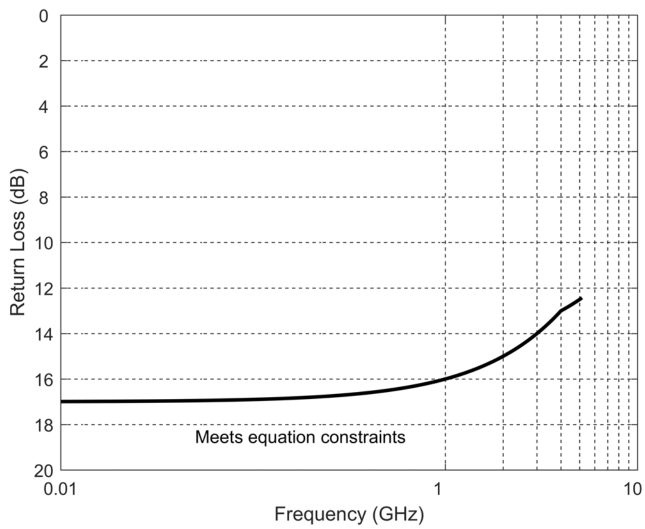

Figure 128D–5—Mated test fixture return loss

128D.2.3 Mated test fixtures integrated crosstalk noise

The values of the mated test fixtures integrated crosstalk RMS noise voltages determined using ~~Equation (128D–5)~~Equation (128D–6) through Equation (128D–9) for the ~~single disturber~~ near-end cross-talk loss shall meet the specifications in Table 128D–1.

Table 128D–1—Mated test fixtures integrated crosstalk noise

Parameter	ICN	Units
~~MD~~NEXT integrated crosstalk noise voltage	less than 1.8	mV

128D.2.3.1 ~~Mated test fixtures integrated crosstalk noise~~

~~Since only one lane is used to transfer data between PMDs, the NEXT that is coupled into a receive lane is from the just one transmit lane. Single Disturber Near-End Crosstalk (MDNEXT) loss is determined using the individual NEXT losses. MDNEXT loss is determined from the individual pair-to-pair differential NEXT loss values using Equation (128D–5).~~

$$MDNEXT\_loss(f) = -10\log_{10}\left(\frac{-NL(f)}{10}\right) \quad (dB) \qquad (128D–5)$$

~~for 0.05 GHz ≤ f ≤ 19 GHz, where,~~

~~*MDNEXT_loss(f)* — *is the MDNEXT loss at frequency f,*~~
~~*NL(f)* — *is the NEXT loss at frequency f in dB, and*~~
~~*f* — *is the frequency in GHz.*~~

128D.2.3.2 Mated test fixture ~~integrated~~near-end crosstalk ~~noise~~ (~~IC~~NEXT) loss

ICN is calculated from the ~~*MDF*~~*NEXT*. Given the ~~single disturber~~ near-end crosstalk loss ~~*MD*~~*NEXT_loss(f)* measured over N uniformly-spaced frequencies fn spanning the frequency range 50 MHz to 5.15625 GHz with a maximum frequency spacing of 10 MHz, the RMS value of the integrated crosstalk noise is determined using ~~Equation (128D–5)~~Equation (128D–6) through Equation (128D–9). The RMS crosstalk noise is characterized at the output of a specified receive filter utilizing a specified transmitter waveform and the measured ~~multiple disturber~~ crosstalk transfer functions. The transmitter and receiver filter~~s~~ ~~are~~is defined in Equation (128D–6) ~~and Equation (128D–7)~~ as weighting functions to the ~~single disturber~~ crosstalk in Equation (128D–8). The sinc function is defined by sinc(x) = sin(πx)/(πx).

Define the weight at each frequency f_n using Equation (128D–6) ~~and Equation (128D–7)~~.

$$W_{nt}(f_n) = \left(\frac{A_{nt}^2}{f_b}\right)\mathrm{sinc}^2\left(\frac{f_n}{f_b}\right)\left[\frac{1}{1+\left(\frac{f_n}{f_{nt}}\right)^4}\right]\left[\frac{1}{1+\left(\frac{f_n}{f_r}\right)^8}\right] \quad (128D–6)$$

~~$$W_{nt}(f_n) = \left(\frac{A_{ft}^2}{f_b}\right)\mathrm{sinc}^2\left(\frac{f_n}{f_b}\right)\left[\frac{1}{1+\left(\frac{f_n}{f_{ft}}\right)^4}\right]\left[\frac{1}{1+\left(\frac{f_n}{f_r}\right)^8}\right] \quad (128D–7)$$~~

The 3 dB transmit filter bandwidth~~s~~ f_{nt} ~~and f_{ft}~~ ~~are~~is inversely proportional to the 20% to 80% rise and fall time~~s~~ T_{nt} ~~and T_{ft} respectively~~. The constant of proportionality is 0.2365 (e.g., $T_{nt}f_{nt}$ = 0.2365; with f_{nt} in hertz and T_{nt} in seconds). In addition, f_r is the 3 dB reference receiver bandwidth, which is set to 8 GHz.

The near-end integrated crosstalk noise is calculated using Equation (128D–8).

$$\sigma_{nx} = \left[2\Delta f\sum_n W_{nt}(f_n)10^{\frac{-NEXT\_loss(f_n)}{10}}\right]^{1/2} \quad (128D–8)$$

where Δf *is* the uniform frequency step of f_n, and~~.~~
NEXT_loss(f)is the NEXT loss at frequency f in dB.

The total integrated crosstalk noise is calculated using Equation (128D–9).

$$\sigma_x = \sigma_{nx} \quad (128D–9)$$

The total integrated crosstalk noise for the mated test fixture is computed using the parameters shown in Table 128D–2.

Table 128D–2—integrated crosstalk noise characteristics

Parameter	Subclause reference	Value	Units
Symbol rate	f_b	5.51625	GBd
Near-end disturber peak differential output amplitude	A_{nt}	600	mV
Near-end disturber 20% to 80% rise and fall times	T_{nt}	20	ps