Tentative Minutes of the IEEE P802.11 Working Group

Plenary Meeting
Irvine, CA
March 9-12, 1992

Monday, March 9, 1992, PM

The meeting was called to order at 3:30 PM, Vic Hayes, chairman IEEE P802.11[1], being in the chair. In the absence of the secretary and vice-chairman the following people "volunteered" to assist the chairman: Minutes were kept by Jim Schuessler; Attendance list was kept by Curt Schmidek; Document distribution was handled by Alan Flatman; Document reproduction was handled by Dr. K.S. Natarajan.

1. Opening

1.1 Objectives:

- review letter ballot results on Requirements

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[1] The officers of the Working Group (as elected at the end of this meeting) are:

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- consider Security/authorization requirements
- continue MAC/PHY interface definition
- review existing and new protocol proposals
- work on channel characterization
- review the schedule to come to standard
- reaffirmation of officers

1.2 Roll Call, Voting rights: All people in the room were invited to mention their names and affiliation. Voting tokens were distributed in the attendance book to be picked up by voting members during attendance list circulation.

1.3 Attendance list, Registration: The attendance list was distributed. The chairman drew attention to the obligation to register for the meetings.

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.

1.5 Other announcements: none

2. Approval of the minutes of the previous meeting

2.1 Ft. Lauderdale meeting, Document IEEE P802.11/91-138: The minutes were approved by consensus

2.2 Chapel Hill meeting, Document IEEE P802.11-91/18: The minutes were approved by consensus

2.3 Matters arising from the minutes: none

3. Reports

3.1 Reports from the AM meetings.

MAC Report:

No meeting was held Monday AM due to lack of communication. Bob Crowder pointed out that more explicit notice was necessary. It was proposed that a separate document (prepared by the chairs of the subgroups) be submitted if the standard meeting schedule would be deviated from in the future.

PHY Report:

Mechanization of standards and developing work:

- document exchange by floppy disk;

- experiments with on line documentation;

- reflector available as CS SAB (Internet);

- Does 802.11 want to participate?

3.2 Report from the executive committee:

The Chairman reported the following subjects of interest to 802.11:

* Vice Chair of ExCom opening: Joe Montague applied. (former Treasurer) Now Treasurer position is open.

* JTC1 Secretariat funding. This needs to be decided in 1992. The current plan is to charge participants $300 USD/year. (Or add a $100 USD charge to the meeting fee. There are other payment proposals.)

Discussion of reasons for this international funding and why IEEE 802 needs to contribute:

Larry van der Jagt: Perhaps JTC1 should cut services and/or personnel to reduce their budget.

Chandos Rypinski: There is a fairness issue here with collection of the fee. It shouldn't be based on attendance at any particular meeting. $300 doesn't seem too high, but he doesn't like it.

Bob Crowder: There are several large companies involved in these committees. Believes that US has accepted an inordinate share of support for committee. It is not up to 802 to support these secretariat.

Nathan Tobol: There are other payment methods that may be more fair.

Payment proposals from the floor: Charge non-voting members more than voting members to encourage membership. Jonathan Cheah proposes that corporations using or claiming conformance to IEEE 802 standard should pay a license or royalty for its use. This could fund the proposed fee. Comment made that this could be construed as a restraint of trade, but this was disagreed with.

Bob: Add this to the optional payments on membership applications/renewals. Members could then choose to pay for the secretariats that are of value to them.

Paul Eastman: There is a large difference between proposing to collect and actually collecting. Agrees that companies using 802 standard should pay and not individuals attending 802 meetings. Paul provides perspective on reasons this fee is of value. Any time IEEE standard. needs to become an international standard., these services would be used. Therefore IEEE is paying for services rendered.

> Proposals:
> 1) Non-voting members pay more than voting ones.
> 2) "Tax" on products.
> 3) IEEE Membership line item checkoff or fee increase.
> 4) $250 meeting fee.
> 5) Company fee proportional to size.
> 6.) Royalty on the IEEE standards compliance label on products.
>
> This is not an isolated issue to IEEE. ANSI is being asked to fund this as well.
>
> Votes:
> 12 not object to $100 meeting fee adder.
> 20 object to $100.
> 14 abstain.
> 13 may cease to participate if fee were charged.
> Discussion stopped to facilitate progress on OUR standard.

* ISO/IEC JTC1 SC6 Meeting: Any comments needed by April 20th.

* FCC issued Notice Proposed Rule Making (NPRM) ET91/9: made a committee document. Outline of comments needed by Thursday noon.

* 802 Strategy Planning. Recognising the new trends of Gigabit networks, Terabit MANs, Graphics and imaging and Distributed computing, reconsideration of our work would be in place. The chair of the ExCom asked to give a vision to the next 10 years of 802 work. This is a process by which the 802 charter will be changed.

* Confidentiality of Global Address Assignees: Some users/manufacturers want confidentiality of their addresses. In some cases duplicate addresses are found. IEEE wants to make this public so these issues can be resolved.

3.3 Financial Report from the Chapel Hill meeting:

Report by François Simon (IBM)

Financial Report of January 1992 Meeting shows that fees balanced costs almost exactly as follows:

Transaction	Credits	Debits
Meeting room fees (including snacks		2,137.24
Audio/Visual fees		949.76
Collected meeting fees	1,581.90	
Collected snack fees	1,362.72	
Negative Balance		142.38

IBM paid a balance of $142.38 (Applause for IBM by those present.)

Motion #1:	**Approve the report.**

Moved by:	Robert Buaas
Seconded by:	Chandos Rypinski

Motion Discussion: none.

Approved: 26   Opposed: 0   Abstain: 0   *Motion #1 Passed*

4. Registration of contributions

Appendix 2 lists the documents relevant for this meeting. Up to docs. 92/31 were available or announced to be before this meeting.

5. Adoption of Agenda

Agenda items 8a. Results on Questionnaire, and 8b. Data rate were added to discuss papers received on those subjects. After agreement that agenda item 9 would be handled before agenda item 8, and that the full working group meeting would continue in the Requirements discussion, the agenda was approved. A small group lead by Wim Diepstraten would analyze the ballot returns received so far to expedite the discussions.

Meeting was adjourned by Chairman Vic Hayes at 5:25pm.

Tuesday, March 10, 1992, AM

The meeting was called to order at 8:45 AM, Vic Hayes, chairman IEEE P802.11, being in the chair. Minutes were kept by Jim Schuessler.

0.Opening

0.1 Announcements

Vic reviewed the voting status of the letter ballot on the Requirements Document. The current status is that out of 79 total members 37 have voted. Yes: 15, Yes with comments: 3, No with comments: 19, Abstain: 0.

Appeal for new officers of 802.11: Vice Chair needed. Office of Chairman is also open if anyone wants to run. No one responded to offer.

MAKE YOUR RESERVATIONS BEFORE APRIL 1. IN LEIDEN, NETHERLANDS.

Proposal to change location of September meeting to Dayton, Ohio. No objections from Dale (Motorola), the current host.

May, 1993 meeting is second consecutive time near Baltimore and there is some concern over this. Submit any comment to Priscilla or Bob Crowder.

Spare copies of Requirements Document available.

0.2 Roll Call, Attendance List. Members introduced themselves. 74 people were present in the room. Attendance list was started around the room.

0.3 Temporary Document List Update: Some additions were made to the document list. Appendix 2 lists the documents relevant for this meeting.

0.4 Agenda Adjustments

No adjustments were required. At the end of the day, however, the subgroup and the plenary schedules would be changed to accommodate work on the Requirements document

6.0 Liaison Bodies

6.1 Reports

- ANSI T1P1

Report by Rifaat Dayem, document P802.11/92-32 "Liaison Information from T1P1".

Discussion:
Frank Koperda comments that he likes connecting the WAN, MAN and LAN services but that there are many other issues to consider. Use X.400 naming structure perhaps. Mobility is an issue. Likes approach of multi-level power and interfaces. Needs to be linkage between IEEE address and international numbering being developed. This needs to be an architected service and data flow.
Wim Diepstraten asks about bandwidth claims for these services.
Rifaat responds this is aimed at PCS. There is no consensus on specific BANDWIDTH numbers yet. This is only the second meeting. Earlier work at Bell Labs supports this, but no specific proposals have been made yet. It does use typical compressed voice.
Bob Crowder comments that there is opportunity to coordinate IEEE effort with T1P1.
Rifaat responds that there is indeed an opportunity to do this. T1P1 expect "our plan" in the future. Rifaat hopes to vote to release Requirement Document to T1P1.

- ETSI

Report by Simon Black, document P802.11/92-36 "Liaison - ETSI STC RES-10".

Simon is secretary of RES 10 (Radio Equip. and Systems), a subgroup developing Hiperlan (High Performance Radio Lan) with goals of data rates up to and exceeding 10Mbit/s. There is some overlap with IEEE 802.11. They have had two meetings since November. '91. Progress has therefore been limited to date. Conclusions have been reached on how the group works and how spectrum is allocated (amongst services within ETSI?). They are working on requirements, just as we are (within a subgroup of RES 10). First draft is due June, '92. The subgroup has meet twice and is chaired by an employee of NCR. There is a second subgroup working on technology capabilities. The Hiperlan is due at the end of 1994. RES 10 is trying to educate the CEPT (similar to the FCC in the USA) that stations can be fixed or mobile, site licenses are not of any use, etc. Great deal of education done at the moment.

Looking at 5GHz. and 17GHz. spectrum. Hoping that exact bands resolved by end of this year.

Discussion:

Peter Cripps asks about the RES 2 committee.

Simon responds that RES 2 is tasked with defining measurement requirements for low power radio equipment. There is a CEPT recommendation detailing 2.4GHz. ISM band usage.

Peter would like this document available to the PHY working group within 802.11

Rich Lee: Is the 5GHz. band the first band "released" and does it apply to the whole of Europe?

Simon: Yes, it will be whole of Europe. Some sharing studies at 17GHz. have been done - results are promising. At 5GHz. this has yet to be done, although he expects this soon.

Robert Buaas: Could you characterize 2.45 GHz ideas in Europe? (vis a vie USA?)

Simon: Sure... Yes they are similar. A wideband recommendation is being made that is very similar to FCC Part 15 in USA. Licensing is likely to be just type approval.

Rifaat Dayem: Asks if 30MHz. extension to DECT band is being proposed for Hiperlan.

Simon: No, completely separate. DECT is finished apart from maintenance. Hiperlan is new and has no relation to spectrum for DECT.

David Leeson: Are 2.45GHz. band power levels decided?

Simon: No.

- Japan

 GHz (Hitachi Research) is the RCR liaison from Japan, but he is not here, so there is no report from Japan this time.

6.2 Establish ad-hoc groups: There is no need for any new ad-hoc group at this time.

7.0 Regulatory bodies

7.1 Reports

- USA

Discussion:

Vic comments on new FCC Notice of Proposed Rule Making (NPRM). FCC seems active in trying to get mobile services within 1.85GHz to 2.20GHz. bands.

Peter Cripps comments that these are now dubbed the "ET" bands (Emerging Technology), but everyone knows ET has a more common meaning..

Frank Koperda: Concern that other requestors for these frequencies mentioned in NPRM have a more powerful lobby. Frank asks that IEEE express concern (to the FCC) that ISM is noisy and interference prone. He has three points for the FCC: 1.) He would like to have an allocation that is cleaner 2.) Wants to propose a protocol that would make use of this new spectrum. And 3.) That it is a great advantage to US industry within these bands.

Jonathon Cheah comments that APPLE petition is part of this.

Frank: Yes, Apple petition is part, but no guarantee that we will get 40MHz or anything related to it. It is a multistep process. First kick people out of band, second define use for it. There are 130 competitors for this spectrum!

Larry van der Jagt: No reason that we shouldn't continue our efforts to petition the FCC. Suggests we form Ad-Hoc group to draft a new comment.

Vic: Yes. Others please be brief.

Chandos Rypinski: Thought about competition between US and others. We need 70MHz in order to do 10Mbit/s in SS. This is too large a chunk. We ought to say we believe in logical separation of users verses physical separation. One user can use the same freq. allocation without impact on the others. IEEE 802.11 should figure out how we can co-exist with these other users. However, he is not optimistic about doing this.

Dave Leeson: Agrees. We need to advise FCC as a VERY important priority.

Vic: maybe this is not the correct NPRM to respond to.

Rifaat Dayem: Data-PCS unfortunate name. Voice-PCS sends wrong message. We want data too!

Wim Diepstraten: What we should be working on for FCC is what we think about technology of sharing BANDWIDTH with other users and justification of our BANDWIDTH request. FCC is missing this information to date.

Ken Biba: Strongly disagree that this is wrong NPRM to comment on. Any NPRM is right to comment on. What kind of services are 802.11 offering? Articulate this to FCC. Second, need to propose method of licensing which is very different from mobile telephone.

Simon Black: Would echo others comments. Likes what Wim said - need to justify our BANDWIDTH request. The FCC is not used to dealing with this type of service. We should do this as often as possible!

Bob Buaas: Adding to Ken's comment - We need to say benefits to society that it purports to serve.

- Japan

No report available.

- Australia

No report available.

- Europe

Report from CEPT by Vic: spread spectrum in 2.4 to 2.5GHz. band allowed subject to measurement standard to be prepared by ETSI STC RES 2. There is study in progress to allocate 150MHz in the 5GHz. area for Hiperlan and ETSI has requested to verify assumption made by CEPT for compatibility.

Discussion:

Virgil Cooper asks if SS allows DS (Direct Sequence) and FH (Frequency Hopping) types of SS.

Vic says Yes.

- WARC '92

Verbal report on WARC 92 given by Mike Callendar.

Won't report on ALL of WARC. Perhaps no one person knows ALL that happened! Will report on FPLMTS (Future Public Land Mobile Telecommunication Systems) aspects and task group "8/1". Looking at FPLMTS, which is a way of reaching anyone anywhere any time. Idea is to get convergence on these efforts. United we stand, divided we fall. We should cooperate here (logical divisions verses physical). Agreed that IEEE 802.11 was part of FPLMTS. (This was noted as significant.)

WARC 92 identified 1885-2025MHz. (140MHz) and 2110 to 2200MHz. (90MHz.) for FPLMTS. Didn't decide how to carve this up for different users; especially mobile satellite components, and terrestrial. We should consider ourselves part of the mobile team and cooperate. UNITED WE STAND, DIVIDED WE FALL should be our motto.

Discussion:

Johnathon Cheah asks for a small written report. (Mike later submitted a two page report entitled "WARC-92".)

Rifaat Dayem comments that seeing 20Mbit/s in FPLMTS is very good.

Mike says, however this is a plan which may not be achieved until the year 2000. (Gasps around room.)

7.2 Establish ad-hoc groups

Dewayne Hendricks will chair ad-hoc group to draft response to FCC NPRM "ET" at 7pm this evening in room 923. Comments will then go to attorneys and Vic and Don Loughery (802 chair) will review. Comments due by April 21st.

9.0 Assign Workgroup Tasks

- Simulation possibilities

Rick Goalgar (SES Scientific Engineering Software) Presents on his sw: SES/workbench

Does systems level modeling. Many members companies within 802.11 are using it already. Rick says this sw already has models of 802.3 and others. Integrates engineering concepts of hw and sw into one tool. Represents CASE, CAE and CAE methodologies in one tool. Workbench lets you model an environment separate from the protocol (application) and get performance data out. It is a graphical tool that runs on UNIX systems now. They may do a PC version in the future.

The models are hierarchical which lends itself to structured design techniques. Rick claims workbench has a higher level of abstraction than BONES (another tool). Icons such as "cpu", "disk", "source" and "sink" are shown on his foils. The programs themselves seem graphical. Users fill out a table of parameters to customize each function. Output is generated by clicking with your mouse on different functions represented as icons. There is a large library of predefined functions which can be used to create state machines up to very sophisticated functions. Rich proposes workbench for PHY and MAC groups.

Discussion:
Larry van der Jagt: Thinks models are necessary, but choices are many. There is much time and money invested in this. Thinks we need a corporate "commitment" to 802.11. (Free software?)
Colin Mick: Thinks we need an ad-hoc committee to discuss this. Believes we need a common language for this committee. Agrees a modular approach is required.

- PHY Group Report

Agenda for this week: Will work on PHY characterization, and structure to assure conformance. Our consensus is that we should work in 2.4GHz. band. Larry is proposing a motion to do so -

Motion #2::	**The PHY Group requests consensus for the IEEE 802.11 plenary to concentrate our initial work (in the RF area) on the 2.4GHz. ISM band. This is consensus for "initial" work. It does not preclude a change if regulations change and does not preclude work on an IR PHY. It also does not preclude further work on other available bands.**

Moved by: Larry van der Jagt
Seconded by: Robert Buaas

Motion Discussion:
Rifaat Dayem suggests we look at characterizing channel down to 1.8GHz as well. How does the group feel about concentrating on this band verses what the FCC's ET suggests?
Larry: We can change later.
Mark Cummings: Ask about health effects.
Larry: We only know about heating and our power is less than a watt. Adequate range can be had under this level. What is adequate in-building range? Look at Requirements Doc. There is no single answer for all locations. Question is what people will buy.
Bob Rosenbaum: Thinks this (motion) is premature. More data needs to come out about whether a single MAC is possible. We need more info on various PHYs to determine this.
Jim Schuessler: Concern that concentrating on one PHY may miss some requirements necessary for other PHYs at the MAC/PHY interface. This may impact the MAC groups ability to define one MAC.
KC Chen: What does "concentrate" really mean? Hopefully we can use one MAC. Is this motion going to restrict this?
Wim Diepstraten: Objective should be to focus on channel characteristics verses PHY itself. How does this relate to HIPERLAN?
Larry: It doesn't really. HIPERLAN chose their own bands.

Robert Buaas: Impacts ability of the group to produce any result. We run risk of "what-if"ing ourselves to death and not achieving anything without doing this.

Johnathon Cheah: Need to know the band before you design the PHY. If your don't' know the model, you can't design the PHY. MACs require only a solid 5 behaviors at this point. These assumptions are independent of band. Since we have done MAC/PHY separation, we need to do this. Why 2.4? Industry can't wait. We need to move forward. 2.4GHz. is the best.

Tom Phinney: Involved in many other committees in the past. Need to prototype a solution with a possibility to discard it. Will never understand trade-offs until we try and fail at effort. Some discard prototype before and some after shipping! Hopes we discard our prototype before we produce a standard. Discovered that service specifications stabilize layers. We hate to do requirements specifications, but these allow alternative trade-offs at later times. 4 issues to be addressed. 1.) MAC service. 2.) Prototype with ability to discard. 3.) PHY service spec. (OSI based) and 4.) We need this experience. IR may run in parallel, but doesn't think it is wise. We need a sense that this may be discarded and forge ahead!

Chandos Rypinski: Experience with design and radio usage. No difference if radio is designed between 1.0 to 5 ghz. We wont' get locked into numbers until much later. FCC ET is not a negative against motion. 87MHz (actually 83.5MHz.) of bandwidth is significant. Supports motion.

Chuck Berman: Not important to focus on result, rather focus on process. Motion is reasonable and the most concrete at this point. Can apply results in other areas. This should be a learning process which could open any pitfalls in other areas.

Larry: Open to non-SS approach as well in this band.

Chuck: Pitfalls in any implementation, specifics are not important. End result is.

Bob Crowder: Likes Larry's last statement. Need fixed band. However, concern over 2.4GHz band which has been discussed in the past. If 2.4GHz. is a prototype or learning band, this is OK.

Larry: Microwave ovens are good for the process since they look like everything at all times. It is a good interferer to characterize.

Johnathon: Microwave oven measurements done in the past. This is a severe problem. Any PHY that works in this band will work in other bands. We should not take advantage of a special weakness (ability to exploit) in the Microwave Oven profile. (That is, a Microwave Oven is OFF for one half cycle 60 times per second.)

Larry: Agrees we should specifically NOT take advantage of this weakness, since we can't count on this characteristic from other interferers.

Mike Pettus: Supports motion. Desire to have a single MAC is not effected by this motion. Channel characterization is independent of this interface. It is 83.5Mhz by the way.

Nathan Silberman: There are many reasons to stop this motion, but this will be a great learning tool for PHY group. This is a good place to start. (support of motion)

Peter Cripps: We're not so much working on 2.4GHz PHY, but rather characterizing the channel here. Yes?

Larry: Yes. However, we are going to proceed ahead with a 2.4GHz SS PHY. If someone wants to define a PHY that is NOT SS, that is fine. This group will proceed with the SS PHY.

John Corey: We have an issue with limited resources. We need to focus with our limited resource with this group. Without this we will not move forward. If others want to come into group and focus on other areas, fine, but PHY group now needs to progress.

Dave Leeson: Agrees with motion. FCC asks why aren't you using the bands we gave you? Answer will come from this group. Hopes 1.8 band will become a subset of the 2.4 interferers. Therefore work done here will map. Third, if we don't do something, de-facto standards will result and if we don't take action our work will be made more difficult. Lastly, the models are not the physical reality. FCC needs something that is real. Supportive of motion.

Ken Biba: Challenge is that number of people differ on the basis of inconclusive information. Speaks in support of particular motion. Ken wants to do similar thing in the MAC layer. Without this we can't move forward in the MAC group. Wants to work on a LCD (lowest common denominator) for MAC group.

Dave Bagby: Moves to call the question. It is seconded.

Vote to call the question: (36,1,1)

Approved: 35   Opposed: 1   Abstain: 2   *Motion #2 Passes*

More Discussion:

Ken Biba: I would like to speak to the health issue. How do we bring this to be authoritative? We need authoritative data.

Larry: Bob Rosenbaum (Windata) made an earlier presentation on this. We may need to solicit an expert in the field.

Johnathon: There is a health effect which deals with protein absorption, but feels this is more of a marketing problem than a real problem. Believes similar to location of 10mW/cm^2 flux density in USA, but other countries are lower. This is generous limit. We should not be in conflict with this legal issue, but it may be a perception issue. Risk is always there -- even 60Hz. is an issue.

Larry: Microwave ovens put out more that 802.11 is proposing.

Dave Leeson: Johnathon is correct. US standard is fairly arbitrary. Can't ignore public hysteria. WLAN has a higher duty cycle than Microwave Ovens, so this is an argument against us. We need to be aware of all these standards. so that we can compare ourselves to them.

Frank Koperda: There is a safety issue long before there are observable thermal effects. Cell damage occurs before thermal rise. Risk should be recognized as non-zero. This is a PHY group issue and not one for the MAC or entire group.

Tom Phinney: Thinks he put this into PAR. Supports Dave and Frank. Primary issue is with PHY group. Worldwide, there are few places where environmental regulations are being relaxed. We should anticipate this!

Mark Cummings: Concern is right on the point. His clients are asking if its safe to use a particular product. This shows that users ARE concerned about and aware of this issue.

Ken: Echo Dave. Guiding standard is what the customer perceives is safe, not what IS safe. There are other products with which we should compare ourselves such as VDTs (Video Display Tubes) which have far lower emissions than Microwave Ovens. Should be concerned with the lower of the values.

John Corey: This is a perception issue. People will ignore safety if there is a desire to use the product. Just look at automobiles for instance. In those cases there is a *requirement* to use the product. We are more at risk, since there is not a *requirement* to use our product.

Vic: Closes discussion.

Larry: Welcomes submissions on subject to PHY group.

- MAC Working Group

Report by Bob Crowder: We have some presentations on MAC protocols to hear. MAC/PHY interface and architecture. Security and block diagrams are also on the agenda. Ken Biba proposes we make motion to concentrate or focus on a single MAC implementation. This issue is postponed for MAC working group.

Tuesday, January 8, 1991, Afternoon meeting

Reconvene at 1:50pm after lunch. Chairman of MAC meeting has worries of attendance this evening. Vic conducts a straw poll of those that will attend this evening: Result is 18. Therefore meeting will be held, from 8pm until 10pm.

8. WLAN Requirements

8.a Questionnaire result, document P802.11/92-28, Chandos Rypinski: Some responses were received on questionnaire that Chan and Larry put together some time ago. These came from some mainframe users.

8.b Data rate paper, document P802.11/92-33, Rifaat Dayem: T1P1 at best will go up to 64kbit/s. He proposes therefore that 802.11 reduce the minimum data rate we are considering to 100kbit/s to cover what he sees as a significant market. He argues that due to the size, power and cost objectives of 802.11,

if we do NOT support lower data rates, some other standard will be needed, or, worst case, a de-facto standard will be born. There are many applications that can be satisfied with 100kbit/s. So why don't we take this opportunity to reduce our cost and size? Now the 802 charter covers 1 to 20 Mbit/s, but this considered only wired systems. Hopes we can change this easily. Point from floor raised issue that 64kbit/s channels comes from ISDN which will be using a non-blocking switch. Our proposal is for a 1 mbit/s LAN which is a shared medium. There needs to be an understanding of this.

Discussion:
Tom Phinney: Suspects 802 executive committee will toss this out due to the fact it's under 1 mbit/s.
Dave Leeson: This makes too much sense for 802 to adopt. There is no reason to be guided by the past unless we are sure there were no mistakes made in the past!
Chandos Rypinski: Subset of connection oriented services. Medium doesn't have to be at the same rate as the service. They are not related.
Vic: This may be out of order since it is below 1 mbit/s.
Larry van der Jagt: Our charter is to provide a data density 1 mbit/s/hectare/floor.
John Corey: Agrees with Chan. Nature of service is the *user* data rate. Independent of the transport (link) data rate, but there are relationships. Look at the application. There are reasons people choose a certain service (non-blocking). The issue is not the data rate speed, it is what the user gets in a non-blocking manner.
Nathan Tobol (sits on 802 Exec. Committee): These are the same arguments that have been made before. As soon as you propose this, you fall out of the bounds of the PAR. First thing to do is to see if we want to revise the PAR.
Rifaat: What about the fact that this is a wireless medium?
Nathan: Motorola's proposal was wireless - for packet radio.
Mark Cummings: Part of the problem is that we are unclear about what we are talking about. We need a common set of terms so we can talk and compare services and channel rates.
Rifaat: What we are talking about is whatever the 1 mbit/s number we have NOW going down to 100kbit/s.
Nathan Silberman: Look at Ethernet. It is 10 mbit/s, but with 10 users you get 1 mbit/s. With this approach we can get better conclusion.
Bob Crowder: Issue is do you want a smart MAC, or a channelized PHY, in which case you need a simple MAC. May have to show we can't achieve the data rates we said before. However, doesn't think there is consensus on this point. If this were the case, we could take it to the Exec. Committee.
Paul Eastman : 802.4 runs at 1 mbit/s or as fast at 20 mbit/s with one MAC. Exec. Committee wouldn't have a problem if we built something that worked at 1 mbit/s, AND worked at 100kbit/s. Basic rate must be 1 mbit/s. It is very difficult to get this proposal through the Exec. Committee.
Dave Bagby: Is it your intention, Rifaat, to make a motion to lower the bound?
Rifaat: Need to find if there is sufficient interest in the group.
Tom: Some devices have been rejected in the past due to not meeting a lower data rate. It will be very hard to standardize a lower than 1 mbit/s. Concern over spending time on this issue.
Vic: Straw poll on continuing (13,31,-) Therefore we stop discussion.

8.1 Ballot result on Requirements Document:

Vic has so far rejected requests to change votes. However, after talking to peers within 802, Vic will change his policy and accept changed votes now. This shows that we are in a weak position to interpret ballot results. He will accept postmarks on ballots up to March 22nd.

Today, we can review what the group did last night and make some restrictions to the editor to let him make a new document. At closing date, ballots go to François Simon (IBM) who will compile comments into one document. Ken will use this to make a new draft within two weeks. Therefore at least one week before the May meeting, we will have a new document. In Leiden, we should have a review, and send it out for a second letter ballot with a 30 day response time.

Discussion:

Dave Bagby: It's OK to authorize next meeting to send the document out, but don't *require* meeting to send it out.

Paul Eastman: There are some hard decisions we must make in this committee that will not achieve 100% consensus. Finds it impossible for Ken to write a document without interjecting his bias. Until we do this (hard decisions), we will not make progress. We are going to have to design something real at some point. People can't vote against this doc. on technical reasons since there is no technical content in it.

Robert Buaas: Adds to what Paul said, but takes issue with his examples. Doesn't agree with "how we do it". We should assist Ken in this doc., not asking him to do it for us. This text should go in *some* document.

Paul: Lets focus ourselves within some limits here. Now, with the present document, there are 16 different ***! ways to do it.

Chandos Rypinski: Prefers to divide doc. into parts. One part is what users want. This is not ballot-able (votable). We need a Functional Requirements doc. that gets enough votes to support it. It should not have many pages.

Paul: We need to decide these specs. IN this committee, not hand it off to someone to create and bring back for a vote. No one doesn't think that what Ken did is not valuable.

Ken Biba: Writing such a document you strive for a LCD (lowest common denominator). Comments have been specific (too specific in some cases). There is some frustration here. We need to find some way to make decisions, but how you do that is an open issue.

Bob Crowder: Agrees with last three speakers. First, there is a large body of market data in the doc. that is not contentious. Proposes we remove market data and ballot it.

Paul: What are you going to ballot?? You can't argue with market data...

Bob: Definitions are a needed service that should be pulled out and used - not as a separate doc. On the point of Functional Requirements: There should be a small committee to frame the QUESTIONS, come to this full committee and discuss it, then go back to small committee and draft the FR (Functional Requirements). If we do this off-line it is more efficient.

Simon Black: Doc. gives good market requirements and glossary, but doesn't address Functional Requirements (FR). This may be a start, but we are missing it so far. This FR is what we should vote on.

Paul: This committee should make some hard decisions. Are we going to do a Centralized system or a Distributed system? Until you decide this you aren't getting anywhere.

Vic: This is in the PAR.

Paul: We don't have enough to define a specific MAC from. Until we do this letter ballots are going to mean nothing. There has been frustration over lack of progress in most previous meetings.

Bob Rosenbaum: Only thing impeding progress is discussion of the document. Thinks we HAVE made progress. Based on doc. and comments, we have some valuable info. Three quarters approval at this time may be a waste of time. We should perhaps go on.

Bob C: Are you recommending tabling vote?

Bob R: Compile comments and then table vote to approve. I think we have gotten all the value from this document as we are going to get. Lets just move on.

Vic: OK to have doc. that is a basis of market (annexes). There is another effort needed for a hard FR doc. We must sit down and make these hard decisions.

Simon: This is something we can compare our result to in the future.

Bob C: What is one example of one FR ?

Carolyn Heide: We have in the MAC group 21 criteria with which to judge. Some are FR.

Paul: Why don't we ballot that?

Mark Cummings: Are talking market requirements or functional requirements? I'm hearing market requirements. Until you clear up that, you can never arrive at FR.

Bob R: Points out that title (of our Requirement Document) used to be "Market Requirements". Agrees we are getting lost in maze of requirements.

Mark: What is the purpose of this doc.?

Vic: Vision is that doc. states requirements of standard in such a way that we can check what me make (results) against it.

Paul: Does this doc. meet that test? Vic: No.

Paul: Then why send it out? Because we said we would? Make sure doc. fits this FR mold. How do we do this? Vic: Wanted FR to be based on applications. That is what we have now. Hoped ballot would converge to FR.

Paul: Didn't did it? Vic: No.

Bob C: This is not a FR doc. This committee is too big to write that doc. We need a much smaller committee to do this. It takes us one half hour to discuss any particular point, if we have 100 points there are several years of work here. Ken has done a fantastic job. As Vic has said, it's important to capture market data.

Ken: Agrees. Need vehicle to cut through BS. This is a problem. Deal with tough issues. Need 5-10 people that has charter from whole committee. to create FR. Otherwise no progress will be made. Present doc. can infer technology requirements, but agrees it is not clear today. Let's do it tonight! Bring doc. back here and vote line item by line item.

Coffee Break at 3:00pm. Reconvene at 3:30pm Two people remaining in queue. One passes.

Robert Buaas: Would like to make two motions. The simpler one first.

Motion #3:	**Construct a "Market Requirements" document consisting of the appendices in Ken's work.**

Moved by: Robert Buaas
Seconded by: Paul Eastman

Motion Discussion:

Bob C: Will comments be a part of this doc.?

Robert: I didn't know about any comments.

Vic: We should make use of this input.

Robert: We need an editor then.

Dave: Comments should be incorporated, but two comments may conflict, so someone should resolve this.

Robert: We then vote on this document.

Paul: What will approving this document accomplish? It won't be part of the final standard.

Robert: Before it becomes final, I want to look at it again. I defer to the chair.

Bob C: We can't send a doc. out for comments and then ignore them. That would set a "fine" precedent.

Chan: Would like to see it adopted as is and get on with it. The merit of the content will show through.

Philip Navratil: This is really just a collection of information. It is a deposition and not more complex than this.

Mark Cummings: I hear we are coming to the same conclusion. Data is valuable, not binding. Add comments and publish doc. If this produces more comments, fine. We don't need to vote on this.

Simon Black: Useful point in current doc. is the appendices AS IS. Comments should not be made on Appendices. If there are contributions in this area, they should be separate committee doc.

Wim: There have been contributions made on Appendix items that should be included.

Vic: Yes. Further comments? Can we vote?

Approved: 26   Opposed: 0   Abstain: 2   *Motion #3 Passes*

Motion #4:	**Prepare a "~~Technical~~ Functional Requirements" document**
	- Charter a ~~working~~ task group
	- Capture/modify/augment definitions
	- Use ballot input
	- Prepare text using definitions
	- Cover points made by MAC/PHY lists

- Deliver in 4 weeks
- Answer the question "What do we want to accomplish?"

Moved by: Robert Buaas
Seconded by: Dave Bagby

Motion Discussion:

<u>Dave</u>: Questions - Clarify "lists" in your motion.

<u>Robert</u>: 21 points by MAC, another list by PHY group.

<u>Dave</u>: What does "publish" mean?

<u>Robert</u>: Normal channels, electronic also.

<u>Dave</u>: Limits on size of this group?

<u>Robert</u>: Perhaps 10 as a goal. We need a dedicated group.

<u>Dave</u>: Agree.

<u>Paul</u>: What does a working group mean?

<u>Robert</u>: Change it to task group.

<u>Paul</u>: Need to use more than ballot input. Need to use any input from any source. Don't prepare text first. First bring back the hard decisions to this committee.

<u>Robert</u>: The hard decisions to me are the text of the definitions. I've spent a number of hours on one definition and I still wasn't satisfied. This definition list will be what we need.

<u>Paul</u>: Wants this effort to set direction. 3/4 vote necessary to change this direction. Thinks we can do this by tomorrow or Thursday. We should do it piece by piece as well, without this we won't get closure.

<u>Robert</u>: Appropriate to seek guidance from this group immediately and as it sees fit.

<u>Ken</u>: From my experience, the fallacy is two fold. Arguments about definitions lead to arguments over requirements in a circular path. Major points provide definitions. Without some consensus here this process will not converge. We need a TRY (Technical Requirements) doc., tried before and did not succeed. Rather than repeat it, cut quickly to the issue of TRY for this standard at this meeting. Gives structure to make definitions. Secondly: This is difficult to do without physical proximity/presence. This should be done face to face. People can argue about the definition of a Local Area Network. This is content free discussion!

<u>Robert</u>: By the end of this meeting, if we can codify the essence of these requirements, that is our goal.

<u>Ken</u>: If we can't agree, we will waste another (meeting) cycle.

<u>Rifaat</u>: Aren't we working on the process of what a FR doc. looks like? Question is what does a FR doc. look like.

<u>Nathan</u>: 802 has a FR doc. as a starting point.

<u>Dave Bagby</u>: Definitions are important, but controversy in the past has been the different viewpoints by members. Also: Don't work on this piece by piece.

<u>Larry</u>: PAR is a reasonable FR doc. Second - although some definition. may not be liked by all, he hopes we don't change them, since these are there as a way to compare what we finally come up with. Unless you can come up with another (Better?) definition, don't mess with them.

<u>Robert</u>: Feels the same way, but sometimes definitions were circular. He wants to add a word or two to fix this, not replace the entire definition.

<u>Paul</u>: We need definition. here - where do Requirements end and specifications begin?

<u>Robert</u>: Intent is that this is the top level doc. which drives all the others. Willing to rename Technical to Functional, but not willing to change Requirements to Specification.

<u>Robert</u>: Test to content of this doc. is question: Is this WHAT we want to accomplish? Later we can add HOW we do something.

<u>Mark</u>: Three things here. In addition to technology issues there are business and political issues. Political issue can best be dealt with in face to face meetings. Lay out all issues. Get agreement on all that is possible in a short time. Identify issues not agreeing on. Send people back to their companies to get input and come back together to resolve them.

<u>Robert</u>: Sympathizes with request. Let's spend several hours to deal with these hard questions. (Ones difficult to achieve consensus on.)

Bob C: Like to see this group report on Thursday. morning. Now have full day to consider key issues. Concerned that if we leave here without some feedback from this committee, we will waste an opportunity.

Johnathon: We have spent a lot of time in the past on similar issues. Why do we want to throw this away? 10 people should take PAR and two sets of 21 points only. At end of session, Robert should integrate these comments.

Ken: Does this mean if I disagree with anything here I should defeat this motion? I would like to propose an amendment. Should have quantified guidance on these issues. Add bullet that requires results/report by the end of the meeting.

Robert: Is what you are saying: You want Urgency added?

Ken: No, I want a checkpoint in terms of votes on these issues. Two: FR for this standard that is voted on Thursday as a checkpoint on the groups progress.

Robert: What happens if it fails?

Ken: If it fails, we have determined that the group will fail. If we can't narrow that list, spending more time is not productive. Lets focus on next 48 hour period.

Robert: No.

Ken: Ok ... Two milestones - first 24 hours set of requirements reviewed by committee as a whole. Need definitive direction. Ken calls question. Paul seconds.

Vote to call the question (29,1,3).

Approved: 9   Opposed: 16   Abstain: 5   *Motion #4 Fails*

Ken: I'd like to make a new motion. (laughter) Same content, but not in 4 weeks. First checkpoint delivered in 24 hours.

Motion #5:	**Prepare a set of Functional Requirements**
	- Charter a task group
	- Capture/modify/augment definitions
	- Use ballot input
	- Cover points made by MAC/PHY lists
	- Answer the question "What do we want to accomplish?"
	- Deliver first checkpoint in 24 hours
	- Using 802 F4nct56na3. Req. and 802.11 PAR as guidelines

Moved by:	Ken Biba
Seconded by:	(seconder unrecorded)

Motion Discussion:

Ken: The goal here is to narrow the range of goals of the document. Until today we have had no consensus.

Rifaat: Are there other members of 802 that can increase the probability of success?

Bob C.: Most successful so far is the five points in the FR, but they have created wars in the past.

Jonathon: The proposal will not result in any new information. Reason is that we have burned much time on this doc. already. Concerned that group will add/change something that will simply cause more controversy.

Paul: I'm sure the group will use the 21 points list, but don't restrict the group either way here.

Ken: I don't think the 21 points list has been agreed on in the first place.

Jonathon: Maybe have a footnote, "we may have this as a new requirement or will delete it". I really don't want the group to omit something which may slip through the cracks. Things are there for a reason.

Paul: I don't accept this as a formal amendment.

Ken: It's MY motion Paul. But I don't agree with it. (the amendment) Jonathon, please propose your motion.

Jonathon: Add the 21 points list.

Ken: Already there. Audit trail is there. Objective is to come up with a crisp set of points that have an audit trail back through our history.

Jonathon: I would accept this.

Larry: Don't know what's going on here. I know we are trying to give direction to group. I don't think there are many points of contention out there now.

Ken: I want to identify the points upon which we agree and also those we disagree on.

Larry: Ask the question: "What don't we agree on", rather than points we agree on. What are the controversial issues and then go back and argue.

Ken: Agrees. Let's document that distance we have come.

Larry: I think there is not much disagreement on ad-hoc networks therefore ask the question: if we need to support ad-hoc networks as an example.

Dave: This is only one example.

Bob Rosenbaum: We've spent too much time on this. I call the question. Robert Buaas seconds.

Vote to call the question: (32, 0, 0)

Approved: 32   Opposed: 0   Abstain: 2   ***Motion #5 Passes***

Vic asks Paul Eastman to chair. Paul accepts for first 24 hours. Greg Hopkins will be secretary.

Motion #6:	**To support the PHY ad-hoc group's intention to target the 2.4GHz. band, MAC will be designed to be compatible to this PHY initially without precluding its compatibility to other future PHYs.**

Moved by: Dr. Jonathon Cheah
Seconded by: Tom "I'll 2nd anything" Phinney

Motion Discussion:

Dave Bagby: Speaks against motion. We must be compatible with multiple PHYs.

Robert: The list that is being produced addresses both MAC and PHY. Therefore the previous motion precludes this motion.

Jonathon: The functional list is not complete. Progress must go on.

Tom Phinney: I have trouble with this wording. Intent is to be supportive of work in MAC development. Instead of being "Compatible" say "emphasize".

Carolyn: Disagrees with motion. PHY group has a job to define multiple PHYs and has chosen which to start with, MAC group must define one MAC. The situations are not the same.

Jonathon: This is a wireless issue. MAC must accommodate PHY in a number of ways. Don't loose site of PHYs peculiarity.

Carolyn: I feel it would be a big mistake to design a MAC for one PHY then bastardize it to work with others.

Rifaat: I would oppose the motion on basic principals, however, there are gotchas in there, so on this basis I support this motion.

Paul: Calls the question. Seconded (seconder unrecorded).

Bob C: Point of order! This motion is out of order since it needs to be taken up on the MAC group.

Paul: You have a choice here Vic. You can choose either path. (out of order or call the question)

Vic: I will call the question.

Vote to call the question: (32, 0, 2)

Approved: 4   Opposed: 24   Abstain: 5   ***Motion #6 Fails***

Straw poll of those who want to participate in this ad-hoc on FR. (23 respond). MAC group will be cancelled for tonight. Members ask for clarification of schedule for the rest of the meeting. FR and FCC ET groups meeting tonight. Wed. morning we have PHY and FR meetings, Wed. afternoon there are PHY

and MAC meetings. The only confusing thing is that if the FR group is not done by noon tomorrow, it will continue in parallel with the MAC and PHY groups into the afternoon (they have 24 hours). Thursday, there is a plenary session in the morning which changes to a joint MAC/PHY meeting around 10:30am.

8.2 Assign ad-hoc groups

FR meeting will commence at 5:15 this evening.

ET starts at 7:00pm. (room 923)

Meeting adjourned at 5:05pm.

Wednesday, March 11, 1992, AM
Meetings of Function Requirements and PHY groups

Wednesday, March 11, 1992, PM
Meetings of MAC and PHY groups

Thursday, March 12, 1991, AM

The meeting was called to order at 8:30 AM, Vic Hayes, chairman IEEE P802.11, being in the chair. Minutes were kept by Jim Schuessler until 10 AM, then by Carolyn Heide for the rest of the day.

12. Reports from ad-hoc and subgroups (Part 1)

12.1 Functional Requirements Group

Chairman Paul Eastman started by thanking all those participating for keeping relatively cool heads and thanked Greg Hopkins for taking minutes.

We were very careful to stay away from "loaded language". We specifically defined the BSA (Basic Service Area). The document is available in the front of the room.

Greg reports that we based our activity on four previous documents: PAR, 92/20 (Requirements), F4nct56na3. Requirements Doc and the 21 points list from the MAC group.

We really latched onto the term "coordination function". It was a good was of separating the loaded terms Peer-to-peer and Hub. We reluctantly used "centralized" and "distributed" control.

Any attempt Greg had been making at doing a presentation now broke down into general discussion.

Discussion:
Paul Eastman: We are not precluding anything by these words.
Greg: Presents list of Functional Requirements. Isochronous as a term "bit the dust" since the term didn't really apply to wireless (physically impossible to accomplish). [sec: This does not mean WLAN is not useful for multi-media networking. What it does mean is that WLAN is not able to meet the strict formal definition of "isochronous" which is, paraphrased, "A constant integral number of time unit between every two data units." WLAN can carry real-time voice and compressed video with some increase in jitter between data units over wired network. J.S.]
Dave Bagby: Two concepts: Every station should support some common function to coordinate amongst each other. Most assume that is "asynch" but this IS an assumption and need not be so.
Greg: Presents chart (care of Bob Crowder). (See paper.)

Paul: Third and fourth column. are connected by other 802 activity. It is of much greater area than most of us would consider "local".

Dave: The printed copy has some alignment problems (table headings are offset to the right).

Greg: Concluded that A, C and D should all be included in the standard and we are still considering whether B is necessary. We will accept input on this

Paul: If BSA "intertwinkling" is accepted, it is an ESA.

Wim Diepstraten: Real ESA may not be reflected in this table.

Greg: Create ESAs by linking Cs together.

Wim: What is ad-hoc in that table?

Paul: Your concept of ad-hoc are columns one and three including A and B.

Dave: There is a second table that presents the same set of data. If the coordination function is separate from the traffic flow, that is it simply controls access to the medium. For example, CSMA were the decentralized ones and ping-pong and polling were centralized. Interconnected set of BSAs is ESA. If you are a BSA are you centralized or distributed and if you are an ESA are you centralized or distributed.? We tried very hard to separate ourselves from packaging concepts.

Wim: Is that a requirement that such a coordination function should exist?

Dave: (and others): Yes

Wim: Next step. What kind of coordination function (distributed. or centralized)? Does that need to be stated as a requirement? To my mind this is an implementation detail. You say A, B and D MUST be supported, you are now forcing an implementation detail.

Paul: What we said was that a small group could come together and talk. If we think of this as CSMA/CD, it is random, but it IS coordination. That is a coordination function. We would also like this to expand over WIDE areas. If it is to remain under 802.11 control, we must have ESA... If it is not to flood medium, there has to be both of these function. done in the same MAC.

Dave: This is not the question he's asking. Why do these three function. need to be supported. "What could this group of people agree on?" Its not the implication that B is NOT supported, but there was clear consensus the other three were necessary. Now if this larger group does not agree with that, we can change it. Please go back and prepare position papers on this.

Tom Phinney: I sense centralized meant electrical connection. I think scheduling func. is kind of mastership function and can be centralized or distributed.

Paul: Correct.

Jonathon Cheah: Dangerous ground here. Centralized and Distributed. Wim had perfect case - this is implementation detail. To the user, is distributed... Make clear this diagram is very TOP level. Distributed does not imply CSMA/CD. HOW you do it is not important.

Paul: Again, Johnathon has the right ideas. We need your help. I saw Wim nodding his head.

Wim: Yes, but... Your controversial example that we recognize in ESA environment to avoid flooding, we need something else (other than CSMA/CD)

Paul: I'm held back by words here. If everybody is always trying to jump in, we see potential.. (radio modem) we can flood the spectrum. We would like a mechanism to lower that background noise to assure that some traffic does get through.

Wim: I agree with that. It is a control function. I'm not really saying that B should be included. I object that A, C and D MUST be supported.

Paul: Would it help if A and C are identical? We may not able to tell the difference. What ever controls the wider area. I think Wim has the "right" idea, he just doesn't like the way we say it. Our language is not intended to be restrictive.

John Corey: I agree this table simplifies what we are doing here.

Paul: We don't like this table. We wanted to translate the table into words. We welcome help here.

John: That should remain an open items.

Paul: It is.

Greg: OK ... we discussed other services. This list goes a long way toward the "whats" we need. Some of these services may be pushed to higher levels later, but for now, we need to concede any WLAN uniqueness to them.

Greg continues presentation: If the MAC/PHY interface is exposed, a single MAC/PHY interface should be adhered to.

Dave: There should be some way for an ad-hoc BSA to exist within a coordinated BSA and not interfere.

Vic: There was a problem with managing the PHY in 802.4.

Dave: This says nothing about that.

Paul: We are a long way from considering this detail.

Tom: There may be a classic mistake here of confusing the physical MAC/PHY interface with the OSI logical MAC/PHY interface.

Paul: Again, don't read too much into our words.

Tom: No, I agree.

Paul: What it really says is that you can use ONE MAC FOR MULTIPLE PHYS.

Jonathon: We are just trying to draw a line between MAC and PHY. I don't like the wording either, but the verbal explanation I can accept.

Tom: I suggest you change MAC PHY to DCE/DTE.

Dave: Our intent was that you can get logical connection between MAC and PHY.

Tom: This statement is talking about exposing which must mean hardware.

Dave: I've seen sw interfaces that are exposed.

Greg: I don't like the wording.

Dave: I think this should have been done by that paper.

Carolyn: Two Issues. There may be a separate logical and physical statement here. Don't we have two statements here?

Paul: Don't read too much into this.

(Discussion of semantics at very high speed between Paul and Tom.)

Dave: We are talking about a logical interface. f you don't expose this, you can split this intelligence too many ways above and below the line. Wherever that line is drawn.

Tom: we need discussion off-line to clarify this.

KC Chen: We are only talking about the service here, not what kind of interface.

Greg: The action item is to do this off line.

KC: Why do we want to define the interface here?

Paul: Lets assume that this MAC gets a little complicated, if so, it's convenient to all that this can be built by one or more vendors. Also they should be somewhat interchangeable. This is what the concept is.

KC: This is ok, but do we want to do this here?

Paul: Again, we need help with the words.

Simon Black: I think "exposed" may be a poor word. Purely conceptional, we want to draw one line with a defined service definition. If this fits into normal OSI, great, but it is one line. We don't know where this line is yet.

Jonathon: This is not what KC is saying. We have a FR before us. He is saying if a chip manufacturer. wants to do this or that, that doesn't belong here. If we accept his idea, that sentence is basically a footnote.

François Simon: I agree. That interface in the standard could explain how data is transferred between MAC and PHY and Management entity, but it does not imply any implementation.

Dave: I never looked at this as a document you could build something from yet. Its best use is just functional requirements. Its use is in the future where we can check our effort against it to see if we are on track - if it fits.

Jonathon: Right. Going back to title of doc. This doc. will replace old Requirements doc. It is the "bible" from which we construct the standard.

Paul: Look at it as the index to the bible.

Jonathon: I love this document, but I think KC was asking how this doc. would be used.

Tom: this is my LAST comment. In other standards. this lead to substantial confusion. In 802.4 we were forced to accept many interfaces. We should put it on ourselves to define a physical interface to avoid this. Don't repeat the past. Put explicit "modem" interface in place.

John: Go back to the "what" - we must be able to change media. If every time you change the media the PHY changes, I don't see any reason why the MAC can't change. There is no difference to the user.

Paul: Differs. We as a natural function break into two groups. This is to facilitate those groups to talk with each other. It would be nice if they had a clean way to divide the work.

John: I agree. But in the functional requirements there are no reasons you must use this mac and phy.

Greg: OK. 802.10 provides some security features, but we felt other functions may be needed.

Dave: Note any MAC must support data rates from 1 to 20 Mbit/s. This is so multiple phys can connect to one mac.

John: Is this a mac/phy data rate?

Paul: Deliverable data. No preamble.

Dave: It is key that MAC is independent from PHY rates.

Nathan Silberman: Yes, PHY can be IR, RF - whatever.

Dave: 1 to 20 came from 802 realm. If this is the wrong word, tell us the correct ones.

Paul: We are permitted by our PAR to do 1 to 20 mbit/s.

Wim: I wanted to state what Dave clarified. Speed ranges.

Jonathon: Be careful. Data rate at every level means different things and it has enormous implications. Terminology should be consistent with cable environment.

Paul: We have the right to take an amended PAR up at a lower data rate, but that same MAC should work.

John: MAC must accommodate data from the PHY at 1 to 20. We don't know how fast the PHY runs. Also, the MAC passes data to the LLC at some rate. If you mean MAC to PHY, I'm comfortable with it.

Paul: This range is a minimum.

John: Yes, a minimum

Greg: List of areas needing further definition, see document.

unidentified: What does "location" mean under station mobility?

Paul: The concept of the BSA/ESA knowing where you are.

Vic: We need a motion to forward this.

Paul: Yes, This is a list of concepts - CONCEPTS. We have tried to put some words around it and failed somewhat. There will be a new group which will carry it forward. We need you help. We need to put these concepts into context free text. We have a starting point here. Good luck.

(laughter)

Vic: Thanks Paul and all those to help. Who would like to take this document further?

Peter Cripps: I spoke to Ken yesterday who expressed apologies for not being able to attend. He also is willing to repackage his document and is willing to continue to refine FR and bring it forward.

Dave: I will volunteer. some time.

Peter: Good. I think Ken will welcome this.

François: I will help also

Jonathon: Use internet for this effort.

Greg: Glad to continue to help.

(others volunteer - Roger?, Jim Schuessler,)

---- hasty change of secretary from Jim Schuessler to Carolyn Heide---

Vic: 40 days is too long a period for ballot circulation to get the results ready to be analyzed by the July plenary.

Dave: What body will send out the letter ballot?

Paul: Needs to go out as soon as possible. Reviewers must comment immediately so second delivery can be sent out for letter ballot at the interim.

Vic: Use the California Microwave bulletin board for fast circulation. Check this from time to time for files. Number 1-800-248-0211 domestic, Vic can supply the international number if needed. Specification: 2400 bit/s, 8 bits, 1 stop bit. Word for DOS and text format should be supplied for all documents.

Motion:#7   **The 802.11 requirements statement should be further processed as follows:
1. ASAP, edit and organize;
2. Circulate for review by 4/6/92, with comments before the next meeting (Leiden);**

3. At Leiden meeting consolidate comments for further review and approval as appropriate for letter ballot;

4. Immediately following Leiden, circulate document for 30 day letter ballot, subject to #3 above.

This will be carried out by nominated group: Biba, Bagby, Simon, Hopkins, Samdahl, Black.

Moved by:	Peter Cripps
Seconded by:	Bob Buaas

Approved: 19   Opposed: 0   Abstain: 1   *Motion #7 Passes*

11. Elections of Officers

Secretary & Editors

Discussion:

Vic: Mike Masleid may not be able to continue as sec. and editor. If no one else volunteers he will take it back. Carolyn has volunteered for secretary.

Dave Bagby: Bill Stevens would make a great sec., but he's not here to accept or reject the nomination.

Accepted as editors: Bob Achatz, François Simon, Nathan Silberman, Chandos Rypinski, Mike Masleid.

Accepted, unopposed, as secretary: Carolyn Heide

Vice Chairman

Accepted, unopposed, as Vice Chairman: Rich Lee

Subgroup Chairmen

Accepted, unopposed, as chairman of the PHY subgroup: Larry van der Jagt

For MAC subgroup chairman Simon Black nominated Dave Bagby. Chandos Rypinski seconded. Ballots were circulated to voting member for the selection of MAC ad-hoc group chairman. Half the ballots had Dave's name first, and half Bob's - they were handed out randomly. Ballot results:

Bob Crowder: 2
Dave Bagby: 26
Abstain: 1

Chairman

Vic leaves the room and vice chairman Rich Lee takes the meeting.

Motion:#8   **Reaffirm Vic Hayes as chairman for the approved period of 2 years.**

Moved by:	Chandos Rypinski
Seconded by:	Simon Black

Approved: 33   Opposed: 0   Abstain: 1   *Motion #8 Passes*

The re-affirmed chairman takes back the meeting amidst applause.

12. Reports from ad-hoc and subgroups (Part 2)

12.2 MAC Subgroup Summary, Carolyn Heide

The MAC group listened to presentations by Dr. Jonathon Cheah and Dr. KS Natarayan. We also discussed restricting new MAC proposals after July 7th. No formal ruling was made on this, but it should be known by any aspirant proposers that there will be reluctance to consider new MAC proposals after the July Plenary.

Next Meeting Objectives: the MAC group carries forward their objectives from last meeting.

12.3 PHY Subgroup Summary, Rich Lee

Objective - work on channel characterization

Day 1 (Mon AM) - Discussion

We need an enlarged set of reference time varying impulse responses and interference profiles OR we need a model that will generate the same.
We need to examine how diverse systems either 802.11 or not can co-habit - this is a question of how can FH, DSSS, NB systems occupy the same band.
Move to concentrate on 2.4 GHz band.

Day 2 -

Presentations by:
    Larry van der Jagt - PHY characterization (doc 92- 27)
    Rich Lee - (1) Infrared media characterization (doc 92-30); (2) 1-6 GHz media characterization
    Bob Achatz - ITS wideband measurement and prediction (doc 92-38)
Executable "wish list" for further measurements
    - one node moving
    - correlation between tx-rx separation and delay spread
    - near field effect
Discussion of how to conformance test. If conformance classes exist must they be upward compatible?
Future work plan - we need to concentrate on channel characterization and modulation approaches to allow "co-habitation" and interference.

Next Meeting Objectives:

1) We need specific submissions of useable preliminary channel models for WLANs:

A) Kiwi Smit and Dick Walvis have volunteered to have one on BBS by 3/11 and to submit to the group at the next meeting
B) Others are welcome

2) We intend to start work on a prototype draft standard - we anticipate the primary opening work to be in the area of discussing characteristics of the FH - DSSS - NON-SS for "cohabitation" in order to prepare for writing that prototype.

A) one submission on FH has been volunteered subject to management approval.
B) others are welcome.

3) We need a volunteer to chair the PHY group in the event that Larry van der Jagt cannot make the meeting - Kiwi Smit or B. Tuch of NCR

Discussion:
Unidentified: Item #24 is too strong.
Dewayne: It will be sanitized.
Chandos Rypinski: Attitude that people can get what they want without sharing. This impression is dangerous. Most others are more experienced at this than us - don't look uncooperative.

Peter Cripps: Agrees in principle, but we have already filed this position. Outside view is that sharing is impossible. Yes, not to share is bad, but committing to share may be worse.

Nat Silberman: "15 years is too long" is too generic - counter with an acceptable time period.

Dewayne: What period is that?

Wim Diepstraten: "Will not work" should be "will not work for data".

Chan: Suggests "Will not work as a general case but may be possible in selected circumstances."

Peter: That sounded good until the "but".

Chan: Will generate a written response.

Dewayne: Reads a section of a 802.4L filing of July 27/90 which requests sharing.

- conclusion on item #24 to add the words "in the general case".

Peter: Meaning should be shaded in the document, but doesn't think sharing will work.

Payne Freret: without Chan's suggested wording we appear uncooperative and we should continue our history of looking cooperative.

Dewayne: Does anybody not believe that 15 years is too long?

Chan: Back to item # 26, "no mechanism is currently known" is better than "will not work".

Jim Lovette: Let's not re-word it, but concentrate on concepts.

Chan: Needs softening to delete arrogance and uncooperativeness.

Jim: You will have a chance to review it to ensure that - thank you for the questions, we will ensure changes.

Mike Callendar: FLPMTS identifies same bands as NPRM; WARC said 8 years is reasonable. You should try to benefit from WARC output and work as a team.

Jim: It is not coincidental that reconciliation is taking place. Strategy is to try to get US/Europe mutual understanding. Pressure points to get FCC commitment is independent of that. Pushing for quick action is not premature.

Mike: If you want your piece you will have to kick someone out and this will take a few years. Ride the wave rather than oppose the FPLMTS definition.

Wim: Reference the standardization process to predict market forecast to be approximately 5 years. How about 5 to 8 years?

Dewayne: Complex topic to do something that will make sense and get approved. We need to make the FCC understand our position. We don't have time to get a complete proposal that we can all agree to - let's just try to get our general point across.

John Corey: Standard life cycle and market drive is not 15 years, and that sense is not being conveyed. We are trying to avoid driving users to alternate solutions.

Payne: Inconsistent references to wanting 70 vs 40 MHz of spectrum.

John: 70 is more appropriate as per PHY.

Dewayne: Change will be made to make both 70 MHz.

Nat S: Don't leave writing the final document up to the lawyers only, we need technical reasons to back it up. I can put some together.

Dewayne: Must be filed before April 21st.

Motion:#9	**Accept document 802.11-92/41 as modified.**
Moved by:	Peter Cripps
Seconded by:	Bob Crowder

Approved: 20   Opposed: 0   Abstain: 3   *Motion #9 Passes*

The motion to be presented to the executive committee: That the ExCom approves the filing of IEEE 802.11-92/41 at the FCC, expansion to legally appropriate text by a group of attorneys and the final clearance by the chairman of 802.0 and chairman of working group 802.11 .

12.5 Other Subgroup Business

Motion:#10	To create a document from the comments received as responses to the letter ballot on document P802.11/92-20. This document "Comments on P802.11/92-20" would be used as a response document for future 802.11 work.

Moved by:	François Simon
Seconded by:	Bob Crowder

Motion Discussion:

Comment authors will be keyed so the history of the suggestions is not lost. Syntax and spelling comments will not be included.

Approved: 24   Opposed: 0   Abstain: 0   *Motion #10 Passes*

12.6 MAC Simulation Presentations

- Simon Black presented P802.11/92-37, "Further Simulations of the hybrid MAC Protocol".

- Wim Diepstraten presented P802.11/92-26, "A Wireless Network Performance Modelling".

12. (Yes, there are two item12's) Review of document list

12.1 Approval of output documents: 92/41 revised goes to ExCom

12.2 Destination of input documents: 92/35 not for distribution

13. Tentative meeting schedule

Date	Month	Year	Place	Type	Location	Host
11-14	May	1992	Leiden, Netherlands	Inter	TBD	NCR
06-10	July	1992	Bloomington, MN	Plenary	Radisson Plaza South	
14-17	September	1992	Chicago area	Inter	TBD	USAF
09-13	November	1992	La Jolla, CA	Plenary	Hyatt Regency Hotel	
TBD	January	1993	Los Angelos area	Inter	TBD	Xircom
08-12	March	1993	Baltimore, MD	Plenary	Omni, inner harbour	
TBD	May	1993	Baltimore area	Inter	TBD	Ship Star
12-16	July	1993	Denver, CO	Plenary	Sheraton Denver Technology Center	
TBD	September	1993	TBD	Inter	TBD	Open
08-12	November	1993	W Palm Beach, FL	Plenary	Ramada Resort	
TBD	January	1994	TBD	Inter		
07-11	March	1994	Vancouver, BC	Plenary	Hotel Vancouver	
TBD	May	1994	TBD	Inter		
11-15	July	1994	Orlando, FL	Plenary	Walt Disney Swan	
TBD	September	1994	TBD	Inter		
07-11	November	1994	Irvine, CA	Plenary	Irvine Marriott	

We received invitations to host a meeting from GM to Oshawa (Ontario, Canada) and LXE to Atlanta (GA).

13.a P802.11-92/35, moving September meeting from Chicago to Dayton.

Presented by Dale Buchholz. Informal Discussion: - joint meetings/conferences can be beneficial; proposed free conference attendance for 802.11 members; our work must be our focus, not whether we are a crowd gathering technique for someone's conference; it is an IEEE conference, not a commercial one.

Motion #11:	**The venue of the Sept. 1992 802.11 meeting should be moved to Dayton Ohio.**

Moved by: Dale Buchholz
Seconded by: Kaveh Pahlavan

Motion Discussion:

Approved: 15   Opposed: 0   Abstain: 9   *Motion #11 Passes*

13.b 802.11 May 1993 Meeting

Bob Crowder presented preliminary cost information on the proposed May 1993 meeting. There were no objections to his continuing to make arrangements for that meeting, although there was some discussion as to whether the cost of the break snacks could be cut down a little. The preferred dates are May 10-13, which is exactly between plenaries.

13.1 Leiden Objectives

- continue MAC/PHY interface definitions

- review existing and new protocol proposals

- work on channel characterization

- process Functional Requirements and consider letter ballots.

- Tentative Agenda:

	Monday	Tuesday	Wednesday	Thursday
Morning	WG Plenary	MAC I PHY	Func. Req. Subgroup	MAC I PHY
Afternoon	Func. Req. Subgroup	Func. Req. Subgroup ----------------------- WG Plenary	MAC I PHY	WG Plenary
Evening				

13.2 Mailing Dates

- March 27th deadline for Functional requirements

- April 20 for papers to this meeting

- bring 50 copies to meeting if paper not submitted by the above date

13.3 Any other intermediate meetings required? No.

13.4 July meeting: Monday morning ad-hoc group meetings in July - Vic will arrange for two small rooms to be available for informal group meetings.

14. Other business

Reconsider scheduled dates for standard development - by consensus it is agreed to slip all dates by 4 months.

15. Meeting closed at about 4 PM

NOTE from the Chairman:

The Executive Committee approved an amended version of document 92/41 (The draft comments on NPRM ET) with the following motion:

Project 802 Resolution

Date: 12 March, 1992

Mover: Hayes

Motion: That the ExComm approves the filing of doc: IEEE P802.11-92/41 R1 at the FCC after expansion to legally appropriate text by a group of attorneys and final clearance by the chairman of 802.0 and the chairman of WG 802.11.

Second: Thaler

For:	Against:	Abstain:	(Motion)
12	0	2	Passes

The amended version is published as doc 92/42

Appendix 1
Attendance list

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Appendix 2
Document list

IEEE 802.11/92-13	Wireless LAN Access Protocol Deleopment, simulation and Demonstration (Chandos A. Rypinski, LACE)
IEEE 802.11/92-14A	Update to Hybrid Wireless MAC Protocol (Ken Biba)
IEEE 802.11/92-15	Additional Requirements for Appendix G of IEEE 802.11/92-01
IEEE 802.11/92-16	Overview of the Hybrid Wireless MAC Protocol (Ken Biba)
IEEE 802.11/92-17	
IEEE 802.11/92-18	Tentative Minutes of the January 1992 meeting (Chapel Hill)
IEEE 802.11/92-19	Tentative agenda for March 92 meeting
IEEE 802.11/92-19bis	IEEE Requirements Document Comments on doc 802.11/92-01 (Wim Diepstraten)
IEEE 802.11/92-21	MAC minutes, Jan 92
IEEE 802.11/92-22	PHY minutes, Jan 92
IEEE 802.11/92-23	Void
IEEE 802.11/92-24	WLAN Requirements minutes, Jan 92
IEEE 802.11/92-25	MAC Criteria (Chandos A. Rypinski, LACE)
IEEE 802.11/92-26	A Wireless Network Performance Modelling (Wim Diepstraten, NCR)
IEEE 802.11/92-27	PHY Characterization (Larry van der Jagt, KII)
IEEE 802.11/92-28	Report on responses to Quetionnaire 91-82B (Chandos A. Rypinski, LACE)
IEEE 802.11/92-29	Notice of Proposed RulemakingMaking ET 92-9
IEEE 802.11/92-30	PHY Layer Initial review and compilation Infrared Media Conformance Specification (Richard Lee, Spectrix)
IEEE 802.11/92-31	Comments on Sequential Asynchronous Access Method (Chandos A. Rypinski, LACE)
IEEE 802.11/92-32	Liaison info from T1P1 (Rifaat Dayem)
IEEE 802.11/92-33	Data Rate Requirement (Rifaat Dayem)
IEEE 802.11/92-34	Issues on Infrared transmission (KC Chen)
IEEE 802.11/92-35	Meeting arrangements for Sept 92 and May 93 (Geier and Crowder)
IEEE 802.11/92-36	Liaison ETSI STC RES-10 (Simon Black)
IEEE 802.11/92-37	Further simulations of the hybrid MAC Protocol (Mike Smith)
IEEE 802.11/92-38	ITS wide band measurement prediction (Robert Atchatz)
IEEE 802.11/92-39	Medium Access Control Protocol for Wireless LANs, An Update (KS Natarajan)
IEEE 802.11/92-40	Set of Requirements for Wireless LANs
IEEE 802.11/92-41	Comments on NPRM ET 91/9