

Notes from 10GBASE CX4 Study Group Meeting – February 18 & 19 2003

Meeting opened at 9.15 a.m.

In the absence of the usual secretary, Peter Bradshaw agreed to act as secretary for the meeting.

IEEE Patent Policy was presented. (Dan Dove)

Opportunity was provided for patent disclosure; Bob Grow mentioned that the form is available via ieee.org WEB site.

Meeting Objectives discussed:

- 1) Ensure PAR and 5 Criteria are ready to be authorized at March Plenary
- 2) Review working paper for submission to 802.3WG at March Plenary

Meeting Agenda was presented: Several people, including intended presenters, were hindered from attending by the heavy snow storm on the East Coast. Order of items was adjusted as necessary to try to accommodate them.

Discussed PAR document (as posted) (N.B there will be a 4 month slip if it is not ready by March). There was a copyright issue regarding the IEC reference number for the connector. (Bob Thornton is trying to establish this). It was suggested that the FC reference may be used as backup;

Motion: to Approve draft PAR and forward to 802 & NESCOM for future processing:-

Moved: Schelto van Doorn; Seconded: Tom Gray; Yes 14; No 0; Abstain 1; motion passed.

Discussed 5 Criteria document. (as presented at Roseville Interim meeting).

1. Broad Market Potential. Tom Palkert suggested; '35 participants' should be replaced by 10GBASE-CX4 average attendance and # of companies (~40); replace '10Gbps...' by '10GBASE-CX4'.

2. Compatibility no comment, but Reformatted picture. Will remove PCS compatibility from picture; Bob Grow suggested that we remove PCS/PMA text.

3. Distinct Identity

4. Technical Feasibility Suggest replace 'CMOS' with 'XAUI' in technical feasibility section

5. Economic Feasibility Add 10GFC to IB4X

General; remove known trademarks (e.g. InfiniBand) and replace by e.g. IBx4

Motion to Approve draft as amended and Forward to 802.3 as supporting documentation.

Moved: Peter Bradshaw; Seconded: Jeff Cain; Yes 16; No 0; Abstain 1; motion passed.

Discussed 10GBASE-CX4 Objectives (as from Roseville)

Reviewed, no changes.

Proposal for Signal Detect (Dan Dove)

Implies a SIGNAL_DETECT function on each channel; some clarifying edits to text including specifically 'all lanes' and 'any lane', and a minimum time specification added.

Motion Accept Dan's proposal and direct editor to incorporate into working paper

Moved: Steve Dreyer Seconded: Petre Popescu; Yes 13; No 0; Abstain 1 ; motion passed.

Presentation on Electrical Spec; Steve Dreyer presented (in absence of Ze'ev Roth, held up in NJ by snow)

Loss Budget Team report:

The V_{out} 1V value was used as placeholder.

2 in (5 cm) of FR4; some bit switches may need a retimer, or extra back out, for more FR4.

Study Template is at TP0, with package models and XAUI device driver models giving

waveforms (all simulation). CX4 Spec will be at TP2.
Ze'ev performed propagation through FR4 & plug & jack, with pre-emphasis (45-55%),
rise time range (70-130psec). At TP2, limit waveforms fall out of 'original' template;
recommended go to 52% nominal pre-emphasis, fits better in 'nominal' template at TP2.

Proposed spec alterations: put in 800mV for Xmit level

Motion to accept proposed TP2 transmit template from Updated Electrical Specs paper for the
working paper with spec amended with 800 mV pp dif for minimum transmit level

Moved Schelto van Doorn; , Seconded Steve Dreyer; Yes 14; No 0; Abstain 1; motion passed;

Motion to accept proposed receive specs with editing replacing TP4 by TP3 and insert in working
paper.

Moved Peter Bradshaw Seconded Steve Dreyer; Yes 13; No 0; Abstain 1; passed

N.B. Before breaking for lunch:- Fee for meeting is \$85 per attendee re Jeff Warren.

Lunch, reconvened at 1.40 p.m.

Presentation by Takeshi Horie Fujitsu

Feasibility of TX template

Test chip Eye at TP1 and at TP5, with 0.5m, 5m, 26AWG 10m, 15m 26AWG

Presentation by Howard et al on initial draft

Cover Page discussion; Bob Grow

Clause 30; Annex B (from Mr. Law) (c.f. enumerated value)

Clause 44

Clause 45 (one minor edit)

Clause 48

Clause 54 Main Editing session.

Transmitter

Absolute Voltage limits replaced by common mode output range -0.4 to $1.9V$,
test circuit modified to measure before capacitors

Minimum Output swing to 800 mV (on normalized 1.0 value from template)

Will need external input for URL for Tx template.

Long discussion re Random Jitter to be less than $0.09UI$ peak (4.1 psec rms);

does not allow trade-off between cycle-2-cycle (averaged DJ) and RJ. Deterministic Jitter
assigned to template, pulled out again, to allow tradeoff. Agreed to keep current numbers, & add
note that transmit jitter allocation will be subject to continued analysis and will be reconsidered at
the March meeting. (~1.5 hour)

Receiver; return loss essentially copied from transmitter section. Jitter tolerance
related to transmitter section, plus worst case compliant channel, and additional sinusoidal jitter.

Meeting adjourned at 6:50 p.m.

Wednesday, Meeting re-opened at 8:20 am

Estimated Timeline presented by Dan Dove for approval (essentially as presented before)

Expect to finish working paper Draft 1.0 in Mid March, WG Ballot late March, leaves April for
comments, 35-40 days approval; sponsor Ballot in July, Final Approval in September.

(Emphasized that group MUST get it right!!)

Agenda adjusted.

Changes to Working Paper as agreed yesterday; Howard Baumer reviewed beginning items.

Interrupted by next item:-

Physical Layer Specifications Chris DiMinico called in to present Paper on Physical Layer Specifications.

Return Loss data; 10 & 15 m data is measured, others were simulated.

NEXT limit (several transmitters next to each receiver) and

MDNEXT (multi-disturber) data discussed

MDELNEXT (PSELFEXT) (multi disturber equal level); Chris said the data is not quite correct, used a non-worst-case cable, but corrected for worst-case channel, needs adjustment, should be small)

Chris made suggestion to remove section 54.8.3 on loss deviation.

Continue with Working Paper adjustments

Cable Assembly: New numbers from Chris Diminico's presentation inserted in Tables.

Discussion of Insertion Loss Deviation; removal from spec. of section 54.8.3

Motion: On advice from leader of Cable Assembly team, to remove section 54.8.3 from the working paper.

Discussion: Peter Bradshaw expressed concern over a future cable with very different characteristics not being equalizable. Chris Diminico (by phone) expressed that there is not enough data to fill it in.

Moved Schelto van Doorn Seconded Steve Dreyer; Yes 13; No 2; Abstain 1; motion passed

Jeff Cain presented information on the power spectrum of data between 2 GHz and 3.125 GHz. Agreed all specifications will reflect 2 GHz as the upper frequency.

Connector 10GFC Connector group has called connector SFF-3470; CX4 will use latching mechanism. Plug picture will exclude proprietary features. 'Receptacle' used instead of 'Jack'

Electrical Measurement.

Edits were made to jitter specifications.

Some discussion of crosstalk effects; the CJPAT pattern has the same pattern on each lane.

Minor edits on Environment to avoid inapplicable sections in 14.7

Any problems need to be found if possible BEFORE March, since otherwise they will need to be justified to the 802.3 Committee.

PIC section will be left to the editor.

Motion: having achieved a complete document, approve changes to working paper, instruct editor to make necessary editorial changes to prepare for pre-submittal to IEEE 802.3 working group
Moved Peter Bradshaw; Second Jeff Warren; Yes 16 No 0 Abstain 0; motion passed

Motion: to instruct the Study Group Chair to pre-submit our PAR, 5 Criteria, Objectives and Working Paper Version 3.1, as appropriate, to the IEEE SEC, 802.3WG, and NESCOM for review prior to the March Plenary.

Moved Howard Baumer Sec Tom Palkert; Yes 16 No 0 Abstain 1; motion passed

Motion: Having generated a high level of visibility to the work done by this study group, and a high level of contribution by many contributors in the last 4 months: Request 802.3 approve the submission to an initial working group ballot in 10GBASE-CX4 following Par approval by the IEEE standards board.

Moved Jeff Cain Seconded: Peter Bradshaw Yes 16; No 0; Abstain 1; motion passed

Motion to adjourn Moved Ze'ev Seconded Steve Approved unanimously.

802.3 10GBASE CX4 Study Group Meeting Attendees:
February 18 & 19 2003

<u>Name</u>	<u>Email</u>	<u>Tu</u>	<u>Wed</u>
Bob Thornton	bthornton@fcai.fujitsu.com	X	X
Takeshi Okuyama	tokuyama@fcai.fujitsu.com	X	X
Bob Grow	bob.grow@ieee.org	X	X
Tom Palkert	tomp@amcc.com	X	X
Takeshi Horie	horie@fia.fujitsu.com	X	X
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Jeff Warren	jwarren@extremenetworks.com	X	X
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Schelto van Doorn	scheelto.vandoorn@intel.com	X	X
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