

**METHOD TO ENHANCE THE PERFORMANCE OF
CATEGORY 5 CABLE IN THE ELECTROMAGNETIC
ENVIRONMENT**

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- * **A recent presentation to the ANSI committee has shown that limitations of category 5 cable will not allow operation within Class B FCC emission requirements coincident with margin against susceptibility in the presence of a 3V/m field as presently specified in the draft standard.**

- * **Grounding of unused pairs in the category 5 cable yields approximately 8 dB more margin to both susceptibility and emissions.**

- * **Proper common mode termination of the 4 pairs of the category 5 cable yield margins to susceptibility and emissions far in excess of that available by grounding unused pairs.**

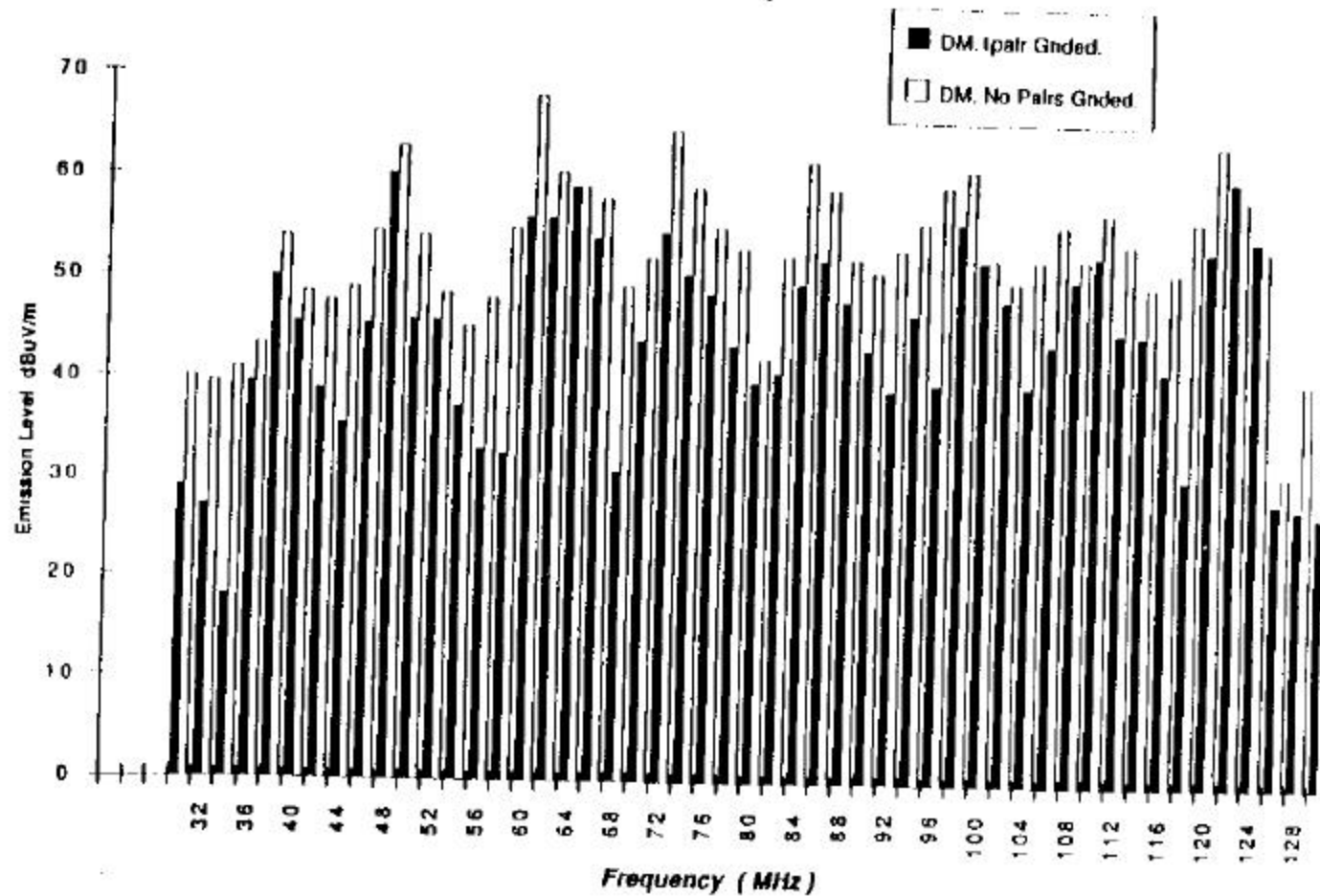
WHAT LIMITS CABLE PERFORMANCE?

- * Just as differential to differential coupling places crosstalk limits on cable performance on signaling in the cable, differential to common mode coupling between pairs limits performance with regard to emissions and susceptibility.
- * Common mode signals induced on the cable (or presented to the cable from external sources) exist as standing waves which may be dissipated either internally as resistive losses or into the radiation resistance of the antenna created by the cable.
- * Proper termination of the common mode impedance of the individual pairs minimizes standing waves on the line and dissipates the energy in the termination.

HOW DO YOU TERMINATE THE COMMON MODE IMPEDANCE?

- * The four pairs of the cable can be visualized as a quad cable if the individual pairs are shorted.
- * The characteristic impedance of opposite pairs of the cable is approximately 145 Ohms.
- * If this impedance is resistively matched at both ends (4 resistors per end), emission and susceptibility performance is enhanced considerably.

FDDI OVER UTP FEASIBILITY STUDY



CAT 5 UTP Vs. BOB'S REV. 4 MODE

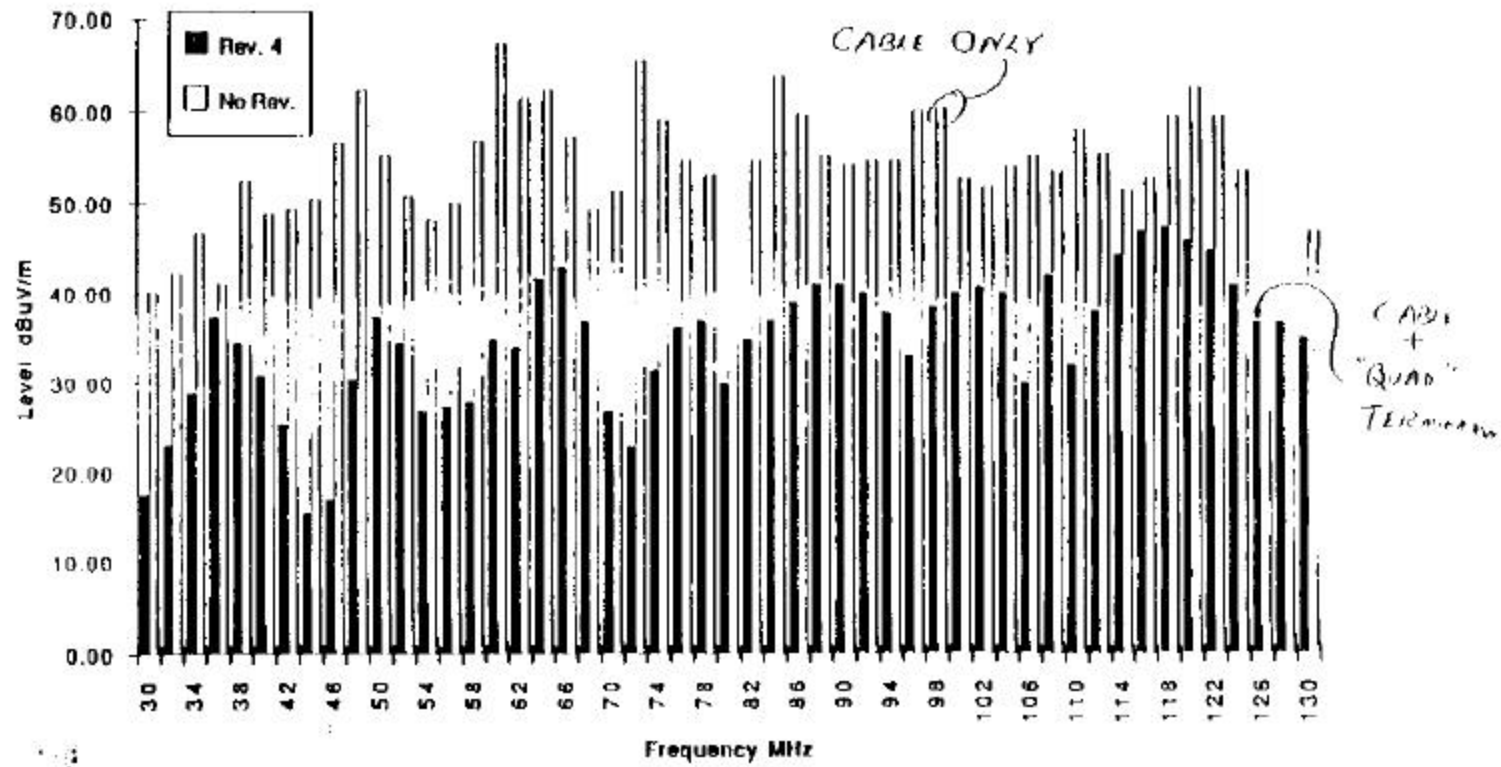
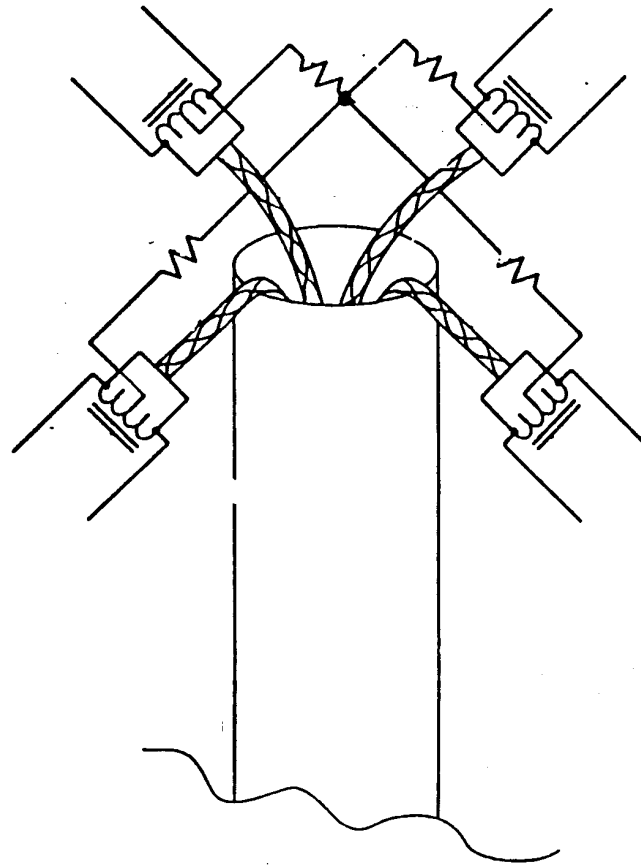
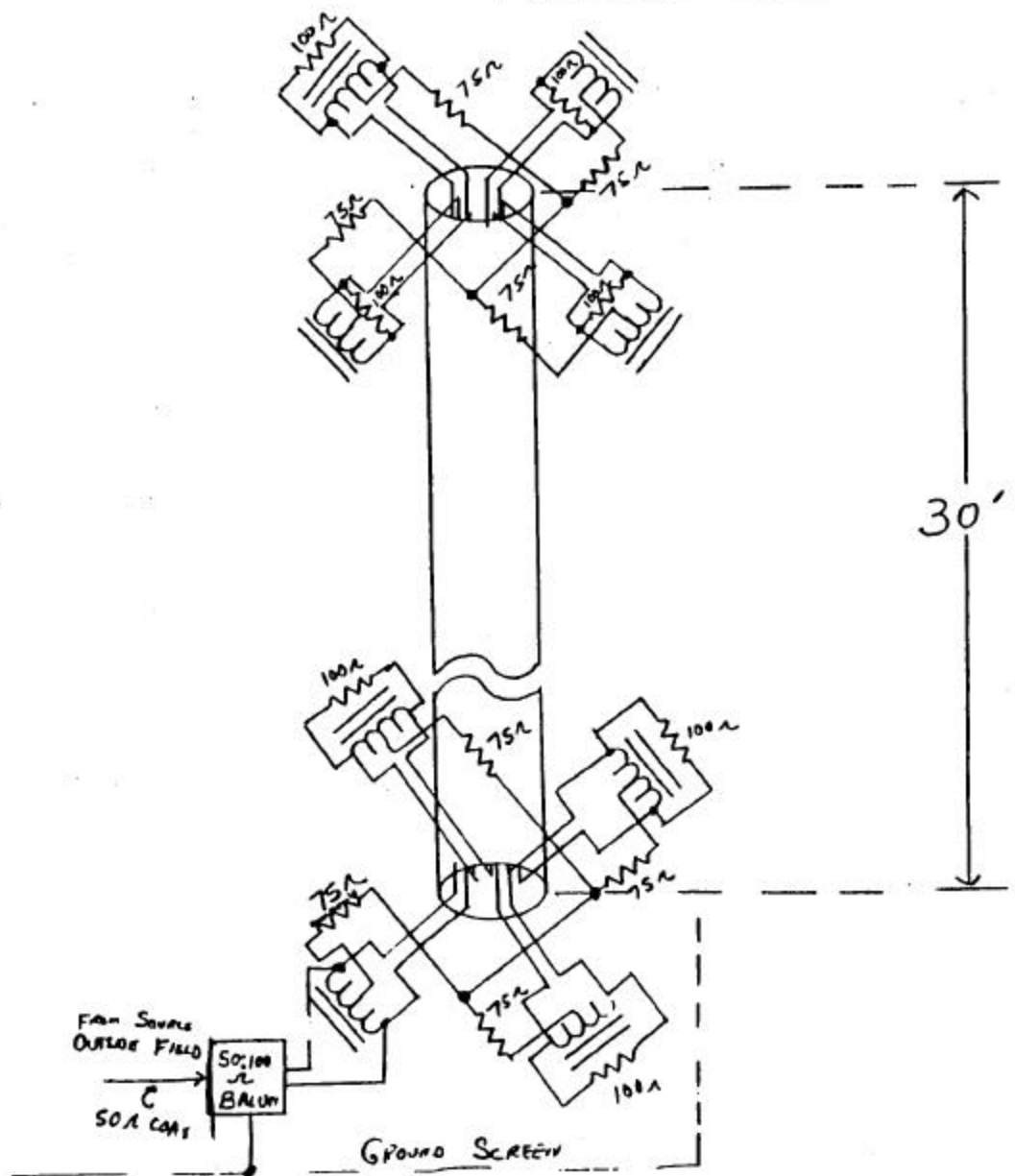


Figure 3

For CAT 5

ALL RESISTORS = 75Ω





CONCLUSIONS

- * With this technique, we believe that Category 5 UTP cable is capable of meeting the necessary emissions (including class B) and susceptibility requirements for high speed transmission.
- * Further work is required to assess the capabilities of Category 3 cable using this technique.