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**Abstract:** *Text modification proposal for clause 12.2.4.1 (Differential mode noise calibration) for SDSL*

1. Introduction

The Adhoc group agreed, that the current text in clause 12.2.4.1 (Differential mode noise calibration) from SDSL standard is not correct and also contains unclear text.

The text from the current SDSL draft is modified, to make it correct and to improve the clearness.

### 12.2.4.1 Differential mode noise calibration

The differential mode noise injection is calibrated using the configuration shown in figure 12.3. During calibration the $R_x$ side of the noise injector is terminated by the design impedance $R_V$ (= 135 Ω) and the $L_X$ side of the noise injector is terminated by an impedance $Z_{Lx}$. The noise levels given in clause 12.5 specify the PSD dissipated in $R_V$ on the $R_X$ side when $Z_{Lx}$ on the $L_x$ side is equal to the calibration impedance $Z_{cal}$. The impedance $Z_{cal}$ is defined in figure 12.4.

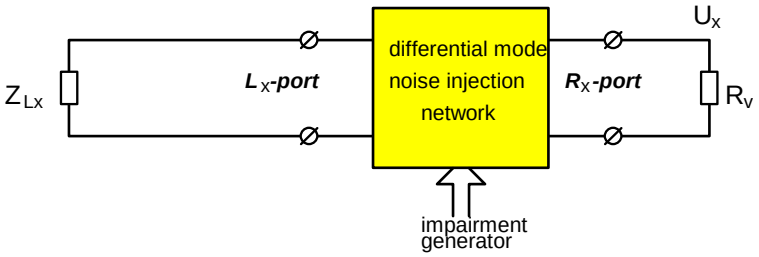


**Figure 12.3: Configuration for noise level calibration**

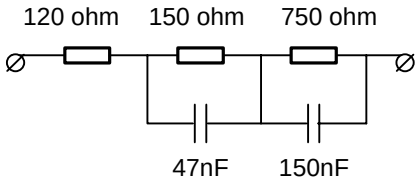


**Figure 12.4: Calibration impedance $Z_{cal}$**

When calibrating the noise source, the impedance $Z_{Lx}$ on the $L_x$ side of the noise injection circuit shall be equal to the calibration impedance $Z_{cal}$ as given in figure 12.4. For this case the PSD dissipated in the impedance $R_v$ shall be equal to the PSD $P_{xn}(f)$ for the cross talk noise defined in clause 12.5.1.

NOTE: This calibration method is theoretically equivalent to the following:
For an arbitrary value of the impedance $Z_{Lx}$, the PSD dissipated in $R_v$ from a calibrated source is equal to:

$$P_x(f) = G(f, Z_{Lx}) P_{xn}(f).$$

For a calibrated noise source this theoretically determined $P_X$ should be identical to the measured PSD dissipated in $R_V$ in the presence of $Z_{Lx}$.

The impedance dependent correction factor is specified as:

$$G(f, Z_{Lx}) = \left| \frac{\frac{1}{Z_{cal}} + \frac{1}{Z_{inj}} + \frac{1}{R_v}}{\frac{1}{Z_{Lx}} + \frac{1}{Z_{inj}} + \frac{1}{R_v}} \right|^2,$$

where $Z_{cal}$ is the calibration impedance given in figure 12.4, $Z_{inj}$ is the Norton equivalent impedance of the noise injection circuit (see figure 12.2), and $R_v$ = 135 Ω is the SDSL design impedance. (Editors note: End of Note)

The noise generator gain settings determined during calibration shall be used during performance testing. During performance testing the noise injection circuit will be configured as shown in figure 12.1. Because the loop impedance and the impedance of the modem under test may differ from the impedance's $Z_{Lx}$ and $R_v$ used during calibration, the voltage over the Rx port of the modem may differ from the voltage $U_x$ observed during calibration.