Alien FEXT Characterization: Class E UTP Link

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Agenda

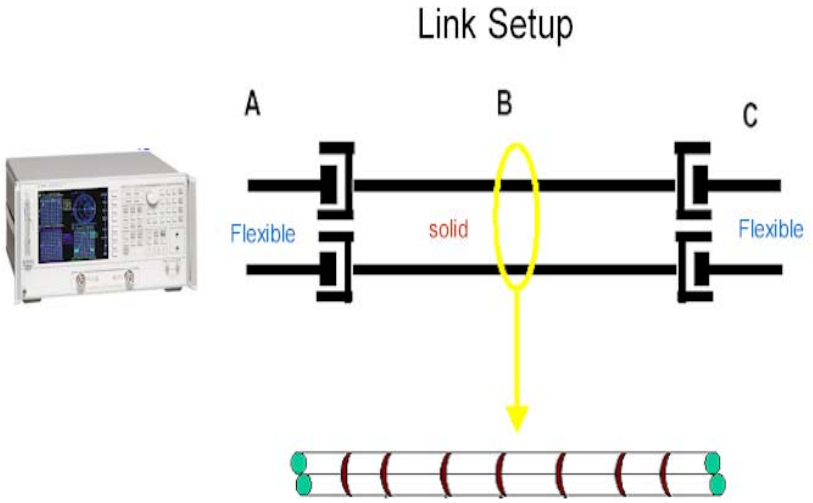
- Introduction
- Measurement Topology
- Test Procedure
- Review of PS AFEXT Measurement Data
- Observations & Next Steps
- References

Introduction

- Provide informative PS AFEXT measurement data collected on a random class E link configuration
- Investigate PS AFEXT performance as a function of length

Measurement Topology

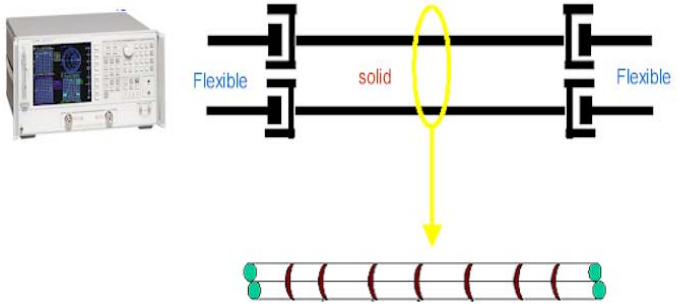
- Two connector link
  - Starting link length = 100m
- Parallel model – links were laid side by side (section B)
- Cable ties placed in 1m increments (section B only)
- Patch cord lengths = 1m
- All components representative of class E UTP (existing base)
- DM + CM terminations applied



Diagrams courtesy of MC communications: [3] & [4]

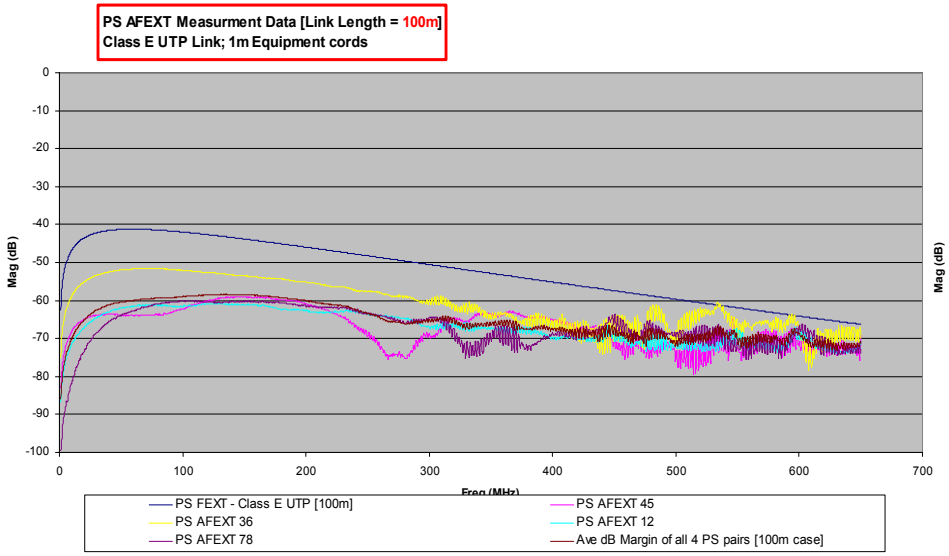
Test Procedure

1. Two 100m class E UTP links were laid side by side (parallel setup)
2. Class E UTP connectivity was terminated at both ends
3. 1m class E UTP equipment cords were mated to connectivity
4. ANEXT and AFEXT measurements were collected. Sweeps collected within the 1-650 MHz range.
5. The link lengths were reduced by 10m for each test run (section B). Cable removed from the work area end.
6. Work area connectors were re-terminated.
7. Steps 4-6 were repeated for link lengths: 90m, 80m, 70m, 60m, 50m.

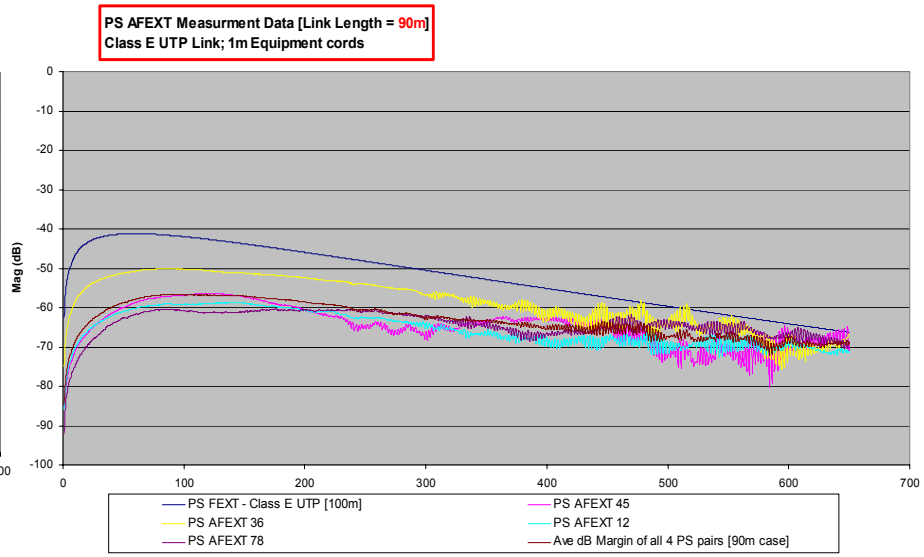


PS AFEXT Measurements [1]

100m Case



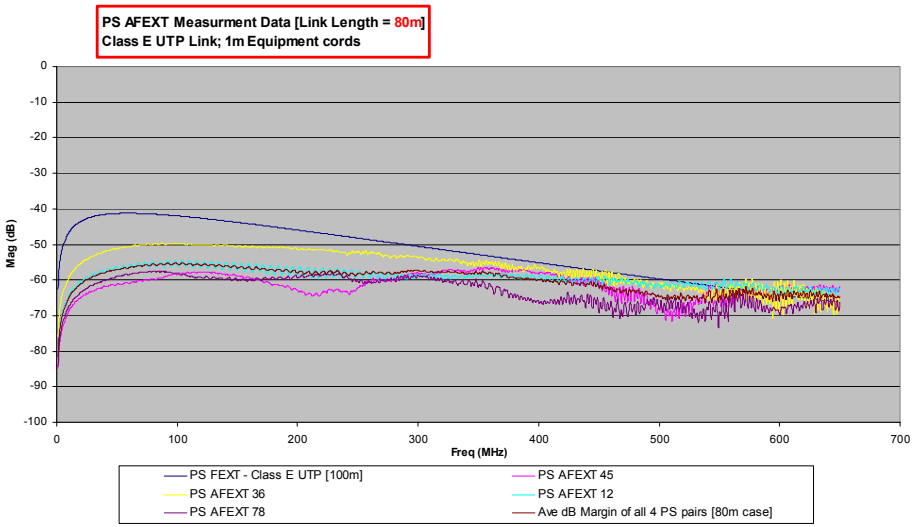
90m Case



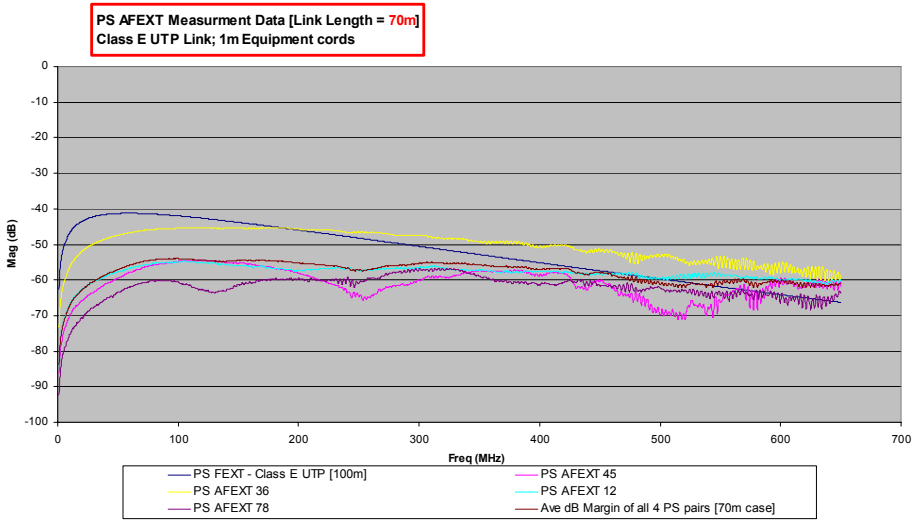
1. Class E UTP PS FEXT limit = Class E PS ELFEXT + Class E IL (Provided for reference only)
2. PS AFEXT calculations based on 4 disturbers

PS AFEXT Measurements [2]

80m Case

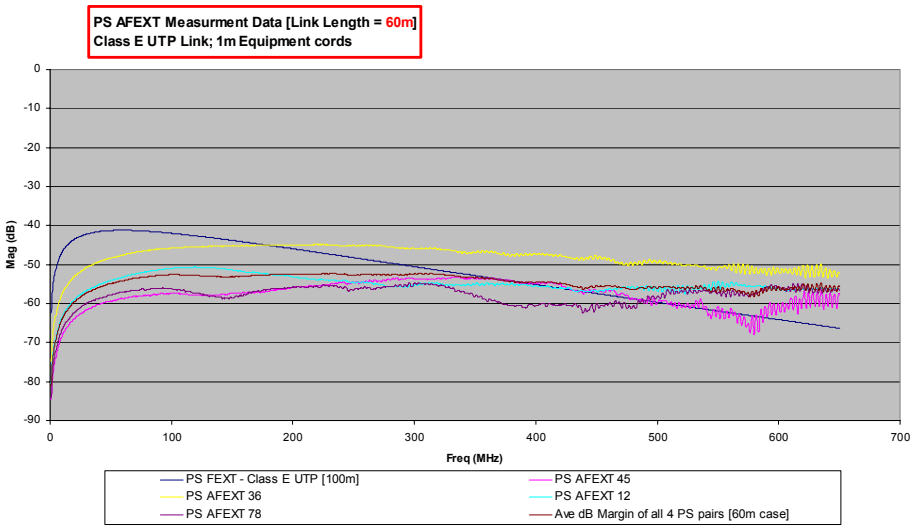


70m Case

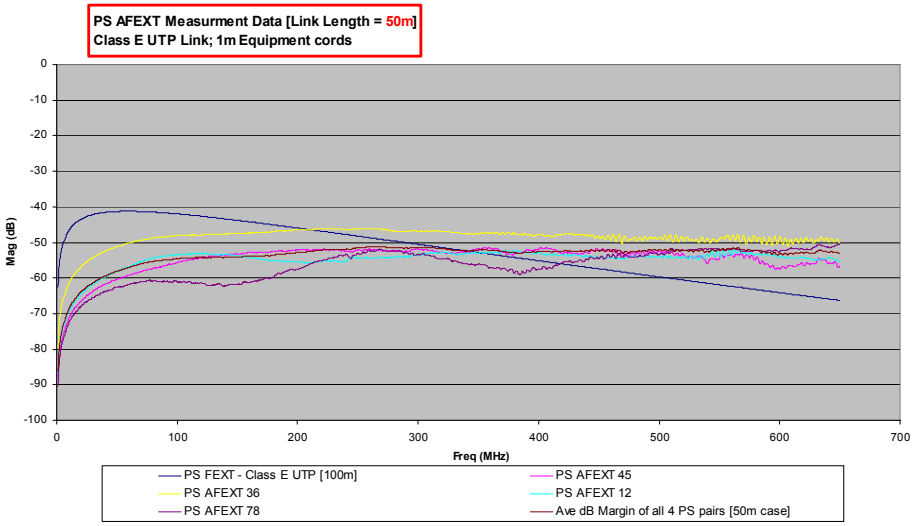


PS AFEXT Measurements [3]

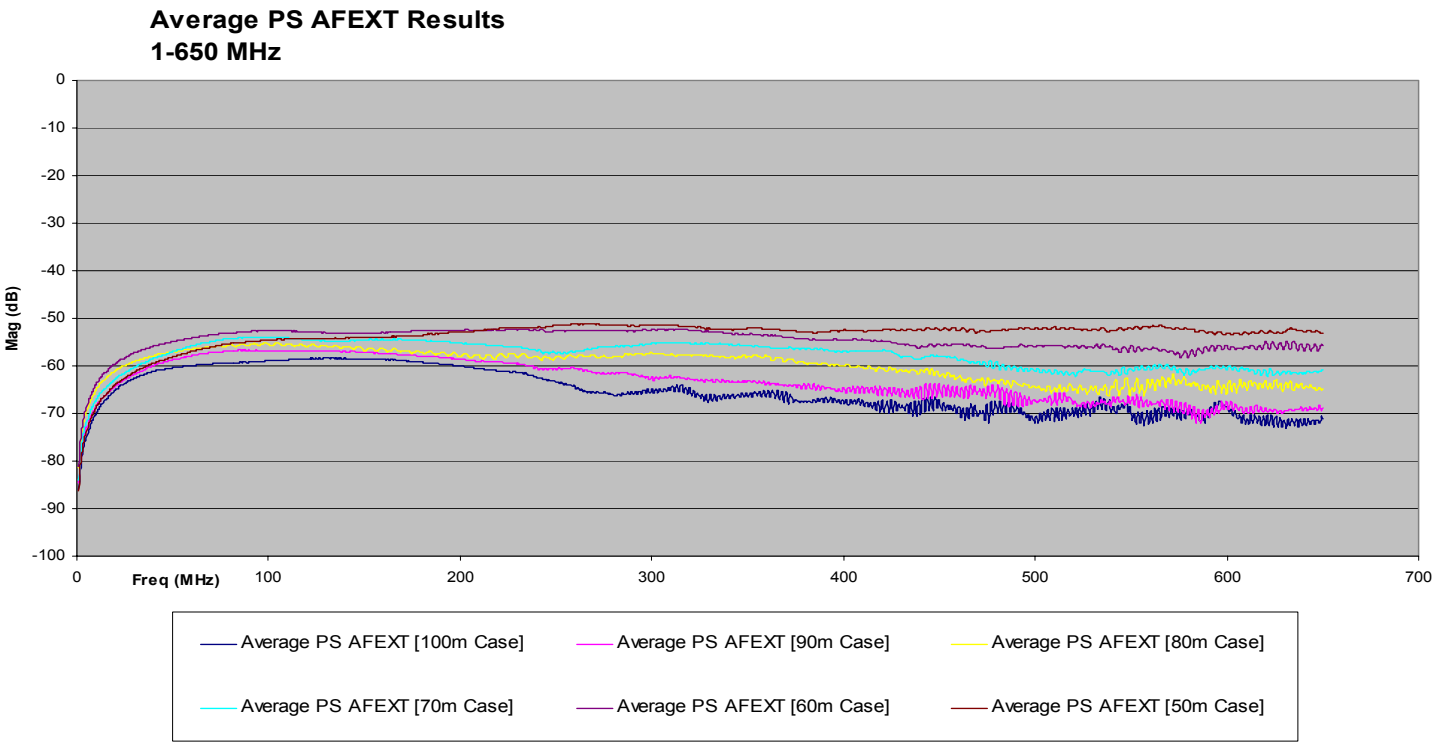
60m Case



50m Case

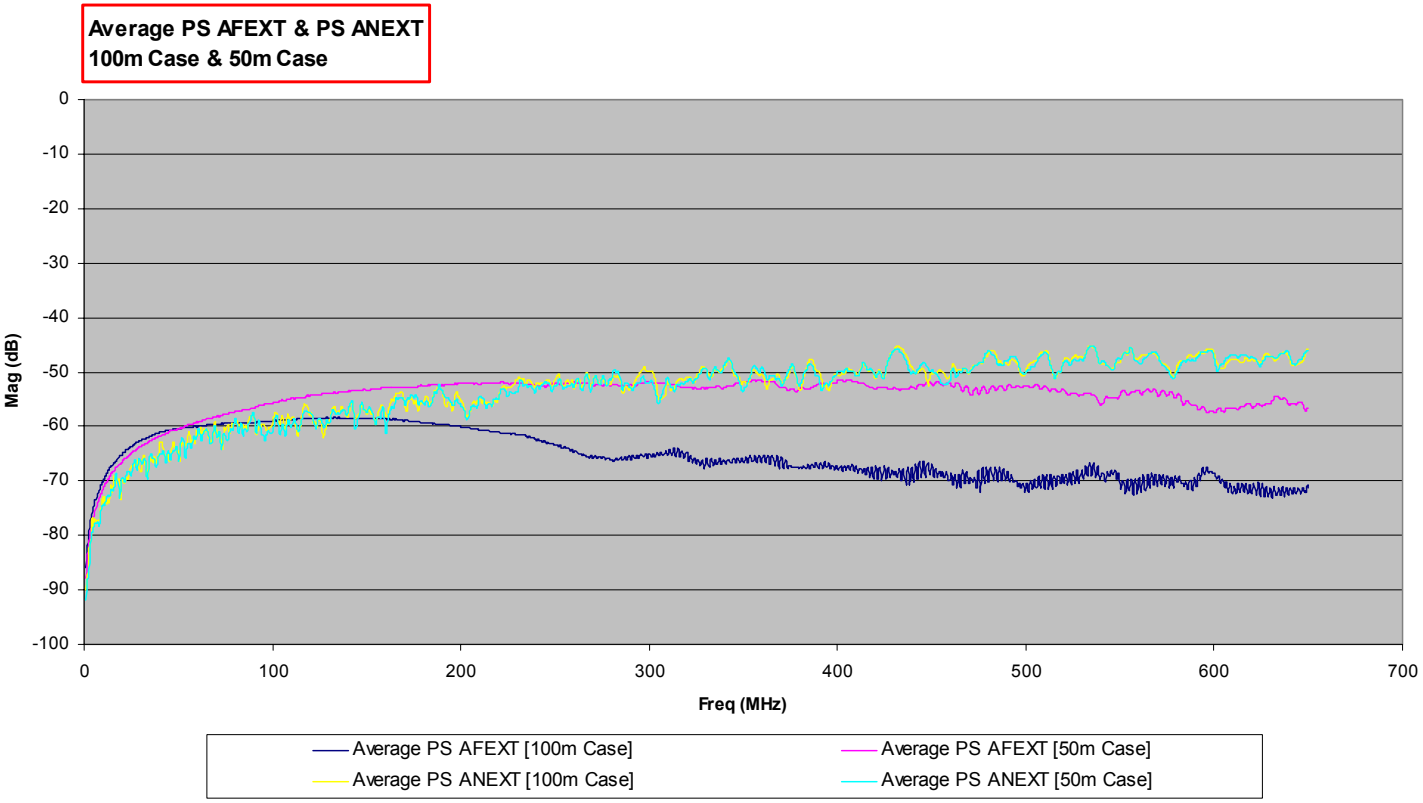


Average PS AFEXT results



1. For a given link length, the average is defined as the average dB value for all 4 powersum pairs. The average calculation was conducted for each frequency point.

Average PS AFEXT and PS ANEXT results: Two Cases: 50m & 100m



Observations & Next Steps

Observations:

- Data indicates that PS AFEXT performance is dependent on length. Shorter lengths result in worse performance.
- Link length > 50m has minimal effect on PS ANEXT performance.

Next Steps:

- Investigate PS AFEXT using 4 connector, 100m channels
- Additional work is required to confirm that the two-parallel test method correlates with
  - Realistic field installations
  - Worst case lab test conditions (i.e. “6 around 1” test method)
- Implications of PS AFEXT performance on capacity models

References

[1] Channel Code Considerations for 10GbT Signaling. URL:
http://www.ieee802.org/3/10GBT/public/jan04/shalvi_1_0104.pdf
[2] 10GBASE-T Market Potential & T Market Potential & Technical Feasibility on Technical Feasibility on Installed Cabling by 2005 Installed Cabling by 2005:
http://www.ieee802.org/3/10GBT/public/sep03/abughazaleh_1_0903.pdf
[3] Cabling Ad-hoc Report, Chris DiMinico MC Communications, April 15, 2003
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[4] Alien NEXT Ad-hoc Material, Chris DiMinico MC Communications, April 30, 2003
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