Alien Crosstalk

Cabling Model Development

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Cabling Model Development - Alien Crosstalk

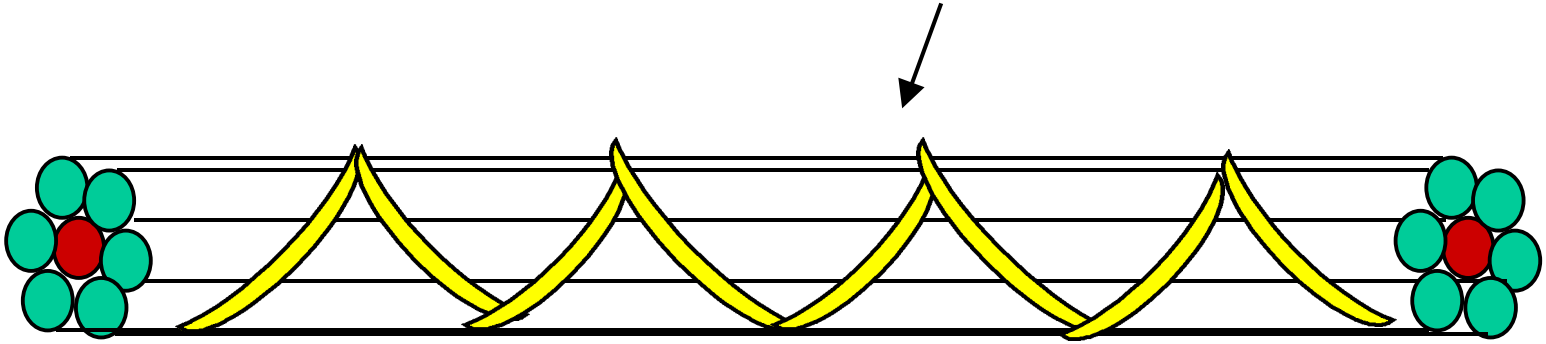
- **Establish Alien Crosstalk Limits**
- **Identification of worst case**
- **Scaling Methods**

Bundled copper cables specifications

•**Bundled cable: An assembly of two or more cables continuously bound together to form a single unit.**

•**Bundled or hybrid copper cables shall meet the bundled or hybrid cable requirements.**

•**These requirements apply to hybrid cables and bundled cables assembled prior to installation, sometimes referred to as loomed, speed-wrap, or whip cable constructions.**



Six- 4 Pair Cables - Around One - 4 Pair Cable

Bundled Cable Requirements

- **Category 5e - PSNEXT between any disturbed pair and all pairs external to that pair's jacket within the bundled or hybrid cable shall be 3 dB better than the specified pair-to-pair NEXT loss**

$$PSNEXT \geq 35.3-15*LOG(f/100)+3dB$$

Calculated PSNEXT loss limit values that exceed 65 dB shall revert to a limit of 65 dB.

- **Category 6 - PSNEXT loss for any disturbed pair from all pairs internal and external to that pair's jacket within the bundled or hybrid cable shall not exceed the values determined using equation (1).**

$$PSNEXT \geq 41.1 -15*LOG(f/100) \quad eq(1)$$

Calculated PSNEXT loss limit values that exceed 65 dB shall revert to a limit of 65 dB.

10GBASE-T - Alien Crosstalk Limit

- **The Bundled Cable specifications provide reasonable worst case specification limits for the Alien Crosstalk of installed cable**

- **For 10GBASE-T applications, loomed, speed-wrap, or whip cable constructions shall meet the bundled cable requirements**

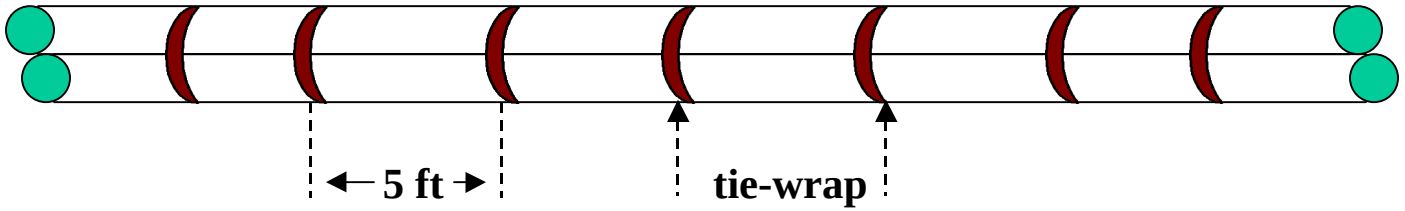
Alien NEXT Measurement Proposal

- Alien NEXT contributions are installation dependent
- Proposed limits based on measurement configurations that reflect cabling installation practices
- Reduction in the number of pair-to-pair measurements whenever possible*

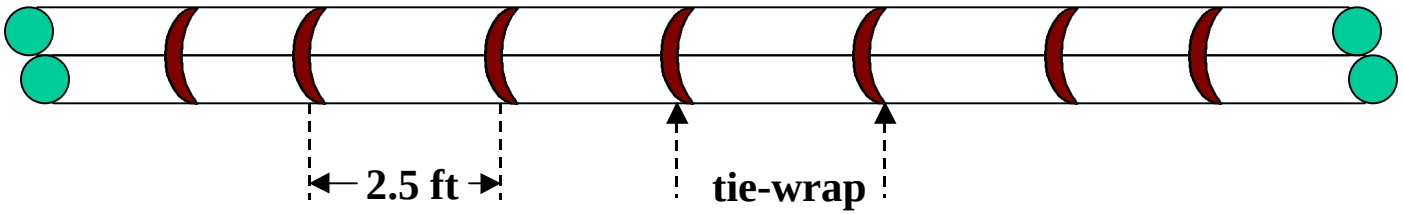
*Based on TIA Contribution from Trent Hayes (Avaya) -February 10, 2000
Alien NEXT: A Follow-up Contribution from the Non-Contiguous Cable Support Study

Alien NEXT- Measurement Configurations

1. Two 4-Pair Cables - tie-wraps every 5 ft - 100 meters



2. Two 4-Pair Cables - tie-wraps every 2.5 ft - 100 meters



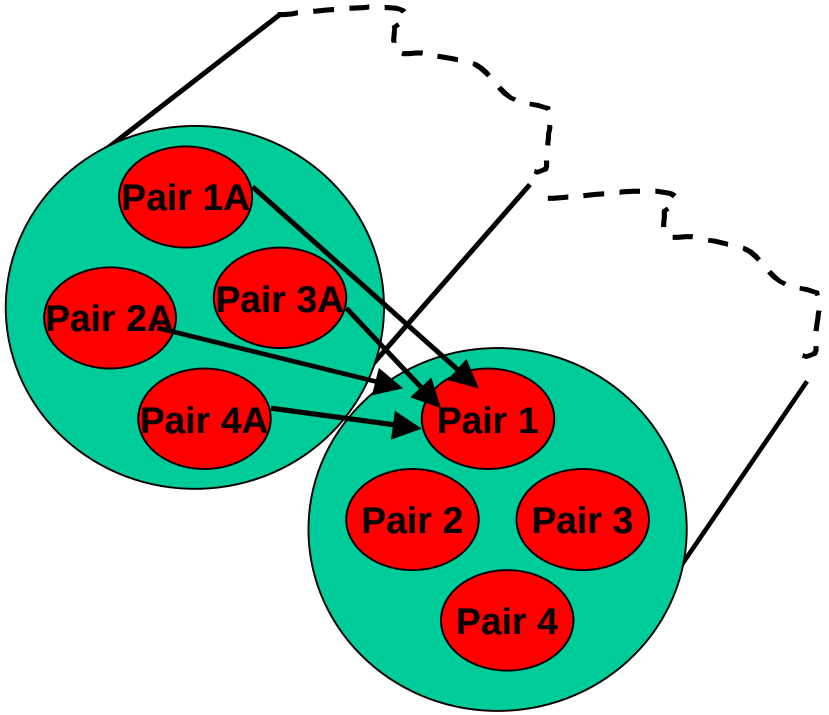
- **Measure configurations per procedure.**
- **Measurement configurations based on cabling installation practices**
- **Cables may not touch between the tie-wraps as illustrated**

Alien NEXT- Measurement Configurations

3. Remove the tie-wraps, tape the ends of each cable, and pull the two 4-Pair Cables into a conduit along with five additional cables of like construction. Size the conduit based on a 40% fill (7 cables). Conduit length ≥ 30 meters. Do not cut-back cable. Measure taped-end cables per procedure and calculate power sum.

Measurement Procedure

1. Measure NEXT Between All Cable Pair Combinations
   -16 Combinations = 4 X (4 Pairs- Into-1 Pair)
2. Calculate Power Sum
   - 4 Power Sum Results
   - Identify worse (4 Pair-into-1Pair) power sum



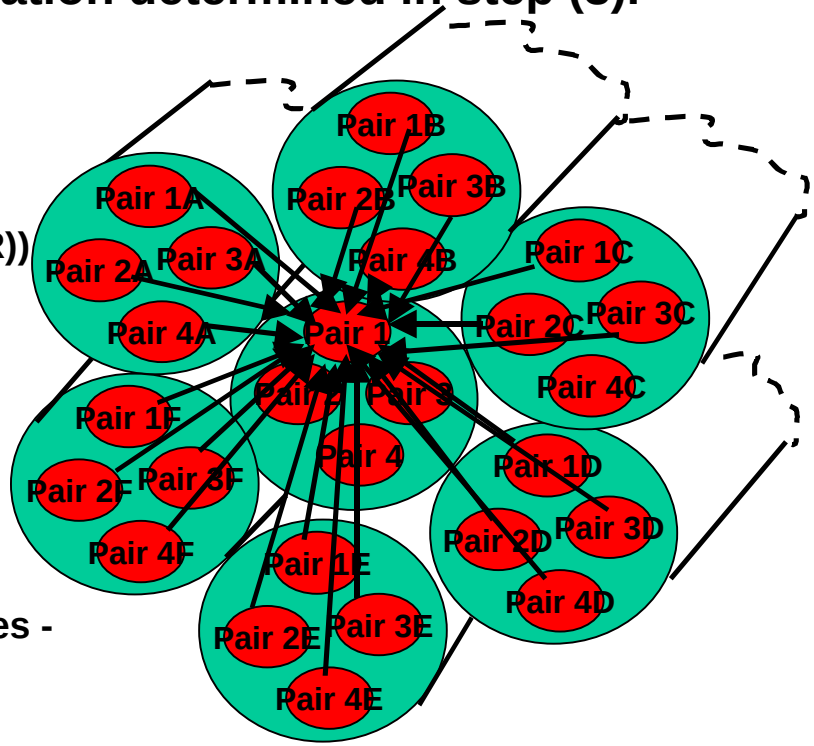
Measurement Procedure

4. Calculate the Alien NEXT of (n) 4-Pair bundled configurations based on the assumption that the power sum of each additional 4-Pair Cable is identical to the worse (4 Pair-into-1 Pair) power sum of the measurement configuration determined in step (3).

PSNEXT(n=6) = 10*LOG(6*(PSNEXT(worse 4PR into 1PR))

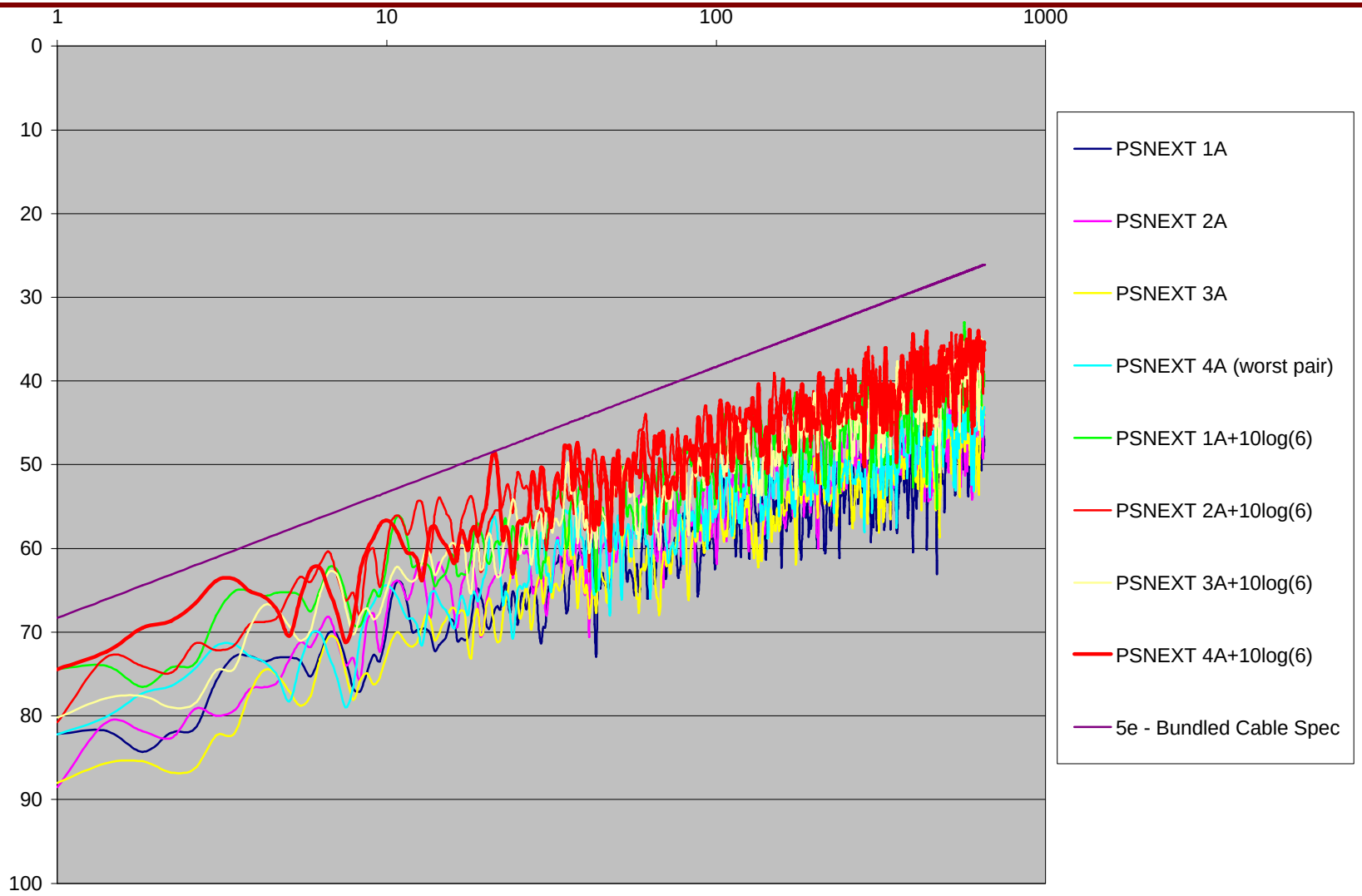
Log(X*Y)= Logx +Logy

PSNEXT(n=6) = 10*LOG(PSNEXT(worse 4PR into 1PR)+ 10*LOG(6))



Six- 4 Pair Cables - Around One - 4 Pair Cable n=6

Measured and Calculated Results (2.5 ft spacing)



Category 5e - Alien NEXT Model (2.5 ft spacing)