Physical Layer Considerations for Link Speed Transitions

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Supporters

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EEE to evaluate link speed reduction

•Move that the IEEE 802.3 working group request formation of an *Energy Efficient Ethernet* IEEE 802.3 study group to evaluate methods to reduce energy use by reduction of link speed during periods of low link utilization

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>50%
802.3 voters: Y: 51 N: 2 A:6

Presentation Objective

- **Considerations for evaluating impact of link speed transitions on *performance*.**
    - **Link segment performance due to changes in environmental conditions**
    - **Testing aspects**
- **Extension of state variable definitions to characterize EEE states of operation**
- **Link operational performance**

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Environmental specifications

1000BASE-T- 40.9.3.2 Temperature and humidity

A system integrating the 1000BASE-T PHY is expected to operate over a reasonable range of environmental conditions related to temperature, humidity, and physical handling (such as shock and vibration). Specific requirements and values for these parameters are considered to be beyond the scope of this standard.

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Environmental specifications

1000BASE-T - 40.7.4.2 Link delay skew

The difference in propagation delay, or skew, between all duplex channel pair combinations of a link segment, under all conditions, shall not exceed 50 ns at all frequencies from 2 MHz to 100 MHz. It is a further functional requirement that, once installed, the skew between any two of the four duplex channels due to environmental conditions shall not vary more than 10 ns within the above requirement.

10GBASE-T - 55.7.2.6 Link delay skew

The difference in propagation delay, or skew, between all duplex channel pair combinations of a link segment, under all conditions, shall not exceed 50 ns at all frequencies from 2 MHz to 500 MHz. It is a further functional requirement that, once installed, the skew between any two of the four duplex channels due to environmental conditions shall not vary more than 10 ns within the above requirement.

EEE Operational considerations

•Link up state maintained over a *reasonable range of environmental conditions* related to temperature, humidity, and physical handling (such as shock and vibration).

•Link down state due to environmental changes sets boundary for the reasonable range.

•A change from a link up state at one speed to a link up state at another speed can be considered within the reasonable range of environmental conditions (i.e., the link is up); therefore, when applicable, the link segment characteristics of the original link up state can be applied.

EEE Link transition

EEE Link transition – Change from a link up state at one speed to a link up state at another speed in order to reduce power consumption during periods of low link utilization.

EEE Study Group