Tentative Minutes of the IEEE P802.11 Working Group

Interim meeting
Wilmington, DE
May 10-13, 1993

Monday, May 10, 1993, AM

The meeting was called to order at 8:45 PM Vic Hayes, chairman IEEE P802.11[1], in the chair. Carolyn Heide secretary. Wayne Moyers managing document originals and copying, Leon Scaldeferri distribution and pigeon hole organization, and Ning Kong handling the attendance list. The agenda document for this meeting is 802.11-93/49 sent out in the April mailing.

Objectives:

- comparison of MAC proposals VS infrastructure services, functional requirements and other adopted requirements;
- security transactions finalization;
- adopt preferred approach for FH PHY;
- move forward on: PHY templates; MAC independent layer; channel model; continue IR and DS study.

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[1] The officers of the Working Group are:

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1. Opening

1.1 **Roll Call:** People in the room were identified from the hotel registration list.

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. In subgroups 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 session.

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. Breaks will be at 10:30 AM and 3:00 PM, and lunch is approximately 12:30 to 1:30 PM.

1.5 **Other announcements:**

Tutorial Monday evening on modulation, by Peter Chadwick.

2. Approval of the minutes of the previous meeting

2.1 **Baltimore meeting, Document IEEE P802.11-93/44:** no quorum

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

3. Reports

3.1 Report from the Executive Committee, by Vic Hayes

No issues for 802.11 from the executive committee.

4. Registration of contributions to be presented

Assigned to the MAC/PHY joint meeting: 93/75

Assigned to the PHY subgroup: 93/31, 93/67, 93/68, 93/71, 93/72, 93/73, 93/74, 93/77, 93/80, 93/81, 93/82, 93/83, 93/84

Assigned to the PHY IR ad hoc group: 93/55, 93/57, 93/78, 93/79

Assigned to the MAC subgroup: 93/54, 93/58, 93/59, 93/62, 93/63, 93/64, 93/66, 93/69, 93/70

Assigned to full working group: none

5. Adoption of Agenda: by consensus with changes as follows -

Tutorial Monday night, 7 PM.
IR PHY ad hoc group Wednesday evening at 6 PM instead of Monday evening.

6. Unfinished Business:

6.1 Comments on updates of draft standard: none

7. New Business

(1) News net group, John McKown

John, from Motorola, is trying to get com.std.wireless for an Internet news net group. If you haven't received e-mail asking you to vote yes on that please see John.

(2) Format of minutes, Jim Schuessler

There was a reflector discussion on the format of the minutes. In other committees concept/summary format is used. This produces shorter minutes with more dense content. Carolyn aggress with Jim that this is a preferable way to do minutes. Although harder to take this way, they are easier to read for new members and absent members. It Jim took 2.5 hours to go through the meeting minutes for the last meeting that he had to miss.

Bill Stevens: having taken minutes for various 802 committees, finds the verbatim style easier for the recorder. Reading the minutes allows a feel for the flavor of the discussion to come through which would not for summarized. How does Carolyn feel about summarizing on the spot versus later?

Carolyn: real-time summary would be essential, misinterpretations would arise otherwise. The meeting might have to be stopped occasionally to ensure I have the summary correct.

Bill: summary places a responsibility on the recorder to interpret.

Dave B: likes the current style minutes, they serve 2 purposes: written record of what was done and understanding of what went on. A couple of hours to understand several days is not unreasonable. The idea of who is in what camp would be lost.

Larry: doesn't have a problem with the style as is. But whatever style is adopted had better have volunteers to do it.

Peter Cripps: agrees with Dave. Hasn't attended for a year now. Stopping coming coincided with Carolyn starting recording and finds the minutes as is very useful.

Bob B: supports Jim. In summary style each synopsis can be numbered so that if the speaker wants to present some other view later they can be addressed easily. There is an additional way of modulating the digest.

Vic: likes the verbatim style, but agrees a summary is needed too. Must do this for the ExCom report and could attach that to the minutes if desired. Extensive minutes are still needed. Also the issues list could be considered - minutes style could be changed to address the issues list very closely, capturing pros and cons directly in the minutes. But thinks extensive minutes are needed.

John M: agrees with what Carolyn just told us, that summary must be done one the spot real-time. Sometimes I take minutes, and verbatim is easiest for people not good at it.

Peter Chadwick: has taken minutes, and never managed to do verbatim because you don't get to speak yourself. It comes down to getting volunteers - if they will do summary only that's what you get. Both are good for different reasons. What the volunteer will do is what's important.

Nat Silberman: has to read MAC minutes because he has to be in the PHY group, likes the verbatim style for those.

Richard Ely: controlled discussions are OK to do verbatim. When the discussion gets out of hand all you can do is say there was a discussion. Capability of the minute taker is all you are going to get.

Jim: certainly if a volunteer is doing it you take what you get.

Straw poll: verbatim style 27, summary style 6.

(3) **Document Services accessible through the Internet,** Bill Stevens

Bill Stevens announcement: Apple is setting up a system on the Internet to provide FTP services. Anyone with thoughts on organization of that please see Bill. Electronic distribution and on-line archive is the goal. After 18 months research there is now a UNIX machine running that is available on the Internet. On the Internet you can use anonymous FTP. Also looking into making the same archive available on electronic mail.

Bill can use any assistance anyone can offer. Haven't yet adopted a method for organizing the documents. Plain ASCII is the most universal, but some may want to do more. RTF does a good job from some packages. Bill has to manage this resource, so let's try to keep the storage as compact as possible.

There will be an ad-hoc meeting after the tutorial Monday night about how to organize the FTP server.

8. Adjourn for subgroups - 10:45 AM

Monday AM (remainder) & PM, 10 May, 1993
MAC and PHY subgroups

Tuesday AM, 11 May, 1993
Joint MAC/PHY

Tuesday AM (remainder) & PM, 11 May, 1993
MAC and PHY subgroups

Wednesday AM & PM, 12 May, 1993
MAC and PHY subgroups

Wednesday Evening, 12 May, 1993
PHY-IR subgroup

Thursday AM, 13 May, 1993
MAC and PHY subgroups

Thursday PM, 13 May, 1993
Full Working Group

The meeting was reconvened at 1:15 PM, by chairman Vic Hayes, with Carolyn Heide secretary.

9. Opening

9.1 Announcements

People came to the chairman this meeting expressing concerns about the high number of participants from particular companies. The IEEE operates on the basis of individual experts, it is therefore important that opinions expressed are based on the individual's expertise. Consequently, the IEEE has rules regarding balance in the ballot groups. Balance is defined as the avoidance of dominance by any single interest group. (quote from the operations manual of the IEEE standards board (1993)). What to do if the balance at P802.11 level is lost, remains to be seen. The chair would like that he would not need to be concerned with such overhead. There has been a case where the chair had warned that they would limit the vote to one for a company if they had the evidence of block voting. Fortunately, it was not needed to execute this warning.

Corrections to the circulated attendance list:

> e-mail Jim McDonald: cjm (not cvm)
>
> e-mail Greg Smith: smith_g (not smith.g)
>
> address Jeff Rackowitz: 36 th Av (not 35 th)

9.2 Document update: Vic reviewed documents distributed this meeting.

9.3 Agenda Adjustments: Added 11.6 future meetings and 12.1 patent policy

10. Reports from sub and ad-hoc groups

10.1   MAC, by Dave Bagby

Papers Presented and Discussed:

93/54 - The CODIAC Protocol, A wireless MAC Protocol.
93/54a - Presentation slides for 93/54.
93/58 - Alternatives and arguments on some issues.
93/59 - Evaluation of the CODIAC protocol
93/62 - IBM MAC protocol 2nd update
93/63 - Criteria for MAC protocol for WLAN (IBM)
93/64 - Network layer requirements.
93/66 - Security associations using 802.10
93/69 - Security of wireless LANs
93/70 - Distributed Access protocol proposal supporting TBS.
93/75 - A compromise MAC protocol.
93/85 - Evaluation of the WHAT protocol.

Papers expected for July meeting

93/50 - MAC proposal from Bob Crowder.
93/51 - MAC comparison from Bob Crowder.
93/65 - Performance of the CODIAC protocol
A MAC proposal from INRIA.
Security related paper from Apple.
Compromise MAC approach part 2 (National).
Simulation results from Xircom.
Lannair MAC protocol proposal.
Relationship on protocol & interference limited design aspects. (Chan)
Importance of DC power management (Wim)

More detail of NCR proposal.

Progress on Mar 93 Agenda Subjects.

⇒ Comparison of MAC proposals vs. Infrastructure services, functional requirements and other adopted requirements.
- Request analysis by proposal authors
  > three received including one new protocol proposal.
- Request identification of weaknesses as well as strengths.
  > tendency to say "great", with other people pointing out weaknesses.
- Comparison of the proposed MAC protocols to facilitate evaluation and potential improvement of the protocols then drive toward convergence.
  > Evaluations generated valuable discussion and illumination of core differences.
  > Unavoidable diversity of question interpretation hampered evaluation as comparison tool.
  > Need consistent questions oriented toward "how" instead of "yes/no".
  > Ad-hoc group to work on this before next meeting.
  > Trend toward common theme
    - 4 proposals use contention then add bandwidth allocation for isoch. service.
    - details very different between proposals.
⇒ Decided to close off new MAC protocol proposals at end of July meeting and concentrate on solution derived from submitted proposals.
- Moved:
  That the MAC group stop accepting *new* MAC protocol submissions at the end of the July 1993 meeting, after that time it will take a simple majority vote of the MAC group (voting members) to consider a new protocol approach.
- Vote: 19, 2, 2

Discussion:
Bill Stevens: how would someone proposing a new protocol get people to vote for considering it?
Dave: it could be mailed out, what we are trying to control is meeting time.
Larry van der Jagt: simple majority of what?
Dave: voting members sitting in the MAC group meeting at the time of the vote.

⇒ Security transactions/issues finalization.
- Adopted 802.10 as core security mechanism and closed several open security issues.
⇒ Issue working.
- Members are expecting to spend time in small groups preparing recommendations for adoption by rest of MAC group.
  > Due to volume of papers received no time available to do this, will schedule for July meeting.

Intellectual property disclosure

⇒ The MAC group discussed the following motion and decided that the subject should be taken to plenary:
- Moved:
  That 802.11 formally adopt the policy that any current and/or future submissions which contain techniques covered by intellectual property law, be so identified in good faith to 802.11 (current submissions to be identified before the end of the July 1993 meeting).
- Vote to raise the subject in plenary: 19, 1, 0

Discussion: held for main agenda item 12.1 .

Issues Processed at May 93 meeting.

6.4: How will authentication and registration be specified in the 802.11 standard?

- Use 802.10 mechanisms and we will have to decide what is needed to define the (eventually) agreed minimal functionality from 802.10 and we will need to identify the 802.10 params.
- Vote: 19, 0, 0

Motion #1:   **to adopt this MAC group recommendation.**

Moved by: the MAC group
Seconded by: Larry van der Jagt

Motion Discussion:
Wim Diepstraten: wasn't there a clarification of the registration part of this issue?
Dave: that goes into the issues log. What Wim is referring to, is that we split the co-ordination function concept from the idea of association.

Approved: 18   Opposed: 0   Abstain: 1   *Motion #1 passes*

6.6: Is there any additional work on security that needs to be done in 802.11 in addition to the work done by 802.10?

- Yes
- Vote: 20, 0, 1

Motion #2:   **to adopt this MAC group recommendation.**

Moved by: the MAC group
Seconded by: Tom Baumgartner

Motion Discussion: none

Approved: 19   Opposed: 0   Abstain: 0   *Motion #2 passes*

6.7: How does re-association interact with authentication?

- 802.11 will define authentication transactions and 802.10 provides the mechanism for negotiation or finding pre-established security associations. Pre-Authentication transactions mitigate possible performance impacts.
- Vote: 12, 0, 1

Motion #3:   **to adopt this MAC group recommendation.**

Moved by: the MAC group
Seconded by: Leon Scaldeferri

Motion Discussion:
Larry van der Jagt: having not the ability to go into the MAC group, I can't make a fuss - I understand what authentication is and why we need it, but I wonder if something else out of our realm should be providing it?
Dave: we already decided to do this, this issue is only about how, not if.
Larry: suspects that this part of our document is going to cause raised eyebrows on the part of the people who are concerned with this.

Vic: proposes we have a liaison with 802.10 .

Dave: We have asked and they have responded, more or less, that they don't have time for us. Leon has been doing an informal sort of liaison.

Vic: proposes we ask in writing to have a liaison with 802.10 .

Dave: doesn't see a problem because we chose to use them.

Larry: maybe we need time in the 802.1 joint technical meeting on Wednesday AM to ask them if they think we need anything.

Kerry Lynn: proposes forming an ad-hoc committee to handle MAC security related issues.

Dave: others interested? Dave is, Vic supposes Jan Kruys would be. But that doesn't relate to closing this issue. Anyone interested call Dave Bagby.

Approved: 19	Opposed: 0	Abstain: 2	*Motion #3 passes*

6.8: How does re-association interact with privacy?

- The only interaction is if the new AP can not support the current privacy algorithm, then it impacts the re-association (which would fail).
- Vote: 15, 0, 2

Motion #4:   **to adopt this MAC group recommendation.**

Moved by: the MAC group
Seconded by: Tom Baumgartner

Motion Discussion: none

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

6.9: Shall the 802.11 standard specify one or more publicly available privacy algorithms which all stations shall be required to support (one privacy option shall be "none")?

- yes (one is "none", see below for other(s))
- The minimal required is "in the clear".
- Additionally, 802.11 will request the list of standardized algorithms from 802.10 and examine them to see if there is one 802.11 also wishes to include in the minimal supported set (or offer one of our own to 802.10 for "numbering" should we decide to do so).
- After reviewing the 802.10 algorithm information, we must answer the issue: Shall we expand the minimal security algorithm set to include a privacy "equivalent" to wired LANs?
- Vote: 12, 0, 3

Motion #5:   **to adopt this MAC group recommendation.**

Moved by: the MAC group
Seconded by: Bob Rosenbaum

Motion Discussion: none

Approved: 16	Opposed: 0	Abstain: 3	*Motion #5 passes*

New issues from May 93 meeting

- Can we say that in the case of the presence of an STA acting as an AP, it always contains the Point CF if a Point CF is present?
- Shall we expand the minimal security algorithm set to include a privacy "equivalent" to wired LANs?

MAC Agenda Subjects and Goals for July 93 meeting

- Additional MAC proposals expected.
- Will drive toward creating a MAC proposal which offers the best of the current proposals.
- Review of improved question set to facilitate comparison of MAC proposals from Ad-hoc group.
- Close off submissions of additional MAC protocol proposals effective the end of the July meeting.
- Discussion of any IP (intellectual property) disclosures.
- Issue working -
  Members are expecting to spend time in small groups preparing recommendations for adoption by rest of MAC group.

10.2   PHY, by Larry van der Jagt

Failed to meet goal of settling on a FH PHY.

Talked about:

1. channel model - conformance and how they interact.
2. modulation - continuous phase FSK, postponed the decision of binary vs quaternary.
3. preamble - what needs to go in the air to do hop acquisition.
4. FH template reviewed.
5. DSSS template reviewed (got a 2nd proposal that agreed a lot with the first from the modulation point of view)

Opened 2 new issues

What is the point of conformance for an 802.11 PHY?

François Simon: alternatives? Can I have some text for the issues log for that.
Larry: one way is to have a spigot where you hook a coax cable in and look. The other is put it in a chamber and see how it behaves. I will give you text.
Chandos Rypinski: on simulators, perhaps there should be an interference component.
Larry: there will be, and the interferers may have to pass through a channel model too.

How will hop synchronization, acquisition and tracking be accomplished in the FH PHY and how are these terms defined?

Larry: what will an 802.11 PHY put on the airway in order to enable these 3 things to be accomplished is what we want to say here. Don't care how an implementation does it, just that there is enough stuff on the airway to accomplish this.

PHY goals:

7/93 - close 24.10. Get schedule for DSSS and IR
9/93 - define common air interface (CAI). Close 24.11 (first new one)
11/93 - review first draft of FH PHY

Next Meeting

Monday AM is IR ad hoc group meeting
Tuesday AM, work on issue 24.11
Tuesday PM, work on issue 24.10 until the issue is closed.
Wednesday AM, DSSS issues discussion before break, after break prepare for joint meeting because expect a lot of feedback to MAC.
Thursday AM for left over stuff and planing for future.

Expected Contributions:

Motorola, Apple and California Microwave - signal to interference characteristics of CPFSK modulation schemes.
Motorola - issue related to carrier detect time and numeric issues of DBC and DBM and what we mean when we say these and spectral mask.
Apple - convergence of FH PHY with MAC.

Questions:

Vic: Dave, PHY group proposes Wednesday PM for joint meeting. Is that OK
Dave: sure.

Larry gives a brief advertisement for Mathematica. He has best prices anywhere.

IR PHY ad hoc group report, by Tom Baumgartner

Unofficial attendance count was 14.
Papers presented by people from Spectrix and University of Aviero (channel modelling again, modulation methods, IR sources)
Plans for next meetings are papers on channel modelling, IR detectors, IR conformance testing and hopefully someone will attempt an overall specification.

10.3   Joint MAC/PHY, by Vic Hayes

The was one presentation, part of 93/75. Conclusion: Jim Schuessler will draft issues that he feels are not currently in the issue log concerning model layer functions.

11. Unfinished Business

11.1 Recap of Output Documents: none

11.2 Recap of Document Distribution: please make sure files and originals, with headers and footers, are given to Vic for this meeting's submissions.

11.3 Next Meeting

Sheraton Denver Tech Center $ 80 + 12 % tax
4900 DTC Parkway   1 or 2 persons
Denver Co 80237   Q-name: 07IEN
Voice 303 779 1100   July 11-16
FAX 303 770 6112

(1) Objectives for next meeting - see the PHY and MAC subgroup reports.

(2) Last Mailing Date: Monday May 24 first mailing date. Last mailing date: 21st of June.

11.4 Other Intermediate Meetings: IR group on Monday morning, July 12, in Denver.

11.5 Confirmation of September 1993, Meeting:

20-23 September   LXE
The Holiday Inn Buckhead $75 + tax
3340 Peachtree Road, NE   Further info at July
Atlanta, GA 30326
Voice 404 231 1234

Fax 404 231 5236

11.6 Future Meetings:

November. 8-12. West Palm Beach, Ramada Resort.

January, it's about time to go to the west coast. There is an invitation to Hong Kong (meets with groans around the room). Wayne Moyers is seeing if he can host. Dick Walvis will check too (and talk to Wayne about it).

May '94, Orest Storoshchuk would like to host in Oshawa, Ontario, Canada. He would like to hold the meeting at the GM plant, so attendees would have to drive to the plant from the hotel. In that case meeting rooms and breaks and copies are free, which is nice. Orest also suggests the possibility of a plan tour, and a measurement party (i.e. IR coverage?). There are no objections to Oshawa by the current attendees.

12. New Business:

12.1 Patent Policy:

IEEE has a policy from 1992, and also there is a new standard operation manual from '93. If the committee intends to use patented material it must explain the reasons why. Vic will look for the latest rules and circulate them. The following is supposed to be read twice at each plenary:

> In keeping with the ANSI policy relating to Patents, each of you as a member of this working group is requested to notify the chair of any patent of which you are aware that might be used in a product implementing this working group's standard.
>
> The current draft of the standard and all discussions at working group meetings should be considered when deciding if a patent might be applicable - when in doubt, err on the side of saying a particular patent might apply. Your notification should include as much information as you have that would help identify the patent and the name of either the patent holder or assignee. The term Patent is intended to include patent applications that are pending. If you feel unable to notify the Chair about a patent for any reason, you have an obligation to contact the patent holder, assignee, or applicant and request that they contact the chair of this working group as soon as possible so that the ANSI patent policy can be discussed.

Dave Bagby thinks that covers the MAC group's concerns, as the worry was not because we wouldn't consider proposals, but because we want to know up front. Asks that the chair notify the membership of everyone that notifies him of intellectual property issues. Also asks would people identify things that pertain to existing submissions.

The chairman notes that there is precedence of a case where a patent was rendered unenforceable because a person was working on a standard while they held a patent that was relevant to that standard, and they didn't mention it.

12.2 Other New Business

Doc. 93/86 about the FTP Server, Bill Stevens

There is a new document in the pigeon holes, 93/86, about the FTP server that Bill spoke about earlier in the meeting. It is available only to direct connect Internet, or on a host that has direction connection. Use the UNIX FTP software and log on as an anonymous guest. Next Monday, as many documents as possible will be there. Bill will work on getting e-mail access to that so you can list the contents and request documents.

The file format is as yet undefined. May start with the documents in the format in which they are received. When you have submissions send them to the archive so they may become available.

<u>Dave Bagby:</u> anonymous FTP means it is completely public. This makes it very easy to get quoted out of context, so some personal disclaimer may want to be added to documents. (Just something for people to bear in mind)

<u>Bill:</u> a 'readme' file will be in there that includes such a statement.

<u>Dave:</u> MS Word might be a good format, and a postscript file to cover UNIX applications.

<u>John McKown:</u> please take a form like you gave us (in 93/86) and you give it to ETSI RES-10 so that they know how to get these documents.

<u>Vic:</u> thanks Bill for offering this service.

Next Meeting Agenda

<u>Jim Schuessler:</u> how much time is there for the joint meeting?

<u>Vic:</u> after lunch Wednesday is the start, the end is flexible. Full agenda will be mailed.

<u>Tom Baumgartner:</u> based on what happened today - the MAC group having to quit at 11 AM because this meeting starts at noon, then we wind up finishing early on Thursday - maybe this full working group meeting should start at 2.

<u>Vic:</u> but at a plenary I need to be sure of being ready for the 802 meeting starting at 5.

<u>Jim:</u> wants a lot of time to be spent on functions in the convergence layers in the next joint subgroup meeting.

<u>Vic:</u> then bring a submission.

<u>Bob Crowder:</u> has already submitted a huge document (from the field bus standard) on that.

<u>Dick Walvis:</u> the PHY group has started already to work on that.

<u>Larry van der Jagt:</u> the output of the last meeting on that subject was to tell the PHY group to go away and work on it and we did.

Thanks to hosts Bob and Priscilla Crowder

Vic made a presentation to Priscilla in thanks for all her hard work, amid a hearty round of applause.

13. Closure - meeting adjourned at 2:30 PM.

Tentative Meeting Schedule

Date	Month	Year	Place	Type	Location	Host
12-16	July	1993	Denver, CO	Plenary	Sheraton Denver Technology Center	
20-23	Sept	1993	Atlanta, GA	Inter	Holiday Inn Buckhead	LXE
08-12	Nov	1993	W Palm Beach, FL	Plenary	Ramada Resort	
10-13	Jan	1994	West Coast	Inter	TBD	WiSE or NSC
07-11	March	1994	Vancouver, BC	Plenary	Hotel Vancouver	
09-12	May	1994	Oshawa, Ontario	Inter	GM of Canada	GM
11-15	July	1994	Orlando, FL	Plenary	Walt Disney Swan	
TBD	Sept	1994	TBD	Inter	TBD	Open
07-11	Nov	1994	Incline Village, NV	Plenary	Hyatt Regency, Lake Tahoe	

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

Appendix 1
Attendance list

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Appendix 2
Document list

Documents distributed

#31	A simple Indoor Microwave Channel Model with realistic motion effects. A progress report and draft for discusion (John McKown, Motorola, and Larry van der Jagt, KII)
54 A	Overheads to doc 93/54: The CODIAC Protocol, Centralized or Distributed Integrated Access Control, A Wireless MAC Protocol (Carolyn Heide, Spectrix)
#57	Data encoding schemes for Infrared signalling (Ellen Oschmann, Spectrix)
#59	Evaluation of the CODIAC Protocol (Carolyn Heide, Spectrix)
#62	Wireless LAN Medium Access Control protocol: Second Update (Frédéric J. Bauchot, IBM)
#63	Criteria for MAC protocol for WLAN (K.S. Natarayan, IBM)
#64	Network Layer Requirments (Charles Perkins, IBM)
#65	Performance of the CODIAC Protocol (Carolyn Heide, Spectrix)
#66	Standard for Interoperable LAN & MAN Security 802.10B revisited (Leon Scaldeferri, NSA)
#67	Comments on proposal for 2 Mbit/s 802.11DSSS PHY (Paul Struhsaker & Tom Tsoulogiannis, TELXON)
#68	Framework update for 2 Mbit/s DSSS PHY (Jan Boer, NCR)
#69	Security in wireless LANs (Jan Kruys, NCR)
#70	A Distributed Access Protocol Proposal supporting Time-Bounded Services (Wim Diepstraten, NCR)
#71	Comparison of Baseband Waveforms of GMSK and Binary 2REC Modulation (Larry van der Jagt, KII)
#72	Preamble length considerations for a Frequency Hopping PHY (Jerry Socci, National Semiconductor)
#73	An unintelligent radio interface (W.B. Cooper, National Semiconductor)
#74	Mutual Interference between FH PHY and DS PHY(Dick Walvis, National Semiconductor)
#75	A compomise MAC protocol concept (Jim Schuessler, National Semiconductor)
#77	Discussion of 0.39 GMSK modulation for Frequency Hop Spread Spectrum (Jim McDonald, Motorola)
#78	Propagation Losses and Impulse Response of the Indoor Optical Channel: A simulation package (Cipriano Lomba et al, University of Aveiro)
#79	Modulation/Encoding Techniques for Wireless Infrared Transmission Systems (Adriano Moreira et al, University of Aveiro)
#80	Constant envelope modulation (Peter Chadwick, GEC Plessey Semiconductors)
#81	Proposal for a Channelization scheme for the DSSS PHY (Tom Tsoulogiannis & Richard Perry, TELXON)
#82	Comment on document 92/127 R1 (Bill Stevens, Apple Computer)
#83	Draft for a FH and DS SS PHY (Nathan Silberman, editor)
#84	Proposal for a modulation technique for FHSS PHY Standard (Nathan Silberman, Calif. Microwave)
#86	Announcing IEEE P802.11 Electronic Document Server (Bill Stevens, Apple Computer)

Appendix 3
Document list

Document number assignments

#85	(Phil Belanger, XIRCOM)
#87	Tentative Minutes of the full Working Group meeting held May 10-13, 1993, Wilmington, DE
#88	Tentative Minutes of the joint MAC/PHY meeting held May 10-13, 1993, Wilmington, DE
#89	Tentative Minutes of the MAC group meeting held May 10-13, 1993, Wilmington, DE
#90	Tentative Minutes of the PHY group meeting held May 10-13, 1993, Wilmington, DE
#91	Tentative Minutes of the IR ad-hoc group meeting held May 10-13, 1993, Wilmington, DE
#92	Tentative Agenda for the full Working Group meeting, July 12-16, 1993, Denver, CO
#93	Tentative Agenda for the IR ad-hoc group of the PHY group, scheduled for July 12, 1993.