NRIC V - Focus Group 3
Wireline Network Spectral Integrity
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C O N T R I B U T I O N

TITLE: **FG3 Recommendation #6 - Intermediate TUs: Remote DSL**

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TOPIC: **Intermediate TUs: Remote DSL**

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ABSTRACT

This document contains a Recommendation from NRIC V Focus Group 3 on Intermediate Transceiver Units – Remote DSL. It is provided for distribution to the members of the NRIC V full council in preparation for its approval at the February 27, 2001 NRIC Council meeting.

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Introduction:

The following FG3 recommendations are based on the following premise: “We believe that there is consumer value in Central Office DSL deployment. We also believe that future consumer value will rely upon establishing a framework for migrating the TU-C closer to the customer via broadband transport. Such a framework must provide the consumer with more advanced service choices (type and supplier) while maintaining wireline spectral integrity in a competitive, cost-effective, business-driven manner”.

Background and Discussion:

A. While the performance of a Central Office (CO)-based NEXT limited DSL system (e.g. SDSL, G.shdsl, HDSL) is little affected by the increased FEXT coupling from remote DSL deployments, performance of CO-based ADSL systems may be significantly reduced when crosstalk from remote ADSL deployments is encountered. This crosstalk may be seen when customers whose loops are in the same distribution cable are served both from CO-based and remote ADSL deployments. The expected rate of occurrence of this condition is not yet fully known, but is expected to vary from region to region and even locality to locality.

B. These potential spectral compatibility problems can be significantly reduced (if not eliminated) by moving the appearance of all ADSL TU-Cs that serve the same distribution cable to the same location. Several techniques have been identified for moving all ADSL TU-C appearances to the remote location. These include the use of derived logical circuits from the remote deployment (whether through co-location at the remote site, handoff of the ATM payload from the remote provider’s deployment, or some other method) and the amplification of CO based ADSL signals to raise the power level at the remote location to a level comparable to that of the remotely deployed ADSL signals. It is important to note that some of these techniques may be more scaleable than others.

C. While we desire to migrate TU-C’s closer to the customer, it is important to recognize the current investment in CO-based DSL equipment. This investment must be considered and weighed against the benefits of the more robust and higher speed service offerings enabled by TU-C migration when proposing possible resolutions to the spectral compatibility problems that may appear in the course of the migration.

D. The foundations of spectrum management and wireline spectral integrity are based on the premise that the guidelines will reduce the occurrence of service degradation to a rate where these events can be remedied in a timely manner, without requiring the dedication of excessive resources to remedy the problems. Therefore our recommendations on intermediate TUs involve the application of both preventative measures and remedial “after the fact” measures, depending on the expected problem occurrence rate.

Recommendations:

1. Focus Group 3 recommends that T1E1's continuing work on spectrum management standards embrace, as a whole, the background and recommendations contained herein.

2. As a preventative measure, the industry should be encouraged to employ available transmit power management mechanisms to minimize the effect of FEXT from remote deployments. One method that has been proposed to do this for ADSL modems is to limit the maximum noise margin per tone to the smallest value where data performance is not affected – this effectively results in tones with lower transmit power and/or fewer tones used. While this will undoubtedly reduce the amount of FEXT caused by remote ADSL, the benefits to be gained from this recommendation are under study.

   Furthermore, we recommend that industry standards bodies incorporate and require implementation of appropriate transmit power management mechanisms in future DSL standards, and that T1E1 incorporate and encourage the use of transmit power management mechanisms in future spectrum compatibility standards.

3. We recommend that the FCC consider the following in future rulemaking on the issue of remote ADSL deployments:

   Where remote and central office ADSL deployments will serve customers with loops in the same distribution cable, providers of remote deployments should provide means for accommodating CO-based deployments.

   Whether this accommodation should be done in a preventative or remedial manner depends on the projected exposure or expected rate of trouble occurrence. If an analysis of the exposure suggests that significant spectral compatibility problems are likely, CO-based ADSL should be accommodated in a preventative manner, as part of the remote ADSL deployment. The extent of this exposure is currently under study in FG3. Therefore, both the strategy (preventative or remedial) and the means (e.g. co-location, derived circuits, amplifiers, etc.) of accommodation will be the subject of future recommendations by FG3.