

## Tentative Minutes of the IEEE P802.11 Working Group

**Plenary meeting  
Vancouver, BC, Canada  
March 7-11, 1994**

**Monday, March 7, 1994, 3:30 PM**

The meeting was called to order at 3:40 PM Vic Hayes, chairman IEEE P802.11<sup>1)</sup>, in the chair. John McKown vice-chairman, Carolyn Heide secretary. Tim Blaney managing document originals and copying, John Rosdahl managing distribution and pigeon hole organization. Leon Scaldeferri handling the attendance list. The agenda document for this meeting is 802.11-94/33.

### Objectives for this meeting (PTO)

1) The officers of the Working Group are:

**Mr. VICTOR HAYES**

Chairman IEEE P802.11

AT&T Global Information Solutions

Zadelstede 1-10

3431 JZ Nieuwegein, NL

E-Mail: Vic.Hayes@Utrecht.ncr.com

Phone: +31 3402 76528

Fax: +31 3402 39125

**Mr. Dave Bagby**

Chair IEEE P802.11-MAC group

Advanced Micro Devices

P.O. Box 3453 MS 17

Sunnyvale, CA 94088, USA

Phone: +1 408 987 2423

Fax: +1 408 987 2800

E-Mail: david.bagby@amd.com

**Mr. Greg Ennis**

Editor IEEE P802.11

16331 Englewood Av.

Los Gatos, CA 95032, USA

Phone: +1 408 356 4775

Phone: +1 408 356 4775

E-Mail: gennis@netcom.com

**Mr. John McKown**

Vice Chairman IEEE P802.11

Motorola

50 E. Commerce Dr.

Schaumburg, IL 60173, USA

E-Mail: mckown@wes.mot.com

Phone: +1 708 538 5235

Fax: +1 708 538 5251

**Mr. Larry van der Jagt**

Chair IEEE P802.11-PHY group

Knowledge Implementations Inc.

32 Conklin Rd

Warwick, NY 10990, USA

Phone: +1 914 986 3492

Fax: +1 914 986 6441

E-Mail: kiilvdj@attmail.com

**Mr. Kerry LynnN**

Editor IEEE P802.11

Apple Computer Inc.

Infinite Loop MS 301-4J

Cupertino CA 95014, USA

Phone: +1 408 974 2394

Fax: +1 408 974 9793

E-Mail: kerlyn@apple.com

Vacant

Secretary IEEE P802.11

**Mr. Bob O'Hara**

Editor IEEE P802.11

Advanced Micro Devices

P.O. Box 3453 MS 70

Sunnyvale, CA 94088, USA

Phone: +1 408 987 2421

Fax: +1 408 987 2814

E-Mail: bob.ohara@amd.com

**Mr. James E. Schuessler**

Editor IEEE P802.11

National Semiconductor

P.O. Box 58090 MS D-3969

Santa, USA

E-Mail: fygs@ralvmg.vnet.ibm.com

Phone: +1 919 254 4584

Fax: +1 919 254 5410

Objectives:

**PHY subgroup**

- Complete the MAC/PHY interface presentations
- FH-PHY
  - preamble length, headers, scrambling/stuffing, etc.
  - clear channel assessment (CCA) criteria and methods
  - close template
  - Tx/Rx switching times
  - update the template
- DS-SS PHY
  - CCA paper for FH/HS-FH
  - tst draft sections 8.4.1
  - attempt to close template
- HS-FH PHY
  - select modulation
  - speed switch preamble specification
- IR PHY
  - to close acceptance of submissions for consideration as the first draft standard

**MAC subgroup**

- MAC/PHY interface issues
  - adopt functionally complete MAC/PHY interface
  - close all issues in issues log related to MAC/PHY interface
- Determine final set of any additional MAC functionality for first letter ballot
  - consider and decision on new proposals
  - clarification of the "you could..." portions of 93/190
- report from simulation adhoc group
- report from MAC editing group, review draft
- tutorial to PHY group
- check foundation protocol vs issues list

**1. Opening**

**1.1 Roll Call:** People in the room were invited to introduce themselves.

**1.2 Voting rights:** Voting tokens were distributed in the attendance book to be picked up by voting members during attendance list circulation. There is a paper describing voting rights and information for new members, IEEE 802.11-92/00, 00.1 and 00.2.

Voting at the working group level is by voting members only. To become a voting member:

- participate in at least 2 out of 4 consecutive plenary meetings. Voting rights start at third meeting
- participation in at least 75% in meetings, in the room
- one interim may be exchanged for a plenary
- to vote you must have the token provided in attendance book

Current membership:

- 104 voting members (Vic is going to ask non-attending members to give up their rights to make it easier to get a quorum at interims)
- 28 nearly members
- 80 aspirant members

Voting at the sub-group level depends on chairman (normally everyone can vote)

**1.3 Attendance list, Registration:** The attendance list was distributed - 75% attendance according to the attendance list is required to qualify for attending the meeting as a whole, so make sure to sign the book. Copies of the attendance list are handed out before the end of each meeting.

- important for administration of voting rights that the attendance book is used properly.
- sign per meeting (morning, afternoon, evening)
- place initials. Do not cross or underline.

**1.4 Logistics:** Document distribution is done using pigeon holes - you will find your copies and messages in the referenced location in the expanding file folders in the slot *in front of* your name.

Document distribution:

- via pigeon holes, this makes sure you receive only one copy of handouts
- pigeon holes are file folders with a letter id on each folder
- in each folder are numbered slots, each of which is 'owned' by a person
- each person owns slot in front of number

Coffee breaks at 10 AM and 2:30 PM. Lunch noon to 1 PM

## 1.5 Other announcements

### 1.5.1 Document Distribution

Vic has been thinks about doing the mailing in electronic form. Bob O'Hara has been helping him look at ways to distribute the standard and issues document without souring costs to a single organization. They found it was possible to economically copy and send diskettes.

Proposed plan:

- to send as much as possible on diskette (3.5", 1.44 Mbyte DOS format, non-compressed)
- use Word-for-Windows v2.0c and PowerPoint v3.0
- send paper copies of papers that can not be made available on diskette
- include cover letter with document list and directory

#### Discussion:

Jim Schuessler: great idea. But draft is currently too big for one floppy. Compressed it's about 1/2 Megabyte. We would have to use a public domain compression program, perhaps send the decompressor with the first version. Worried that anyone can alter a .DOC file and purport that they got it that way. PostScript files would be better protected against that.

There is a general objection in the room that some people can't do .DOC files, while others can't do PostScript.

Kerry Lynn: Word-for-Windows has some problems - sometimes with illustrations, sometimes formatting changes on different machines, sometimes with formatting across MAC/DOS transfers. The paper copy handed to the chair is the definitive copy, so PostScript is convenient. How many people have no convenient access to an FTP site [about 35% of people in the room say they don't] - that is the fastest method of distribution.

Bob O'Hara: how many don't have access to Internet email [number in room is very small, but others say that is much too expensive to download on those public services]. There is the document subscription service - but the FTP server is the fastest way.

Ed Geiger: on UNIX type systems that access email there are some utilities that let PostScript files by spilt and compressed which may reduce the size of the problem. Some mailers don't like big files and the standard will get big.

Bob?: PostScript should be the driving document format for a secure version. Others who can't get them that way (cost) could get them mailed.

Larry van der Jagt: DOS disk is the cheapest most universal approach. It takes forever to get these files over a slow email rate. Floppy disk is the cheapest [others in the room agree]. Also, PostScript is not necessarily safer, it can be edited too.

Jim Schuessler: the 'right' way is all of these methods. PostScript is the best format, documents should be emailed, on the FTP server and mailed. For a while compressed version will fit on one disk.

Dave Bagby: problem is one of cost. This costs Vic a lot and if he can't do it, it should be added to the meeting fee. If you can't foot the bill, then you just can't. Multiple methods will probably come out more expensive in time than just sending paper.

Vic: subscription service is available to get paper copies

Wim Diepstraten: using a self-extracting file, one for DOS and one for Apple solves compression problem.

Vic: like to get small group - Kerry Lynn, Jim Schuessler, Bob O'Hara, Bob Crowder to discuss best way to do this. [In the room there is good support for limiting paper distribution and going to floppy.]

### 1.5.2 Special

Presentation to Larry van der Jagt for his hard work for 802.11.

### 1.5.3 Notice of Call for Articles, by Paul Eastman

IEEE Micro magazine (computer society) in next issue has a call for articles on wireless computing. Anyone interested contact Steve Diamond through the IEEE office.

Tom Baumgartner says if that is the notice he is thinking of the articles are due by March 26.

## 2. Approval of the minutes of the previous meeting

**2.1 San Jose meeting, Document IEEE P802.11-94/26:** approved by consensus

**2.2 Matters arising from the minutes:** none.

## 3. Reports

### 3.1 Report from the Executive Committee, by Vic Hayes

- Technical Plenary, Wed AM
  - Multimedia, how many interested? Give up a room?
- Operating rule review group
  - Quorum issue?
  - meet tonight
- Update LMSC Active Projects Workplan
- International Participation Fee
  - 120 k for 802, 40 k for POSIX, 300 k for ANSI
- Operating rule review group
  - Major issue # 1
  - Representation of WG discussion/decision by WG chair at sec (802.0)
    - chair authority without responsibility
    - perspectives: 802.N, 802, (IEEE, IT Industry)
    - Technical and economical/political issues
  - Open meeting, for observers
  - Meets 5-? Chart room

Quorum issue: at interims would like to relax a quorum from 50 to 40% of voting members. Vic asks Paul Eastman if this is an appropriate group to take it to? Paul says yes, if submitted in writing to the group that sits in about 1/2 hour from now.

#### Discussion:

Jim Schuessler: the root problem is not getting binding votes at interim meetings. Isn't making it easier to loose membership the better way to solve the problem?

Kerry Lynn: echoes Jim. People who don't attend 4 meetings (interim and plenary included) - their opinion is of no value in a vote, they should loose their voting membership.

Dave Bagby: maybe some number of plenaries - 2 plenaries, instead of 4 meetings.

John McKown: (1) what freedom do we have to the change rules - can we propose any we want? Some groups say that a quorum = 1/2 average of voting members at the last 3 meetings for instance. (2) In Vic's opinion, will limiting voting rights this help enough. (3) the object is to enable binding votes at interims, it seems peculiar to have that based on the attendance at the plenary.

Vic: answers: (1) Rules say bylaws can specify any number they want for a quorum as long as it is agreed upon. We can ask this group to do anything. (2) 4 meetings - that was the last proposal - it needs discussing more. 2 out of 4 consecutive meeting where one has to be a plenary maybe is a good idea.

Kerry: suggest using the same ratio of attendance to loose voting as to get them. Loose voting after the third meeting, just like getting rights. "Participate in at least 2 out of 4 consecutive WG meetings (plenary and interim), voting starts at third meeting. Must be maintained by attending 2 out 4 consecutive WG meetings."

Dave B: we should go to the committee and say this is our problem, what should we do to about it.

Paul E: this is a bad idea. Some people can only afford to go to plenaries and they shouldn't be punished for it. Will take whatever this group wants to the adhoc group, but personally thinks it shouldn't change. If we go by what was just suggested, a person gets back their voting right the meeting after they lost it.

Bob Crowder: lower quorum is a better solution [others agree] It would also get implemented faster, immediately instead of four meeting from now.

**Motion #1:** ~~To lower the quorum at interims to 35%.~~

**Amended:** 802.11 will be bound by decisions made at 802.11 interim meetings if at the interim meeting there is a quorum. At an interim meeting a quorum will be defined to be  $\geq 50\%$  of the average number of voting members who attended the previous 3 802.11 meetings.

Moved by: Larry Zuckerman

Seconded by: Leon Scaldeferri

#### **Motion 1 Discussion:**

**Motion #2:** To amend motion 1 to: 802.11 will be bound by decisions made at 802.11 interim meetings if at the interim meeting there is a quorum. At an interim meeting a quorum will be defined to be  $\geq 50\%$  of the average number of voting members who attended the previous 3 802.11 meetings.

Moved by: Dave Bagby

Seconded by: John McKown

#### **Motion 2 Discussion:**

Larry van der Jagt: clarification - we are going to suggest this to the excom as changing the operating rules for 802?

Dave B: don't know what 802 wants to do, thought that this is a way for us to get work done. Unless excom says we can't do this ourselves.

Vic: we are bound to the 802 operating rules.

Larry vdJ: calls the question. Seconded by Tom Baumgartner. (No nays)

Approved: ayes      Opposed: no nays      Abstain: -

**Motion #2 passes**

#### **Motion 1 Discussion (con't):**

Larry Zuckerman: thinks there is an unintentional math problem here. For example: plenary-40, interim-45, plenary-50. Average is 47. If next interim 50% of 47 would be 24. This is too low. Was that the intention?

Dave B: don't know.

**Motion #3:** To amend motion 1 by changing 50% to 90%, and saying 'participated' rather than 'attended'.

Moved by: Larry Zuckerman  
Seconded by: Kerry Lynn

**Motion 3 Discussion:**

Greg Ennis: agrees original 50% is too low, but 90% is too high. This all came about because it was difficult at the San Jose meeting to achieve a quorum. 90% is too high so the same situation will occur.

Steve?: 75% might work, but what are the real numbers?

Vic: normally less voting member at interims than plenaries.

Bob Egan: 802.11 should be removed from the motion too.

John McKown: a quorum is not to ensure that everyone is represented, but to make sure that the meeting is not pirated by a small group. If the object is to make interims count, then 50% is the number. Everyone has a chance to come to them just as plenaries. If the number is set high, we are holding back what we are trying to achieve. The percentage requirement should be high enough that a non-representative minority would have trouble forcing its own decisions. 90% might help, but the plenary/interim/plenary weighting must be compensated for.

Larry vdJ: this committee has established rules for issues processing that are under our control. Those are the only things that control what our interims can and can't do. Nothing says a quorum is required to move a document forward. We are talking about our own internal rules stopping us from doing things at interim meetings. Proposing asking 802 to solve a problem we made ourselves.

Approved: one aye    Opposed: many nays    Abstain: -

**Motion #3 fails**

**Motion #4:** To strike '802.11' from the amendment.

Moved by: Bob Egan  
Seconded by: Leon Scaldeferri

**Motion 4 Discussion:**

Jon Rosdahl: do we make up our own rules at interims, 802 doesn't tell us how to act there? If we pass this these, they are our rules and we are just inform 802 what we are going to do?

Dave B: the previous discussion is irrelevant - we are discussing what to ask 802. The motion says what it says. Calls the question. Seconded by Wayne Moyers (no nays)

Approved: 3 ayes    Opposed: many nays    Abstain: -

**Motion #4 fails**

**Motion 1 Discussion (con't):**

Bob E: what are we discussing? The agenda item is what to bring to 802.

Vic: chair rules this motion out of order because it is to amend 802.11 operation and we are talking about what to bring to 802 operating rule review group. On that subject we couldn't come to a conclusion about what to take in short time available, so proceed with report.

**Motion #1 ruled out of order**

- Conformance standards
- Renewal of contract with CCI
- ARCNET
- Conformance Test Policy
  - Present policy
  - LMSC supports C.T> policy of JTC1

- write Abstract Test Suites (A.T.S.), Protocol Implementation Conformance Statement (PICS) (Use TTCN as applicable)
- Proposed Policy
  - support PICS on all LMSC standards
  - Write A.T.S. if deemed useful
- Needed action
- approve C.T. policy on Thursday
- respond to North American Open System Test/Certification policy council request
- Discuss implications of proposed policy shift in WG/TAG:
  - > are there any risks?
  - > how do we continue to assure interoperability?
  - > what is our response to JTC 1 conformity assessment initiatives
- IEEE staff input
  - Books for distribution
    - 802.1f Definition & Procedures Management info
    - 802.6c&h DS1 PHY layer convergence Procedures (Suppl) Isochronous over the MAN
    - 8802-6 6 + 6d and 6f
- Schedule:
  - Wednesday: registered voting members of WGs 1-5 PM
  - Thursday: all registered from 9 AM, if any left over
- Foreword update
  - including switching
- Template availability in Word for Windows
- New staff
- List of registered consultants
- Improper Publication
  - Do not claim conformance to standards that do not exist yet
- 802.1 Multimedia Task Force
  - To better understand the multimedia comm. requirements and how mm traffic can be seamlessly transmitted over 802 class LANs
  - Developing bandwidth allocation for multimedia services on 802 class LANs
  - Tuesday evening tutorial
- 802.1 Multimedia Task Force, Wednesday morning 802.1 technical plenary
  - Overview & other standards work
  - bandwidth allocation
  - bandwidth allocation for high priority traffic in 100 VG-AnyLAN
  - FDDI-Sync bandwidth allocator
  - MM on the Internet
  - IMA Networking activities
- Wednesday PM (802.1 meeting)
  - Discuss MM impact on local / remote bridging
  - Discuss bandwidth allocation in 802 LANs

### 3.2 Financial Report from San Jose meeting, by Wayne Moyers not available yet

### 4. Registration of contributions to be presented - list is in pigeon holes already

### 5. Adoption of Agenda (94/33):

Kerry Lynn is worried about having only 4 hours for the joint MAC/PHY. Lengthening it should be discussed since the purpose of this meeting is to work out MAC/PHY issues.

Dave Bagby agrees with Kerry, but doesn't know how much time is needed for joint work until after he has conferred with the MAC group. Thinks the agenda should be left flexible.

Larry van der Jagt thinks a small group could meet in the evening to discuss the MAC/PHY interface. Kerry suggests that this discussion be added as a point to the new business agenda item, and it is.

There are no objections to the agenda now - **agenda approved by consensus.**

## 6. Unfinished Business:

### 6.1 Comments on updates of draft Standard

Tom Baumgartner: what is this item for? Line items in draft?

vice: this was created to help Francois Simon with problems with draft standard text.

Carolyn Heide: are we talking about the email sections sent out last week, or stuff mailed out, or hard copy handed out here?

Dave Bagby: has the same quandary. Let's defer to Thursday, at least, since there is a paper just handed out now.

Agenda item moved to Thursday afternoon.

### 6.2 Intellectual property statement

Vic explained patent policy as usual.

## 17. Re-confirmation of Officers:

### 17.1 Secretary and Editors

- Carolyn Heide has resigned as secretary. There are no volunteers, so the working group has no secretary.

- editors: There were several people listed as editor previously, but only Francois Simon was doing anything, and he resigned. Bob O'Hara has volunteered.

#### Discussion:

Jim Schuessler: wonders what is the goal of editors? There are several listed on front of minutes, all with equal functions.

Vic: at that time we took all volunteers, but only Francois ever did anything.

Jim S: one editor should be the keeper of the document, the final editor.

Vic: yes. That is the right way.

Paul Struhsaker: each subgroup has an editor all ready. There are 3 drafts out there already for each of the adhoc groups. The editor-in-chief is the question here.

Dave Bagby: issues - need people called editors to get draft standard in shape. A small team of people, less than 5 that can work together. Don't care who is editor in chief. Get group together and let them decide who keeps the document. Remember that the editor doesn't invent text from scratch - group provides text to editors, they format and style and note open items. They don't do all of work.

Ed Geiger: editor of draft makes up no text on his own. All text is approved in plenary and written in groups. The editors only format into standard language and do appearance, not content.

Dave B: why should we go from multiple editors to one?

Vic: for 2 years people wanted to see editor behind their name, but only Francois did the work.

Paul S: that won't happen now - it's later in the process.

Vic: asks question and gets more ayes in favor of a group of editors then for one.

Dave B: should be only a few - 2 or 3.

Jon Rosdahl: sort of an editorial committee with a chair.

Peter Chadwick: how many PHY documents are we to produce - we should have one editor per document. Different documents for each PHY type and one for MAC. One editor for each.



Jim S: don't mind sub-editors for different sections. But these aren't separate documents - one document only.

Kerry Lynn: small team of editors the right way.

Bob O'Hara: if there is a small team of volunteers then that team should do it. The issue log editor is a separate thing.

Standard editor applicants: Bob O'Hara, Kerry Lynn, Greg Ennis, Jim Schuessler. It is left to them who owns the document up to the group

Kerry Lynn volunteers to be editor of the issues log.

**Motion #5:** To approve editors list by acclamation

Moved by: Dave Bagby

Seconded by: Tom Baumgartner

**Motion Discussion:** none

Approved: ayes      Opposed: no nays      Abstain: -      **Motion #5 passes**

## 17.2 Vice-Chair

John McKown is available for continuation, and re-elected by acclamation.

## 17.3 Subgroup Chairs

Subgroup chairs - Dave Bagby and Larry van der Jagt are willing to continue.

**Motion #6:** Establish position of vice-chair for MAC and PHY subgroups.

Moved by: Kerry Lynn

Seconded by: Bob Egan

**Motion Discussion:**

Kerry: Robert's Rules state that chairman of a group cannot participate in debate and if they do the chair must be yielded. So we need vice-chairs so our technically astute chairs can participate. [reads Robert's Rules article 10 section 50.]

John McKown: speaks against - argument that a temporary chair should exist doesn't imply need for elected vice-chair as the only person who can do this. That wording assumes a large sea of qualified persons from which to choose officers. Not a lot of committed people are available here. The chairs must participate, but don't think we have to formalize it, it has been working very well.

Wayne Moyers: gives a logical line of succession if the chair can't be there.

Bob Egan: calls the question, seconded by Leon Scaldeferri. (only one nay)

Approved: 34      Opposed: 13      Abstain: 15      **Motion #6 passes**

MAC subgroup: chair = Dave Bagby; vice-chair = Kerry Lynn

PHY subgroup: chair = Larry van der Jagt; vice-chair = Jim McDonald (Peter Chadwick nominated but refuses nomination)

**Motion #7:** To approve these positions

Moved by: Paul Stuhlsaker

Seconded by: Colin MacNabe

**Motion Discussion:** none

Approved: ayes

Opposed: no nays

Abstain: -

*Motion #7 passes*

Vic states that officially added to the vice-chair responsibility is default secretary when no one else will do it.

#### 17.4 Working Group Chair

John McKown takes chair for 802.11 chair re-elections, Vic leaves the room.

**Motion #8:**                      **To reelect Vic as chairman of 802.11 .**

Moved by:                      Peter Chadwick

Seconded by:                  Jan Boer

**Motion Discussion:** none

Approved: ayes

Opposed: no nays

Abstain: -

*Motion #8 passes*

### 7. New Business

#### 7.1 Number of PHYs, by Dave Bagby

Noticed, and others have commented, that a lot of different work is going on in different PHYs. Would like to start a little discussion of - if, and if so when, the fragments of various PHY efforts are going to coalesce. We are supposed to get a letter ballot out in November - concerned about resources devoted to separate efforts. Would Larry van der Jagt address how and when and what is plan to get them back together and get a draft out.

Larry van der Jagt: formally chartered FH, DS, IR and channel modeling and conformance testing to be adhoc groups. The reason for DS and FH - in ISM band, which is not our band, there are all kinds of people in it. Some applications are suited for DS and some for FH. The choice was whether to fight it out for DS or FH in 2.4 GHz ISM band, or agree that if application needs which drive each, someone will do it in this band - so it would be better if the interferers out there would be us. Better to deal with ourselves than others. IR, that's a totally separate band, non-interfering. reason for the HS-FH adhoc group - when we take something to plenary and it gets approved, like the 1 MHz GFSK as a base standard, we would like to have higher rates as for further study. That was unanimously approved by the working group- the first is the base standard, the other group is studying what we might do in the future for a higher data rate. There is no commitment as to what that effort outcome will be. We have FH and DS, and people studying what else we could do.

Dave B: that matches what I recall, except I would bet that there are some people in the HS-FH study group who have a different opinion. They think they are building a different PHY. Also heard that DS is looking at 1 Mb and 2 Mb. Reality check - multiple PHYs is good, but a 1 and a 1.4 Mb in the same frequency band is unreasonable. The market won't support it.

**Motion #9:**                      **The 802.11 PHY sub group is directed to accomplish the following tasks during this week's meetings:**

- 1: To re-focus it's work and to resolve the conflicts which have resulted in multiple, similar PHY development efforts for the 2.4 GHz ISM band.**
- 2: At the 802.11 plenary session, on Thursday of this week, the PHY group is to:**
  - a) Recommend no more than one DS and no more than one FH PHY in the 2.4 GHz ISM band.**
  - b) Report on what bit-rate is recommended for each PHY type, why the recommendation is made, and the major issues that were involved (including relevant intellectual property issues).**
  - c) To move for 802.11 formal adoption of their recommendations.**

d) Once recommendations are adopted, to cease working on additional DS or FH PHYs for the 2.4 GHz ISM band.

Moved by: Dave Bagby  
Seconded by: Jim McDonald

**Motion 9 Discussion:**

Larry vdJ: to the process - we are putting together draft documents that get balloted by 802.11 as a whole. Have to get 75% approval to advance beyond this forum. All no votes must be resolved after that. Another balloting group when it goes to ISO, and each time this all comes back down to us to be fixed. If you have too many options you don't have a standard (is the sentiment at all these other levels). Options have to be justified very strongly. So consider what we will have to go through - a lot of people outside this forum say why so many options what are you going to do about this.

**Motion #10: 10 minute recess**

Moved by: Bob Egan  
Seconded by: Ed Geiger

**Motion 10 Discussion:** none

Approved: few ayes Opposed: many nays Abstain: -

**Motion #10 fails**

**Motion 9 Discussion (con't):**

Bob Egan: PAR doesn't say 2.4 GHz, and other than single channel it only refers to wireless?

Kerry Lynn: reads from the PAR - it says radio spectrum PHY and other PHY layers may be considered at a later time ... basically says ISM band first.

Bob E: this is much more specific than what the PAR of this group has been approved to do. This motion is too specific.

Kerry: PAR says radio first, IR if time. In radio concentrate on ISM first.

Dave B: wrote 2.4 ISM band to recognize a market reality that we can't have a business success if we have multiple FH or DS when their rates are very close. Since we agreed to concentrate on 2.4 first. [everyone agrees that we agreed on 2.4]

Wayne Moyers: in objection to this motion. Standard is different from market demands. Rates in excess of 1.4 Mb must be addressed - it will be shown that those rates are compatible with a baseline that has been adopted. This adhoc group has not attempted to change the base, only to add embellishments to increase market acceptance. Meetings attended by as many 50 to 60 people and meet with about an average of 25 people. Have had as many as maybe 30 submissions, 9 on agenda now. A lot of interest that would be frustrated by disbanding this group.

Jan Boer: the DS group is working on one DS PHY. Two bit rates have been defined - the point there is, is the MAC supporting 2 rates?

Juan Grau: Proxim is interested in higher data rate PHYs - is very conscious of customer requirements for these higher rates, and trying to present proposals for one PHY that provides higher rates. It was guaranteed to the group that there would be an effort to move forward on higher rates. 1 Mb was a compromise as a starting point. We are trying to provide the MAC with representation of the state of the art. Allow us to finish our work and present it to plenary.

**Motion #11: To amend motion 9 to say at (b) report on what bit rates are recommended.**

Moved by: Steve ?  
Seconded by: Paul Struhsaker

**Motion 11 Discussion:**

Larry vdJ: calls the question, seconded by Mike Fisher (no nays)

Approved: 29

Opposed: 22

Abstain: 10

*Motion #11 fails***Motion 9 Discussion (con't):**

Naftali Chayat: one FH PHY can mean a set of rates. In modems we have families of rates. If we can achieve similar goal in FH, then it will be one consistent proposal. Not proper to limit ourselves to 1 Mb.

Mike Rothenberg: the motion was generated because of (1) time table and (2) market acceptance. Agree with (1), a certain deadline should be enforced. (2) - not sure that Dave is right. Thinks Dave is not aware that important progress has been made in DS and FH to determine that the bit rates are organically linked - one modem supporting different speeds. That they have reached this point of compatibility. Strengthen the deadline and let people who have the technical architectural skills do their jobs.

Dave B: observes that the speakers all assume that this motion is aimed at eliminating their favorite flavor of PHY. This says resolve your differences and bring us the result. It speaks for no rate - it says we should have one thing in a standard. Determine what that is and tell us. It says in the 2.4 band recommend only one FH and one DS. It says nothing about what gets done later in any other band. These are my opinions, but they are based on experience and customer feedback. A standard shouldn't have anything that smacks of venter implemented fields in it - that is a way to say I didn't like the standard decision and want to get away from it. Just create a another chapter and standardize what some people are already making is wrong. Modems can do it and we can to - that is point to point and we aren't. This motion is aimed at focus and timely release of a standard.

Peter Chadwick: sees nothing in the motion that prevents the committee from later producing other varieties. Calls the question, seconded by Colin MacNabe (36,18,5)

Approved: 31

Opposed: 24

Abstain: 8

*Motion #9 fails*

Dave Bagby asks for a ruling as to whether the motion was technical or procedural. Chair rules it technical. Dave appeals ruling but gets no second.

**7.2 Time to Discuss MAC/PHY Interface, by Kerry Lynn**

Kerry took a straw poll on Thursday evening on the reflector, got about a dozen replies. Now at the point where MAC/PHY interface may have to be a primary order of business. The straw poll said how many would like to address the MAC/PHY interface: (1) about 4 hour a meeting like we do now; (2) more time together as the full group; (3) form a small adhoc group.

**Motion #12:**                      **To establish small adhoc groups to resolve MAC/PHY interface issues.**

Moved by:                      Kerry Lynn

Seconded by:                      Bob O'Hara

**Motion 12 Discussion:**

Dave Bagby: concerned that people who are qualified to deal with MAC and PHY are the same bodies that must be in MAC and PHY meetings. In evenings this week would be ok. But cannot compete for people's time. In MAC group we need to finalize MAC/PHY interface. Small groups are more productive.

Kerry: skeptic that all MAC/PHY interface issues can be resolved at this meeting. Evenings at this meeting, but don't want to limit it for later.

Dave B: couldn't support this now, because we decided to deal with MAC/PHY issues in the MAC group this week. The need for this group should be gone by Thursday.

Paul: the DS group has MAC/PHY interface as an issue this week also. At least a third of the time will be spent on it this week. Agrees with Kerry - a small group should do this.

Ed Geiger: agrees with this from the FH point of view. Management things that are not being addressed by the MAC. Also need to give the PHY group some direction from the MAC. There are issues specific to one PHY versus another that need to be dealt with in a smaller group of experts.

Mike Fischer: supports concept. Problems with and discrepancies between views of this issue come from how segmented this development has been so far.

**Motion #13:**                      **To amend motion 9 to say 'group'**

Moved by:                      Mike Fisher  
Seconded by:                  Phil Belanger

**Motion 13 Discussion:**

Phil Belanger: useful work will take place when representatives from different groups get together. One small group of representatives from each area would force dealing with hard problems as soon as possible.

Kamilo Feher: at the MAC tutorial, Wim Diepstraten stated that MAC is designed to accept multiple rates. Valid proposals going up to 2.4 Mbits exist now. As long as the one group focuses only the multiple rate issues is in favor.

Dave B.: notes that data rate is not in this motion at all. Calls the question, seconded by Mike Fisher (no nays)

Approved: ayes              Opposed: no nays              Abstain: -                      **Motion #13 passes**

**Motion 12 Discussion (con't):**

Phil: calls the question, seconded by Dave Bagby (no nays)

Approved: ayes              Opposed: no nays              Abstain: -                      **Motion #12 passes**

Kerry Lynn nominated to convene group. Tomorrow evening.

**8. Adjourn for subgroups - 7:10 PM**

**Monday Evening, 7 March, 1994**  
**PHY-DS, PHY-HSFH and PHY-IR ad-hoc groups**

**Tuesday AM, 8 March, 1994**  
**MAC and PHY subgroups**

**Tuesday PM, 8 March, 1994**  
**MAC subgroup & PHY-FH, PHY-DS, PHY HSFH, PHY-IR ad-hoc groups**

**Wednesday AM & PM, 9 March, 1994**  
**MAC subgroup & PHY-FH, PHY-DS, PHY HSFH, PHY-IR ad-hoc groups**

**Wednesday PM, 9 March, 1994**  
**MAC subgroup & PHY-FH, PHY-DS, PHY HSFH, PHY-IR ad-hoc groups**

**Thursday AM, 10 March, 1994**  
**Full Working Group**

The meeting was reconvened at 8:30 AM, by chairman Vic Hayes, with Carolyn Heide secretary.

## 9. Opening

**9.1 Roll Call:** People in the room were invited to introduce themselves.

**9.2 Document list update:** Vic reviewed documents distributed this meeting. Make sure Vic gets electronic copy and make sure that all documents have proper headers and footers - especially since electronic distribution planned.

**9.3 Agenda Adjustments:** agenda is document P802.11-94/43:

**Motion #14:**                      **To adopt the agenda for this morning.**

Moved by:                      Wayne Moyers  
Seconded by:                  Leon Scaldeferri

**Motion 14 Discussion:** none

Approved by consensus

*Motion #14 passes*

## 9.4 Announcements

When making reservations for next meeting please use airline discount program - for each 40 calls, 802 get one free ticket which is used to pay for staff to come to the meeting.

Dave Bagby says he has found those discounts are more expensive than what we can get without them. Others agree they have had the same experience.

Make reservations now! For the plenary in Florida, at the Walt Disney Swan. When the 802 reservations were made 2 years ago the attendance was small. Since then attendance has gone up and the hotel won't increase the space reserved, so book early. It's also time to book for Oshawa.

Vic has been told by IEEE staff that we are not allow to keep draft standards on FTP sites. They say that because it's on an FTP site people will say, incorrectly, that it is public domain and the copyright statement will be ignored. Other groups have this situation too, so Vic will see what we can do about it.

### **Discussion:**

Dave Bagby: it would be an administrative headache to the FTP site runner, but instead of anonymous it could be committee members only. Don't want to loose electronic access. Their concern must be that if anyone can get it for free then they loose their revenue.

Ed Geiger: IEEE policy regarding people using the attendance list to circulate advertisements?

Kerry Lynn: could have a box to check on the attendance list that says I don't want any junk mail. Even getting calls from headhunters.

Vic: our attendance list is my database, I'm very conservative with it. Whenever I give it out I say it can't be used for commercial purposes. Cannot stop anyone from using attendance list here - I make it available for your own benefit.

Ed G: thought that IEEE had some copyright on that list and anyone using for commercial purposes could go after them?

Vic: maybe I should include on the list that it not to be used for commercial purposes.

Bob Crowder: if you get stuff you don't want, write on it 'refused' and it gets returned and the sender has to pay.

**10. MAC/PHY Interface Issues****Report From Ad-hoc Group by Jim Schuessler**

Tuesday evening

Ed Geiger led a fruitful conversation on MAC/PHY interface. Proposed primitives and parameters for the FH PHY.

fragmentation issue: should the MAC accept a larger SDU size than the PDU it sends to the MAC.

Wednesday evening

Mike Fischer presented a table of possible PHY MIB.

presentation of CCA summary by Jim McDonald.

Goal was to agree on set of MAC/PHY service primitive and parameters they contain. Never got there.

**Discussion:**

Kerry Lynn: suggests work of adhoc group extends beyond service primitives. A lot of rich conversation took place the last 2 evenings, but we're not there yet. Efforts like Mike's in attempting to define timing parameters should be on going. What will happen in the future - do we continue the ad-hoc working group?

Jim S: thinks the group should continue because there's still more work to do. Should it be a formal group?

Kerry: there is the issues of concurrent meeting s.

Dave Bagby: group has to continue, unquestionably. But would go further - continue, but continue between now and the May meeting and come back with a complete proposal in May. We are in schedule trouble if we don't have this done by May. We need output not just progress.

Kerry: on Monday you (Dave) said there was no need for the group beyond Wednesday, now you say not needed beyond May.

Dave B: don't want to create an open ended group without a charter. A group with a specific goal. Thought it could be done by the end of the week, but it couldn't, then May is the next likely target.

Kerry: need more time in next agenda. 4 hours this week wasn't enough. If done right there can be a lot of consensus achieved through email before the meeting.

Dave B: the work that should be done in the May meeting is just presentation of results that have been published before the May meeting in time for everyone to study first. Present interface at May meeting - won't make the scheduled it if work starts in May.

Jim S: the group working on this should be entire membership.

Ed G: concern - this work needs to be open for all to participate if they so chose. A lot of issues like fragmentation that need to be addressed by this group affect both PHY and MAC. Unless all participate, there could be a problems - companies feeling they have been deliberately excluded threatening action.

Bob C: there was an un-announced meeting last night - some of us were already signed up to go on the cruise, which is the Wednesday night social, a scheduled event. Don't feel it's to call meetings in conflict with other things. Could we avoid it in the future.

Bob O'Hara: upset by those comments. There is always a potential schedule conflict. Many people made the choice that getting a standard out was more important.

Paul Struhsaker: need to make sure when we schedule these things that people can get to them (thanks to the people who worked last night). There are going to be minor differences between PHYs and we have to make sure thess get attended to.

Dave B: let's forgo the discussion of how groups work and who gets excluded. The subgroups do things and make decisions and always come back to the plenary with the results. Non-issue. PHY differences - don't know if true yet because work not done yet.

Kerry: we always leave here with a tentative schedule for the next meeting, so it is relevant to discuss this now. People need to know when sessions are ahead of time.

Mike Fischer: suggests proceeding. Supports what has been said about working in between meetings using the reflector. Turning the proposed MIB table into some thing in mailings. If one or two people from each PHY would contribute and a representative document could go out by next meeting.

Agenda list (for this discussion):

- FCS - how many - where - which ones
- fragmentation - ?
- MAC/PHY primitive format and parameters
- MIB - common across all PHYs
- CCA
- signal quality
- timing

Paul S: FCS polynomial has been chosen in our group because we had to pick a scrambler that didn't affect the CRC. When we talk about using a CRC8, what is the polynomial is a factor of the scrambler we are using. It could make the CRC invalid.

#### **Fragmentation Discussion, led by Dave Bagby**

What this comes issue means is defined by what 802.11 pieces do with input and output. Something above the MAC feeds it data, the MAC feeds the PHY, and the PHY puts data out on the medium. What size goes into the MAC (what is expected); what's possible out of the PHY - if these are different where do you reconcile is the basic question? In the MAC group discussion indicated that as different protocol stacks feed different stuff to the MAC the number is anywhere from 16K to about 500 bytes. If you come down to what comes out of the PHY, the MAC group needs input from PHY. Informal opinions expressed the in evening session ranged largely but were mostly 500-900 bytes. We have thought that 500 to 600 bytes into MAC might be ok, so that's interesting.

#### **Discussion:**

Paul S: between 2 systems there may be 2 different values. PHY should tell MAC this is what the maximum size should be.

Dave B: you are saying - PHY group will recommend those sizes be different per PHY, but not yet formally decided. PHY group has no intention of doing fragmentation at the PHY level?

General response: not doing fragmentation; intent is to just deliver data and CRC.

Jim S: sizes different on different PHY types, ok. For a PHY will the value change over time?

John McKown: haven't decided.

Mike F: on some networks when the speed changes the size changes. Has there been any discussion of more than one speed and will size change with speed?

Dave B: let's deal with issues of multiple speed at another time.

Mike F: not speaking for or against multiple speed, just saying don't ignore that possibility.

Jan Boer: there is a small difference between the size that goes into the PHY and what goes out on the medium because of PHY added things like preamble.

Dave B: yes. Only talking about payload.

Ed G: PHY should supply maximum length in the MIB that the MAC can use. MAC could decide if the maximum be used. Papers have been presented that PHY may do fragmentation or error correction. About bridging - there is a bridge group within 802 that could give insight as to what may happen to interface between MAC and what is above it, say in the AP . 802.2 packet allows up to 65k, could come across this boundary.

Dave B: top is at the MAC not the LLC.

Dean Kawaguchi: relating to fragmentation in PHY issues - there is a middle option. MAC sends large packets but have separate CRCs at places throughout the packet. Increase the probability of sending through, but don't do much fragmentation or add much overhead. If some portion doesn't get through the whole packet is resent, but only the parts that didn't make it last time are needed.

Dave B: just trying to determine if it is required, not how to do it. Sounds like fragmentation by any other name.

Wim Diepstraten: but it could be option that MAC can use. Does the PHY retrain after every segment?

Dean: no, it is send as one large frame. Have to retransmit all segments when ever any fail.



Wim: maximum frame size also affected by the mobility speed of a station. Imagine a DS PHY could handle 1500 byte frame size, the mobility speed becomes the limiting factor. We did have speed ranges specified - pedestrian speed, fork-lift speed.

Dave B: Ed Geiger said nothing focuses a discuss like a number so ... what do the groups say as minimum payload guess -

A large number of independent discussions were created by this request as Dave tried, with difficulty, to get the three values following filled in.

DS - 1.5-2K (number put out by Wim Diepstraten)

FH - 128-600 (inferred from Jim McDonald)

IR - 1.5 K (number put out by Tom Baumgartner)

Ed G: requires lengthy discussion.

Dave B: we are talking about order of magnitude. Looking for divergence. Why are people reluctant to express opinions here?

Jim McDonald: we had extended discussion of this yesterday. A straw poll which had one element 'more time needed' had that choice win. Range of values was 128 to 600 bytes.

Mike Rothenberg: don't like this discussion. It is not professional to shoot from hip like this. Would like to hear common MAC/PHY meeting recommend to the PHY group to study and suggest number. Criteria to optimize this length, to try to find for each PHY. There is a lot of place for compromise between PHYs to get single value.

Chris Zegelin: looks like the MAC side is looking for a numb, while the PHY looks at a range. FH numbers heard are about 25% of what heard from IR and DS. This may be scary, but a fact.

Dave R: this is a useful discussion. Let the PHY group know that they need to belly up to the bar and make some decisions. Nice things happen in MAC at about 500-600 bytes and around 1500. The amount of work to do is indicated by how difficult this discussion here is. The DS and IR numbers look pretty good, but the FH numbers make you think. This is a critical issue. If the PHY group walks into the MAC in November and says 128 bytes it may be too late to do fragmentation.

Paul Eastman: goal is to define interface next meeting, hopefully the PHY and MAC will be talking by then. What types of information get passed back and forth - maybe the question is granular not maximum or minimum. But talk, spread ideas, right or wrong.

Jon Rosdahl: to move ahead, since PHY people seem reluctant time to speak -

**Motion #15:** PHY working group be instructed to have decided by Tuesday noon of the May interim meeting, a value for the MAX frame size including the PHY headers delivered to the Ant., and the Size of the MPDU expected.

**By Thursday closing meeting the MAC group will have the MAX SDU size determined.**

Moved by: Jon Rosdahl  
Seconded by: Barry Dobyns

**Motion 15 Discussion:**

Mike R: agrees but - make time frame longer and permit finishing the job in the next plenary.

**Motion #16:** Replace 'Thursday closing meeting' 'by the end of the next plenary'

Moved by: Mike Rothenberg  
Seconded by: Paul Eastman

**Motion 16 Discussion:**

Mike R: this decision needs to be made on facts, not feelings. Simulation results should show optimum values.

**Point of clarification** - next plenary means July.

Dave B: speaks against amendment. Gets us into July. Does two things distasteful: probably makes it impossible to make the November deadline; also assumes only plenary can make decisions. Interims must do work - if you can, attend the interims. If you don't, don't tie everyone else up.

Jon R: also against. Same reason. Need to get moving. Decide and move on.

Mike F: also against. PHYs have been in development for years, if something this fundamental can't be answered now we have a problem.

Mike R: amazed. This issue is complicated and crucial, if we want to make a real wireless system that works. Everyone who has ever transmitted data over a radio understands the importance of fragmentation. We are engineers not bureaucrats. We need to study even if it creates delays. From the MAC point of view this could be treated as a parameter of unknown value and no delay incurred. We need serious numbers please, no guessing.

Tom Baumgartner: calls the question, seconded by Paul Eastman. (all ayes, no nays)

Approved: 8

Opposed: 37

Abstain: 9

***Motion #16 fails***

#### **Motion 15 Discussion (con't):**

Dave B: in favor. Reason is, if this group can't get talking then the only other appropriate motion is to disband. A group of people that won't even express their opinions together will not create a standard. Yes we should do a lot of serious work to decide it and this can be done by May. Calls the question, seconded by Tom Baumgartner. (a lot of ayes, about 4-5 nays)

Dave asks, and no one wants a count.

Approved: 42

Opposed: 3

Abstain: 6

***Motion #15 passes***

Jon R: maybe we should go to next item on the agenda.

unidentified: disparaging numbers. One way to resolve is to go lowest common denominator. Other way is if one PHY has different numbers that PHY could be brought up to the same level so there is one common size.

Dean Kawaguchi: to decide on the packet size we need common rules. A BER of  $10^{-5}$  is that regardless of what PHY. Is that acceptable?

Jim Schuessler: the PAR has that number, so that must be acceptable. The inter-meeting discussions should be held over the reflector so everyone can participate.

Dave B: think about - convergence layer could do things for one PHY that it doesn't do for others.

Bob Crowder: we just voted that there will be one MAC frame size transmitted by all 802.11 LANs. If this isn't possible than we are rushing too fast.

Jon R: intent of the last motion - used the word antenna because there is isn't a wire. Meant whatever we put into the air. The idea is we asked for a number and we got discussion. By noon on Tuesday we will have number(s) so we can proceed, and have numbers plugged in by the end of the May meeting and move on.

Bob C: that motions says we must have one frame size for all PHYs ...

**Point of order,** Jon Rosdahl - the motion passed, let's continue on. The time to argue this is Tuesday noon in May.

Vic: the PHY group is free to come back and say we couldn't do this, please consider something else.

Jim S: perhaps we can resolve this minor problem quickly. Straw poll as to meaning of last motion to show that we all understand different PHY groups may give different values.

Those who believe that the motion means (1) there may be different values for different PHYs (a lot). All PHYs have same (no one)

Jon R: sorry if the motion wording wasn't, we're not lawyers. Thought we were engineers that could work together. The idea is let's get work done and move ahead.

Bob C: a minimum maximum value is what we want - biggest fragment any PHY can handle.

Jim S: looking for one value that is static across time. But it is a range.

Jon R: there is a maximum value and a minimum maximum value. The motion says maximum, you can still determine the minimum maximum whenever you want. But I want the maximum by Tuesday noon in May.

Dave B: hears violent agreement

Wayne Moyers: signal quality is up there. The PHY can do nothing but report it. The MAC should use that and adjust the packet size sent. Otherwise why are we reporting it.

#### **MIB Values Discussions**, led by Mike Fischer

Origin of MIB list - Tuesday evening it became apparent that a list of values would be a useful thing to have. Critical parameters the MIB has to know. Things from 94/68 and 94/61 are in here [*sec. note* - "here" is a list Mike displayed which will be distributed as document 94/84]. There are things in here that don't belong as well as things that are missing.

3 categories: (1) definitions like PHY type, number of channels; (2) for making management decisions, like turn on/ off times, not directly related to communications; and (3) times, which are critical. Abstract service specifications don't deal directly with time but the MAC has some very critical interval times.

The way in which the PHY was modeled in 94/68 has 3 states: tx, rx and listen. The discussion of tx/rx and rx/tx delays became inclusive of carrier sense as well as switching times. Believes those are going to require a maximum and minimum to be specified - controlling item is the maximum. You can't do things before the slowest of the other stations is ready, so you could turn on too fast unless the minimum is known too. A minimum before you pay any attention to the CCA to prevent ramp down from the previous frame looking like the start of a new frame.

It is unclear whether 94/68 proposes data indication at end of frame as opposed to on an octet basis, for instance - there are granularity issues to be considered.

Also, if frame is expanded by inserted bits that factor has to be fixed.

Different rx levels on different antenna may cause some values to become vectors.

Different groups have been using terms to mean different things - use of CCA for instance. In this MAC it is some form of detection of something RF that isn't dependent on receiving any part of a valid frame.

Getting values filled in between now and May would be good.

#### **Discussion:**

Jerry Socci: tx/rx delay = PHY tx busy to PHY rx busy, or until PHY is able to rx?

Mike F: the latter.

Jerry: including IFS?

Mike F: that is a mac issue.

Jerry: in Ed Geiger's document, PHY rx busy includes time to rx preamble.

Mike F: intention is that this is the value for calculating slot time. How long for tx to turn off, rx to turn on and do whatever diversity selection it takes to be able to rx.

Jim McDonald: be very clear on what the PHY is reporting in its rx definition. We are not decoding NETID or anything. We are reporting energy in the Media.

Mike F: cs-indication is energy, rx busy is frame detect in 94/68. Used that definition because 94/68 was more specific than anything else produced so far. Believe range is important a lot of the time.

Wim Diepstraten: tx/rx delay - included detection time.

Mike F: preamble and start frame delimiter too. tx to cs delay is ending the tx turn around and being ready to rx preamble.

Wim: urges to make some more atomic definitions that the tx/ rx delay says time after which the receiver is fully able receive energy.

Mike F: in 93/190 and tx state of 94/68 the definitions are not the same. Either we create some new name, or we change one definition.

Wim: tx/rx delay = time that a transceiver needs to turn around and be able to receive. Let's have definition such that it does not include detection time So that slot time can be calculated from all those individual components.

Ed Geiger: this is important stuff, a good first cut. Opposed to trying to engineer the details here.

Mike F: trying surface the issue of the gap between the documents.

Jerry: what the MAC really needs is what's important rather than trying to match to a particular document.

Jim Schuessler: we want to come up with is the minimum calculation required by any MAC.

#### CCA

Jim S: should we continue on with this in this forum?

Carolyn Heide: thinks we decided to have an adhoc group and they should go away and discuss and make decisions and present, rather than doing the work here.

Jim S: what do now?

Carolyn: discuss when that group is going to meet and what it is going to do.

**Motion #17:**                      **to approve at the May 94 meeting the definition of the MAC/PHY interface including:**

- primitives and parameters
- MIB, definition of objects and the way to cross the boundary
- CCA
- signal quality
- timing
- other deemed necessary matters

**That an adhoc group is chartered to prepare the definition in between the meetings using the reflector to disseminate the discussions to the members of 802.11. The adhoc group is empowered to hold meetings provided that they announce and report on the reflector**

Moved by:                      Jim Schuessler

Seconded by:                  Dave Bagby

**Motion 17 Discussion:** none

Approved: ayes

Opposed: 1 nay

Abstain: -

***Motion #17 passes***

#### 11. PHY Issues about MAC/PHY Interface

(1) Kerry Lynn

In the most recent version of draft standard the model showed the MAC/PHY dividing line moved, moving the adaptation layer into the MAC.

Some time ago when Ed Geiger presented the Apple FH method its model showed segment reassembly, FEC offered in the adaptation layer. There is a paper from Jim Lovette (our representative to the FCC) called 'Darwinism in the ISM band'. It is great reading. One illustration from that showed user in the band as a function of time. The skyrocketing in the 900 MHz band will happen in the 2.4 band soon. There is new magnatron powered fluorescent lighting which saves a lot of energy. They start as an interferer in one band, and as they age they move through the band.

The PAR compatibility requirements require minimum implement to have a frame loss rate of  $10^{-5}$  as offered to the LLC. For a 4000 bit frame this transfers to a rate of  $10^{-8}$  or  $10^{-9}$  as a virtual BER at the MAC/LLC boundary. How do we accomplish this?

Perhaps not now, but at some there will be a motion "that forward error correction be adopted as a method to accomplish the compatibility requirements spelled out in the 802.11 par".

#### Discussion:

Dave Bagby: asks for a document number to which people can refer for information on this.

Chris Zegelin: suggesting FEC just for FH, or DS standard as well.

Kerry: believes that is a PHY specification issue. Believes that for FH it will be necessary.

Paul Struhsaker: interpretation of the 99.9% requirement in the PAR - implies ack and retransmission required as well. Delay is proportional to the amount of noise and interference. Unlike all other 802 LANs we are not protected by a cable or fiber. You can pick an environment and say you can't meet the requirement, and I can pick one in which you can.

Kerry: if it takes 1/2 hour to get through it is useless. 94/44a has a spread sheet that shows packet length versus BER. For a 512 byte packet, if BER is  $10^{-5}$ , you only have 4% retransmission.

Pablo Brenner: I wrote that paper, so keep in mind it was made by a MAC guy, PHY guys may have something else to say.

Kerry: 4% at  $10^{-5}$ , 33% at  $10^{-4}$ . On a bad day you retransmit a 1/3, and a 1/3 of those get lost and so on.

Dave B: thanks you for not making the motion so we get to eat lunch with calm stomach. It says 'a' method to accomplish. We have to meet that frame loss specification and we have to figure out how. The channel varies in quality and we can compensate for a bad one several ways. One may be FEC - another is retransmission, another is fragmentation. All have different pros and cons. We shouldn't vie for only one trick, but look at as a set and evaluate. We have a specification to meet and we need to carefully consider how.

Bob O'Hara: moving of the boundary on the model - would adopting this boundary move imply PHY is not managed? The management stack only goes down as far as MAC.

Kerry: perhaps it is an error that needs correcting.

John McKown: when you say PAR mandates error rate with that is the implication that you have chosen a standard channel model over which the error rate is to be met. A long time ago we struggled with channel models. Due to the tight schedule we have done away with channel modeling. It is no longer true that the PAR dictates this - we can say the channel model we are designing to allows that error rate, because we don't have one. We have dispensed with rigor on this subject. FEC may help enough sometimes and other times not.

Kerry: thinks our clients expect this performance of us.

John M: PAR is somehow vague. Throughput we haven't discussed also. Before we go on discussing the different techniques we should agree what are the requirements.

Kerry: is simply saying there may be functionality that needs to be moved into the MAC (see Ed's paper 93/104). Will be proposed at the next meeting.

Ed Geiger: believes the PAR says that this is the level of service we provide to upper layers. They will break if that level is not adhered to (IP and Appletalk). The PAR is not vague, nor is it something we can change because the channel is not right.

Bob Crowder: has been concerned in MAC group that there is some feeling that somehow the MAC can say what features are needed by the PHY. We can say how we will resolve problems that the PHYs may have meeting upper layer service specifications. We can't change the physics of the radio. MAC has to ask PHY people to think very precisely about what level of service they can provide. This is why I am so concerned about minimum maximum thing - cannot just create a model that allows us to meet the PAR. We need to face the real problems.

KC Chen: we're supposed to pick modulation and decide many physical things based on channel modeling, but we didn't do that. This is bad. Kerry points out an important issue - any FH system that wants to work reliably needs FEC - it is all over common literature. We never looked at performance issues or BER, we just decided what we want to do. This standard is not being created carefully. 2 years ago or so I had a paper about using diversity encoding - we concluded that without that the  $10^{-5}$  BER cannot be achieved. But maybe some other algorithm can be used. Even these things may not be good enough to get the required error rates - we don't understand this and yet we are making a standard anyway. Would support considering using FEC in this standard.

Dave B: the core of this conversation is why the MAC group is frustrated in these subject. The MAC looks up and has to provide a level of service. Looks down and gets a level of service, and has to reconcile these two. Has no inform about what level is coming from below, so can't decide which of these things like FEC and fragmentation we need to implement. It doesn't serve us to complete a PHY and bring it to us. We need feedback at every step of the way. A completed PHY on presentation might meet with "that's not good enough for us to provide the service we need to above us".

unidentified: the channel will provide errors that come in bundles, this is a characteristics of wireless. FEC is Gaussian in nature, there is a lot of literature dealing with this, and is more appropriate for random bit errors. There are FEC's that correct groups of errors.

Kerry: if you know of papers let us know.

Chris Zegelin: once at our office someone put a desk down on an Ethernet cable. It was a couple of weeks later that customers of the LAN started to complain about the level of service. When we looked we saw an 80% to 90% error rate - but it took a couple of weeks for people to complain. A drop in the expected level of service was what triggered it. This is what we are dealing with - the acceptable level of service expected by the users. Ethernet wasn't designed to deal with what happens if someone puts a desk on the cable. Don't think that we have to design a system that works perfectly all the time under all circumstances.

Kerry: talk to marketing people - do customers want a product that exhibits widely varying performance, or whether a lower throughput all the time is better.

Dave B: recognizes that 2 things are not specified in the PAR - distance over which reliability required, and throughput. Loss rate is specified, not throughput. What is required versus what we are just trying to do well.

Paul S: a MAC is a proven system for getting packets through. Throughput delays occur in bad environments, yes. FEC is going to put a lot of overhead on every packet even when not required if statically applied. This subtracts from the data rate. Does the overhead make up for the number of packets that get through without out it? Antenna diversity does better for you, a rate receiver. DB and signal to noise gives you a BER - there are physical things to do that can improve a lot more.

## 12. MAC Issues about MAC/PHY Interface

(1) Dave Bagby

Technical issues the MAC has talked about have been brought up. Plea for information from the PHY. Not a game of is antenna diversity better than FEC or fragmentation - it is we are trying to get a level of service and how ever many of thing we have to do, we have to do them. Tell us the level of service you give us. If it is what we have to provide to upper layers, that would be outstanding, but it's not expected.

**Adhoc MAC/PHY interface group meets now.**

## 14. Adjourn - 11:50 AM

# Thursday PM, 10 March, 1994 Full Working Group

The meeting was reconvened at 1 PM, by chairman Vic Hayes, with Carolyn Heide secretary.

## 14. Opening

### 14.1 Announcements:

Going to limit overall reflector list to short papers, ASCII files not lager than 5 papers. There will be another list which will contain 'bulk' files - i.e. all files that are circulated electronically. Put 'bulk' in the 'remark 1' box next to your name in the attendance list to get onto the bulk reflector list.

Make reservations early for Oshawa and Florida.

**14.2 Document List Update:** up to 94/81 handed out this meeting so far.

**14.3 Agenda Adjustments:** Start with editors' report, then MAC, PHY, and distribution.

**Motion #18:** To adopt the agenda for the afternoon.

Moved by: Dave Bagby  
 Seconded by: Leon Scaldeferri

**Motion Discussion:** none

Approved by consensus

*Motion #18 passes*

## 15. Reports

### 15.1 Editors, by Bob O'Hara

See document 94/81 'Recipe for Editing'. When producing input for the draft follow this recipe. Don't expect editors to interpret and revise.

Submit early and often, just like voting in Chicago.

Would like to sustain a continuous discussion of the current draft, on the reflector, so that when you make a correction everyone sees it and gets a chance to comment on your input. Make great use of the reflector. The editors will log all comments that come across the reflector and periodically publish a report on the reflector about comments received and changes made. Using these everyone will be able to keep their own copy up to date. Then at every meeting there will be a consolidated report at the opening plenary. Editors will also report at closing plenary about events the week of the meeting.

#### **Discussion:**

John McKown: hard copy instructions on how to use the reflector - are they still up to date?

Vic: yes. Remember to put the special first line in your mail. I found that when I moved to Microsoft mail any of my messages going out had a line added, so the first line didn't conform, so it didn't go. If you cc to Bob Egan when you send he will check.

### 15.2 MAC Group, by Dave Bagby

March agenda progress

- Organization, Schedule, Agenda.
  - Adopted.
- Approval of minutes
  - Done
- Foundation tutorial for PHY members.
  - Done
- Simulation group report
  - Little done due to license problems.
  - Code now avail with (free) license agreement
- MAC editing group report
  - Draft updated per Jan plenary instructions
  - Distributed this week, please review
- Detailed sched for mac
  - deferred to May
- Issues processing
  - none
- Due diligence - check foundation against closed issues to identify areas for correction.
  - Deferred to May.
- Major technical goal 1: MAC/PHY interface issues
  - Adopt a functionally complete MAC/PHY interface.
    - » not done
  - Close all issues in issues log related to MAC/PHY interface.
    - » not done
  - Good common understanding progress in M/P evening sessions.

- Major technical goal 2: Determine final set of any additional MAC functionality for first letter ballot.
  - Consideration and decision on new proposals.
    - » New functionality submissions now closed.
    - » decisions 95% done
    - » more details later in report.

Papers Presented and Discussed:

- All papers submitted (and author present)

Chandos Rypinski's papers are available, but he regrets he cannot be here. He wanted to give a talk in the evening, but wants everyone to know that he would be available to talk with anyone between meetings and will be at the next meeting.

Papers schedule pushed out:

- None

Other papers distributed:

- Author not present:
- Announced and distributed per his request.
  - 94/46 - 802.11 Terminology replaces use of "Time-Bounded" services with "Connection-Type" services.
  - 94/47 - The DFWMAC shall be modified to designate the "Point Control Function" as the Primary Mode, and the "Distributed Control Function" as secondary or default.

Papers re "Problems"

- 94/41 - MAC State Machine Changes
  - Minor corrections to MAC state machines adopted.
  - MAC vote: 21-2-5

**Motion #19:**                      **To adopt MAC this group recommendation.**

Moved by:                      The MAC Group  
 Seconded by:                      Bob O'Hara

**Motion 19 Discussion:**

Ed Geiger: the motion doesn't specify the text be added to that into the draft standard?

Dave B: the changes are arrows, flags and things.

Approved: 33                      Opposed: 0                      Abstain: 4                      **Motion #19 passes**

Papers re New functionality

- 94/76 - MAC protocol version control
  - Proposed change adopted.
  - MAC vote: 28-3-10

**Motion #20:**                      **To adopt MAC this group recommendation.**

Moved by:                      The MAC Group  
 Seconded by:                      Mike Fischer

**Motion 20 Discussion:**

Ed Geiger: what document is this relevant to?

Dave B: 94/76 proposes the change. The current draft standard is the document impacted.

Approved: 42                      Opposed: 0                      Abstain: 1                      **Motion #20 passes**



- Three papers on fragmentation:
  - 94/37 - Packet Fragmentation in the MAC
  - 94/77 - MAC fragmentation
  - 94/44 - MAC Layer Fragmentation or Small MTU?
- Fragmentation motion
  - Moved: 802.11 agrees to add fragmentation functionality to the MAC or a convergence layer when it is shown to be required by PHY frame length limitations or performance simulations and/or empirical data.
  - Laid on table 3/9/94 with intent to discuss in joint mac/PHY mtg before taking back up again in the mac group...
  - Since joint M/P after MAC mtg, will be on May agenda.
- 94/38 - Packet Windowing in the MAC
  - Dependent on fragmentation decision
  - Deferred to MAY by group consensus
- 94/22 - The RT Encryption Algorithm
  - Proposed action not adopted.
  - Group split
    - > Some not up to speed on subject
    - > Some want more info on proposed alg.
    - > Some strongly in favor.
    - > Some strongly opposed.
    - > Subject will return again, get educated now.
  - IP covered proposal with implementation cost info included.
    - > \$0.50 -> \$0.15 if adopted in standard.
- 94/43 - Proposed Change to MAC Draft: AP-Based CTS
  - Proposed changes not adopted.
- 94/39 - Access Point Relay
  - Motions proposed by paper withdrawn by author.
- 94/40 - The Negative Acknowledgment addition.
  - Paper proposals not adopted.
  - Header protection aspect a M/P subject.
- 94/59 - Transmit Power control protocol provisions
  - Proposed changes not adopted
  - split group 12-12-7
- 94/58 - Priority in CSMA/CA to support distributed Time-Bounded Service
  - Continuation of proposals from January.
  - Solves TBS vs Roaming problem in current foundation.
  - Simplifies foundation complexity.
  - Addresses TBS, not PCF or ACF of foundation.
  - Motion: To add 'distrib time bounded' service to the foundation MAC and to determine by the end of the May 1994 meeting whether one or both of the TBSs will remain in the standard.
  - Approved: 25-1-5

**Motion #21:**                      **To adopt MAC this group recommendation.**

Moved by:                      The MAC group  
 Seconded by:                      Mike Fischer

**Motion 21 Discussion:** none

Approved: 39                      Opposed: 0                      Abstain: 9                      **Motion #21 passes**

- Motion: To add 'priority access mechanism' to the DCF of the 802.11 MAC.
- MAC vote 17-2-9
- Plenary vote: 38-0-9

**Motion #22:**                      **To adopt MAC this group recommendation.**

Moved by:                      The MAC Group  
 Seconded by:                  Kerry Lynn

**Motion 22 Discussion:**

Dave B: doing TBS in a distributed fashion means priority needs to be given to that traffic.

Approved: 38                  Opposed: 0                  Abstain: 9                      **Motion #22 passes**

- Motion: To use the mechanisms proposed in doc 58 as a basis for the "priority access method" to be included in the DCF, and to further investigate its sensitivity to relevant parameters.
- Postponed to definite time (May 94) 19-4-4

Contact Kerry Lynn or Wim Diepstraten to discuss the priority access mechanisms from which will have to choose next meeting. Kerry for first method submitted, Wim for second.

Papers re Improvements

- none.

Other Issues we closed

- none

MAC submission rules: Presentation categorization approach:

- MAC groups presentations as:
  - 1: Papers identifying foundation problems along with a proposed solution.
  - 2: Papers Identifying potential foundation improvements.
  - 3: Other papers.

Abstract requirement for papers:

- ABSTRACT REQUIRED.
- Abstract contents:
  - Paper category
  - Short, concise summary
  - Action requested
- NO ABSTRACT, NO AGENDA TIME!

**Discussion:**

Ed Geiger: submitter cannot identify problems without solutions?

Dave B: yes.

Kerry Lynn: speaking as issue log editor, call out in papers the number(s) of issues(s), if known, that the paper pertains to.

Bob O'Hara: it would help the standard editors, if the paper addresses text to the draft, please include the alternate text, or include the new text you want.

Kerry: the editors are putting a template on the FTP server, please use it.

Wayne Moyers: in what context do these rules apply?

Dave B: just telling you the MAC subgroup rules.

MAC Agenda Subjects and Goals for May 94 mtg.

- DTBS improvement finalization.
- Complete M/P interface
  - If not done in May schedule is in jeopardy!

- MAC fragmentation decision
- Windowing decision
- Multi PHY rate impact exploration.
- Simulation results now what simulator issue resolved.
- Deferred draft vs issues log cross check.
- MAC schedule review for progress check.

## 15.2 PHY Group, by Jim McDonald

### Report

#### 1. Modulation Issues

PHY Group has responded to the concern of the Joint MAC/PHY Group regarding the multiplicity of options in the modulation formats in the Direct Sequence and Frequency Hop PHYs

Both PHYs now have 2 data rates

- \*1 Mb/s
- \*2 Mb/s

In both cases, the high data rate option is a simple and logical extension of the 1 Mb/s format:

Direct Sequence:

- \*1 Mb/s - DBPSK
- \*2 Mb/s - DQPSK

Frequency Hop

- \*1 Mb/s - 2 Level GFSK
- \*2 Mb/s - 4 Level GFSK

#### Discussion:

Dave Bagby: elaborate - given we have the mandate of options only when absolutely necessary, why is the higher rate an option for FH?

Jim M: many people believe that higher rate is required for market appeal. So having the option available will be for the betterment of the standard. Implementation of the option is very simple.

Dave B: why optional, not just everyone have the ability to do better?

Jim M: some people are not ready to accept the cost burden of 2 Mb. But they are interested in an option as an easy extension.

Dave B: is there a motion coming here, or are you just informing us of trend.

Jim M: not ready for a motion at the plenary yet. But it has been adopted by PHY group by > 75%.

Dave B: when will this be brought back to plenary as binding on the group?

Jim M: haven't discussed that yet. The joint group is an excellent place to have communication on this between meetings. To make the judgment on what motion should be presented to the plenary.

Mike Rothenberg: there are papers describing this 2 Mb PHY. Suggest interested people read them and put in writing their concerns to be addressed before formal bringing as a motion.

Ed Geiger: if we were not working on any other modulation schemes maybe we could save time and effort by making a motion to accept that decision here. Thinks that was where Dave was coming from.

Dave B: just asked for clarification.

Jim M: perhaps there should be a round of meetings at a joint MAC/PHY forum to discuss ramifications.

Dave B: asks for guidance from chair - when is the appropriate time to discuss an issue? Now we are listening to a report that says a subgroup has made a decision but has decided not to ask for ratification of that decision. They are working to it. It's not binding, but it will guide their future work, they're not going to do anything else. They are making decisions governing their work without asking for input or opinion from the rest of the body they belong to. Doesn't believe this is appropriate, but should it be addressed in the middle of the report?

Vic: finish the report. Deal with this before leaving this agenda item.

Bob Egan: with respect to the vice-chair of the PHY group - wasn't my impression that we weren't going to ask for ratification. Believe that text should be written and given to the draft people. We overwhelmingly decided on the modulation method. That is ready for a vote.

Bob O'Hara: is concerned as a member of 802.11, and as an editor. Sounds like PHY group is going along and trying to get every last bit complete then come and drop the whole thing in our laps. Completing issues that need to be addressed and sharing problems with the group is the way we need to work because we can't all be everywhere simultaneously. Second concern - the option in FH data rates that seems to be justified on an economic basis. Not sure that is a valid concern for the standard. If economically unfeasible it should be out. If economically feasible and technically possible it should be in.

#### **DS Adhoc Group Report**, by Paul Struhsaker

An excellent CCA algorithm has been proposed and presented to PHY group.

Closed modulation issue, voted unanimously for DBPSK and DQPSK. No change in bandwidth, symbol rate, spreading code. Just increase constellation of modulation from 2 constellation states to 4. Provides increased throughput where the system allows it.

Worked on MAC/PHY interface.

#### **HS-FH Adhoc Group Report**, by Juan Grau

##### The Gear Switch

- All control, broadcast, multicast packets are transmitted in 2GFSK.
  - The switch to 4GFSK modulation, when selected prior to a transmission, is handled in the PHY layer and is invisible to MAC.
  - The PHY header and end delimiter shall be transmitted in 2GFSK, the MAC MPDU shall be transmitted at the rate selected (Ed Geiger corrects, there is no end delimiter).
  - The modulation rate selected for transmitting the MAC MPDU is identified by a field in the PSF of minimum length two bits.
  - No need for timing critical resources in the MAC.
  - MAC functionality required is similar to other multiple rate requirements (e.g. DSSS).
  - Time to switch, 'instantaneous' at field boundary.
- CCA
    - Will Support the 4 proposed schemes Continuously: energy detect, clock detect, hybrid, packet detect at both 2GFSK and 4GFSK.

##### Questions:

Mike Fischer: statement made that timing aspects were not visible to the MAC. MAC needs to know occupied times based on end of transmit - how can this be time transparent to the MAC?

Juan: meant actual switch is invisible, MAC does not need to get involved. Most network timing information is carried in control packets which are transmitted in the base mode so all stations will get them.

Ed Geiger: there may be something misleading to MAC people here - MAC wants to control whether the packet is sent at 1 or 2 Mb, and that will be transparent. But the duration will be calculable.

Bob Egan: Mike Fischer has summarized a list of primitives and talked about timing relationships. Numbers have to be put on those primitives in the PHY group. More work for the MAC/PHY interface group.

Dave Bagby: since higher rate is an option, not all stations will be able to transmit and receive at the higher rate?

Juan: correct.

Dave B: how do APs get created since they have to talk to all stations? AP is required to implement the higher rate.

Juan: all higher rate units are required to be able to back off to the lower rate. So if a low rate AP, stations must back off to slower rate.

Dave B: still believes there is an impact on the MAC.

Juan: there is an impact on the MAC. Only said switch was transparent.

Ed G: only thing asked of MAC is that stations that wish to communicate with one another will be able to do so at 2 rates if they both support the higher rate. All MAC control packets go at one rate, the lower.

Dave B: rates change frame by frame?

Ed G: speed changes at the beginning of the MPDU. Rate changes on a per node basis for all the people you can talk to.

Wayne Moyers: will cover all these points, have answer to all these concerns. If under the PCF the AP cannot handle the 2 Mb rate then all exchanges happen at the low rate. If peer to peer the two talk at higher speed if they can. Only if permitted upon association, this can be done.

Ed G: informs the MAC group that there needs to be some way for all MACs to figure out what rates they can talk to with each node. AP needs to know what speed to talk to each node.

**point of order** - Dave Bagby: there is a report in progress.

Vic: return to this discussion after the report.

#### **IR Adhoc Group Report, by Roger Samdahl**

Object - to close modulation proposals. 9 presentations were made, and as a result ended with a list of 9 possible encoding techniques: 16 PPM, EXIRLAN (b.b/carrier framework); RZB, OOK, 4 PPM, DCGPPM (IBM proposal), MRLC, FSK FQPSK.

Roger Samdahl elected chair. Peter Blomeyer selected as representative to IEC.

Group asks 802.11 chair to ensure that issue log includes IR PHY issues. Vic says give text of issues to Kerry Lynn the issues log editor.

Technical issues not submitted yet to total PHY: (1) break up available IR band 0-30 MHz, into 3 subbands of 0-5 baseband, 5-15 coexistence; 15-30 multiple carrier operation; (2) adopt one or more of 1, 2, 4 or 10 Mb rates for baseband and/or modulation schemes.

Objectives: templates for each modulation technique for further perusal. Several techniques are older submissions and probably won't have support at the next meeting. Any to be defended need templates. Select one technique for baseband and modulation. Also select frame size as directed.

Tom Baumgartner read the draft of the letter to the chair of IEC 84 working group.

**Motion #23:**                      **To appoint Peter Blomeyer as liaison between 802 and IEC and send the attached letter to the chair of IEC on free air IR transmission.**

Moved by:                      Roger Samdahl  
Seconded by:                  Tom Baumgartner

#### **Motion 23 Discussion:**

Wim Diepstraten: should this be as liaison between 802.11 not 802?

Vic: IEC is at the same level as 802. We need peer to peer communications here.

Approved: 34

Opposed: 0

Abstain: 1

**Motion #23 passes**

## **2. Motions**

No issues are at a state of completion that is appropriate for consideration as motions by the Plenary

## **3. Current emphasis**

Each of the PHY Subgroups is preparing working draft documents. The intent is to present these with 75% support to the Plenary in Nov. 94.

## **4 Next Meeting**

All subgroups will be editing text

Resolve CCA issues at the subgroup level

Resolve PLCP Headers

Generate input to the MAC group on questions they have asked.

### 5. Administrative Logistics Issue

The PHY group requests the Plenary to have draft documents kept in the groups until the November meeting when they would be combined into one 802.11 document. The PHY group suggest that this will reduce the efforts of the Plenary body with respect to the draft preparations

### New Business

NTIA proposal to reassign 17 MHz of the 2.4 GHz to Government Service

Request the Plenary to empower a group to respond.

### Questions:

Dave Bagby: 'request' - is this informal or a motion?

Jim M: informal motion.

### General

Wim Diepstraten: no report from low speed FH?

Jim M: primary consideration this week was high speed.

There is a short discussion of whether Peter Chadwick should give a report. No one wants one.

Carolyn Heide: the request to keep documents in the groups - what happens to a request?

Vic: nothing, it just sits in the minutes.

Wayne Moyers: not a part of full report because thought it wouldn't come to vote today. Might as well have on the table since we will be working on this between now and next meeting. Would like to make motion "that the action taken in the full PHY group re data rates (2) for both DS and FH be ratified into the working draft specification of 802.11".

**point of order**, unidentified - there was no decision in the PHY regarding number of rates, we ratified modulation scheme. Amend that motion to "2FSK and 4 level FSK" as in the motions adopted in the PHY group.

John McKown: can't ask the group to accept a motion referring to a motion which is unstated.

Ed Geiger: reword - that the FH PHY has accepted 4 level FSK as a modulation scheme for running at a higher speed. This does not imply that all MAC issues relating to running with 2 speeds in the same LAN have been resolved.

Mike Rothenberg: take the 2 PHY group motions and display them.

**Call for the orders of the day**, by Dave Bagby.

Vic orders is PHY group.

John M: reads motions from PHY group passed

1. full PHY committee accepts 4 GFSK for 2 Mb FH optional service. (23,2,4)

2. full PHY accepts DBPFSK for 1 Mb and DQPSK for 2 Mb operation for DS. (25,1,2)

**Point of order**, by Dave Bagby: ignored call for orders of the day

Vic: did not ignore. PHY group issues being dealt with perfectly in order.

**Motion #25:**                      **Ask for ratification of the above motions.**

Moved by:                      Wayne Moyers

Seconded by:                      Mike Rothenberg

### Motion 25 Discussion:

Dave B: premature to ask for judgment on this. We haven't thought about it long enough.

**Motion #26:**                      **To lay motion 25 on the table.**

Moved by: Dave Bagby  
 Seconded by: Mike Fischer

**Motion 26 Discussion:** motion undebatable

**Point of order,** Paul Stuhlsaker: how does it get off the table?

Vic: it is a procedural motion, needs a majority vote.

Approved: 13      Opposed: 23      Abstain: 9      **Motion #26 fails**

**Point of order,** Dave Bagby: one minute period for holding the floor. Dave has not had his minute yet  
 Vic rules he hasn't spoken for a full minute and has 20 seconds left.

**Motion #27:**      **To postpone motion 25 to the May meeting.**

Moved by: Dave Bagby  
 Seconded by: Jim Schuessler

**Motion 27 Discussion:**

Tom Baumgartner: calls the question, seconded by Dan Lewis (a lot of ayes, one nay)

Approved: 11      Opposed: 27      Abstain: 10      **Motion #27 fails**

**Motion 25 Discussion (con't):**

Dave B: tried twice to help people make an informed decision and failed. So I will have to abstain or vote against since I don't have enough information. Calls the question, sec Tom Baumgartner (ayes, no nays).

Approved: 26      Opposed: 6      Abstain: 14      **Motion #25 passes**

Dave B: as a direct result of listening to the PHY report it seems to me that root of a lot of problems is communication. Has not been trying to block progress, honestly didn't have enough information to make so important a decision. The PHY group makes decisions which guide their work but they don't come back to the plenary for ratification. Now we have passed a motion where we have an optional rate, I think. The PHY groups think this has no ramifications, I'm not so sure. We should have communication to understand these things. We do have this problem - lack of information back into plenary from PHY groups. In PHY report there was a request that said we want to handle drafts completely different from the way we normally work. Wish we didn't have this problem, want to try to solve it.

**Motion #28:**      **~~The PHY group~~ All subgroups and its officers immediately commence following the spirit of the standing procedure of the 802.11. In particular, that when the PHY group has a decision which has passed the PHY group with a simple majority, that they bring that recommendation to the next 802.11 plenary session and ask 802.11 to make a decision on the recommendation. Further the PHY group all subgroups are to report their progress to every plenary.**

Moved by: Dave Bagby  
 Seconded by: Jeanine Valadez

Dave B: the more information brought forward, the more likely things are to be accepted.

Peter Chadwick: friendly amendment, delete the last sentence in case a group didn't do anything.

Dave B: rejects that amendment.

Kerry Lynn: friendly amendment to "the PHY group" in first and last sentences with "all subgroups" and remove the two uses of "PHY" in the second sentence.

Dave and Jeanine accept that amendment.

**Motion 28 Discussion:**

Peter C: PHY group prefers to get a 75% majority before bringing things forward. Means much better proposal with much better chance of acceptance.

Bob Egan: thanks MAC chair for his illustrious words, particularly thanks him for removing the word PHY from the motion. Points out to the group that we now have a motion which, in my opinion, on what should be obvious, what is the absolute administrative policy which is the normal policy of a working group. Might perceive from thus that the chairs and vice chairs maybe need further discussion to orchestrate continued work. If one of the chairs feels strongly enough to make this motion, then there is something you, Vic, as general chair need to resolve between the subgroup chairs.

Rob? if the PHY chair was here there might have been a report of some other activities or motions, and more of an organized report. Don't make a judgment according to a situation outside of PHY chairman's normal operating mode.

Kerry: has difficulties with the current operating procedures especially as pertains to editing a draft standard. Technical decisions are reflected in a draft standard where there are still open issues pertaining to those decisions. Issues about packet formats for instance. For text to be added to the draft standard that is not technical in nature - might need to revisit operating rules. The affect of this motion forces editors to go through the draft standard and remove text.

Vic: we only change the draft when an issue is closed.

Bob O'Hara: text got into the first version of the draft as the MAC group made the decision that 93/190 go into the draft standard, and that got ratified by the plenary.

**Point of order,** Jon Rosdahl: is the rule that things go into the draft resulting from closed issues or can vote of plenary put things into the draft?

**Point of order,** Dave Bagby: don't believe this discussion is germane to the motion on the floor.

Vic: agrees, discussion will return to the motion on the floor.

Dave B: 75% desire of the PHY group is understood. What people don't seem to understand is that this motion makes zero change to our current operating procedure. There is nothing proposed here, simply stated the current rules. Believes this is not a problem due to Larry not being here, this is not directed at Larry. This is not just a problem of this week, it has happened at many meetings. The PHY group wants to do great engineering work and bring to the plenary when it is perfect. Because of the time it takes you to get it perfect, on presenting it and finding someone wants a change, then no one wants to make the change. It is emotional blackmail at the time you want the approval. Not trying to change the rules just ask that we follow them.

Bob Crowder: we all understand there is a communications problem. But it is not all on the PHY group and the operating procedure. They are open and willing to answer questions, if asked. There are times of overlap when this can be done. There are informal things that can be done in coordination meetings. We all want to produce a standard that produces radios. We have to have time to do due diligence, not just doing procedure.

John McKown: the PHY group is a minuted body like any other. All the submission available to anyone who care to read them. Rejects that there is inadequate communication.

**Motion #29:**                      **To lay this motion on the table.**

Moved by:                      John McKown

Seconded by:                      Bob Egan

**Motion 29 Discussion:** not debatable

Approved: 27

Opposed: 7

Abstain: 8

**Motion #29 passes**

**Motion #28 tabled**

Tom Baumgartner: 2 meetings ago the IR group wanted to have this body establish some contact with IRDA, an HP initiated group trying to get industry standard on an IR non-LAN communication method. Request never got made due to a sudden adjournment of the meeting that day. The problem here is that there is a significant fee to join (don't remember, but something in the neighborhood of \$5000) the group. We would ask them to waive the fee.



**Motion #30:** To appoint Mr. Roger Samdahl as liaison between 802.11 and IRDA. Letter to the chair of IRDA on IR tx and rx. If free of fee.

Moved by: Tom Baumgartner  
Seconded by: Ed Geiger

**Motion 30 Discussion:**

Kerry Lynn: calls the question, seconded by Bob O'Hara (ayes, no nays)

Approved: 38      Opposed: 0      Abstain: 0      **Motion #30 passes**

Greg Ennis: would like to revisit the item in Jim's report from the PHY group regarding request for the PHY group to develop text for the standard and submit it to the full group at the November meeting. Speaking as an editor, there are many editor things that need to be handled before Nov., since it is to be submitted for letter ballot shortly after that. Given the communication issue between PHY and MAC, the informal communication between groups has been good, lot of progress has been made on the MAC/PHY interface. But one way to have groups work together is to have a common document we are all working on. The concern that perhaps the PHY group has been expressing in this request to not submit something to the group until Nov., sounds like there is a fear of loosing technical control over the content of document. Hopes that we work on the basis of a working draft. We are aiming for the editors having some editor latitude to put things into standard-eze, but the technical content would remain the purview of the relevant groups. Urges the PHY group to submit documents to the common draft earlier than Nov.

Bob O'Hara: echoes Greg's concern as an editor. That statement in the PHY report terrified me. Our goal is after the Nov. meeting we will issue a letter ballot including the draft. This cannot be accomplished if the PHY group does this. On technical grounds, if there are things of concern to people not in PHY group, they would be forced to be resolved in the letter ballot.

**Motion #31:** That all subgroups be required to provide draft text to the editor whenever an issue is closed. Within two weeks from the end of subject meeting.

Moved by: Bob O'Hara  
Seconded by: Jim Schuessler

Jon Rosdahl: a reasonable time should go in there.

Bob and Jim agree to add the second sentence.

**Motion 31 Discussion:**

Jim Renfro: could this be addressed by having a PHY representative among the editors?

Bob O: no - they couldn't give unofficial, un-ratified input. But we would welcome editors from the any group.

No-one volunteers.

**Motion #32:** amend motion 31 to replace the text following "be required to provide" with "new text, not including revisions, to the draft standard no later than the Sept meeting".

Moved by: Barry Dobyns  
Seconded by: Bob Crowder

**Motion 32 Discussion:**

Bob O: against. This is giving the editors a vacation until September then asking them to work their butts off to get everything done. Unreasonable efforts requested out of a volunteer team with other duties for the employers.

Kerry: in one sense it should be up to the subgroups to deal with their sections as they see fit. But there is also a uniformity issue. The only affect is that they are working on a separate document number. The latest revision is always available on the FTP server.

**Point of order**, Jon Rosdahl - IEEE has stated that we cannot provide the drafts on the FTP server.

Kerry: calls the question, seconded by Bob O'Hara (ayes, no nays)

Approved: 2

Opposed: a lot

Abstain: -

*Motion #32 fails*

**Motion 31 Discussion (con't):**

Peter Chadwick: thinks difficulty with this is that we have a good large working document that undergoes revision at every meeting. If we attack it piece meal it may take a lot of time. What is the 'issue' thing - not every line, every point is an issue. We have a problem if we just say closed issues only get into the draft. Maybe looking for the best judgment of the editors to do it by chunks as they see fit.

John M: fact is, no one wants to exploit the editors. It's just not ready yet. It's going to be hard on the editors and it's going to be our fault and we should apologize in advance. Calls the question, seconded by Peter Chadwick (ayes, one nay)

Approved: 27

Opposed: 4

Abstain: 9

*Motion #31 passes*

**General Discussion:**

Wayne Moyers: like to know about rumor - has something gotten into our overall draft standard that has not passed our 75% vote? Asks Dave Bagby, when we passed the foundation MAC and closed many issues, did it get into the draft.

Dave B: to the best of my knowledge, yes. The only editor's words are in there are where they had questions. What do the editors think?

Greg: agrees.

Bob O: normally we close an issue, get the 75% requirement, then something goes into the draft. Prior to document 93/190 that was the only way. The simple adoption of 93/190 as the foundation didn't cause any text to go in. At the last meeting the MAC group instructed the editor to reflect the foundation into that draft. This plenary then ratified that decision - to put 93/190 into the draft. This was the only time text got into the draft not as a result of closing an issue.

Dave B: that is why on the MAC agenda was to check issue log versus draft for conflict, but we didn't get to it. Believes nobody has done that in bad faith but errors may have occurred. So we have an agenda item to check.

Wayne: we need a perfect document. If we have a sense of having an imperfect document we are nowhere.

Jim Schuessler: at the last meeting we closed a lot of issues as a result of 93/190. We asked for ratification on all of them. We all want a high quality product here, but you said nothing in the draft standard that isn't perfect - the state machines in there no one here thinks are perfect. We all voted to put them in there, and we all just voted to fix them.

Wayne: there were things voted in that we don't all understand. Don't want to get things to get into there by accident. These are the concerns behind the PHY group request.

Jim McDonald: the spirit of the PHY meeting yesterday was that the group is concerned about developing a portion of the specification and doing a thorough, complete job of it. Feel the need to continue and improve the process of communications between the groups. Personally learning a great deal at the meetings like last night, they should be continued. Everyone wants a good standard out on time, just have a different view of procedures. The idea for the PHY group is to present only text approved by 75%.

Greg: voted for the previous motion, and has mixed thoughts on that. Issues a plea for sanity with regard to the issue process. For instance, issues in log that end up being major things answered with a yes or no. Editors can't go off and do things to draft on that yes/no. Then there's the extreme that maybe there is only one huge issue like "what is the xx PHY". If we continue to use the issue process as a way to get text into the standard, the text for closure of issues must be included with closing an issue. If that's the way we work we can make the kind of progress we need to make. We're not working in isolation - a common document is a way to force us all to communicate.

Kerry: at the Nov. plenary I went on ad nauseam about what it meant to vote on the standard. The foundation protocol was new and unfamiliar and I was worried about adopting it wholesale. I was assured that there were hundreds of issues to close before anything got into the draft standard. They weren't, 93/190 was just voted into the standard as a whole. Further note that the DFWMAC passed by one vote, my vote. Which I made in good faith. Things like this help to keep this undercurrent of distrust going. We don't know what's in there by 75% and what isn't. We got a tiny little change in there today by 75%. It's in there and it takes 75% to get it out. I thought we were voting on simple majority stuff to get the foundation in shape, then we would vote it in. As long as we keep entire sections out of the draft standard until done, then for the editors just take a chunk and drop it in. Currently there is text in the draft standard that got there not by closing issues, and the operating procedure should be modified or the draft needs reviewing.

Vic: stick to rules, draft needs review.

Dave B: operating rules are set by Vic. Believe rules have been conscientiously followed. People who have done that should be commended for the work they have done. Decisions have been made in good faith, as is indicated by the issues log/draft cross check item on the agenda. Discussing this procedure every meeting is not fruitful.

**Motion #33:** To move to next item in agenda.

Moved by: Dave Bagby  
Seconded by: none

**Motion 33 Discussion:**

Rick White: it is important to discuss how things got into the draft from DFWMAC. There never was a motion to take document 93/190 and put it into the standard. There was a discussion, no motion in MAC or plenary that says text from 93/190 could go into the draft standard. The motion passed in the November plenary was:

Motion #14 as amended by motion 15:

The plenary session directs the MAC group to:

- Accept the DFW MAC as the direction of the 802.11 WG
- Instruct MAC SG to:
  1. Proceed to study and enhance this proposal by vote
  2. Answer & resolve questions relative to its performance
- When the subgroup has something that can pass by simple majority that it be offered back to the plenary for 75% approval.

Reiterates Kerry's sentiment. This was a new proposal, there were concerns we wanted to look at it, and improve it, before it got into the draft and became difficult to change.

Bob C: intent of this motion was, it was difficult to break a deadlock in this committee and let work move forward. Thinks best thing to do now is that the document now referred to as draft standard be declared a MAC document, and schedule in July a review.

**Motion #34:** To declare draft as MAC document to be treated in accordance with the Nov 1993 motion as recorded in the minutes.

Moved by: Bob Crowder  
Seconded by:

**Objection to the motion**, by Dave Bagby

Vic: asks if assembly wants to consider motion 34. If 2/3 object we don't consider it. (23,11,5).

Vic begins the motion discussion queue with Dave Bagby as first. There are many complaints about Dave always being first, and Vic puts KC Chen first on the queue.

**Point of personal privilege**, Dave Bagby: the chair recognized that I was first to speak, others objected so you removed me.

**point of order**, Arthur Coleman: same person should not be first in every queue. Especially someone who may be obstructionist.

**point of order**: Kerry: people should be recognized in the order the chair recognizes them and Vic just recognized KC.

**Motion 34 Discussion:**

KC Chen: against this motion unfortunately. This should be a decision of the MAC group. Echoes Kerry, many people including me approved the DFWMAC as direction to work on the MAC protocol. We believed it was direction.

Dave B: ask chair for ruling, this motion is in conflict with many motions previously taken. As currently worded it is out of order. Chair should help the mover to reword it so it won't be out of order.

**chair rules motion 34 out of order**

Bob Crowder appeals, Bob Egan seconds the appeal.

Vic: asks the assembly shall the decision of the chair stand? (17,12,7) ruling stands.

Vic: this agenda item gets another 6 minutes than we move on.

**Motion #35:**                      **93/20 be reviewed in the July plenary meeting be become the draft standard. And that a 75% vote of the plenary be required to move text to the draft standard.**

Moved by:                      Bob Crowder

Seconded by:                  Kerry Lynn

**Motion 35 Discussion:**

Barry Dobyns: would it be possible to defeat the whole content of 93/20 as draft standard?

Bob C: yes.

Kerry: previous version of 93/20 contained text 75% ratified, vb0 doesn't.

**Point of order**, Dave Bagby: this motion is out of order again, it reverses decisions previously taken.

**Call for orders of day**, Bob Egan.

Vic asks whether the group wants to call order of day (ayes, no nays)

**Point of order**: Jon Rosdahl: are decisions at interims are binding?

Vic: yes if there is a quorum.

**15.1 Distribution Adhoc Group Report**, by Vic Hayes

IEEE has stated that we cannot have a draft standard on the FTP site. We will remove it from there for the time being.

**Reflector**

- Provided by Bob Egan, DEC
- Only for voting-, nearly- and aspirant-members
- Mailing list is controlled by Chair
- To send a message: address to  
    mailer@feenix.lkg.dec.com
- First line should only contain:  
    @80211-list
- You can not reply to the reflector.

**FTP sites**

We have two:

- one maintained by Kerry Lynn, Apple - atg.apple.com
- one maintained by Ronald Brockman, University of Twente, NL

Document Distribution

Document 131 will be distributed by Tom Phinney to people that were not present!

**16. Unfinished Business**

**16.1 Recap of Output Documents:** liaison statements from IR group

**16.2 Recap of Document Distribution:** please make sure files and originals, with headers and footers, are given to Vic for this meeting's submissions. Also ask all authors to give Vic copies on diskettes. The electronic copies will go onto the FTP server.

**16.3 Next Meeting**

Last Mailing Date:

For first mailing, March 18, in Vic's hands.

For last mailing, April 8 , in Vic's hands.

**16.4 Other Intermediate Meetings:** none

**16.5 Future Meetings:**

Vic reviewed the meeting schedule.

Jon Rosdahl says on May '95 would anybody be opposed to Salt Lake or Provo Utah for an interim meeting hosted by Novell. Hasn't asked for permission yet, wants to see if the group wants to do it first. Not sure about drinking laws. No one has any objection.

**18. New Business:**

**18.1 NTIA, by Peter Chadwick**

In Feb. 94 NTIA produced a Preliminary Spectrum Allocation Report. It suggests re-allocation of 2400 to 2417 MHz - this would leave is in what could be called the brown stuff. We have until the end of this month to express our concerns. It would also be a good idea as individual companies to obtain a copy of the report and make a statement.

Would like to formally ask the IEEE to make a statement.

Vic says we cannot make the end of March, so probably have to file request for late arrival. Set up the standing committee and make our point, then approve through 802.11 and then the excom.

Everyone get copies yourself and express objections. 94-27 NTIA publication "Preliminary Spectrum Allocation Report".

**Motion #36:** To file comments to PSAR 94-27 including late filing standing committee process and excomm approval.

Moved by: Peter Chadwick

Seconded by: Kerry Lynn

**Motion 36 Discussion:** none

Approved: 17

Opposed: 0

Abstain: 0

**Motion #36 passes**

19. Closure - meeting adjourned at 5:07 PM.

#### Tentative Meeting Schedule

Date	Month	Year	Place	Type	Location	Host
9-12	May	1994	Oshawa, Ontario	Inter	GM of Canada	GM
11-15	July	1994	Orlando, FL	Plenary	Walt Disney Swan	
29-8/1	Sept	1994	San Antonio, TX	Inter	TBD	Digital Ocean
7-11	Nov	1994	Incline Village, NV	Plenary	Hyatt Regency, Lake Tahoe	
9-12	Jan	1995	San Jose?	Inter	LeBaron?	WiSE & Tetherless?
6-10	Mar	1995	West Palm Beach	Plenary	Ramada Hotel Resort	
TBD	May	1995	??Utah??	Inter		Open
10-14	July	1995	Maui, HI	Plenary	Hyatt Regency	
TBD	Sept	1995	TBD	Inter		Open
6-10	Nov	1995	Montreal, PQ	Plenary	Queen Elizabeth	
11-15	March	1996	La Jolla, CA	Plenary	Hyatt Regency	
8-12	July	1996	??Amsterdam?? NL	Inter		
11-15	Nov	1996	Vancouver, BC	Plenary	Hotel vancouver	

We received invitations to host a meeting from DEC to Boston area, ICIL to Hong Kong, and LACE.

**Attachment**

Chairman IEC Working Group 84

Dear Mr. Chairman:

We have been advised by Mr. Peter Blomeyer that IEC Working Group 84 is working on standardization of infrared free air transmission. Further we understand that the scope of this work will likely relate to LAN devices. We welcome IEC endeavors in these activities.

In light of Working Group 84's intentions it seems appropriate to establish dialog between IEEE P802.11 and IEC Working Group 84 since some of our respective activities should be considered by the other party. We consider Mr. Blomeyer, an active member of IEEE P802.11 with specific interest in infrared, as an appropriate candidate to perform such dialog.

We would appreciate your consideration of this matter at your next meeting. If IEC Working Group 84 deems it advisable, P802 would be interested in exploring the possibility of a more formal liason on the subject of free air infrared transmission.

Sincerely,

## Appendix 1 Attendance list

First name	Last name	Status	Company	communications
Mr. ROBERT	ACHATZ	voter	US Dept of Commerce	+1 303 497 3498 rachatz@ntia.its.bldrdoc.gov
Dr. HASSAN M.	AHMED		AirAccess	+1 508 653 3646 hma@world.std.com
Mr. REYNALDO	ARCHIDÉ		NEC Electronics Inc.	+1 415 965 6133 rarchide@asic.mtv.nec.com
Mr. ROMMEL	ATIENZA		UC Davis	+1 916 752 4608 atienza@ece.ucdavis.edu
Mr. DAVID	BAGBY	voter	Advanced Micro Devices	+1 408 987 2423 david.bagby@amd.com
Mr. C. THOMAS	BAUMGARTNER	voter	Spectrix	+1 708 491 4534
Mr. PHIL	BELANGER	voter	Xircom	+1 415 691 2500 pbelange@xircom.com
Mr. MANUEL J.	BETANCOR	voter	ETSI Telecomunicacion	+34 28 451272 betancor@deimos.ulpgc.es
Mr. SIMON	BLACK	voter	Symbionics	+44 223 421025 sab@symbionics.co.uk
Mr. TIM	BLANEY	voter	Apple Computer Inc	+1 408 862 6572 tblaney@applelink.apple.com
Mr. PETER	BLOMEYER	voter	ANDROMEDA GmbH	+49 89 8901480
Mr. JAN	BOER	voter	AT&T Global Info Solutions	+31 3402 76483 jan.boer@utrecht.ncr.com
Mr. JACK L.	BRADBURY	voter	AMP Inc M.S. 210-020	+1 717 561 6271
Mr. PABLO	BRENNER	voter	LANNAIR	+972 3 6458375 pablo@lanet.com
Mr. CHARLES	BRILL	voter	AMP Inc	+1 717 561 6198
Mr. GLENN J.	BRONSON		Scope Communications Inc.	+1 508 393 1236
Mr. ROB	CARL		Pulse Engineering Inc	+1 619 674 8272 robcarl+asandiego%pulse@mcimail.com
Mr. PETER E.	CHADWICK	voter	GEC Plessey Semiconductors	+44 793 518080 gecp.peterc@applelink.apple.com
Mr. NAFTALI	CHAYAT		LANNAIR	+972 3 6458391 naftali@lanet.com
Dr. KWANG-CHENG	CHEN	voter	National Tsing Hua University	+886 35 715131 x4054 chenkc@ee.nthu.edu.tw
Mr. STEVE	CHEN		Standard Microsystems Corporation	+1 714 707 4803 chen@ccmail.west.smc.com
Mr. MICHAEL	COLANBARI		UC Davis	
Mr. ARTHUR	COLEMAN		Proxim Inc.	+1 415 960 1630



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First name	Last name	Status	Company	communications
Mr. ROBERT S.	CROWDER	voter	Ship Star Associates Inc	+1 302 738 7782 0002892306@mcimail.com
Ms. SANCHAITA	DATTA	voter	Dayna Communications rb@bingham.utah.edu	+1 801 269 7251 mi-
Mr. FRANK	DELLA CORTE		GEC Plessey Semiconductors Inc.	+1 408 439 6053 dellacorte_f@laurel.gpsemi.com
Mr. MARK	DEMANGE		Motorola	+1 708 576 7913 mark_demange@wes.mot.com
Mr. WIM	DIEPSTRATEN	voter	AT&T Global Info Solutions	+31 3402 76482 wim.diepstraten@utrecht.ncr.com
Mr. BARRY A.	DOBYNS		Photonics	+1 408 955 7930 X230 76527.266@compuserve.com
Mr. JAMES T>	DOYLE		Intel Corporation	jdoyle@sedona.intel.com
Mr. ROBERT E.	EAGON		Intermec Corporation	+1 206 348 1895
Dr. PAUL	EASTMAN	voter	RF Networks	+1 602 861 3652 p.eastman@compmail.com
Mr. ROBERT J.	EGAN	voter	Digital Equipment Corp	+1 508 486 5746 b_egan@nac.enet.dec.com
Mr. JOHN W.	ENG		Digital Equipment Corp	+1 508 486 7734 eng@nac.enet.dec.com
Mr. GREG	ENNIS	voter		+1 408 356 4775 gennis@netcom.com
Dr. KAMILO	FEHER	voter	University of California Davis	+1 916 752 8127
Mr. MICHAEL	FISCHER	voter	Digital Ocean Inc.	+1 210 614 4096 mfischer@child.com
Mr. MAURICE	FRANCE	voter	Turner Gold France Engineering	+1 310 373 9515 hmfrance@aol.com
Mr. PAUL R.	FULTON	voter	Netcore Technology Inc.	+1 214 578 7090
Mr. KEITH S.	FURUYA		Xircom	+1 415 691 2500 kfuruya@xircom.com
Mr. ED	GEIGER	voter	Apple Computer Inc	+1 408 974 4907 edg@apple.com
Mr. EUGEN	GERSHON	voter	Advanced Micro Devices	+1 408 987 2408 eugen.gershon@amd.com
Mr. JUAN	GRAU	voter	Proxim Inc.	+1 415 960 1630 grauprox@aol.com
Mr. STEVEN D.	HALL		CommQuest Technologies Inc	+1 619 633 1618 x115 hall@cqt.com
Dr. LEE	HAMILTON	voter	Motorola Inc	+1 708 576 7473 lee_hamilton@wes.mot.com
Mr. VICTOR	HAYES	voter	AT&T Global Info Solutions	+31 3402 76528 Vic.Hayes@Utrecht.ncr.com
Ms. CAROLYN L.	HEIDE	voter	Spectrix Corp	+1 708 491 4534 71041.3262@compuserve.com

## Appendix 1 Attendance list

<u>First name</u>	<u>Last name</u>	<u>Status</u>	<u>Company</u>	<u>communications</u>
Mr. ALEX	HERMAN		WINDATA	+1 508 393 3330 alexh@windata.com
Mr. RANDY	HILLOCK		Motorola	+1 708 538 3352
Ms. LAURA	HINDY		Raytheon	+1 508 490 1420
Mr. DOUGLAS A.	HUTCHINSON	voter	IBM Canada Ltd	+1 905 316 5523
Mr. LARRY van der	JAGT	voter	Knowledge Implementations Inc	+1 914 986 3492 killvdj@attmail.com
Mr. CHARLIE	JENKINS		GEC Plessey	
Mr. WERNER	JUST		Siemens AG	+49 89 41 44 55 66
Mr. FRED	KAMP		Paradigm Marketing	+1 408 436 4023
Mr. DEAN M.	KAWAGUCHI	voter	Symbol Technologies Inc	+1 408 249 9890 X 196 deank@psd.symbol.com
Mr. MIKIO	KIYONO	voter	NEC Technologies Inc	+1 408 433 1457 mikio@lpd.sj.nec.com
Mr. BUD	KOCH	voter	Gransden Group	+1 408 255 8480 rbudk@aol.com
Mr. JOSEPH J.	KUBLER	voter	Norand Corporation	+1 303 442 1850
Mr. RICK	KUNZ	voter	Compaq Computer Corporation	+1 713 378 1337
Mr. TRUNG	LAM		Fil-Mag	+1 619 569 6577
Mr. DANIEL E.	LEWIS	voter	Norand Corporation	+1 319 369 3370
Ms. ISABEL	LIN	voter	Toshiba America Info Systems Inc	+1 714 583 3854 isabell@tais.com
Mr. FRANCISCO JOSE	LOPEZ-HERNANDEZ	voter	Univ. polytechnica de Madrid	+34 1 336 73 41 dxtn@fco.upm.es
Mr. JERRY	LORAINE	voter	Symbionics	+44 223 421025 jl@symbionics.co.uk
Mr. ANDY J.	LUQUE		Open Communications Technology	+1 503 389 6512
Mr. KERRY	LYNN	voter	Apple Computer Inc	+1 408 974 2394 kerlyn@apple.com
Mr. COLIN L.M.	MACNAB	voter	GEC Plessey Semiconductor	+1 408 439 6075 gecp.colinm@applelink.apple.com
Mr. RONALD	MAHANY	voter	Norand Corporation	+1 319 369 3552 mahanyrl@norand.com
Mr. DAVID	MANSOUR	voter	RDC Communications Ltd	+972 2 519311
Mr. DONALD J.	MARSH		IIMORROW/UPS	+1 503 581 8101
Dr. P.TAKIS	MATHIOPOULOS		University of British Columbia	+1 604 822 6942
Mr. MASAO	MATSUDA		Fujitsu Computer Products of America Inc.	+1 503 681 7300
Mr. JIM	McDONALD	voter	Motorola	+1 708 576 3169 cjm015@email.mot.com
Mr. JOHN	McKOWN	voter	Motorola	+1 708 538 5235 mckown@wes.mot.com
Mr. HUSSEIN	MEHDI		UC Davis	+1 916 752 4608 mehdi@eecs.ucdavis.edu

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First name	Last name	Status	Company	communications
Mr. BRIAN	MESSENGER		Proxim	+1 415 960 1630
Mr. MIKE	MICELI		Motorola Inc.	+1 708 413 2532
Mr. T.	MITSUTOMI	voter	Sharp/SDI	+1 714 261 6224
Dr. AKIRA	MIURA	voter	Panasonic Technologies Inc.	+1 415 858 1000 miura@tadw.research.panasonic.c
			om	
Mr. ROY	MIYANO	voter	ALPS Electric (USA) Inc.	+1 408 432 6458 71234.3457@compuserve.com
Mr. WAYNE D.	MOYERS	voter	WISE Communications Inc	+1 408 376 0250 moyers@netcom.com
Mr. ROBERT	O'DELL		Motorola	+1 512 891 2177
Mr. BOB	O'HARA	voter	Advanced Micro Devices	+1 408 987 2421 bob.ohara@amd.com
Mr. FRANK	O'NEILL	voter	LXE Inc	+1 404 447 4224 fon1477@engulf.lxe.com
Mr. MITSUJI	OKADA		NEC Electronics Inc.	+1 415 965 6549 mokada@asic.mtv.nec.com
Mr. JEFF	RACKOWITZ	voter	INTERMEC Corp	+1 206 348 2600 x6307 jeffr@intermec.com
Mr. JAMES A.	RENFRO	voter	Raytheon Co	+1 508 490 1934 renfro@tif188.ed.ray.com
Mr. DAVE	ROBERTS	voter	Advanced Micro Devices	+1 408 987 2377 david.roberts@amd.com
Mr. PHIL	ROBINSON		LAN Access	+1 310 328 9700 philr@lana.com
Mr. WILLIAM	ROEDER		LXE	+1 404 447 4224
Mr. JAMES F.	ROESCH JR		Harris Corporation	+1 407 729 2977 jroesch@ic1d.harris.com
Mr. JON WALTER	ROSDAHL	voter	Novell Inc	+1 801 429 3183 jrosdahl@novell.com
Mr. MICHAEL	ROTHENBERG	voter	LANNAIR	+972 3 6458422 ieee_802.11-
			distr@lannet.com	
Mr. ROGER N.	SAMDAHL	voter	Photonics Corporation	+1 408 955 7930 70110.360@compuserve.com
Mr. KULBIR	SANDHU		Hitachi Micro Systems Inc.	+1 408 456 2118 ksandhu@hmsi.hitachi.com
Mr. LEON S.	SCALDEFERRI	voter	NSA R22	+1 301 688 0293 lsscald@alpha.ncsc.mil
Mr. JAMES E.	SCHUESSLER	voter	National Semiconductor	+1 408 721 6802 jim@berlioz.nsc.com
Mr. RAUL	SETHI		Toshiba America	+1 714 455 2230

## Appendix 1 Attendance list

First name	Last name	Status	Company	communications
Mr. GLEN	SHERWOOD	voter	Intermec Corp	+1 206 356 1791 glens@intermec.com
Mr. GREG	SMITH	voter	GEC Plessey Semiconductors	+44 522 502274 smith_g@lincoln.gpsemi.com
Mr. JERRY	SOCCI	voter	National Semiconductor	+1 408 721 5590 socci@berlioz.nsc.com
Mr. MARVIN	SOJKA	voter	Accipiter Corp	+1 216 666 6380 msojk@telxon.com
Mr. KYUNG S.	SON		US Army CECOM	+1 908 532 0451 son%doim6@monmouth- emh3.army.mil
Mr. PAUL F.	STRUHSAKER	voter	Telxon Corporation	+1 216 867 3700 x3331 pstru@telxon.com
Mr. MACK	SULLIVAN		Proxim Inc.	+1 415 960 1630
Mr. MIKE	TROMPOWER	voter	TELXON Corporation	+1 216 867 3700
Dr. EDWIN	TURNER	voter	ICL	+44 344 476249
Mr. RYAN H.	TZE	voter	Toshiba American Info Systems	+1 714 587 6769 ryant@tais.com
Mr. RUI T.	VALADAS	voter	Universidade de Aveiro	+351 34 381937 rv@zeus.ci.ua.pt
Ms. JEANINE	VALADEZ	voter	Advanced Micro Devices	+1 408 987 2444 j9@brahms.amd.com
Mr. SAROSH	VESUNA	voter	Symbol Technologies Inc	+1 408 249 9890 x166 saroshv@psd.symbol.com
Mr. HIROHISA	WAKAI	voter	SHARP	+1 510 644 9267 wakai@sharp.co.jp
Mr. STEVEN	WEISS		DCA	+1 408 432 9111 Steve_Weiss@pacdata.com
Mr. RICHARD E.	WHITE	voter	Motorola	+1 708 576 7878 rick_white@wes.mot.com
Mr. CHRIS	ZEGELIN	voter	Symbol Technologies Inc	+1 408 249 9890 x144 chrisz@psd.symbol.com
Mr. LAWRENCE H.	ZUCKERMAN	voter	Integrated Circuit Systems	+1 215 630 5306