Initial evaluation of CER TDECQ

Addressing comments #179, #180, #181 and #182 against IEEE 802.3dj D2.1

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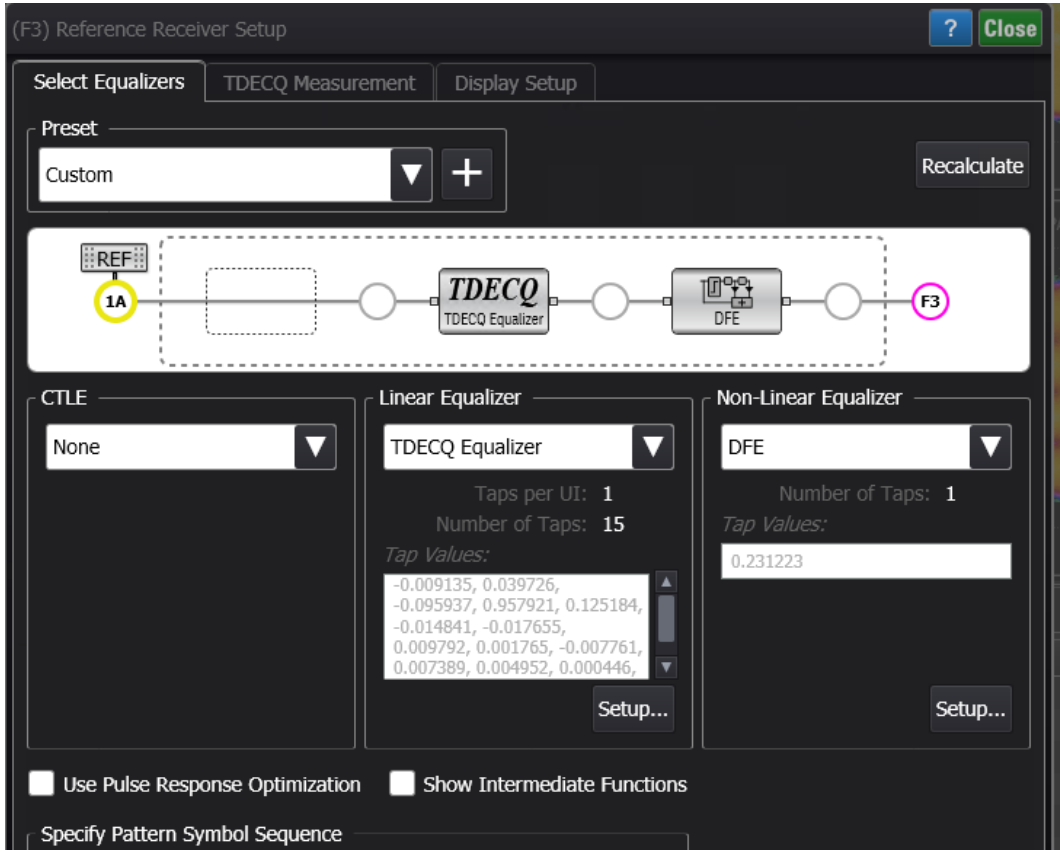
DCA test setup

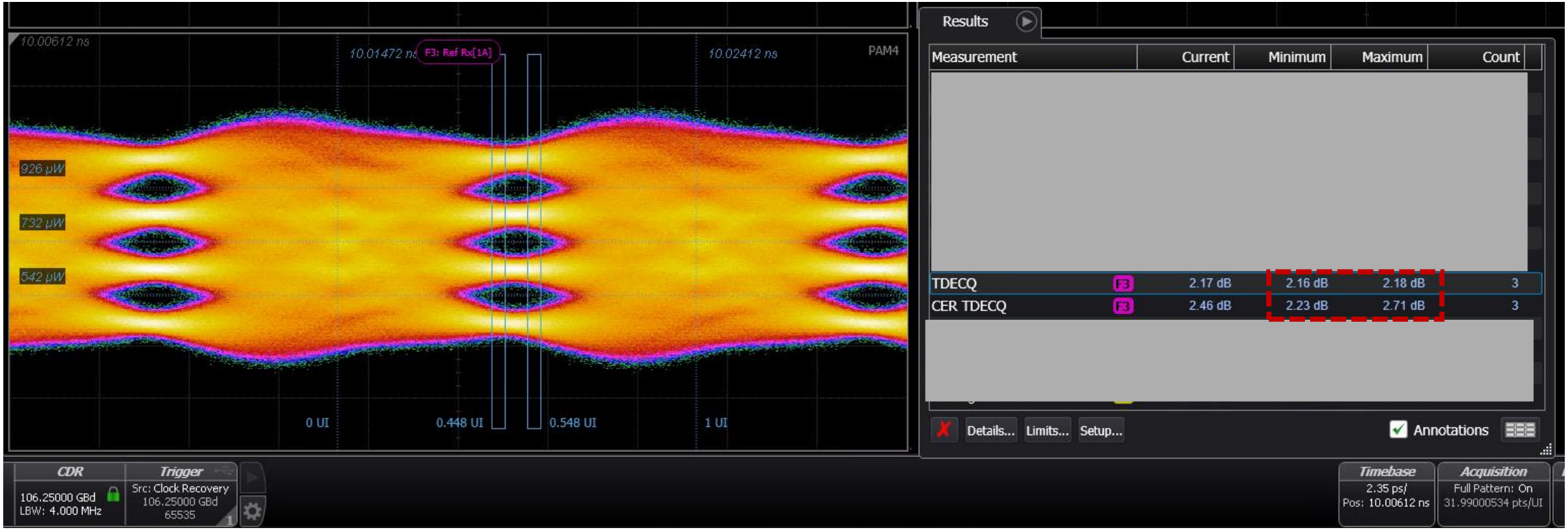
A big thank you to Ahmad El-Chayeb, Keysight, for providing an evaluation version of FlexDCA for lab testing and for his guidance on setting up the test.

Reference Receiver Setup



CER TDECQ Configuration

Measurement Setup

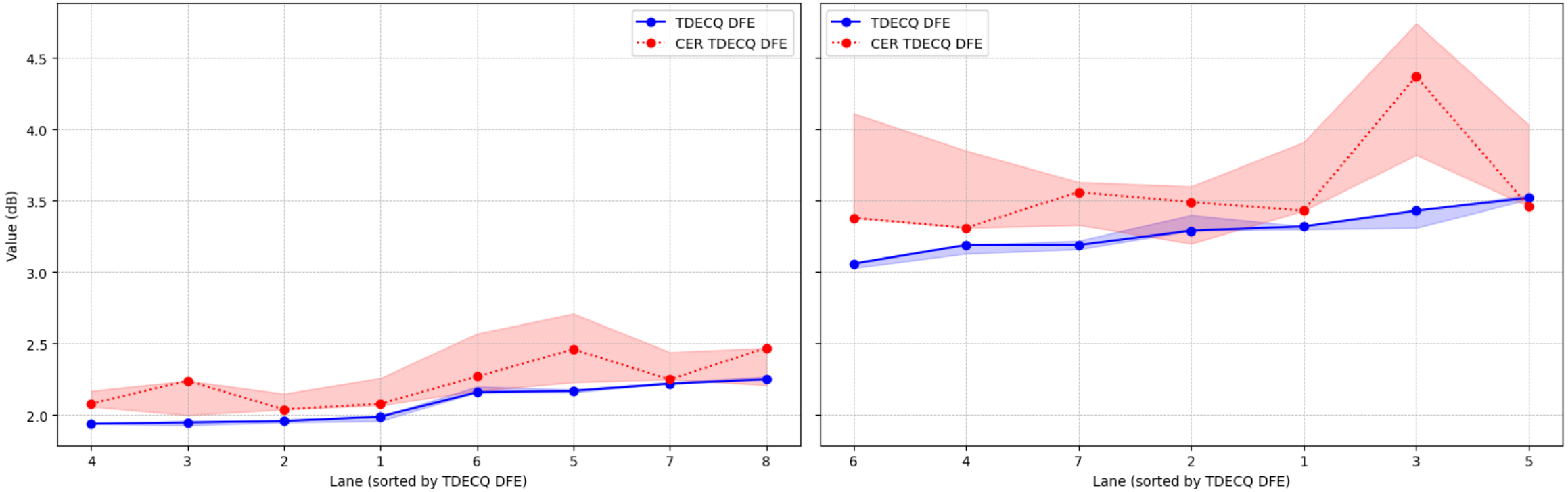


- Measuring simultaneously TDECQ and CER TDECQ.
- CER TDECQ changes significantly between counts

Measurement Results

Testing the methodology with a short patchcord fiber (TECQ) over multiple Tx lanes from different modules

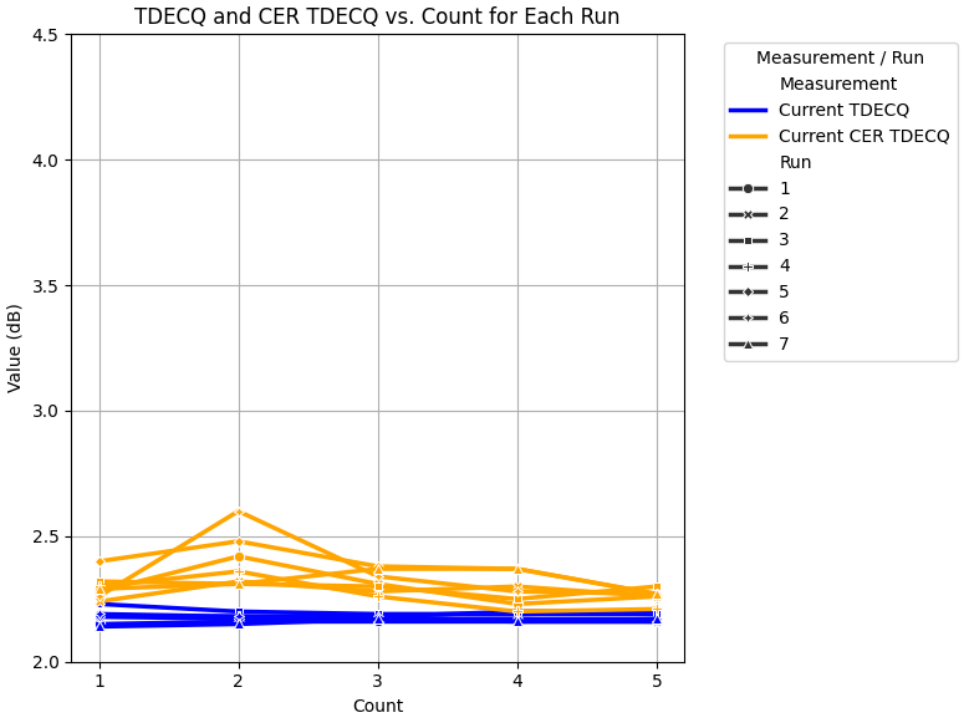
TDECQ and CER TDECQ vs Lane



- CER TDECQ gives around 0.2dB higher in average, however, it shows significantly variability
- CER TECQ could even go below TECQ in some cases.

Test Repeatability

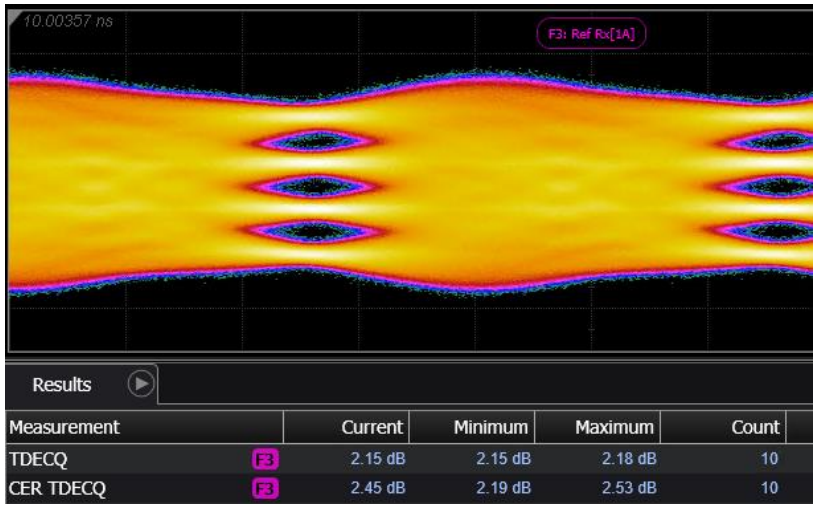
- Record TDECQ and CER TDECQ for every count accumulation up to 5
- repeating the test 7 times (runs)
- On a higher TECQ Tx and a lower TECQ Tx



CER TECQ can varies and does not seem to converge when collecting more data (up to 5 counts)
The variation is higher for high TECQ Tx

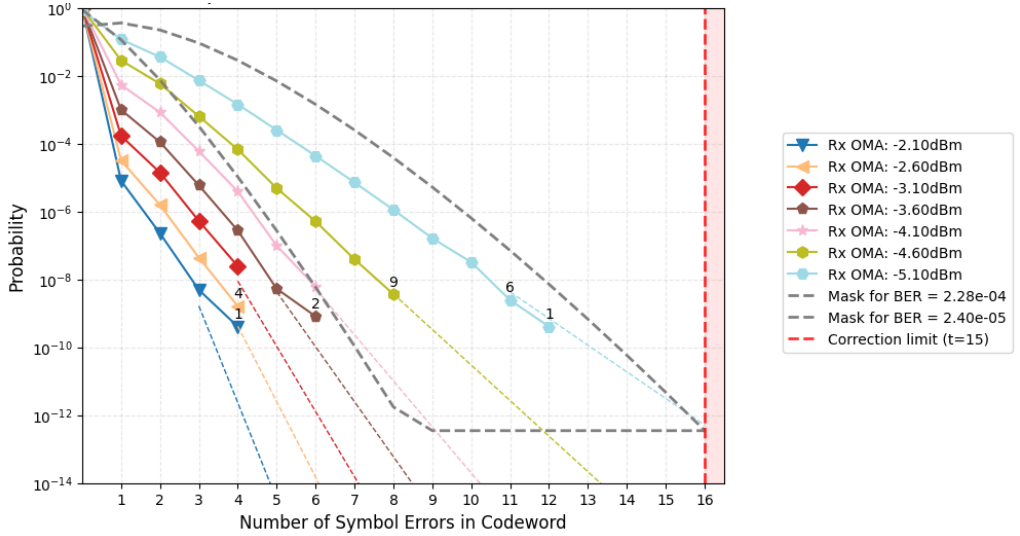
Link Performance of the Txs

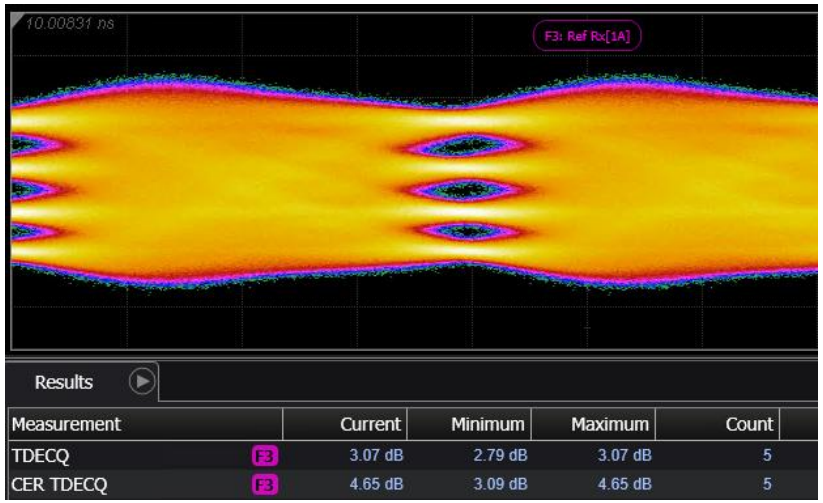
- Link performance of the same two Txs in previous slide into the same Receiver
- Link performance difference does not show a significant degradation (besides ~0.8dB penalty) that would justify a >2dB penalty in CER TECQ



Results

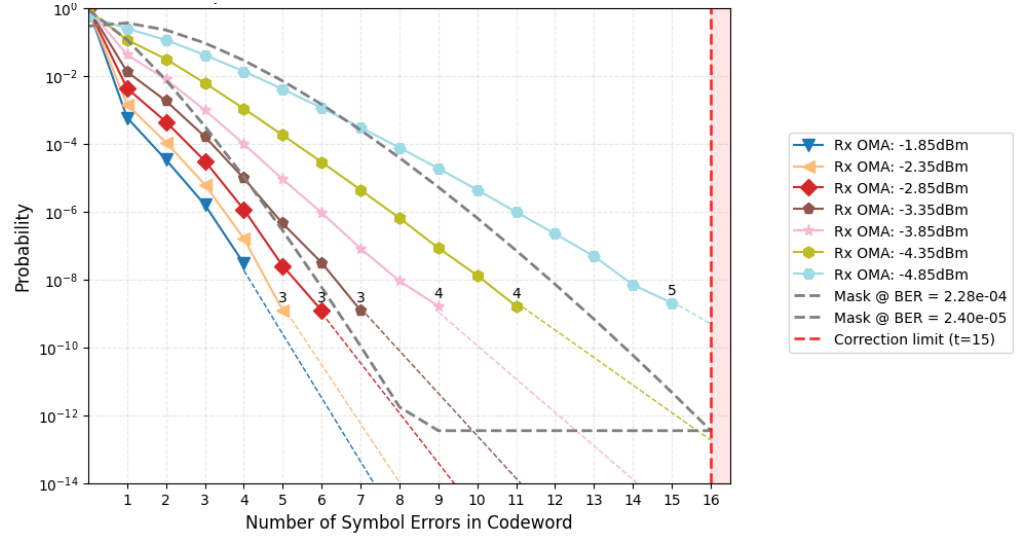
Measurement		Current	Minimum	Maximum	Count
TDECQ	F3	2.15 dB	2.15 dB	2.18 dB	10
CER TDECQ	F3	2.45 dB	2.19 dB	2.53 dB	10





Results

Measurement		Current	Minimum	Maximum	Count
TDECQ	F3	3.07 dB	2.79 dB	3.07 dB	5
CER TDECQ	F3	4.65 dB	3.09 dB	4.65 dB	5



Conclusion

- Thank you to Ahmad and Keysight for developing this new test. While it serves a valuable purpose, further refinement and evaluation are needed before it can be adopted.