Minutes of the High Speed Working Group

Irvine, Ca
10-14 Mar 97

The meeting convened at 1pm on 3/11/97

The first order of business was the meeting agenda:

Presenting of SG operating rules
Approval of minutes of Nov 96
Review of previous motions for newcomers
2.4Ghz issues
    Carl Andren
Other bands/Higher speeds
    Requirements (Paine/Fishel)
    NII Bands
Infrared
    LTEL/ITT 10 Mbps presentaiton discussion
PR wording
    Five criteria
Setting goals and agenda for future meeting
At the

Agenda was approved by unanimous consent

The second order of business was the formation of the Study Group operating rules:

Discussion of how the rules apply to the special group rather than plenary or
    75% for approving the PAR
    Members can vote on the topics

Review of previous motions for the newcomers
    To generate a PAR for higher speed wireless LANs
        PAR 1 - PAR for extending 2.4 standard
        PAR 2 - PAR for higher speed wireless LANs
        Third - at least 3Mbps for FH and 8Mbps for DS
            Sensitivity is 10db (on how bad the modulation scheme can be)

The third order of business was the proposal for a 10Mbps 2.4ghz DS:

Presentation by Carl Andren of Harris Corp.
2.4 Ghz related issues
    High speed DS PHY extensions
        Looking for Waveform that has:
            good power efficiency
            “10dBPG”, ie willpass FCC CS jammer test
            acceptable multipath performance
            low to moderate amplitude modulation
            low implementation cost
Want to use existing preamble and PLCP header, so it would be interoperable with lower rate stations
    Options for increasing the data rate

Multiple bits per symbol
M-Ary Orthagonal Keying
11Mchips per second
Data rate=8bits/symbol
Properties
This modulation is most power efficient
The spectrum is like the 802.11 DSSS
Multipath performance is nominal for the SNT
Requires coherent processing
Moderate implementation complexity
Cyclic Code Shift Keying
Data rate=8bits/symbol*1.375 MSps=11Mbps
Properties
- The CCSK modulation symbols are not orthogonal, so they do not achieve as high an efficiency as MOK.
- The CCSK symbols are susceptible to long range multipath.
- Requires the least hardware to implement
M-QAM with Mcps spreading
Data rate=10bits/symbol*1MSps=10Mbps
Properties
- 1024 QAM is very sensitive to distortion and would need an equalizer to even be considered
- Does not achieve 0 eb/n0
M parallel carriers
Orthogonal Frequency Division Multiplex (OFDM)
16 spread chennels at 0.68 Kbps - 10Mbps
Properties
- Multiple summed orthogonal signals produce a high degree of incidental amplitude modulation
- Good eb/n0
- Same spectrum as 802.11 currently
M parallel orthogonal spread signals
16 frequency channels at 0.68Kbps*1bit/channel = 10Mbps
Properties
Best use of the spectrum with flat characteristic
Large degree of amplitude modulation
Means that a very linear power amplifier is required
Complex processing (FFT)
More cost and power consumption
Good spectrum and power efficiency in waveform
Can use differentiall, non-coherent processing

Carl did not get any input after saying that MOK came out the best.

Standard Definition Issues
Lack of 10+Mbps physical layer standard
Provide backwards compatibiity to IEEE 802.11 at 1&2 Mbps
Limited bandwidth available in the ISM bands
Maximize bits/Hz
Need at least 3 channels
Meet FCC requirements for ISM bands
Preliminary review is encouraging
FCC is comfortable with any solution that passes CW test

Interoperate with 1 & 2 Mbps equipment (<10% hit)

Some discussion of the business aspects of the having 802.11 things, both low and high rate work together means that they both should use the same header.

Others

Higher spread rate not considered, it reduces number of available channels too much.

Conclusion

Recommend MOK or CCSK

Keep the same header

Discussion

- Some questions from Jan about the phase shifting and differences between the different keying techniques. 30db per 100 feet.
- The rate will fall back to the 1 and 2Mbps because it is compatible with the previous 802.11
- Discussion about that these modulation schemes do not work well in point to multipoint.
- Discussion about the MOK not meeting the formula for FCC approval.
- Question from Naftali about the difference between using Walsh and OCDM and that the Walsh could be a problem being a distinct waveform.

Wayne Moyers had some comments about the right people to talk to in the FCC. Carl might not have found all the right people.

Harris is not claiming any intellectual property on the MOK.

Naftali made some comments about Carl needing to do some work within 6 months for the PAR to be approved.

Carl will provide data by July

Awarding the PAR with all members of 802.11 having access to the basic technology

Multiple vendors can use it (Carl did not tell anybody how to demodulate the signal, allowing competition)

Work on the 2.4Ghz DS is now deferred until July.

The fourth order of business was the proposal for a 25Mbps PHY at 1pm on 3/11/97:

Richard Paine, Boeing, Presentation 97-28 on the U-NII FCC Release of frequency bandwidth.
Richard showed a chart on possible future growth of wireless LANs
Showed the overview of the ATM Forum wireless LAN.
Showed a breakdown of the ETSI HIPERLAN variety of standards.
Next slide shows ETSI Vs .IEEE and what the band allocations are.
Showed a slide of the ISO Model
Limits of the 802.11 at higher speeds Shows 25Mb/s and 10 Mb/s and the MAC PHY interface.
This is not a proposal for direct translation of the header as is. Showed some conjecture on the 25 Mb/s PHY.
Boeing Wireless Mobility Model showing the current requirement and future.
requirements for High Speed

- Interoperability
- U-NII
- Start with 150 Mhz covered by U-NII and HIPERLAN
- Data rate 25 Mbit/sec and consider fallback
- Range
- Transmit Power
- Overlapping
- Power Consumption

- Multi-path Immunity
- Interference Immunity
- Economics

Naftali Chiatt protested all of the other group involvement such as ETSI, WINForurm, and others. Discussion followed as to the 802.11 MAC not supporting the ETSI HIPERLAN technology. Naftali Chiatt stated his opposition to this proposal and felt that this work did not belong in 802.11. Discussion on central control as provided by ATM and distributed control as is the case in 802.11.Chan Rapenski added his view on the subject

Proposal by Richard Paine to "Create a new 20-25 Mb/s Standard Based on the U-NII rule making " and a friendly amendment was made by Wayne Moyers to the proposal made by Richard as follows: "Create a new802.11 PHY operating up to 25 Mb/s per channel Standard Based on the U-NII rule making". Discussion Followed. Motion seconded by Wayne Moyers. Motion to call the question 17-0-2 question called
14-1-5 Motion passes
Naftali suggested that we talk about a modulation scheme. Discussion followed. Wayne Moyers suggested that changes may be made to the rule making by the FCC and that a modulation scheme could be chosen.
Richard closed with a slide showing PAR Requirements and wanted to address the following criteria:

- Broad Market Potential
- Compatibility
- Distinct Identity
- Technical Feasibility
- Economic Feasibility

Meeting adjourned at 17:00 for dinner.

The fifth order of business was the proposal for a 10Mbps IR:

Presented by M. Hirayama (LTEL Corp)
3/11/97 8-9pm on Tuesday night

They built the IC for a 10Mbps infrared
Modulation Differential Mark Inversion (DMI) (optical fiber)
Distance 3-30m
Ethernet Frame
Address - 16 channels
CSMA

Infrared LAN System - the design technology of 10Mbps infrared LAN system
Presented by H. Matsumoto (LTEL Corp)
3/11/97

After the presentation, there was a lot of discussion about the features of this product. In the size of our conference room, they would have four access points that would connect in a range of 3-5 meters.

A question came up about the safety regulations about their IR device.

The question came out about filtering 60 cycle flourescent lighting. The general consensus was that there were some technical holes in the product that did not match well with the 802.11 MAC.

DMI was used as a matter of convenience.

Naftali

Work on the PAR - do we proceed with both IR and radio?

Wayne brought up the need to follow the original 802.11 PAR. A copy of the PAR was produced and the language was reviewed. Photonics went out of business because it wouldn't work in the sun. Wayne brought up that the PAR suggests mobility to the extent that it can be walking speeds.

Naftali stated that the concensus seemed to be that they did not bring us enough ammunition to approach the 802.11 committee with a proposal.

The question came up on whether a PAR can be modified. The answer was yes.

Naftali came up with the conclusion that the group needed to conclude whether they could work over the 802.11 IR PHY and MAC and they should come back with an IR product that fits the 802.11 mold.

The discussion moved away from IR and back to the PAR proposal for U-NII frequencies. Wayne Moyers wanted to discuss more about how to get the appropriateness of the MAC addressed by the MAC group (who are presently very busy resolving the state machine diagrams to complete the 802.11 standards.

Wayne Moyers made a motion "to submit the PAR without addressing specific modulation type except only as it regards technical feasibility". Seconded by John Fakatselis 15-0-1 Motion passed

The issues of the MAC compatibility and functionality to enable useful accomodations to the purpose of the NII bands or can be extended or modified to meet the goals.

1. Look at the effects of the MAC if using higher speeds. Determine if the IEEE 802.11 MAC meets the goals of the U-NII bands or can be extended or modified to meet the goals.
2. Forward the questions of whether or not current MAC will meet the higher speed PHYs under current proposals.

The vote was 17-1-1 in favor.

- The meeting readjourned at 9pm

The sixth order of business was the wording of the 25Mbps PAR done on 3/12/97:

Wednesday March 12 .1997

New wording for PAR from PHY Study Group.

12 March 1997 meeting High Speed Study Group 08:30
Meeting opened by Naftali Chiatt
Subject of meeting is to develop a PAR for higher speed networks in the 5 Ghz Bands.
Draft PAR:

IEEE STANDARDS PAR FORM

(1/96)

Fill in the answers to the questions in the bracket provided. A Hard Copy of this document must be printed, signed with the appropriate signatures and mailed or faxed to the Standards Department for submission to NesCom.

1. Sponsor Date of Request _____

2. Assigned Project Number (confer with staff) _____

3. PAR Approval Date (leave blank) _____

4. Project Title, Copyright Agreement and Working Group Chair for This Project

I will write/revise a Standards Publication with the following TITLE (Spell out all acronyms)

[X] Standard [for] (Document stressing the verb "SHALL."), or

[ ] Recommended Practice for (Document stressing the verb "SHOULD.") or

[ ] Guide for (Document stressing the verb "MAY.")

TITLE:

Standard for Physical Layer (PHY) for High Speed Wireless Local Area Networks (LAN) in the 5 GHz band

I hereby acknowledge my appointment as Official Reporter (usually the W.G. Chair) to the (Name of Working Group)

Vic Hayes

In consideration of my appointment and the publication of the Standards Publication identifying me, at my option, as an Official Reporter, I agree to avoid knowingly incorporating in the Standards Publication any copyrighted or proprietary material of another without such other's consent and acknowledge that the Standards Publication shall constitute a "work made for hire" as defined by the Copyright Act, and, that as to any work defined, I agree to and do hereby transfer any right or interest I may have in the copyright to said Standards Publication to IEEE.

Signature of Official Reporter _____

Name	Vic Hayes
Date	xx-xxx-1997
Title	802.11 Chair
Company	Lucent Technology
Address	Zadelstede 1-10
City	Nieuweigen
State	Netherlands

Zip 3431 JZ
IEEE Member Number
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5. Describe this project: (Choose ONE from each group below)

a. [ ] Update an existing PAR
[ ]Yes or [X]No
If YES, project number/approval date)_____

Is this in ballot now? [ ]Yes or [ ]No

b. [X] New Standard
[ ]Yes or [ ]No
[ ] Revision of an existing standard.
[ ]Yes standard number/year_____ or [ ]No
[ ] Supplement to an existing standard
[ ]Yes standard number/year_____ or [ ]No

c. [X] Full Use (5-year life cycle)
[ ] Trial Use (2-year life cycle)

d. Fill in target completion date for submittal to
IEEE Standards Review Committee (RevCom).

31 July 1999

6. Scope of Proposed Project (*What is being done* including the technical boundaries of the project?)

To develop a High Speed (circa 25 Mbps) PHY for use in fixed, moving or portable Wireless Local Area Networks. The PHY will be used in conjunction with the 802.11 Medium Access Control (MAC)

7. Purpose of Proposed Project [*Why is it being done*, including the intended user(s) and benefits to that user(s)]

To create a high speed wireless access technology to the Global Information Infrastructure suitable for data, voice and image information services.

The project will focus on communication techniques which use the spectrum efficiently and enable a high aggregate throughput, as well as high speed for an individual network.

8. Sponsor (Give full name; spell out all acronyms) Society/Committee:

Computer Society - LMSC

9(a.1) [ ] Are you aware of any patents relevant to this project?
(*If YES, attach explanation, or No*)

NO. In the field of modem technology there are patents, but according to IEEE 802 policy an attempt will be made to avoid use of patented techniques, unless significant advantage is proven.

9(a.2) [ ] Are you aware of any copyrights relevant to this project?
(If YES, attach explanation, or No)

NO

9(a.3) [ ] Are you aware of any trademarks relevant to this project?
(If YES, attach explanation, or No)

NO

9b. [ ]Are you aware of any other standards or projects with a similar scope?
(If YES, attach explanation, or No)

YES

European HIPERLAN Type 1, developed by ETSI

European HIPERLAN Type 2,3 (Wireless ATM oriented) being developed by ETSI

The "Magic Wand", a Wireless ATM demo being developed by a consortium of European companies under the auspices of ACTS (Adv. Comm. Tech. ????)

9c. [ ]Is this standard intended to form the basis of an international standard?
(Yes, or if NO, attach explanation, or Do Not Know)

YES

9d. [ ]Is this project intended to focus on health, safety or environmental issues?
(If YES, attach explanation, or No, or Do Not Know))

NO

10. Proposed Coordination/Recommended Method of Coordination (Coordination is accomplished in any of the following three ways:
Circulation of Drafts or Liaison Membership or Common Membership.)

ATM Forum Wireless ATM subgroup (Common Membership)
ETSI - RES10 (Circulation of Drafts, Common Membership)
WINForum - WINSpectrum Committee (Circulation of Drafts, Common Membership)
FCC (Circulation of Drafts)
ITU-R (Circulation of Drafts)
ARIB - Japanese Regulatory Body

10a. **Mandatory Coordination**

SCC 10 (IEEE Dictionary)	Circulation of Drafts
IEEE Staff Editorial Review	Circulation of Drafts
SCC 14 (Quantities, Units, and Letter Symbols)	Circulation of Drafts

10b. **IEEE Coordination requested by Sponsor**:
(Use additional page if necessary). If you believe your project will require a Registration Authority, please list IEEE RAC (refer to Working Guide).

If coordination is not required, please attach an explanation.

10c. Additional Coordination Requested by Others. (Leave blank. This will be completed by the Standards Staff).

11. Submitted by: (This **MUST** be the Sponsor Chair or the Sponsor's Liaison Representative to the IEEE Standards Board)

Signature of Submitter_____

Name Jim Carlo (802 chair) ???
Title
Date
Company
Address
City
State
Zip
IEEE Member Number
Telephone
Fax
E-Mail

Supplement to a High Speed Wireless LAN PHY PAR

Scope of the Project

To develop a High Speed (circa 25 Mbps) PHY for use in fixed, moving or portable Wireless Local Area Networks. The PHY will be used in conjunction with the 802.11 Medium Access Control (MAC)

Radio Spectrum

Currently 802.11 supports rates of 1 and 2 Mbps rates in the 2.4 GHz ISM band. Since the inception of 802.11 things have changed both in a regulatory arena and regarding the needs for higher transfer rates.

Specifically, in the US, FCC released for unlicensed use 300 MHz in three 100 MHz subbands in the 5 GHz region (ET Docket 96-102) for a use with high speed Local Area Network communication services. The structure of the new regulations encourages communication at speeds of about 20 Mbps. These rulemakings are evidenced by subpart E - Unlicensed National Information Devices in Part 15.4xx.

Given the regulatory changes (as opposed to 15.247 which was the basis for 802.11's work), it becomes feasible to develop efficient high speed modulation methods to address the 20 Mbps speed range. The scope of the proposed PAR is to propose such modem technology and methods as to take advantage of the new regulations. The modem technology will be examined with respect to propagation impairments typical of both indoor and reasonable range outdoor environments.

Compatibility with 802.11 MAC

The 802.11 PAR mentions that the MAC will be capable of operation in the 1-20 Mbps range. The intent of the effort of this PAR is to examine rates beyond the 20 Mbps range. The 802.11 MAC will be revised for it's capability to support such rates. In addition, the MAC will be revised to examine its capability to support the data, voice and image services intended in the rulemaking.

The channel access mechanism, based currently on Clear Channel Assessment (CCA) will be revised as to ensure fairness with respect to participating stations and other types of networks present in the environment, according to the spirit of the rulemaking.

Compatibility with other layers and requirements of 802 will be ensured by the use of 802.11 MAC.

Five Criteria

Broad Market Potential

To support the claim for the broad need for high speed wireless networking, let us quote the FCC ET 96-102 Docket, which expands on the potential uses of such a technology. Applications such as education, medical, business, consumer, telecommunication extensions and community Internet access are mentioned.

The applications today tend to be more graphically intensive and include voice and video. The volumes of data involved in medical image transfer are tremendous.

The trend in both the networking and the telecommunication industry to increase the speed of their products and the services they provide creates a market need for the wireless LAN to match the throughput capabilities of the WAN.

US market alone seems to be sufficient to justify the Project. US government actively supports wireless access to information, as it is reflected in the FCC Docket 96-102. This Docket brings US spectrum policy into considerable alignment with western Europe. Coordination with worldwide regulatory bodies will be attempted to ensure even wider market potential for the technology to be developed in this Project.

High degree of interest expressed by multiple vendors and the history of active participation of multiple vendors in 802.11 PHY standardization process promise that the standard will be accessible to multiple vendors. In addition, semiconductor manufacturers are expected to provide solutions for the emerging standard, making the technology available to multiple system manufacturers.

The 5 GHz radio component technology is starting to develop and we beleive that the U-NII rulemaking will give a boost to availability of such components.

The modem component technilogy needed to support 20 Mbit operation is of a scale comparable to cable modems or sattelite Direct Video Broadcasting. This makes it reasonable to believe that components will be available from several vendors to implement the PHY resulting from the proposed Project.

We beleve that the cost of the PHY resulting from this project will be comparable to the cost of wireless LAN adapters based on current 802.11 technology. The complexity of the PHY operating at 20 Mbps should be few times higher than a solution for a DS operating at 11 Mchip/s, but taking into account the progress in semiconductor device density the cost should be comparable, once appropriate ASICs are developed.

Compatibility with IEEE Standard 802

The compatibility with IEEE 802 requirements will result from the use of 802.11 MAC, which itself was developed to be compatible with those requirements.

Distinct Identity

The proposed high speed PHY is trivially distinct from all other nonwireless 802 groups by being wireless.

The proposed Project is distinct from the 802.11 Project in that it is not restricted by 15.247 rules. As a result, usage of spread spectrum techniques in no longer required, and wider bandwidths are allowed. All this factors add up to enable significantly higher data rates.

Technical Feasibility

The technical feasibility of the radio part is already proven by existing 5.7 GHz products. The requirements of a High Speed PHY are not significantly different from todays ISM systems.

The increased processing requirements of the digital modem part are in line with the progress in ASIC technology. There are demonstrations of modem technologies which we believe to be of comparable complexity, such as XDSL, cable modems, sattelite DVB modems, etc.

The tenfold increase in data rate, compared to 2 Mbps ISM device, is expected to reduce the cell radius by an estimated 40% (assuming fourth power propagation law). In addition, the 5 GHz band does not experience interference from microwave ovens.

Economic Feasibility

The economic feasibility of the proposed Project draws on the feasibility of 5 GHz radio technology available today and of our expectations of modem complexity. Once 5 GHz MMICs proliferate, the cost will drop to that compatable to nowdays 2.4 GHz technology. Some cost penalty may be incurred by tighter filtering requirements at the band edges, as FCC requires. Test equipment for higher frequency range may cost more, incurring some additional penalty on product cost. The modem ASICs will be somewhat more expensive than current 2.4 GHz modems. The overall cost of a 5 GHz high speed LAN adaptor should be marginally higher that the current 802.11 adaptor.

The installation of 5 GHz devices at the stations is not different from a 2.4 GHz LAN, and has almost no associated cost. The infrastructure cost (Access Points) is expected to be higher, due to smaller cell size than with lower rate 2.4 GHz equipment. Taking into acount the higher rate of the proposed PHY, the overall cost/performance ratio should improve over ISM type network.

Break for lunch at 12:15

Final motion was to move forward with the 25Mbps PHY PAR to the 802.11 Plenary. Motion Richard Paine, second by Michael Rothenburg. Called to question by Naftali for vote. The vote was: 16-0-1.

The seventh order of business was the wording of the 25Mbps PAR done on 3/13/97:

Thursday March 13, 1997

To make comments to PAR received during the plenary on Wed evening to complete par to submit at closing plenary.

George recommended the addition of working group name to Vic Hayes name followed by "Chair 802.11" which is name of working group.

Comments from 802.11 wed plenary:

1. Not writing a new standard but making a supplement to an existing standard.
2. Purpose of project: whether it is appropriate to use GII in header of standard or just refer to LAN standard. Michael Rothenberg, said that GII should be taken out and wording rephrased to state:
   To create a highspeed wireless access technology suitable for data, voice and image information services.
   To create a high speed wireless access technology suitable for data,voice and image information services

Dave Fisher 3Com: This technology should be beneficial for improved access to the Global Information structure and wired LANs, as well as creation of high performance ad hoc networks Corporate LANs, and ad-hoc networks.

Issue of rate of 25Mbps: Michael Rothenberg perfers to put lower rate of 20Mbps to get the PAR through the MAC group
Straw poll: most agree to reduce the speed to 20Mbps, from 25Mbps and Naftali changed the wording to 20Mbps.

Just “No” for aware of patents relevant? As commented in yesterdays plenary. Leave the wording as it is.

Projects relevant to this project: took out the ( ) refering to words defining ACTS.

Coordination of project between standards bodies:
1. Coordination with other bodies was problematic (comment by Vic Hayes) requires very formal documentation.
2. Naftali read the rules for coordination.
3. Dave Fisher 3Com: clarification of coordination efforts. (ETSI, FCC, ARIB) regulatory bodies, but not how the spectrum is used? FCC must comply with FCC rules for the spectrum use. Each company developing products, must go to FCC on their own to get FCC approval for products. Japan a lot of problems to get approval from this country. ETSI, WINForum and ATM Forum may respond negatively to IEEE 802 standards because of competition.
4. Cherry asked what impact coordination has? Does it mean that if the other body does not sign off on specification it is not approved.
Decided we need to get clarification from Vic Hayes. Naftali went to get Vic to provided clarification. Winforum defining sharing rules which go to FCC to become law. Aironet guy.

Naftali removed regulatory body FCC, ARIB, WINForum.

George requested to add IISP for ANSI clearing house for all US standards. And comminication between all US groups. George worried about development of standard development which would not interoperate with other standards.

Scope of Project: (supplement part)

must address the comments on MAC to change from revise to review.
Clear Channel assessment: advised to withdraw it because
1. no one wanted to mention fairness to other types of networks present
2. PHY will provide it’s own fairness access mechanism as part of its development.

Wayne stated that his notes stated that we would add Clear Channel Assessment mechanism, and Dave Bagby suggested that revised to "will be developed" Should read :

The clear channel assessment in the phyiscal layer will be developed to ensure fairness with respect to participating stations and other types of radio devices present in the environment according to the spirit of the FCC rule-making.

Group agreed to modification but one concern about fairness issue within 802.11 MAC protocol. What about issue of fairness to other type of devices without 802.11 MAC protocol.

Dean (Symbol) stated what mac guys wanted is a cca that works with 802.11 MAC . Need to change the statement again. The 802.11 MAC requires fairness to operate.

New change to wording: (two issues no change to 802.11 MAC and fairness with respect to FCC rules.)

The clear channel assessment mechanism in the physical layer will be developed to operate with 802.11 MAC.

In addition, the cca will be developed to ensure fairness with respect to partcipating stations and ensure operation in the presence of other radio devices operating in the environment, according to the spirit of the FCC rulemaking.

Naftali: is this agreed to everyone in room.

Wayne says that canada is ready to roll out video rabbit product which will act like a jammer to 802.11 phy and mac. Wayne wants to leave in participating stations. Much discussion ensued.

Michael recommend that we take out paragraph entirely
or that we make changes:
Naftali stated that we have four possibilities to make this change:

withdraw paragraph
withdraw second sentence
change sentence
leave alone

3com guy: FCC fairness and our local area networking fairness. LAN fairness means equal access to network for everyone. FCC considers fairness in regards to jamming for NSS. IEEE can't

MAC compatability issues for MSDU:
Performance issue: to add Dave Bagby concerns: Dean added this issue
qualitity of performance is an issue of combination of PHYand MAC to be garuenteed.

"Compatability with the other layers and requirements of 802 will be ensured by the use of 802.11 MAC and the dependence upon the PHY level performance. "

Naftali proposed to add another sentence to clearify qualitiy of service and performance:

"The proposed PHY will be developed so that in conjunction with 802.11 MAC it will meet the quality of service requirements MSDU loss rate and availability requirements as detailed in 802.11 PAR." Naftali asked for okay as sentence no, more discussion needed.

Dean stated new sentence

The new high speed PHY will be developed to be consistant with the existing 802.11 MAC - PHY interface. This should perserve compatability with other levels and requirements of P802. The proposed PHY with the 802.11 MAC will meet QOS as detailed in 802.11 PAR.

Naftali asked wayne if this is okay.

Five Criteria:
Issue Broad Market Potential:
how to define the market numbers.

Wayne suggested that we go with the government survey which details the market.
Michael recommended addition of a new sentence to justify the project and add the comment about over 50 responders to the MPRM.

US market alone paragraph: dave bagby stated why we believe us market is suffienct
The huge market potential is reflected in the over 50 commentor's market assessment contained in their responses to the MPRM.

Michael: US government actively supports wireless access to information as is reflected by issuing the FCC report and order on January 9,1997 for Docket 96-102 . The large potential of the US market alone is reflected in the over 50 commentor's market assessments contained in the responses to the FCC's NPRM. The frequency band allocated in the FCC Docket overlaps with a 5.2 GHz band allocated in Western Europe for high speed local networking (the HIPERLAN project). Coordination with worldwide regulatory bodies will be attempted to ensure even wider market potential for the technology to be developed in this project.

Everyone active in discuss seemed to agree with current wording change to PAR.

ITU had to choose one standard (8802-11) with ETSI and IEEE 802 submission to ISO but for separate bands. HIPERLAN and new 802.11 high speed PHY (Richard wondering about duplication of effort) between ETSI and IEEE. ATM - connection oriented standards. ATM cells

Vic requested in par clear statement to respond to worldwide regulatory agencies. Need to be able to lobby foreign government. IEEE needs to communication with FCC in US CEPPT (European) and ETSI only authorized to sell in Europe. IEEE must be able to sell product in Europe, and be able to lobby CEPT for acceptance, and coordinate with ETSI to ensure that HIPERLAN development is known and that we may be considered to be HIPERLAN compliant device and can be able to sell in European. HIPERLAN type II is specific to ATM. HIPERLAN type I : vs IEEE 802 distinctiveness:

CITEL Latin America and Canada, observer is by Saudia Arabia

added to Economic Feasibility:
IN order for the developed standard to be applicable geographically as widely as possible, the committee will be authorized to appeal to regulatory bodies worldwide to make frequency allocation

Vic joined the group to discuss the PAR. Coordination with the standards group is what we need to do. Coordinate with the US Technical Advisory Group, which will be the coordination with the European efforts (CEPT).

Vic gave some history on the relationship between ITU, ETSI, and IEEE. Both ETSI and IEEE submitted to the ITU. Neither ETSI nor IEEE went to the Brazil meeting. They were embarrassed. Vic showed up at the next meeting in Guernsey. He submitted the 802.11 as ISO 8802.11. It was accepted as the ISO worldwide standard. Either ETSI did not meet the ISO criteria for a worldwide standard or they made the ITU irritated enough to be ignored.

The major question is "can IEEE companies sell a 5.2GHz product in western Europe."

CEPT (the European equivalent to FCC) is the only official link to the PTTs.

ETSI is defining a HIPERLAN device

CTEL is the equivalent of the FCC in central and south America.

Vic suggested that a white paper is necessary to argue some of these points to be presented at the next 802.11 plenary.

There was some discussion about the ATM over the 802.11 interface.

What are the obstacles for getting it into western Europe.

There was lots of discussion about what makes the proposal move

Motion by Wayne, seconded by Michael 12-0-1. Motion passed.

The new PAR is now a separate document but can be found in 97-31.