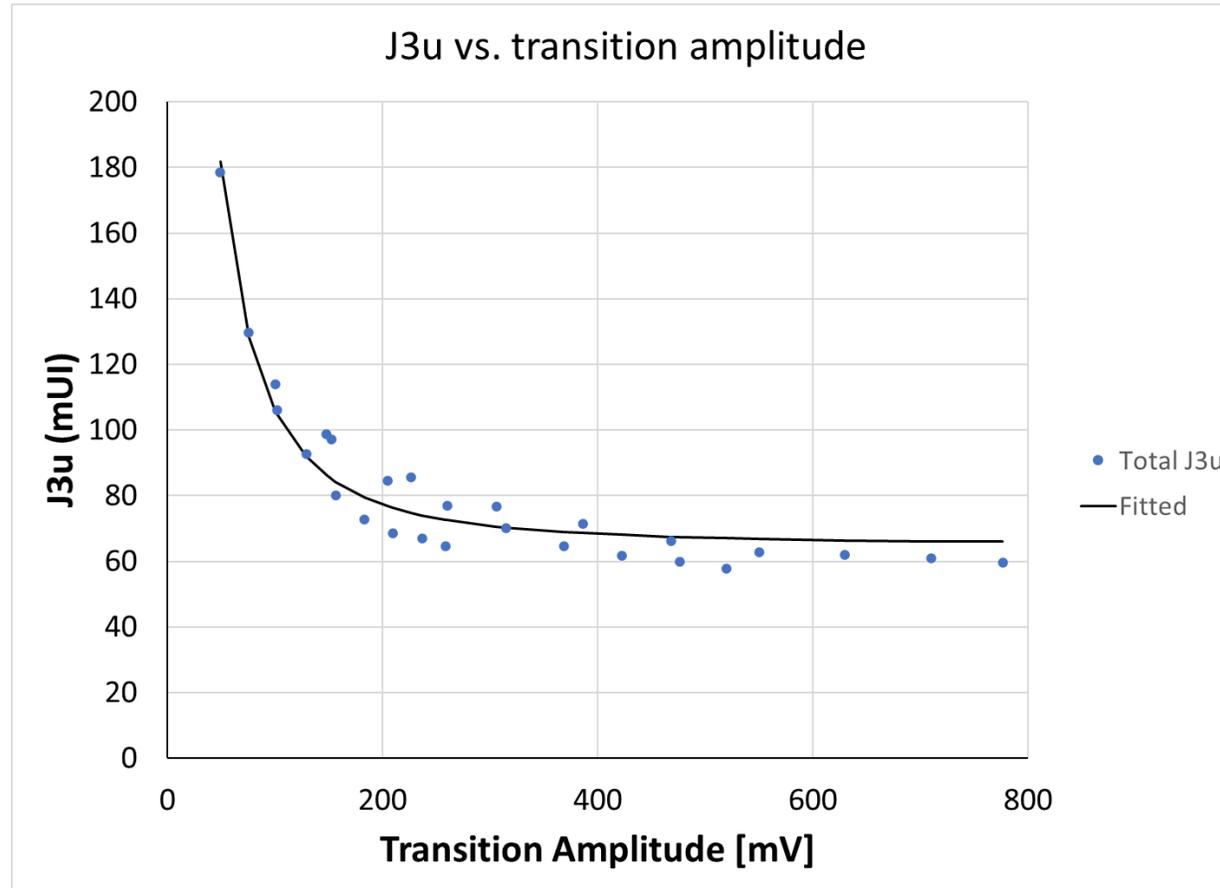
0 ->3



Dependency on the Transition amplitude

Signal amplitude	Transition	Transition amplitude	J3u
200 mV	2 levels	100 mV	110 mUI
400 mV	1 level	102 mV	106 mUI
200 mV	3 levels	148 mV	98 mUI
300 mV	2 levels	152 mV	97 mUI
600 mV	1 level	156 mV	93 mUI
300 mV	3 levels	225 mV	85 mUI
400 mV	2 levels	205 mV	84 mUI
500 mV	2 levels	260 mV	69 mUI
1000 mV	1 level	259 mV	65 mUI

Dependency on the Transition amplitude



$$Fitted J3u[mUI] = \sqrt{65.07^2 + \left(\frac{8366.6}{TA[mV]}\right)^2}$$

Conclusions

- J3u measurements at TP2 do not reflect actual uncorrelated jitter, as they are highly dependent on effects of slew rate limits and noise.
- Test equipment are borderline for the current J3u specification.
- TX equalization does not resolve the measurement issue.
- Measurement issue will become worse for 200 GEL.
- Other metric of uncorrelated jitter should be considered.

Proposed changes on next slide

Proposed changes

- Higher limit for J3u to encounter for the measurement issues:
 - In CL 162 Table 162-9 change J3u from 115 mUI to 125 mUI
- Alternatively, apply fitting formula to compensate for the measurement impairments.