

Cat5e Alien Crosstalk Measurements

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Jan 2015

Supporters

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- Richard Mei – Commscope
- Andy Jimenez – Anixter
- Yakov Belapolsky – BelFuse
- Victor Renteria – BelFuse
- Alan Flatman – LAN Technologies
- Paul Vanderlaan – BerkTek
- Masrtin Rossbach – Nexans
- Ron Nordin - Panduit

Purpose

- Alien crosstalk not specified for Cat5e
- Measurements to assist in characterization of Cat5e Alien crosstalk for development of NGEABT link segment specifications.
 - 100m Cat5e Channel
 - 6-around-1 Alien performance

Alien crosstalk limits

- 10GBASE-T
 - Sample Rate = 800Mbaud
 - 4 pairs = 2.5 Gbps per pair
 - Bits/Sample = $\frac{2.5Gbps}{800Mbaud} = \underline{\underline{3.125 \text{ bits/ baud}}}$
- 2.5GBASE-T
 - Bandwidth = 100MHz
 - Sample Rate = 2 x 100MHz = 200Mbaud
 - 4 pairs = 625 Mbps per pair
 - Bits/Sample = $\frac{625Mbps}{200Mbaud} = \underline{\underline{3.125 \text{ bits/ baud}}}$
- 2.5GBASE-T over 100 MHz bandwidth yields similar spectral efficiency and SNR requirements for 2.5GBASE-T compared to 10GBASE-T
- Use 10GBASE-T alien crosstalk limits over 100 MHz

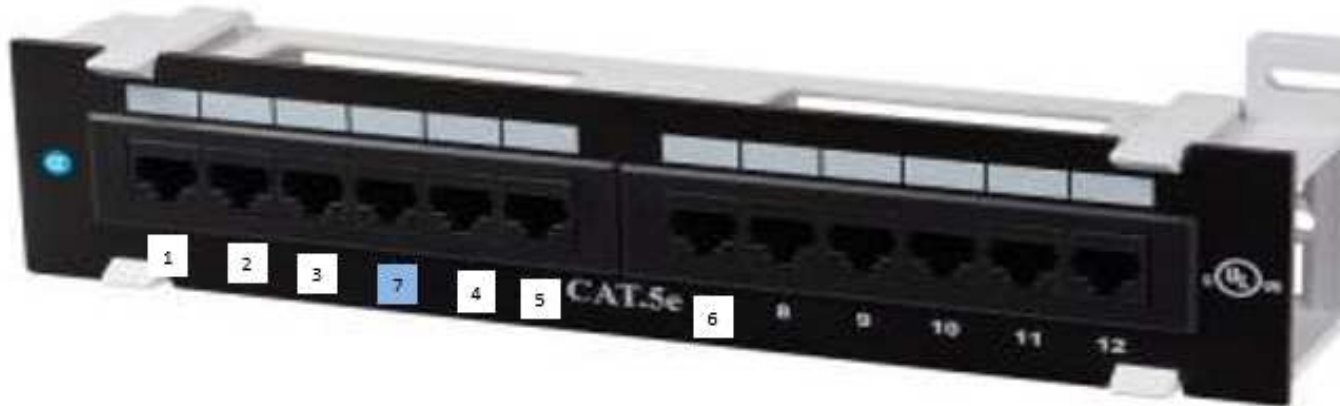
Channel Configuration

Using off-the-shelf Cat5e components (non-Panduit)
bundled in 6-around-1 configuration

Channel Configuration



Patch Panel Wiring



12-Port Cat5e Mini Patch Panel with 89D Mounting Bracket

6-around-1 100m Bundled Cat5e Channel Measurements 10GBASE-T limits for supported cable types (6/6A)

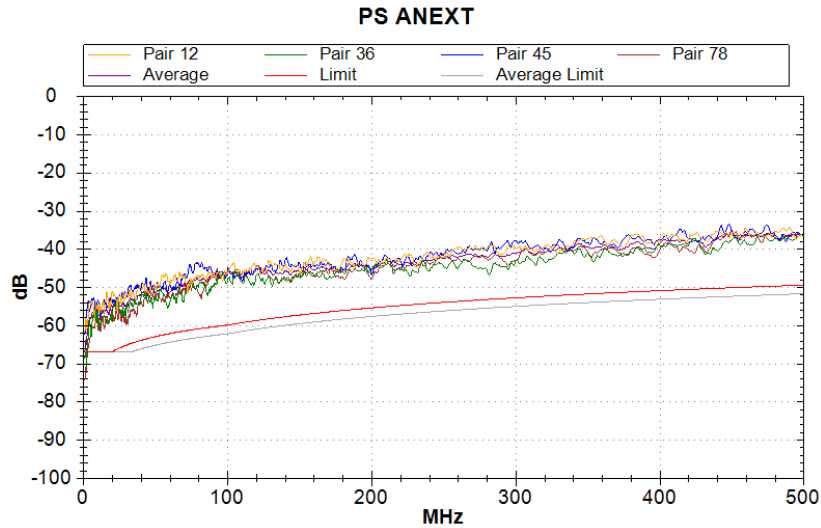


Table 55-14— Calculated PSANEXT constants for supported cabling types

Cabling	Insertion loss at 250 MHz (dB)	PSANEXT_constant (dB)	PSANEXT_constant_avg average of the 4-pairs (dB)
Category 6/ Class E	35.9 ^a , 20.3 ^b	62 ^a , 47 ^b	64.25 ^a , 49.25 ^b
Class E _A / Augmented Category 6	33.8	60	62.25
Class F	33.8	60	62.25

^aLink segment length of 100 m.

^bLink segment length of 55 m.

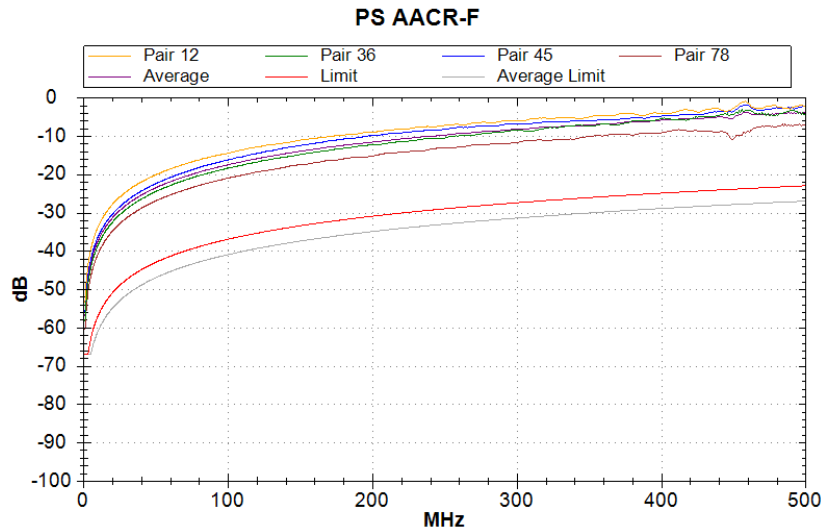


Table 55-17— Calculated PSAELFEXT constants for supported cabling types

Cabling	Insertion loss at 250 MHz (dB)	PSAELFEXT_constant (dB)	PSAELFEXT_constant_avg average of the 4-pairs (dB)
Category 6/ Class E	35.9 ^a , 20.3 ^b	37.9 ^a , 33.7 ^b	41.9 ^a , 37.7 ^b
Class E _A / Augmented Category 6	33.8	37	41
Class F	33.8	37	41

^aLink segment length of 100 m.

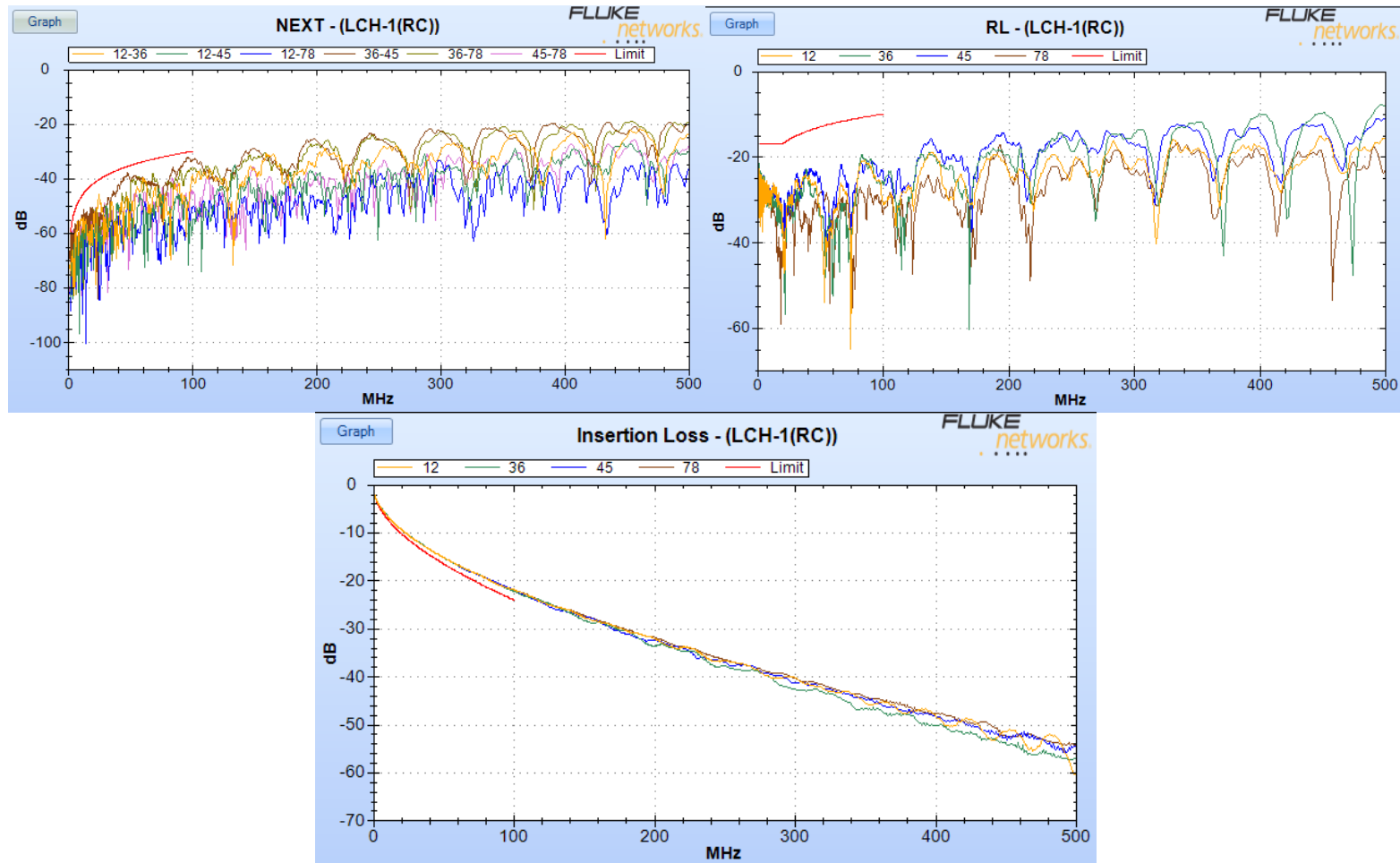
^bLink segment length of 55 m.

Summary

- Alien crosstalk not specified for Cat5e
- Measurements to assist in characterization of Cat5e Alien crosstalk for development of link segment specifications
 - 100m Cat5e Channel
 - 6-around-1 Alien performance
- 2.5GBASE-T over 100 MHz bandwidth yields similar spectral efficiency and SNR requirements for 2.5GBASE-T compared to 10GBASE-T
- Use 10GBASE-T alien crosstalk limits over 100 MHz
- Will need to conduct more testing with other Cat5e channels to determine if this data is representative
- Next Steps:
 - Test with Cat6

Backup

100m Cat5e Channel To Cat5e Limits



100m Cat5e Channel To Cat6A Limits

