146.5.4.2 Transmitter output droop

With the transmitter in test mode 2 and using the transmitter test fixture shown in Figure 146–20~~,~~:

- When a Clause 104 Type E PSE or PD PI is not encompassed within the MDI, the magnitude of both the positive and negative droop shall be less than 10% measured with respect to an initial value at 133.3 ns after the zero crossing and a final value at 800 ns after the zero crossing.
- When a Clause 104 Type E PSE or PD PI is encompassed within the MDI, the magnitude of both the positive and negative droop shall be less than 25% measured with respect to an initial value at 133.3 ns after the zero crossing and a final value at 800 ns after the zero crossing. For applications such as those shown in Annex 146A, implementers should consider transmitter amplitude limitations.

146.8.3 MDI return loss

When a Clause 104 Type E PSE or PD PI is not encompassed within the MDI, t~~T~~he MDI return loss (RL) shall meet or exceed Equation (146–17a) for all frequencies from 100 kHz to 20 MHz (with 100 Ω ± 0.1% reference impedance) at all times when the PHY is transmitting data or idle symbols.

$$Return\ Loss\ (f) \geq \begin{cases} 20 - 18 \times log_{10}\left(\frac{0.2}{f}\right) dB & 0.1 \leq f < 0.2MHz \\ 20dB & 0.2 \leq f < 1MHz \\ 20 - 16.7 \times log_{10}(f) dB & 1 < f \leq 10MHz \\ 3.3 - 7.6 \times log_{10}\left(\frac{f}{10}\right) dB & 10 < f \leq 20MHz \end{cases} \quad \text{(146-17a)}$$

where *f* is the frequency in MHz.

When a Clause 104 Type E PSE or PD PI is encompassed within the MDI, the MDI return loss (RL) shall meet or exceed Equation (146–17b) for all frequencies from 100 kHz to 20 MHz (with 100 Ω ± 0.1% reference impedance) at all times when the PHY is transmitting data or idle symbols.

$$Return\ Loss\ (f) \geq \begin{cases} 20 - 18 \times log_{10}\left(\frac{0.5}{f}\right) dB & 0.1 \leq f < 0.5MHz \\ 20dB & 0.5 \leq f < 1MHz \\ 20 - 16.7 \times log_{10}(f) dB & 1 < f \leq 10MHz \\ 3.3 - 7.6 \times log_{10}\left(\frac{f}{10}\right) dB & 10 < f \leq 20MHz \end{cases} \quad \text{(146-17b)}$$

where *f* is the frequency in MHz.