802.3an Task Force

Interim Meeting
May 25-27, 2004
Long Beach, CA

Tuesday, May 25, 2004

The meeting was called to order by Brad Booth at 1:10pm. Mike McConnell volunteered as secretary for the meeting.

The first order of business was the approval of the minutes. Hearing no comments or objections to the minutes as recorded the chair called for approval of the minutes.

Motion: Accept the minutes as currently recorded.
Mover: Hugh Barrass
Second: Juan Jovier

The motion carried.

The chair presented the agenda for the meeting. Hearing no comments the chair accepted the agenda for the meeting. The chair then reviewed the procedures for joining the reflector for 802.3 and 802.3an.

The chair then reviewed the voting rules for the task force. These are:

- 802.3 Rules apply
  - Foundation based upon Robert's Rules of Order
- Anyone in the room may speak
- Anyone in the room may vote
- RESPECT… give it, get it
- NO product pitches
- NO corporate pitches
- NO prices!!!
  - This includes costs, ASPs, etc. no matter what the currency
- NO restrictive notices

Additional usual and customary rules for 802.3 task force groups will apply. Specifically all technical votes will require a 75% majority to pass. Non-technical votes require greater than 50%. Anyone present in the room may vote however the chair will ask for and record a second vote of the 802.3 voters present in the room at the time on all technical matters. The voting rules may be changed at the discretion of the chair at any time. IEEE structure and organization was reviewed. Information on the Bylaws and Rules of 802 were noted. All the material referred to is publicly available via the 802 web site. Other operating (ground) rules and guidelines for the task force we also reviewed including the structure of the IEEE and the bylaws and rules of the IEEE.

At 1.25pm the chair presented and read the IEEE Patent Policy:

"IEEE standards may include the known use of essential patents and patent applications provided the IEEE receives assurance from the patent holder or applicant with respect to patents whose infringement is, or in the case of patent applications, potential future infringement the applicant asserts will be, unavoidable in a compliant implementation of either mandatory or optional portions of the standard [essential patents]. This assurance shall be provided without coercion and prior to approval of the standard (or reaffirmation when a patent or patent application becomes known after initial approval of the standard). This assurance shall be a letter that is in the form of either:

a) A general disclaimer to the effect that the patentee will not enforce any of its present or future patent(s) whose use would be required to implement either mandatory or optional potions of the proposed IEEE standard against any person or entity complying with the standard; or

b) A statement that a license for such implementation will be made available without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination.

This assurance shall apply, at a minimum, from the date of the standard's approval to the date of the standard's withdrawal and is irrevocable during that period."

Bob Grove commented that if anyone is aware of any patent issues they should contact him for appropriate forms and help.

Additional material on IEEE patent policy can be found on the 802.3 web site at http://grouper.ieee.org/groups/802/3/10GBT/public/jan04/index.html.

Material presented by the Task Force Chair referenced above is available for the web site for the Task Force (http://grouper.ieee.org/groups/802/3/10GBT/public/jan04/index.html)

The chair then reviewed inappropriate topics for the group.

- Don't discuss licensing terms or conditions
- Don't discuss product pricing, territorial restrictions or market share
- Don't discuss ongoing litigation or threatened litigation
- Don't be silent if inappropriate topics are discussed… do formally object.

The chair then presented and explained the standards process.

The next agenda item was a review of the Objectives for the Task Force.

- Preserve the 802.3/Ethernet frame format at the MAC Client service interface
- Preserve min. and max. frame size of current 802.3 Std.
- Support full duplex operation only
- Support star-wired local area networks using point-to-point links and structured cabling topologies
- Support a speed of 10.000 Gb/s at the MAC/PLS service interface

- Select copper media from ISO/IEC 11801:2002, with any appropriate augmentation to be developed through work of
- 802.3 in conjunction with SC25/WG3
- Support Clause 28 auto-negotiation
- Support coexistence with 802.3af
- To not support 802.3ah (EFM) OAM unidirectional operation
- Meet CISPR/FCC Class A
- Support operation over 4-connector structured 4-pair, twisted-pair copper cabling for all supported distances and Classes
- Define a single 10 Gb/s PHY that would support links of:
  - At least 100 m on four-pair Class F balanced copper cabling
  - At least 55 m to 100 m on four-pair Class E balanced copper cabling
- Support a BER of 10^-12 on all supported distances and Classes

The overall timeline for the Task Force Objective was presented and reviewed. The next milestone is creation of Draft 1.0 at the conclusion of the July 2004 Plenary

Next on the agenda were liaison and ad hoc group reports. Mr. Alan Flatman noted there had been no activity in ISO/IEC JTC/SG25/WG3 since the March meeting. The next scheduled meeting for this group is in three weeks and will be held in Japan.

Ms. Val Rybinski presented her report on TIA TR-42 activities. Her complete report is available on the 802.3an web site. Chris DiMinco added some additional comments that a lot of progress was made and we should expect input at the upcoming July meeting.

Mr. Sanjay Kasturia, editor for the 802.3an group, provided a report on the current status of the draft standard. A question was raised during the presentation about the creation of a “Blue Book” for circulation prior to the creation of the actual draft. The overall consensus was that such a document had proven to be very helpful and was desirable. Mr. Kasturia agreed to create such a document for the group. A question was raised regarding the criteria list (and spreadsheet) noting that numerous items needed to be discussed and agreed to by the group at large. After some general discussion, the chair suggested that the group address the topic Thursday morning from 8-10am. The group agreed and Mr. Kasturia completed his presentation.

Mr. Chris DiMinco presented Clause 55 - Link Segment Baseline Proposal and responded to questions.

Mr. Thuyen Dinh presented Updates: Test Data for 10GBase-T Magnetics and responded to questions.

The chair adjourned the meeting for a 15 minute break.

Mr. Sterling Vaden presented 10G Extended Frequency Primary Parameters For Channel Link Segment Performance and responded to questions.

Mr. Terry Cobb presented NEXT Requirement for New Cabling and responded to questions.

Mr. Wayne Larsen presented NEXT and Alien NEXT of Connectors and responded to questions.

Mr. Sterling Vaden presented Connector ANEXT vs. Internal NEXT and responded to questions.

Concluding presentations the chair adjourned the meeting for the day and indicated that we would resume at 8:30am May 26, 2004.

Wednesday, May 26, 2004

The chair called the meeting to order at 8:30am to resume the presentations.

Mr. Sandeep Gupta presented 10GBASE-T Transmitter Key Specifications and responded to questions.

Mr. Hiroshi Takatori presented DFE Bound Calculation for Line Code Alternatives and responded to questions.

Mr. William Jones presented Receiver-Base Equalization for 10GBT and responded to questions.

The chair adjourned the meeting at 10:30 am for a 10 minute break.

Mr. Joseph Babanezhad presented 10GBASE-T PAM5 Line Signaling and responded to questions.

Mr. Tetsuya Higuchi presented Refinements of OFDM Signaling Method for 10GBASE-T and responded to questions.

The meeting was adjourned until 1:20pm for Lunch.

Mr. Gottfried Ungerboeck presented Achievable Bit Rates and Choice of Modulation Rate for 10GBASE-T and responded to questions.

Mr. Sailesh Rao presented Update on the LDPC 4D-PAM8 Proposal and responded to questions.

Mr. Brett McClellan and Mr. George Zimmerman presented PHY Proposal for 10GBASE-T: Encoding, Mapping & Framing.

The chair adjourned the meeting for a 10 minute break and ask to resume the meeting with questions on the preceding presentation.

Mr. Brett McClellan and Mr. George Zimmerman and responded to questions on their presentation.

Mr. Jose Tellado presented 10GBASE-T PHY Proposal and responded to questions.

Mr. Katsutoshi Seki presented PHY proposal for 10GBASE-T and responded to questions.

Mr. George Zimmerman presented Downside of TH Precoding and responded to questions.

Mr. Scott Powell presented Multi-Vendor Agreement on Precoder Proposal and responded to questions.

Concluding presentations the chair adjourned the meeting for the day at 6:40pm and indicated that we would resume at 8:30am May 27, 2004.

Electronic reference copies of all presentation are available publicly from the 802.3an May 2004 meeting web site at
http://grouper.ieee.org/groups/802/3/10GBT/public/jan04/index.html

Thursday, May 27, 2004

The chair called the meeting to order at 8:30am

The next meeting will be held in Portland in July. Estimates of attendance for that meeting was approximately 80. Approximately 30 802.3 voters were in the room with 17 first time attendees present.

Mr Kasturia presented the second section of his editorial presentation beginning with slide 7 titled “Morning After Presentations”. The editor noted that several changes had bee made the previous evening and that and updated spreadsheet was available from the web site. This was an overall summary of the presentations made at this meeting and the open items that need to be resolved to permit the editor to create the draft.

Chris DiMinco noted that he had received some editorial comments on his draft of the channel model. Joseph Babanezhad commented that the issue of Return Loss specification needed additional clarification. It was noted that the TR42 group would be meeting June 11. The outcome of that meeting would be presented at the July Plenary.

The editor presented tables on the various baud rate and equalization proposal and fielded questions and comments.

The topic of Transmit PSD as it relates to EMI compliance was discussed. Allen Flatman noted that he had sent a white paper on the subject to the reflector. The chair agreed that the paper would be posted on the 802.3an web site for reference.

Matrix channel models have been requested by the group. The approved channel model needs additional information to properly interpret the scaling of these models. Group consensus will need to be obtained on this subject. It was noted that if we adopted mixed mode S-Parameter models then we didn't need to worry about scaling. It was requested that this topic be presented to the cable modeling ad-hoc group for discussion and decision.

Mr. Luc Adriaenssens noted that at the previous meeting there was a request for a power backoff proposal and that none were presented at this meeting. Mr. Adriaenssens ask if someone could provide details on a power backoff proposal.

The chair discussed the necessity of beginning to eliminate some of the proposals and would like to begin limiting the introduction of new proposals. The chair noted that the proposals for July will require more than one supporter for proposals. The only new proposals invited will be those that fill out missing sections of the baseline draft.

The chair then offered the following straw poll questions:

Straw Poll Question: Shall the 802.3an Task Force continue to entertain and explore PHY proposals with line codes other than Pulse Amplitude Modulation (PAM)?

Task Force:	Yes:	27	No:	28	Abstain:	13
802.3 Voters:	Yes	11	No:	12		

Straw Poll Question: Should the Task Force limit the PAM levels under investigation to be greater than or equal to:

4 Levels
Task Force members: Yes: 7
8 Levels
Task Force members: Yes: 43
12 Levels
Task Force members: Yes: 7
No Limit
Task Force members: Yes: 12

The chair adjourned the meeting for a 10 minute break.

Straw Poll Question: Should the Task Force adopt the peak to peak differential voltage of 2V at the MDI for the 10GBASE-T transmitter as summarized in slide #11 of the presentation gupta_1_0504.pdf and use that as the baseline for defining various transmitter test modes for Draft 1.0?

Mr Takatori expressed concern that we could not specify the Vpp without resolution of several questions about the magnetics, where it's being measured and with what type of filters. Mr. Zimmermann suggested that perhaps making the question more general would be appropriate.

Straw Poll Question Revised: Should the Task Force adopt the peak to peak differential voltage of less than or equal to xV at the MDI for the 10GBASE-T transmitter as summarized in slide #11 of the presentation gupta_1_0504.pdf and use that as the baseline for defining various transmitter test modes for Draft 1.0?

X=2

Task Force members: 27

X=2.5

Task Force members: 19

X=3

Task Force members: 14

Straw Poll Question Revised: Should the Task Force adopt the peak to peak differential voltage of less than or equal to 2.5V at the MDI for the 10GBASE-T transmitter as summarized in slide #11 of the presentation gupta_1_0504.pdf and use that as the baseline for defining various transmitter test modes for Draft 1.0?

Task Force members: Yes: 46

Should the Task Force adopt MDI return loss as summarized in slide #11 of the presentation gupta_1_0504.pdf:

> Any reflection due to differential signals incident upon the MDI from a balanced cabling having an impedance of 100 ohms +/- 15% is attenuated, relative to the incident signal, by at least 16dB over the frequency range of 1-40MHz, and at least 16-10log10(f/40) over the frequency range of 40MHz to 625MHz (f in MHz). This is to be used in generating the relevant specification for Draft 1.0

Chris DiMinico commented that he felt strongly that additional work needed to be done on this subject. Additional discussion followed with a focus on the suggestion that the tolerance be reduced from +/-15% to +/-1%. The finial comments settled on the substitution of tbd.

Should the Task Force adopt MDI return loss as summarized in slide #11 of the presentation gupta_1_0504.pdf:

> Any reflection due to differential signals incident upon the MDI from a balanced cabling having an impedance of 100 ohms +/- (TBD)% is attenuated, relative to the incident signal, by at least 16dB over the frequency range of 1-40MHz, and at least 16-10log10(f/40) over the frequency range of 40MHz to 625MHz (f in MHz). This is to be used in generating the relevant specification for Draft 1.0

Task Force members:	Yes:	43
802.3 Voters:	Yes	22

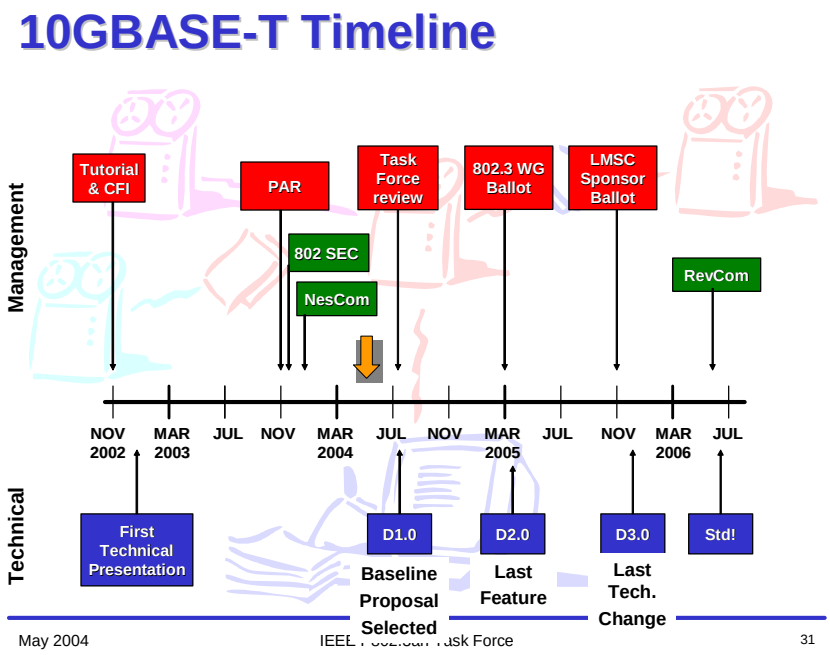
Straw Poll Question: Should the Task Force adopt Tomlinson-Harashima precoding as the baseline proposal for channel equalization strategy.

Discussion followed about if this should be taken only within the context of PAM coding since the Task Force has not formally limited proposals to PAM. Additional discussion followed on what specific types of precoding would be included or excluded. A comment suggesting that further study of other proposals should be made prior and than this decision be postponed.

Revised Straw Poll Question: Should the Task Force adopt Tomlinson-Harashima precoding (or derivatives) as the baseline proposal for channel equalization strategy.

PHY Vendor members:	Yes	19	No	9
802.3 Voters	Yes	14		
Task Force members	Yes	47		

The chair then presented the 10GBASE-T timeline. Mr. David Law reviewed the timeline and recommend adding comments that clearly reflect the status of the draft at the various revision points. These additions are noted under the respective draft revisions shown in the timeline.



Motion: Make the proposed additional qualifications to the 10GBASE-T timeline.
Moved: David Law

Second: Thomas Dineen
The motion carried by acclaimation.

The chair then opened the floor to motions from the group.

Motion: The 802.3an Task Force restrict further investigation and entertained proposals for PHY implementations to those with PAM line coding with a minimum of 8 levels.
Moved R. Hayes
Second B Armijo
This is a technical motion and requires 75% approval.

Mr Luc Adriaenssens made a friendly motion to insert the word baseline in the motion. The friendly amendment was rejected.

Task Force	Yes	66	No	2	A	5
802.3	Yes	26	No	1	A	1

The motion passed

Motion: 10GBASE-T adopt Tomlinson-Harashima precoding (or derivative) as the channel equalization strategy.
Moved S. Powell
Seconded: Jose Tellado
Technical, 75% required

The chair offered a friendly motion that 10GBASE-T be changed to 802.3an Task Force. The mover and second accepted the amendment.

Motion: 802.3an Task Force adopt Tomlinson-Harashima precoding (or derivative) as the channel equalization strategy.

Mr Jones spoke against the motion. Mr. Eisler motioned to table this motion, Seconded by Burt Armijo. After some discussion regarding tabling vs postponing the motion, Mr Eisler revised his motion to postpone this motion until the morning of July 15th. Mr. Tellado agreed.

Task Force	Yes	29	No	43	A	2

The motion to postpone failed.

Mr. Terry Cobb called the question:

Task Force	Yes	43	No	21	A	7
802.3 Voters	Yes	12	No	14	A	4

The motion failed

Motion: Adopt the peak to peak differential voltage of <=2.5V at the MDI for the 10GBASE-T transmitter as summarized in slide #11 of the presentation gupta_1_0504.pdf “10GBASE-T Transmitter key specifications”, and use that as the baseline for defining various transmitter test modes for Draft 1.0
Moved S Gupta
Seconded J Tellado

The chair offered a friendly amendment to change the presentation title to the file name for ease in reference. The mover also offered additional wording changes.

Motion: Adopt the peak to peak differential voltage of <=2.5V at the MDI for the 10GBASE-T transmitter as summarized in slide #11 of the presentation gupta_1_0504.pdf, and use that as the baseline for defining various transmitter test modes for Draft 1.0

Mr Luc Adriaenssens offered a friendly amendment to change the 2.5V to 2.0-2.5V. Both mover and second accepted the change.

Motion: The 802.3an Task Force adopt the peak to peak differential voltage in the range of 2.0 to 2.5V at the MDI for the 10GBASE-T transmitter as summarized in the presentation gupta_1_0504.pdf, and use that as the baseline for defining various transmitter test modes for Draft 1.0

Mr Zimmermann made a friendly amendment to change the upper range to 3.0. The mover rejected the amendment. Failing the friendly amendment, Mr. Zimmerman moved to change the upper voltage range to 3.0. Second B Jones.
Procedural: 50% required

Task Force	Yes	16	No	42	A	12

The motion failed

Motion: The 802.3an Task Force adopt the peak to peak differential voltage in the range of 2.0 to 2.5V at the MDI for the 10GBASE-T transmitter as summarized in the presentation gupta_1_0504.pdf, and use that as the baseline for defining various transmitter test modes for Draft 1.0
Technical: 75% required

Task Force	Yes	37	No	28	A	10
802.3 Voters	Yes	15	No	13	A	5

The motion failed

The chair adjourned the meeting for lunch. The group is to resume at 1:00pm.

At 1:10pm the chair call the meeting order.

Motion: The 802.3an Task Force adopt MDI return loss as summarized in slide #11 of the presentation gupta_1_0504.pdf: Any reflection due to differential signals incident upon the MDI from a balanced cabling having an impedance of 100 ohms +/- TBD is attenuated, relative to the incident signal, by at least 16dB over the frequency range of 1-40MHz, and at least 16-10log10(f/40) over the frequency range of 40MHz to 625MHz (f in MHz). This is to be used in generating the relevant specification for Draft 1.0
Moved S. Gupta
Second J. Tellado

Mr. Gupta offered some additional comments about the fact this motion does not make any statement about the cable but rather the test conditions.
Technical: 75% required

Task Force	Yes	47	No	0	A	8
802.3 Voters	Yes	19	No	0	A	4

The motion passes

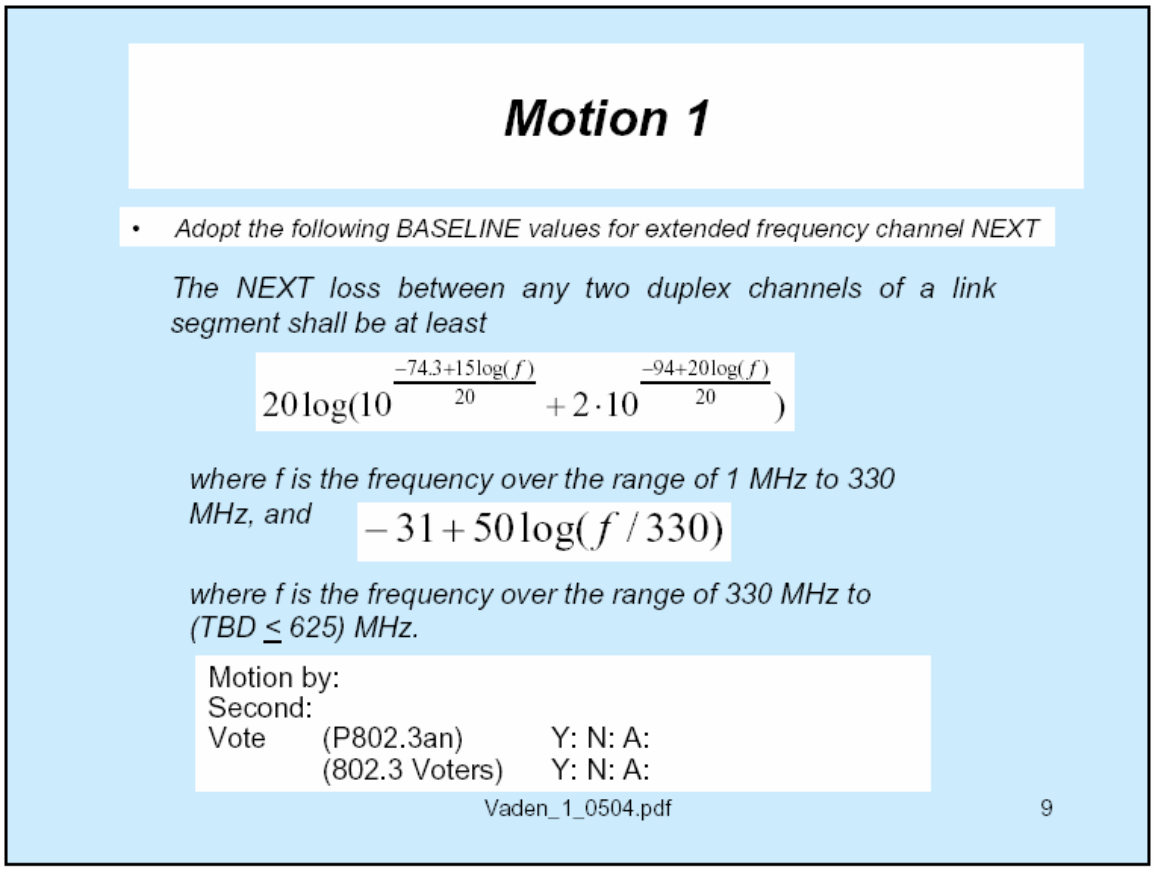
Motion: taken from vaden_1_0504.pdf slide 9
Mover Sterling Vaden
Second Mr. AbuGhazaleh

A point of clarification was added that this motion does not represent feedback from the TR42.7 group but input from a member of the group to 802.3an. Several comments noted that due to the meeting cycles between TR42.7 and 802.3an it was difficult to get direct feedback between the groups in time for this interim meeting. Concern about relationships between the ANEXT and the NEXT being specified here was expressed and discussion followed.

The motion wall called by Shadi G. The chair hearing an objection to calling the question polled the room. The motion to call the question carried.

Task Force	Yes	28	No	21	A	16
802.3 Voters	Yes	15	No	12	A	1

The motion failed



(ed note: This motion was taken from vaden_1_0504.pdf)
Mover Sterling Vaden
Second Mr. AbuGhazaleh

Mr Kasturia suggested that to clarify the motion that the motion reflect the plot. The chair ask for a point of clarification from the TIA representatives if this would be included in a letter from the TR42.7 group. Mr. Vaden noted that the TR42 group had adopted a more stringent motion at the previous meeting in Baltimore. The chair ask the group to use the microphone to make comments. Mr Ungerboeck ask for clarification about why the loss was increasing. Response was that it was a sign convention and would be clarified by inclusion of the plot. Mr. Cobb made a motion to postpone this motion until we have an official response from both (ISO/IEC and TIA) cabling organizations. After some discussion Mr Cobb amended his motion to a motion to table. Moved T Cobb, Second Tom Toutino.

Task Force Yes 24 No 17 A 16
The motion to table passed

Motion: Move that the 802.3an Task Force to limit the upper frequency range to 500MHz for cabling parameters in the link segment specifications.
Moved P. Kish
Second C. DiMinico

C DiMinico spoke in favor of the motion. Mr Adriaenssens spoke against this motion and raised concern that other choices still to be made may require something greater than 500MHz. Mr. Flatman commented that reducing the upper limit from 625Mhz to 500Mhz would be very helpful to the cabling groups. Mr Powell expressed concern about the reduction of the limit. Mr Vareljan also suggested that data beyond 500Mhz would be useful to have. Mr Kish noted that the way cable specification are written the industry they typically. Mr Adriaenssens made a motion to change the upper limit from 500 to 625Mhz. After some discussion the motion was withdrawn. Mr AbuGhazaleh spoke in favor of leaving the 500 figure in the motion. Mr Flatman called the question
Technical: 75% required

Task Force	Yes	32	No	25	A	6
802.3 Voters	Yes	18	No	7	A	3

The motion failed

Motion: Move that the 802.3an Task Force to limit the upper frequency range to 600MHz for cabling parameters in the link segment specifications.
Moved L . Adriaenssens
Second R Nordin

Mr AbuGhazaleh spoke against the motion stating he did not believe that it added that much value. Paul L called the question.
Technical: 75% required

Task Force	Yes	15	No	33	A	10

The motion failed

Mr. Kasturia reviewed the updates he made to his editorial presentation for the group and noted the areas that additional specific presentations are needed.

The chair discussed with the group the procedures for presenting at the next meeting. The chair discussed and established the policy of freezing the presentation 24 hours prior to the beginning of the task force meeting. This will be applied to the next meeting.

Motion to adjoun by T. Dineen.
Seconded by Mr. AbuGhazaleh.
The motion carried by acclamation.

The chair adjourned the meeting at 2:55pm.