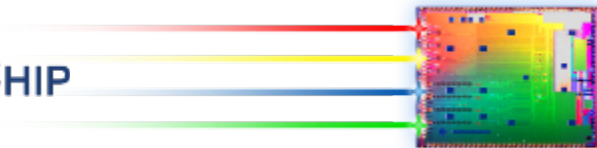# Updated TDECQ measurements vs Rx ref BW for T & T/2 spaced equalizers
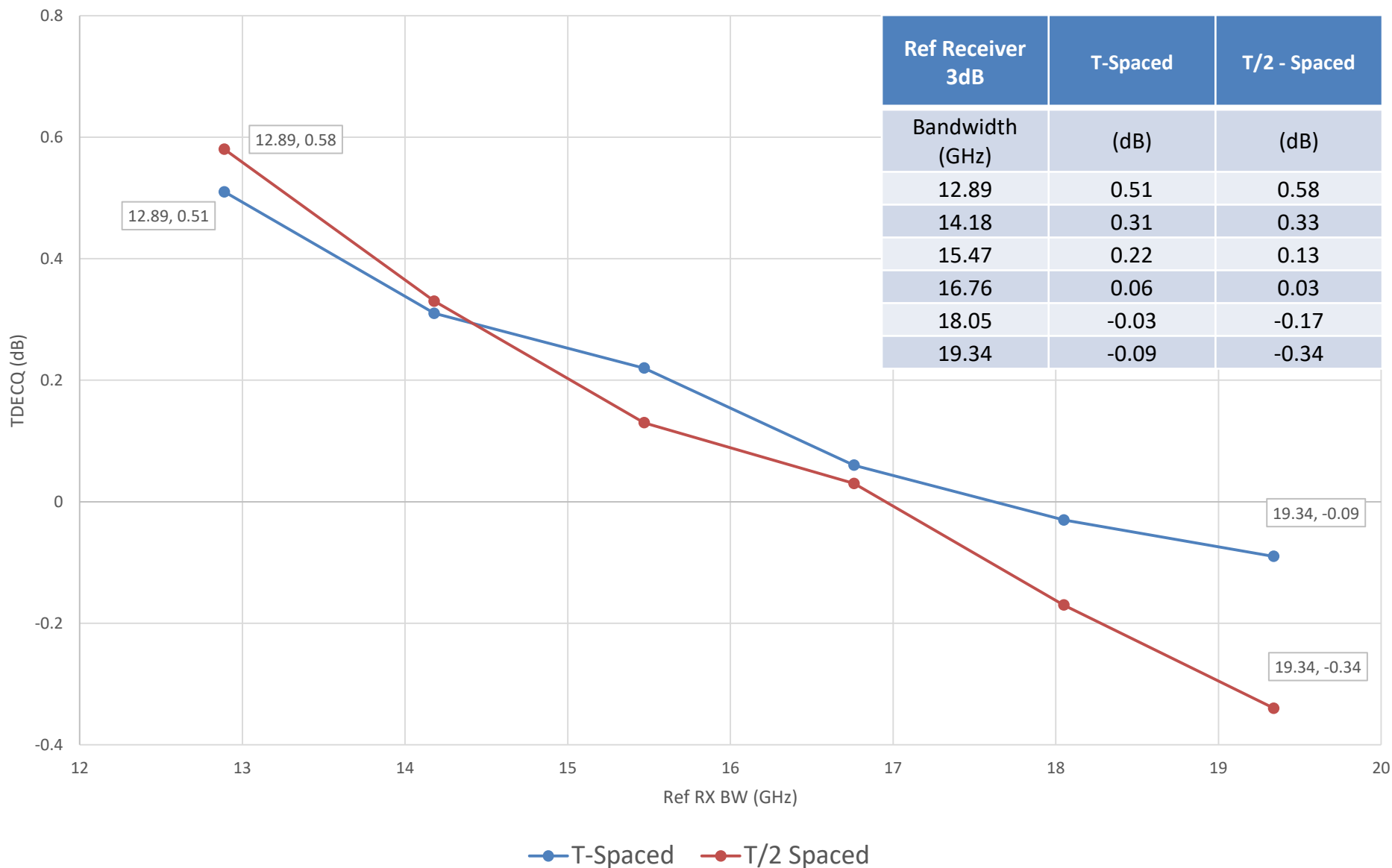
Brian Welch

FIBER TO THE CHIP

- Updates to welch_01_0718_SMF
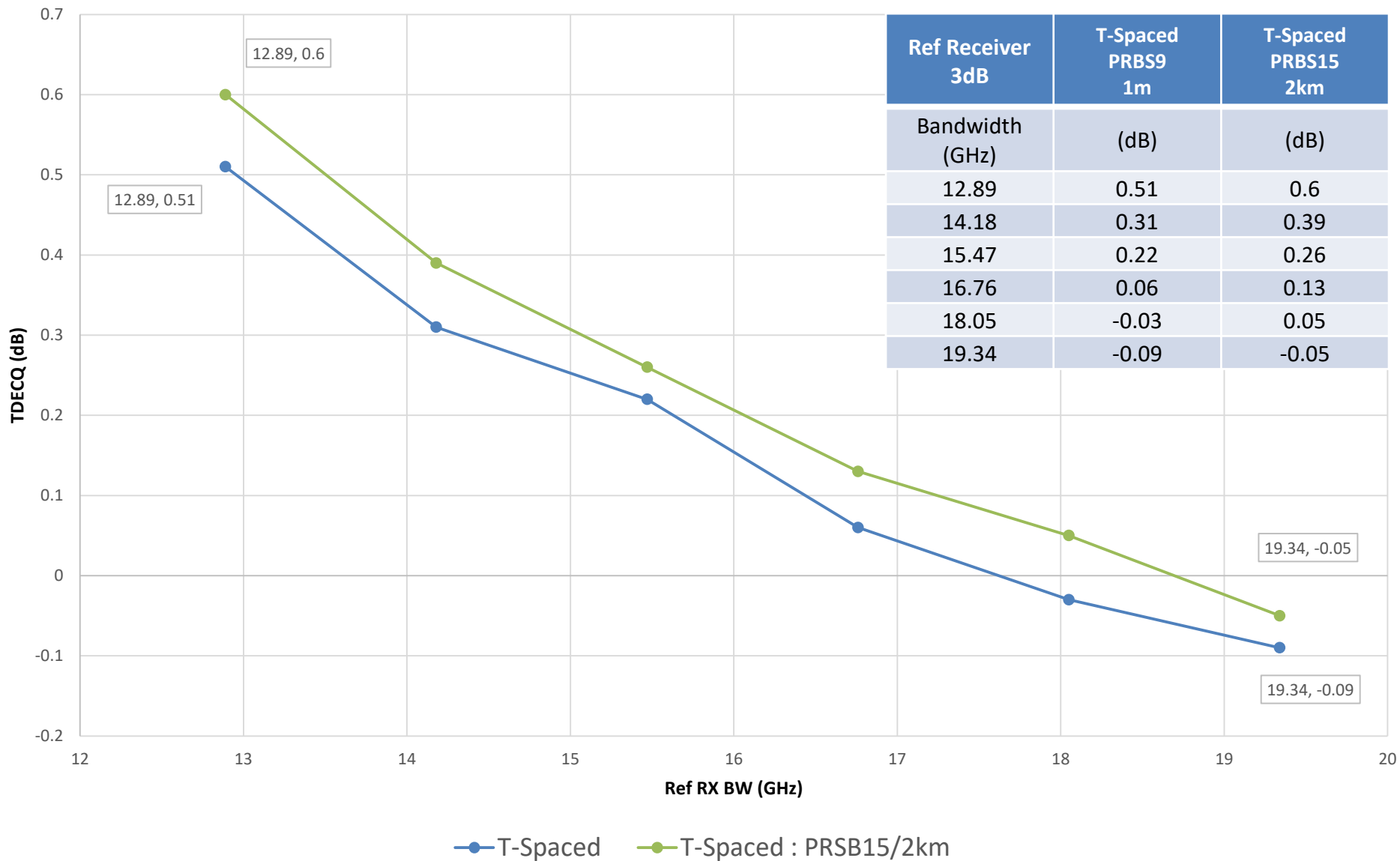- Adds PRSB15 2km TDECQ measurement for T-spaced equalizers (previous used PRBS9 at 1m)
  - Nominal SMF28 fiber
  - Measurements taken on a 26GBD-PAM4 transmitter
  - RX reference varied from 0.5x baud rate to 0.75 x baud rate (in 0.05 x increments)
  - Measured using a Keysight N1092A DCA-M
    - SIRC enabled
  - *No SSPR pattern available with pattern generator in use*

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TDECQ vs Ref RX BW: From welch_01_0718_smf

Ref Receiver 3dB Bandwidth (GHz)	T-Spaced (dB)	T/2 - Spaced (dB)
12.89	0.51	0.58
14.18	0.31	0.33
15.47	0.22	0.13
16.76	0.06	0.03
18.05	-0.03	-0.17
19.34	-0.09	-0.34

12.89, 0.58

12.89, 0.51

19.34, -0.09

19.34, -0.34

TDECQ (dB)

Ref RX BW (GHz)

T-Spaced   T/2 Spaced

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Updated TDECQ vs Ref RX BW

Ref Receiver 3dB	T-Spaced PRBS9 1m	T-Spaced PRBS15 2km
Bandwidth (GHz)	(dB)	(dB)
12.89	0.51	0.6
14.18	0.31	0.39
15.47	0.22	0.26
16.76	0.06	0.13
18.05	-0.03	0.05
19.34	-0.09	-0.05

Data labels on chart: 12.89, 0.6 ; 12.89, 0.51 ; 19.34, -0.05 ; 19.34, -0.09

Axis labels: TDECQ (dB) — Ref RX BW (GHz)

Legend: T-Spaced   T-Spaced : PRSB15/2km

Conclusions

- Penalty (relative) for PRBS15 at 2km < 0.1 dB for high bandwidth transmitters

- TDECQ values < 0.6 dB possible with low bandwidth RX filter