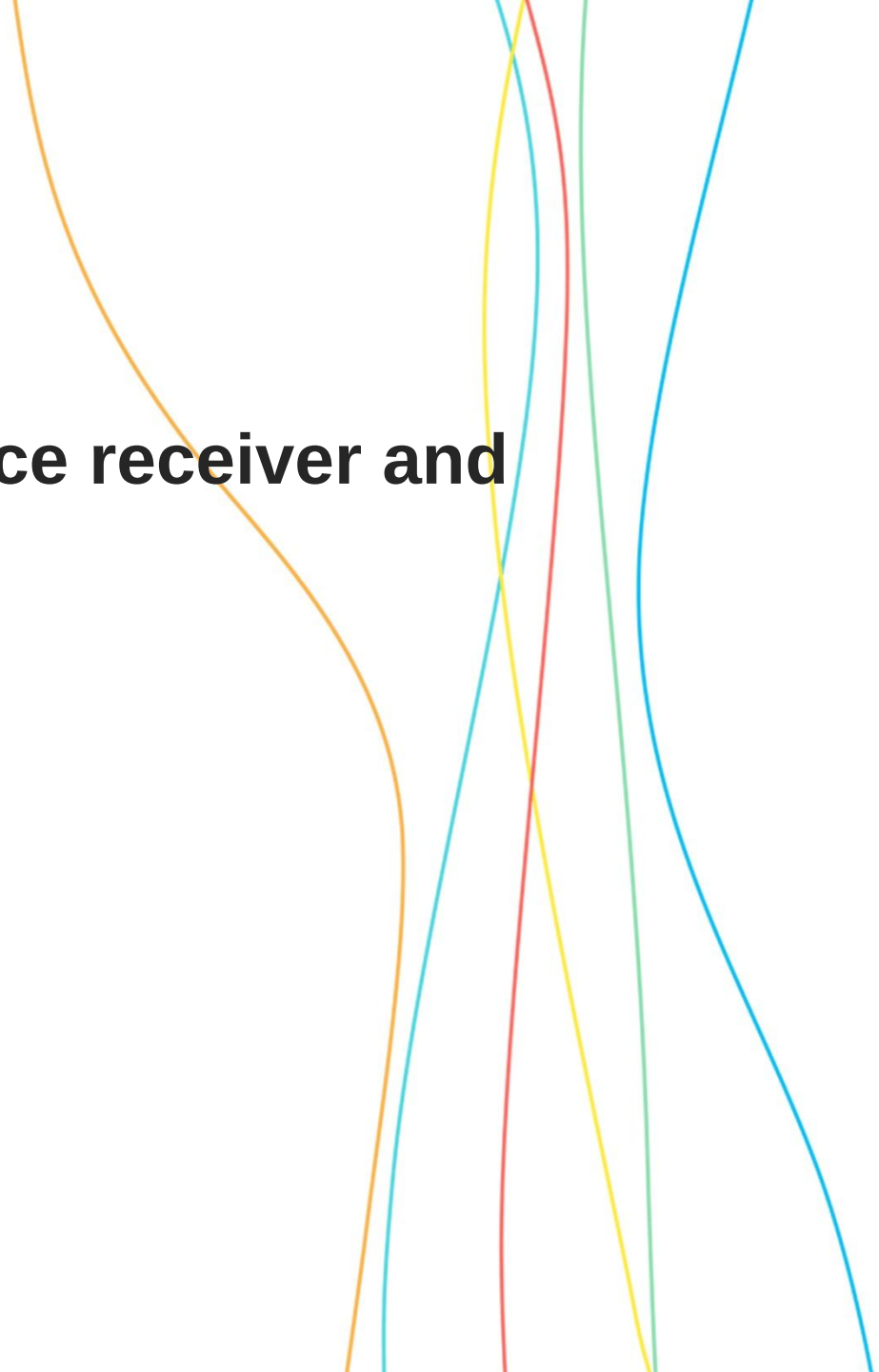




TDECQ conformance test setup, reference receiver and exceptions in 802.3ds

Supporting comments: #23,24,25

Guangcan Mi
Huawei

IEEE P802.3ds TF meeting
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Supporter

TDECQ conformance test block diagram in 802.3dj

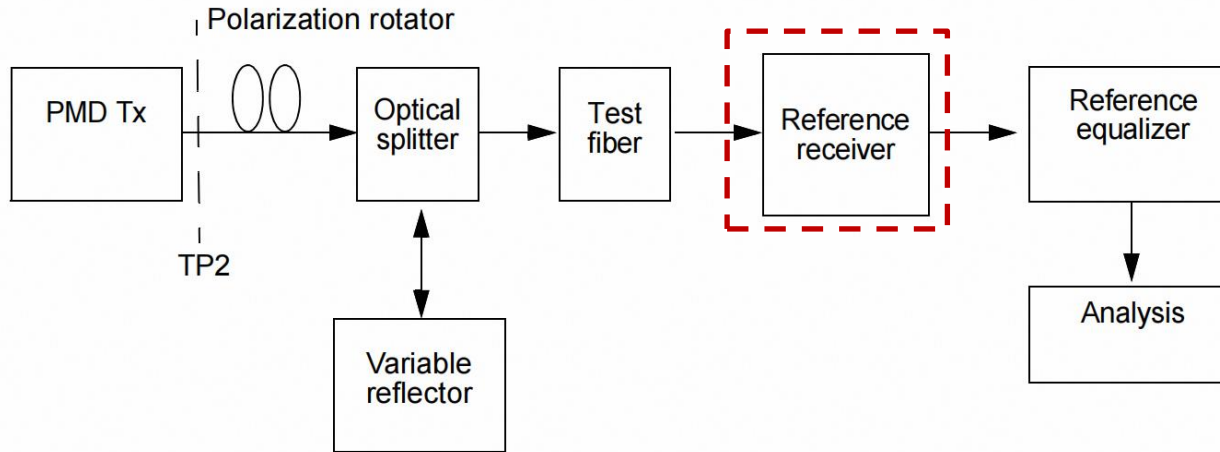


Figure 180–9—TDECQ conformance test block diagram

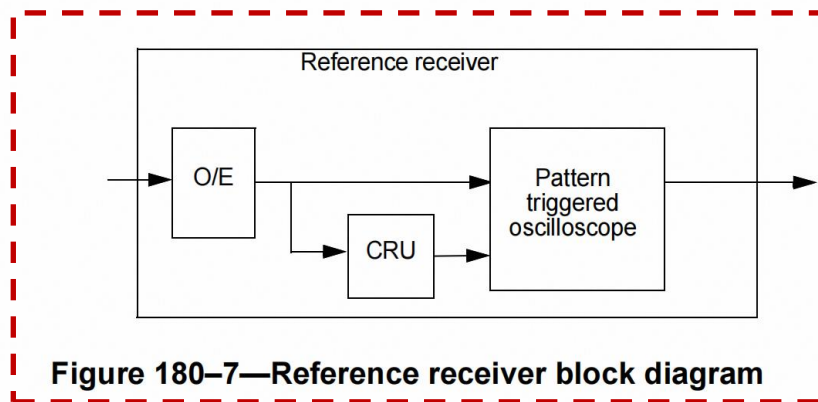


Figure 180–7—Reference receiver block diagram

The combined frequency response of the O/E converter and oscilloscope has a 3 dB bandwidth of approximately 53.125 GHz with a fourth-order Bessel-Thomson response for frequencies up to at least 1.3×106.25 GHz and a response no higher than –20 dB for frequencies greater than 1.3×106.25 GHz.

→ Frequency response of the reference receiver

Current text in 802.3ds for reference receiver

➤ 193.9.3 Reference Receiver

- A reference receiver is defined for transmitter measurements. The reference receiver, composed of the combination of the O/E converter and the oscilloscope, has a 3 dB bandwidth of approximately 53.125 GHz with a fourth-order Bessel-Thomson response to at least 1.3×106.25 GHz. At frequencies above 1.3×106.25 GHz, the reference receiver response should not exceed -20 dB. Compensation may be made for any deviation from an ideal fourth-order Bessel-Thomson response. The clock recovery unit (CRU) has a corner frequency of 4 MHz and a slope of 20 dB/decade. The CRU may be implemented in hardware or software depending on oscilloscope technology.

Its block diagram would look like this

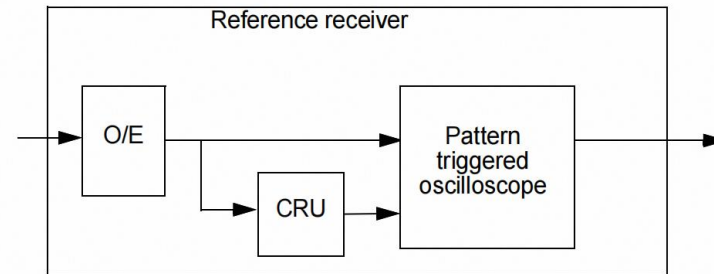


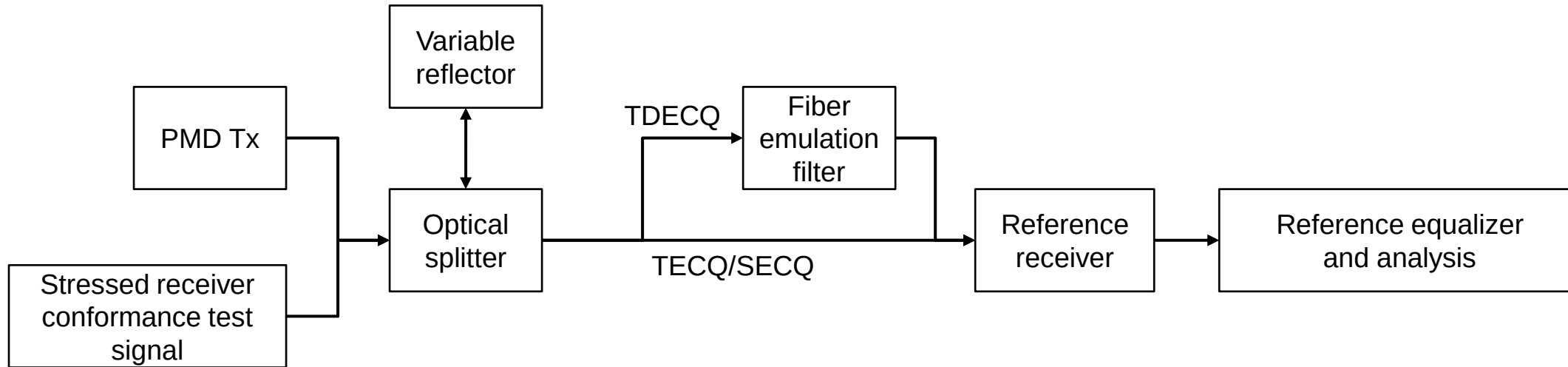
Figure 180–7—Reference receiver block diagram

Current text in 802.3ds for TDECQ has some ambiguity

- TDECQ is a measure of the optical transmitter vertical eye closure as measured through an optical to electrical converter (O/E) with a bandwidth equivalent to a combined reference receiver and worst case optical channel, and equalized with the reference equalizer specified in 193.9.7.1. The reference equalizer may be implemented in software or may be part of an oscilloscope. Table 193–13 specifies the test pattern to be used for measurement of TDECQ. O/E-2
- The TDECQ of each lane shall be within the limit given in Table 193–7 if measured using the methods specified in 180.9.6, with the following exceptions:
 - The conformance test block diagram shown in Figure 167–4 is used in place of Figure 180–9.
 - The frequency response of the combination of the O/E converter and the oscilloscope used to measure the optical waveform is that of two cascaded filters. The first filter emulates the dispersion of the fiber and has a 3 dB bandwidth f_A that depends on the PMD type and the center wavelength of the transmitter according to Table 193–14. The fourth-order Bessel-Thomson response of the first filter should extend to at least $2.6 \times f_A$ GHz, and at frequencies above $2.6 \times f_A$ GHz, the response should not exceed –20 dB. The second filter represents the reference equalizer front end and is described in 193.9.3. O/E-3

- O/E-1 $\neq$ O/E-2 $\neq$ O/E-3
- Multiple bandwidths or frequency responses were mentioned, and some are related
- 193.9.3 is the reference receiver, not the reference equalizer front end. The reference equalizer, defined in 193.7.1 and referenced in the text, is the multi-tap filter, does not have a front end.

Proposed updates: add a new conformance diagram



Add text to the exceptions: The fiber emulation filter may be implemented in software or may be part of an oscilloscope.

Proposed changes to the text

- TDECQ is a measure of the optical transmitter vertical eye closure as measured through an optical to electrical converter (O/E) with a bandwidth equivalent to a combined reference receiver and worst case optical channel, and equalized with the reference equalizer specified in 193.9.7.1. The reference equalizer may be implemented in software or may be part of an oscilloscope. Table 193–13 specifies the test pattern to be used for measurement of TDECQ.
- Proposed text change :
- TDECQ is a measure of the optical transmitter vertical eye closure as measured through a filter emulating the worst case fiber channel and a reference receiver specified in 180.9.3, and equalized with the reference equalizer specified in 193.9.7.1. The reference equalizer may be implemented in software or may be part of an oscilloscope. Table 193–13 specifies the test pattern to be used for measurement of TDECQ. The fiber emulation filter may be implemented in software or may be part of an oscilloscope.

Proposed changes to the text-continued

- The TDECQ of each lane shall be within the limit given in Table 193–7 if measured using the methods specified in 180.9.6, with the following exceptions:
 - The conformance test block diagram shown in Figure 167–4 is used in place of Figure 180–9.

Proposed change :

The conformance test block diagram shown in Figure 193-10 is used in place of Figure 180–9

- The frequency response of the combination of the O/E converter and the oscilloscope used to measure the optical waveform is that of two cascaded filters. The first filter emulates the dispersion of the fiber and has a 3 dB bandwidth f_A that depends on the PMD type and the center wavelength of the transmitter according to Table 193–14. The fourth-order Bessel-Thomson response of the first filter should extend to at least $2.6 \times f_A$ GHz, and at frequencies above $2.6 \times f_A$ GHz, the response should not exceed –20 dB. The second filter represents the reference equalizer front end and is described in 193.9.3.

Proposed change:

- The fiber emulation filter emulates the dispersion of the fiber and has a 3 dB bandwidth f_A that depends on the PMD type and the center wavelength of the transmitter according to Table 193–14. The fourth-order Bessel-Thomson response of the first filter should extend to at least $2.6 \times f_A$ GHz, and at frequencies above $2.6 \times f_A$ GHz, the response should not exceed –20 dB.
- The normalized noise power density spectrum, $N(f)$ in Equation (180–9), is equivalent to white noise filtered by a fourth-order Bessel-Thomson response filter with a 3 dB bandwidth of 53.125 GHz.

Proposed change:

Delete this exception.

An abstract graphic on the right side of the slide, featuring several thin, curved lines in orange, yellow, red, green, and blue that sweep upwards and outwards from the bottom right corner.

THANK YOU