Performance of Ad Hoc Cat6 Models with Experimental Avaya Alien Model

William Jones

Solarflare Communications

Overview

- Purpose: Determine 10GBASE-T Capacity with Ad Hoc Cat6 Models and Avaya Experimental Alien Model.
- Review of Experimental Cat6 Alien Model
- Capacity Calculations
- Summary

Avaya Experimental Cat6 Alien Model

- Alien PSNEXT Model (Dallas Plenary, March 2003) [5]
  - **- 60 +10Log(f/100)**
  - **f in MHz**

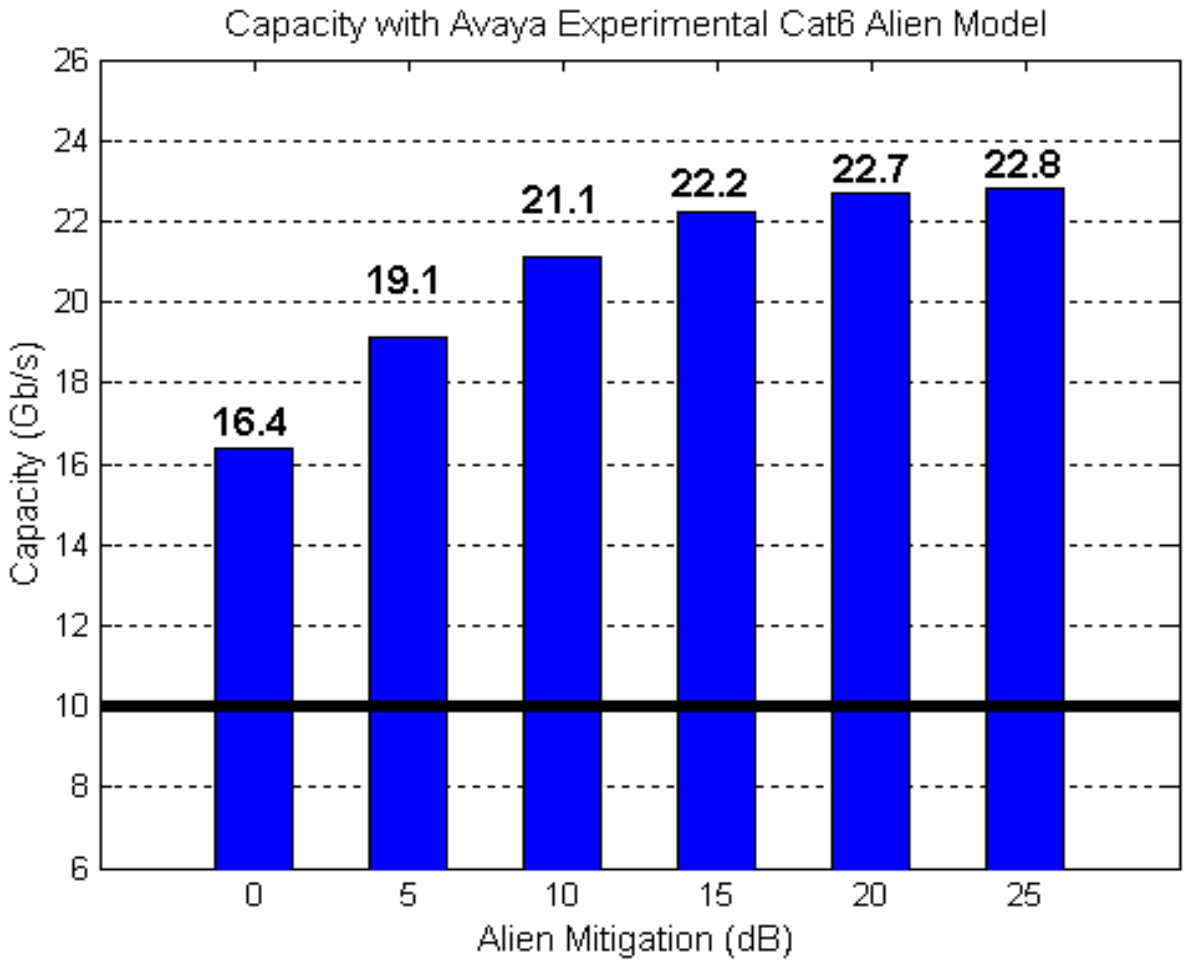
Capacity Calculations

- 10GBASE-T Cabling Ad Hoc Channel Models:
  - Established models for Category 6 Insertion Loss, Return Loss, self NEXT and self FEXT (May 6, 2003).
- Avaya Experimental Cat6 Alien Model [5]
- Background Noise
  - Upper bound noise level of -150 dBm/Hz appears consistent with actual data center noise.[1,2]
- Launch power of 10 dBm.

Capacity Calculations

- Self-Impairment Cancellation:
  - 55 dB Return Loss Cancellation (15 dB Hybrid, 40 dB PHY)
  - 40 dB NEXT Cancellation
  - 25 dB FEXT Cancellation
- No Established Level for Alien NEXT Mitigation. Mitigation of 0 dB to 25 dB Realized through Combination of One or More Alternatives:
  - PHY (0 dB to 10 dB)[3]
  - Improved Installation Practices (0 dB to 10 dB)[4]
  - Enhanced Cable Design/Specification (0 dB to 25 dB)[5]

Capacity vs Alien Mitigation



Summary

- Capacity Greater than 10 Gb/s can be Achieved with
  - Ad Hoc Cat6 Models and Avaya Experimental Cat6 Alien Model
  - Reasonable Levels of Impairment Cancellation
  - Negligible PHY Alien Mitigation

References

[1]Pagnanelli, C., “Data Center Background Noise Measurements,” IEEE802.3 10GBASE-T Contribution, May 2003.

[2]Cobb, T., “Background Noise,” IEEE802.3 10GBASE-T Contribution, May 2003.

[3]Solarflare Communications, “10GBASE-T Tutorial,” IEEE802.3 Contribution, Nov. 2002.

[4]Cohen, L., “Alien Crosstalk Measurements,” IEEE802.3 10GBASE-T Contribution, Jan. 2003.

[5]Cobb, T., “Experimental Cat6 Cable Developed with Improved Alien NEXT,” IEEE802.3 Contribution, March 2003.