Benefits of Splitters with EMI Filter

Results

- 11,000 ft loop, Mixed gauge
    - Improved Downstream Data Rate from 1.2Mbps to 8Mbps.
- 21,500 ft Loop mixed gauge-
    - Improved Downstream Data Rate from 1.1Mbps to 4.2Mbps.
    - Increased Noise Margin from 12 to 16
- Long loop unconfirmed length-
    - Improved Downstream Data Rate from 1.9Mbps to 2.9Mbps.
    - Eliminated PPP session drops

Explanation of the Results

Twisted Pairs | Differential Signaling

Differential signaling is used in telecommunication utilizing twisted pairs. One of the main advantages of differential signaling is an increased resistance to electromagnetic noise. However, resistance to electromagnetic noise is achieved only if twisted pairs are balanced. Both Tip and Ring receive interfering signals with the same amplitude and phase so when twisted pairs are transferring signals in differential mode (signal on Tip minus single on Ring), the perfect balance will result in any couple signals on tip and ring being cancelled.

In the real word, rarely are twisted pairs balanced. As a result, interfering signals on Tip and Ring are not the same in amplitude and phase resulting in coupled signals on Tip and Ring not being cancelled. The Common Mode EMI Filter provides insertion loss of 30dB of couple signals (Electromagnetic interference signals) without adversely affecting the DSL signal (differential mode). This reduces the effect of EMI on DSL signals, having a dramatic improvement in customer experience.

Splitter with EMI Filter

Comtest Splitters with EMI filter perform 2 functions main functions:

- Provide needed isolation between voice and DSL band utilizing low pass filter between Line port and POTS port (ordinary splitter function).
- Provide very significant common mode isolation between Line and DSL port, with virtually no loss in differential mode between Line and DSL port (additional function).

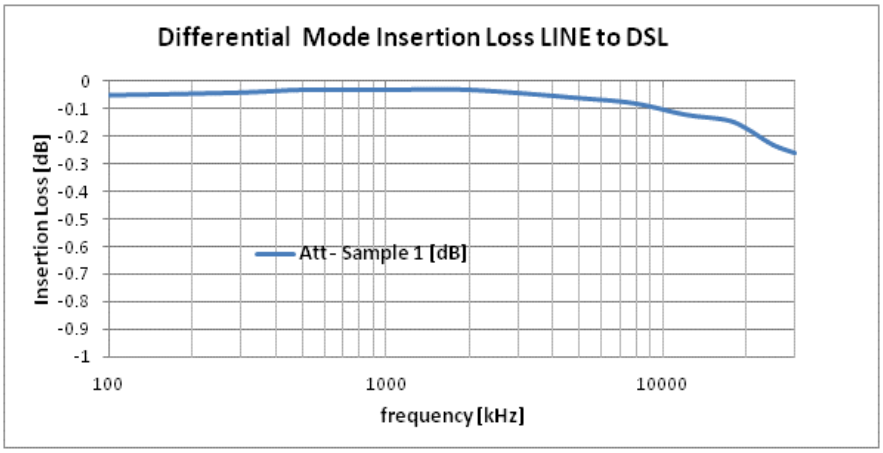

Figure 1: Differential mode insertion loss

Figure 1 shows insertion loss in differential mode of the EMI filter between Line and DSL, which results in loss of the DSL signals. From Figure 1, it can be seen that the EMI filter brings minimal loss to the DSL signal. The EMI filter does not introduce any significant loss to the DSL signal.

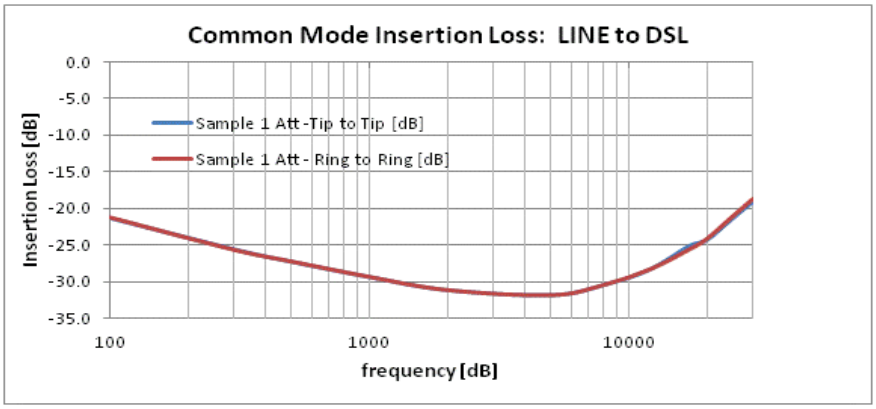

Figure 2: Common Mode Insertion Loss: LINE to DSL port

In the case that twisted pairs are not balanced, coupled EMI signals between tip and ground and ring and ground will be different in amplitude and phase; therefore, unwanted EMI signals will be present between tip and ring. The graph in Figure 2 shows that unwanted EMI signal (or noise) from Tip_GND and/or Ring_GND between LINE and DSL port is typically reduced by more than 25 dB

A 25dB reduction in noise is an improvement of 316 times.