Support for a comment proposing better emulation of fiber dispersion for multimode TDECQ

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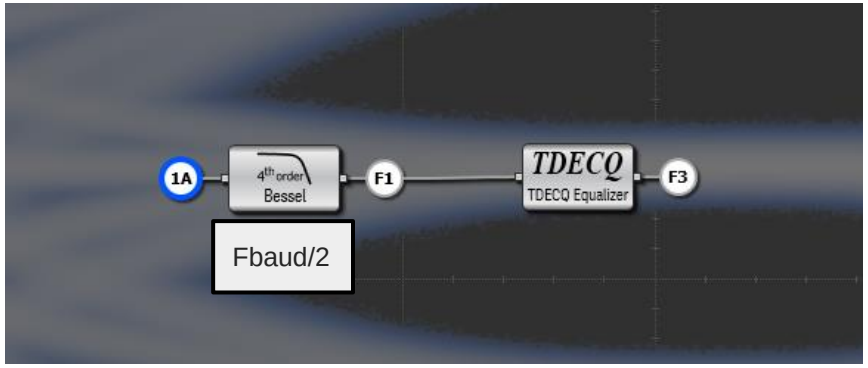
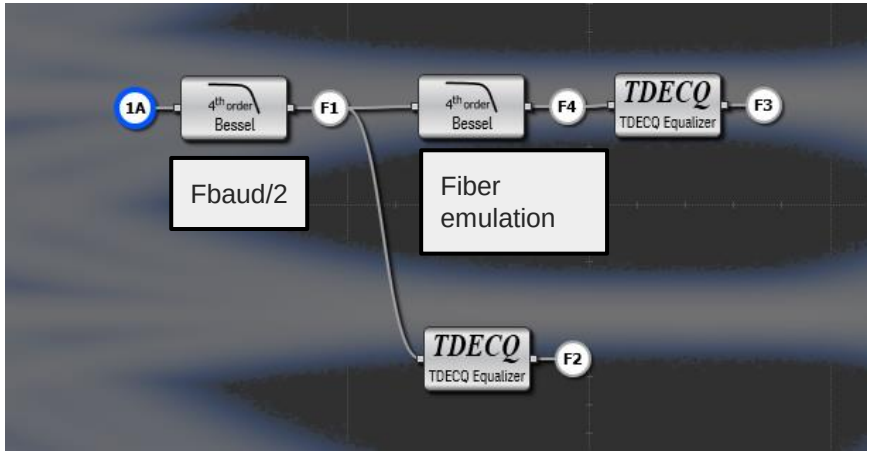
TDECQ review

- TDECQ generally is measured on a TX signal with a half-baud receiver bandwidth
- Currently in draft 1.0 (and earlier multimode standards) rather than place a full span fiber between the TX and the scope to create dispersion, it is emulated by reducing the observation bandwidth
- With current measurement technology, we have the opportunity to better emulate the fiber response and potentially achieve better accuracy in assessing the transmitter dispersion penalty without incurring extra measurement time or cost. This can also simplify the testing of other transmitter parameters
- The key is to determine an agreed upon method to emulate the fiber

Emulating the fiber dispersion

- Today we aggregate the receiver bandwidth with the effective fiber bandwidth created in the scope hardware for a single waveform acquisition
- If we keep the reference receiver bandwidth and the fiber emulation separate, we can acquire one waveform in the half-baud reference receiver bandwidth (used for TECQ and other parameters) and pass the waveform through a virtual function emulating the dispersion to assess TDECQ
- At a minimum, fiber emulation could be a simple BT filter (e.g. 18.2 GHz), but it could be more sophisticated
  - Linear models are good
  - Some form of impulse response?
  - Multiple models could be applied with no extra test time (VSR and SR test definitions can differ, but be performed at the same time)





Comment against draft 1.0, clause 167.8.5

SUBTITLE (DELETE IF NOT USED)

- The reference receiver bandwidth for TDECQ analysis is typically at half baud to emulate DSP based receivers with anti-aliasing filters. For multimode transmitter test, the observation bandwidth is reduced further to emulate the dispersion that is created by the fiber span. An alternative approach should be considered. The transmitter waveform is acquired in the half-baud bandwidth. For TECQ, this waveform can be directly analyzed. For TDECQ, the waveform is additionally passed through a second processing block that emulates the fiber. This could be as simple as a low-pass Bessel-Thomson filter, but could be something that better emulates the physical impact of the fiber span, to be determined by the group. This method has the advantage of being able to provide several transmitter metrics, for both SR and VSR requirements, with a single oscilloscope acquisition, reducing overall test time and cost, and likely better emulating the true channel response

Proposed remedy

- Change the text of lines 24-34 of page 43 (55 in the overall document) to read: The combination of the O/E converter and the oscilloscope used to measure the optical waveform has a 3 dB bandwidth of approximately 26.5 GHz with a fourth-order Bessel-Thomson response to at least 1.5 × 26.5 GHz. At frequencies above 1.5 × 26.5 GHz, the response should not exceed 24 dB. Compensation may be made for any deviation from an ideal fourth-order Bessel-Thomson response. Prior to TDECQ analysis the waveform is passed through a function that emulates the response of the maximum allowed fiber span. This function is described as TBD