COMMITTEE T1 – TELECOMMUNICATIONS **T1E1.4/2000-302**
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CONTRIBUTION

TITLE: **Performance of CO Deployed ADSL due to Crosstalk from RT Deployed ADSL**
SOURCE: **Copper Mountain Networks, Rhythms**
PROJECT: **Spectrum Management**

ABSTRACT

This contribution examines the impact of crosstalk from remote terminal (RT) based ADSL on central office (CO) based ADSL. It is shown that crosstalk from a remote deployed ADSL is not spectrally compatible with the CO deployed ADSL basis system in the same serving area.

NOTICE

This contribution has been prepared to assist Accredited Standards Committee T1–Telecommunications. This document is offered to the Committee as a basis for discussion and is not a binding proposal on the source companies. The requirements are subject to change in form and numerical value after more study. The source companies specifically reserve the right to add to, amend, or withdraw the statements contained herein.

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1. Assumptions

The disturbance source assumptions in Annex L of the draft spectrum management standard (T1 LB869) were used for simulation. The disturbance in to the basis system's downstream receiver includes the following:

- FEXT from the CO based disturbing reference system, coupling length = Z,
- NEXT from the CO based disturbing reference system,
- FEXT from the RT based disturbing system, coupling length = Z-Y,
- NEXT from the RT based disturbing system, and
- white noise at –140 dBm/Hz

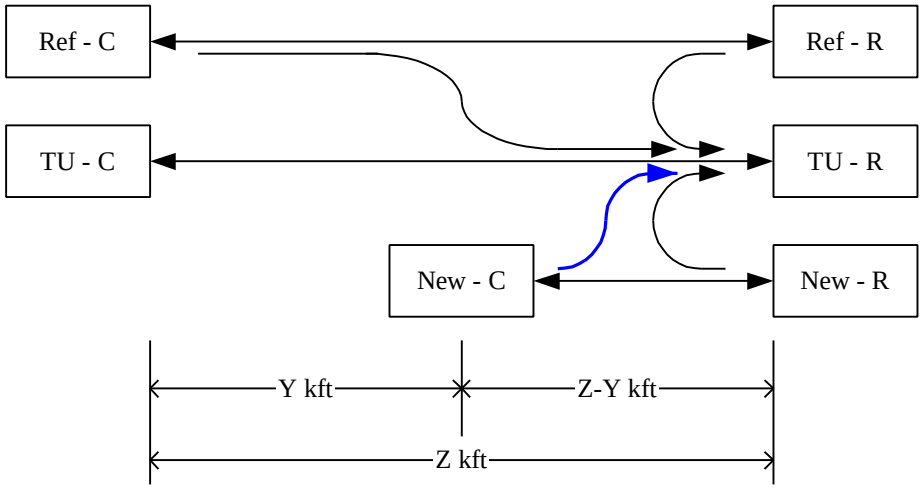

Figure 1 - Basis System Downstream Receiver: NEXT/FEXT with Intermediate TU-C Device

The disturbance in to the basis system's upstream receiver includes the following:

- FEXT from the CO based disturbing reference system, coupling length = Z,
- NEXT from the CO based disturbing reference system,
- FEXT from the RT based disturbing system, coupling length = Z-Y, attenuated by Y
- NEXT from the RT based disturbing system, attenuated by Y
- white noise at –140 dBm/Hz

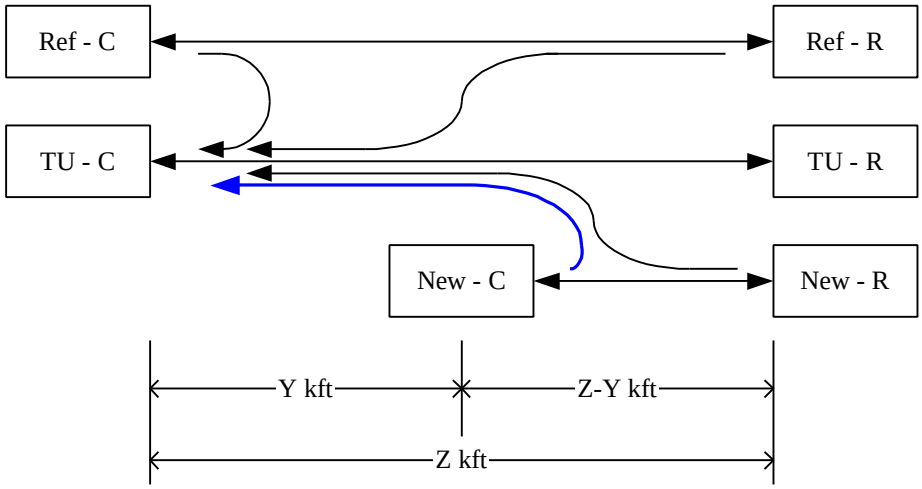

Figure 2 - Basis System Upstream Receiver: NEXT/FEXT with Intermediate TU-C Device

It is obvious that upstream basis system performance due to crosstalk noise from RT deployed ADSL is not as severe as CO based disturbers and is not included in this contribution.

2. Simulations

The parameters of the simulation are defined in Annex A of the draft spectrum management standard, T1 LB869. Simulation model of compatibility with ADSL (section A.8) was used in simulation. Spectral compatibility as determined by the draft spectrum management standard, T1 LB869 is defined as a new technology causing more disturbance to a basis system then the reference disturber.

All three ADSL performance levels were analyzed. The performance level evaluation loop Z is not reduced to obtain spectral compatibility with the ADSL basis system because the source of the disturbance is FEXT. With a FEXT based disturbance, the only variables used to meet spectral compatibility requirements are the disturbing technologies distance (Y) from the CO and the disturbing technologies PSD. Because of simulation uncertainty for lengths less than 1000 ft, the data is only show for NEXT/FEXT if the coupling length is 1 kft or greater.

The length Z was fixed at the evaluation loop length for the ADSL basis system. The length Y from the CO to the RT was varied and the PSD of the remote deployed ADSL was from T1.413-1998 Annex F with a 3.5 dB reduction. Three simulations for the ADSL basis system were run: Z=9kft with target data rate of 4850kbps, Z=11.5kft with target data rate of 3095kbps, and Z=15.5kft with target data rate of 425kbps. In each of the three simulations, two crosstalk scenarios were considered: 24 RT ADSL NEXT/FEXT and 12 RT ADSL NEXT/FEXT + 12 Reference NEXT/FEXT. The results are shown in Figures 3 – 5.

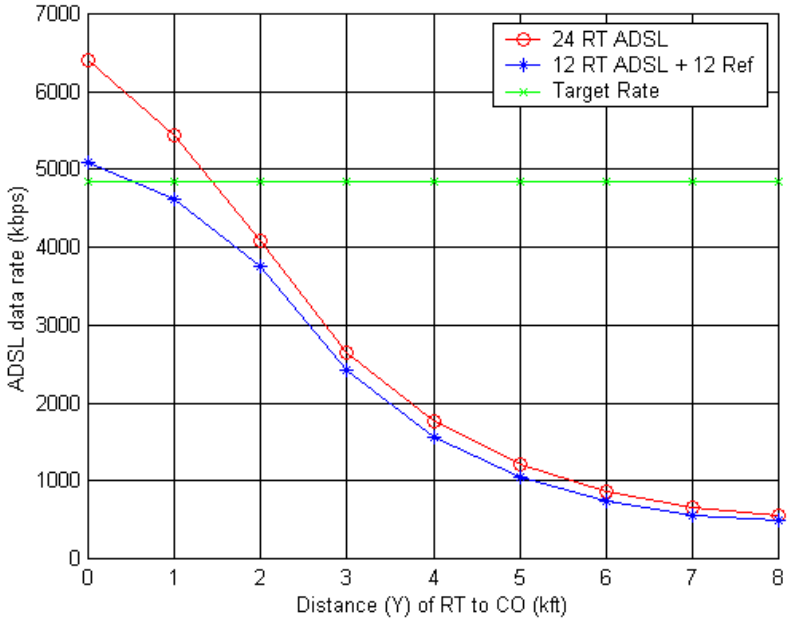

Figure 3 –ADSL downstream basis system performance level A (Z = 9 kft)

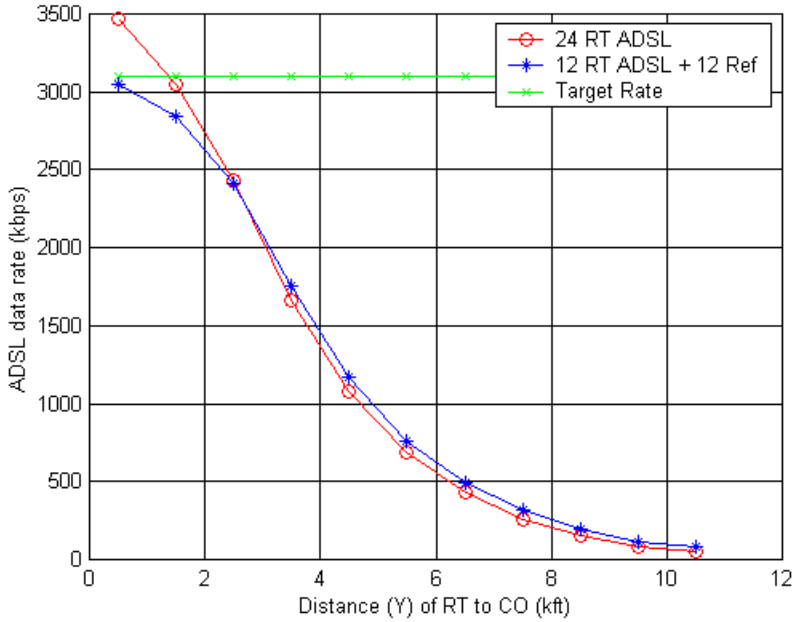

Figure 4 – ADSL downstream basis system performance level B (Z = 11.5 kft)

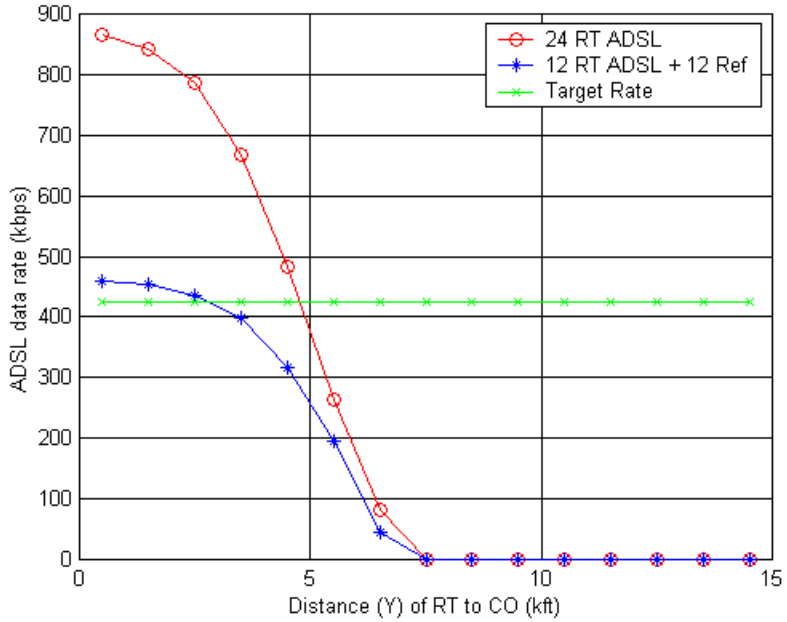

Figure 5 – ADSL downstream basis system performance level C (Z = 15.5 kft)

3. Conclusion

This contribution has shown that remote deployed ADSL is not spectrally compatible with the basis systems when a CO and RT provide ADSL service to the same service area. The remote deployed ADSL is more catastrophic to downstream performance of CO deployed ADSL than repeatered HDSL and T1 AMI[1]. The standard needs to recognize that remote ADSL deployments are not spectrally compatible with the basis systems in the same service area.

[1] Draft spectrum management standard, T1 LB869, Table G.1