

PSANEXT and PSAACRF Requirements for 10BASE-T1S

IEEE 802.3cg Task Force

February 2019 interim

Related to draft 2.3 Clause 147.7 ballot comments

Masood Shariff, CommScope

Add PSANEXT Requirements for 10BASE-T1S using 100BASE-T1

96.7.1.5 Power sum alien near-end crosstalk (PSANEXT)

There is no FEXT or NEXT as 100BASE-T1 is a single pair solution. When multiple cable pairs are bundled, the alien XTALK (ANEXT and AFEXT) become interference sources. Since the transmitted symbols from the alien noise source in one cable are not available to another cable, cancellation cannot be done. When there are multiple pairs of cables bundled together, where all pairs carry 100 Mb/s links, then each duplex link is disturbed by neighboring links, degrading the signal quality on the victim pair. In order to limit the near-end crosstalk noise for a 5-around-1 cable bundle (up to 15 m length and up to four in-line connectors, equally spaced), the Power sum alien near-end crosstalk (PSANEXT) loss shall meet Equation (96–9).

$$\text{PSANEXT}(f) \geq 31.5 - 10 \times \log_{10}\left(\frac{f}{100}\right) \quad \text{dB} \quad \text{for } 1 \text{ MHz} \leq f \leq 100 \text{ MHz} \quad (96-9)$$

where

$\text{PSANEXT}(f)$ is the power sum alien near-end crosstalk loss at frequency f
 f is the frequency in MHz

Proposed changes for new Clause 147.7.4

- Adapt the text as follows:
 - Change 100 Mb/s links to 10 Mb/s links and 100BASE-T1 to 10BASE-T1S
 - Change 100 MHz maximum frequency in equation 96-9 to 40 MHz maximum frequency
- Resulting text below:

147.7.4 Power sum alien near-end crosstalk (PSANEXT)

There is no FEXT or NEXT as 10BASE-T1S is a single pair solution. When multiple cable pairs are bundled, the alien XTALK (ANEXT and AFEXT) become interference sources. Since the transmitted symbols from the alien noise source in one cable are not available to another cable, cancellation cannot be done. When there are multiple pairs of cables bundled together, where all pairs carry 10 Mb/s links, then each duplex link is disturbed by neighboring links, degrading the signal quality on the victim pair. In order to limit the near-end crosstalk noise for a 5-around-1 cable bundle (up to 15 m length and up to four in-line connectors, equally spaced), the Power sum alien near-end crosstalk (PSANEXT) loss shall meet Equation (147–xx).

$$\text{PSANEXT}(f) \geq 31.5 - 10 \times \log_{10}\left(\frac{f}{100}\right) \quad \text{dB} \quad \text{for } 1 \text{ MHz} \leq f \leq 40 \text{ MHz} \quad (147\text{-xx})$$

where

PSANEXT(f) is the power sum alien near-end crosstalk loss at frequency f
 f is the frequency in MHz.

Note: These proposed specifications fit the data in slide 11 of [kaindl_matheus_3cg_01c_09_2017.pdf](#)

Add PSAACRF Requirements for 10BASE-T1S using 100BASE-T1

96.7.1.6 Power sum alien attenuation to crosstalk ratio far-end (PSAACRF)

The Power sum alien attenuation to crosstalk ratio far-end (PSAACRF) for a 5-around-1 cable bundle (up to 15 m length and up to four in-line connectors, equally spaced) shall meet Equation (96–10).

$$\text{PSAACRF}(f) \geq 16.5 - 20 \times \log_{10}\left(\frac{f}{100}\right) \text{ dB} \quad \text{for } 1 \text{ MHz} \leq f \leq 100 \text{ MHz} \quad (96-10)$$

where

$\text{PSAACRF}(f)$ is the power sum alien attenuation to crosstalk ratio far-end at frequency f
 f is the frequency in MHz

Proposed changes for new Clause 147.7.5

- Adapt the text as follows:
 - Change 100 MHz maximum frequency in equation 96-10 to 40 MHz maximum frequency
- Resulting text below:

96.7.1.6 Power sum alien attenuation to crosstalk ratio far-end (PSAACRF)

The Power sum alien attenuation to crosstalk ratio far-end (PSAACRF) for a 5-around-1 cable bundle (up to 15 m length and up to four in-line connectors, equally spaced) shall meet Equation (147–yy).

$$\text{PSAACRF}(f) \geq 16.5 - 20 \times \log_{10}\left(\frac{f}{100}\right) \text{ dB} \quad \text{for } 1 \text{ MHz} \leq f \leq 40 \text{ MHz} \quad (147\text{--}yy)$$

where

PSAACRF(f) is the power sum alien attenuation to crosstalk ratio far-end at frequency f
 f is the frequency in MHz

Note: These proposed specifications fit the data in slide 12 of [kaindl_matheus_3cg_01c_09_2017.pdf](#)