8802-3/802.3 REVISION REQUEST

DATE: 14th March, 2000

NAME: Terry Cobb
COMPANY/AFFILIATION: Lucent
ADDRESS:

PHONE: (619)-509-0248
FAX:
E-MAIL: tcobb@ixpres.com

REQUESTED REVISION:
- STANDARD: IEEE Std 802.3-1998
- CLAUSE NUMBER: 25.3 and 25.4
- CLAUSE TITLE: Specific requirements and exceptions

PROPOSED REVISION TEXT:

See attached pages.

RATIONALE FOR REVISION:

The purpose of this maintenance request is to include the UTP Category 5 Cable Plant Specifications which are now defined in ANSI/EIA/TIA and ISO/IEC. The current specification in Clause 25 uses the specifications defined in TP-PMD which were created prior to the publication of ANSI/EIA/TIA-568-A, TIA/EIA TSB-67, and ISO/IEC 11801. The cable plant specifications were taken directly from Clause 40.7 of 1000BASE-T. Included in this specifications is a noise requirement, also specified in 1000BASE-T, for a 100BASE-TX PHY.

IMPACT ON EXISTING NETWORKS:

None.

Please attach supporting material, if any

Submit to:- Geoffrey O. Thompson, Chair IEEE 802.3
Nortel Networks, Inc. M/S SC5-02
4401 Great America Parkway
P. O. Box 58185
Santa Clara, CA 95052-8185 USA
Phone: +1 408 495 1339 FAX: 988 5525
E-Mail: geoff_thompson@baynetworks.com

For official 802.3 use

REV REQ NUMBER: 1036
DATE RECEIVED: 14th March, 2000
~~EDITORIAL~~/TECHNICAL
ACCEPTED/~~DENIED~~
BALLOT REQ'D YES/~~NO~~
COMMENTS: Published IEEE Std 802.3-2002

For information about this Revision Request see -
http://www.ieee802.org/3/maint/requests/revision_history.html#REQ1036

Proposed Maintenance request for 100BASE-TX

The following is the proposed changes to 100BASE-TX Clause 25. The purpose of this maintenance request is to include the UTP Category 5 Cable Plant Specifications which are now defined in ANSI/EIA/TIA and ISO/IEC. The current specification in Clause 25 uses the specifications defined in TP-PMD which were created prior to the publication of ANSI/EIA/TIA-568-A, TIA/EIA TSB-67, and ISO/IEC 11801. The cable plant specifications were taken directly from Clause 40.7 of 1000BASE-T. Included in this specification is a noise requirement, also specified in 1000BASE-T, for a 100BASE-TX PHY.

If there are any comments please forward them to Terry Cobb at: **tcobb@ixpres.com** . There will be conference call to discuss these on May 12 from 1:00 to 3:00 PM Eastern time. A notice and agenda will be sent out 30 days prior.

Under 25.3 General exceptions:

Change d) to e)

Add:

d) The cable plant specifications for unshielded twisted pair (UTP) of TP-PMD 11.1 are replaced by that specified in 25.4.6.

Changes to 25.4 Specific requirements and exceptions:

The 100BASE-TX PMD (including MDI) shall comply to the requirements of TP-PMD, 7, 8, 9, 10, and 11, and normative annex A with the exceptions listed below. In TP-PMD, informative annexes B, C, E, G, I, and J, with exceptions listed below, provide.....

Change subclause numbers:

25.4.9 to 25.4.10, 25.4.8 to 25.4.9, 25.4.7 to 25.4.8, 25.4.6 to 25.4.7

Add subclause:

25.4.6 UTP cable plant

The cable plant specification for unshielded twisted pair (UTP) of TP-PMD 11.1 is replaced by that specified in this subclause. The term “link segment” used in this subclause refers to a duplex channel of 2 pairs. Specifications for a link segment apply equally to each of the two pairs of a duplex channel. All implementations of the balanced cabling link shall be compatible at the MDI.

25.4.6.1 Cabling system characteristics

The cabling system used to support a 100BASE-TX duplex channel requires 2 pairs of Category 5 balanced cabling with a nominal impedance of 100 ohms. The cabling system components (cables, cords, and connectors) used to provide the link segment shall consist of Category 5 components as specified in ANSI/TIA/EIA-568-A:1995 and ISO/IEC 11801:1995 (Class D).

25.4.6.2 Link transmission parameters

The transmission parameters contained in this subclause are specified to ensure that a Category 5 link segment of up to 100 m will provide a reliable medium. The transmission parameters of the link segment include insertion loss, characteristic impedance, return loss, NEXT loss, and external coupled noise.

25.4.6.2.1 Insertion loss

The insertion loss of the link segment shall be less than,

$$\text{Insertion\_Loss}(f) < 2.1 f^{0.529} + 0.4/f \qquad \text{(dB)}$$

at all frequencies from 1 MHz to 100 MHz. This includes the attenuation of the balanced cabling pairs, including work area and equipment cables plus connector losses within the link segment.

The insertion loss specification shall be met when the link segment is terminated in 100 ohms.

NOTE – The above equation approximates the insertion loss specification at 20 °C for discrete frequencies of Category 5 100-meter links specified in ANSI/TIA/EIA-568-A Annex E and in TIA/EIA TSB-67.

25.4.6.2.2 Differential characteristic impedance

The nominal differential characteristic impedance of each link segment, which includes cable cords and connecting hardware, is 100 ohms for all frequencies between 1 MHz and 100 MHz.

25.4.6.2.3 Return loss

Each link segment shall meet or exceed the return loss specified in the following equation at all frequencies from 1 MHz to 100 MHz.

$$\text{Return\_Loss}(f) \quad \begin{cases} 15 & (1-20\,\text{MHz}) \\ 15-10\log_{10}(f/20) & (20-100\,\text{MHz}) \end{cases} \quad \text{(dB)}$$

where f is the frequency in MHz. The reference impedance shall be 100 ohms.

25.4.6.2.4 Differential Near-End Crosstalk (NEXT)

In order to limit the crosstalk at the near end of a duplex channel, the differential pair-to-pair Near-End Crosstalk (NEXT) loss between the two pairs of a duplex channel shall be at least,

$$27.1-16.8\log_{10}(f/100) \quad \text{(dB)}$$

where f is the frequency over the range of 1 MHz to 100 MHz.

NOTE – The above equation approximates the NEXT loss specification at discrete frequencies for Category 5 100-meter links specified in ANSI/TIA/EIA-568-A Annex E and in TIA/EIA TSB-67.

25.4.6.3 Noise environment

The 100BASE-TX noise environment consists of noise from external sources and could impact the objective BER. This noise may consist of sources outside the cabling that couple into the link segment via electric and magnetic fields. In addition noise from adjacent cables, referred to as alien crosstalk, may couple into the link segment. This alien crosstalk is generally present when cables are bound tightly together. To ensure robust operation a 100BASE-TX PHY should operate in the presence of an external noise as specified in 25.4.6.3.1

25.4.6.3.1 External coupled noise

The differential noise coupled from external sources that is measured at the output of a filter connected to the output of the near end of a disturbed link segment should not exceed 40 mV peak to-peak. The filter for this measurement is a fifth order Butterworth filter with a 3 dB cutoff at 100 MHz.

Add new subclause as follows:

25.5.4.3 Characteristics of the link segment

Item	Feature	Subclause	Status	Support	Value/Comment
LKS1	Implementations of balanced cabling link	25.4.6	M		Compatible at the MDI.
LKS2	100BASE-T links	25.4.6.1	M		Category 5 components as specified in ANSI/TIA/EIA-568-A:1995 and ISO/IEC 11801:1995 (Class D).
LKS3	Insertion loss	25.4.6.2.1	M		As specified in 25.4.6.2.1 at all frequencies from 1 MHz to 100 MHz when link segment is terminated in 100 Ohms.
LKS4	Return loss	25.4.6.2.3	M		As specified in 25.4.6.2.3 at all frequencies from 1 MHz to 100 MHz when link segment is terminated in 100 Ohms.
LKS5	Differential Near-End Crosstalk (NEXT)	25.4.6.2.4	M		As specified in 25.4.6.2.4 at all frequencies from 1 MHz to 100 MHz.