Minutes of IEEE P.802.11 WLAN High Data Rate FH-PHY Ad-Hoc Group Meeting

Singapore Room, Apple Computer
Cupertino, California
August 23, 1993

Co-Chair: Wayne Moyers, Nathan Silberman

Minutes Taken: Yanpeng Guo, Hussein Mehdi, Hongying Yan

The IEEE P.802.11 WLAN High Data Rate FH-PHY Ad-Hoc Group meeting was held on August 23, 1993. About thirty people attended the meeting. The names and affiliations are shown in Appendix 1. The agenda of the meeting is shown by App. 2.

I. Presentations

1. N. Silberman: "Modulation Selection Criteria for Higher Data Rate FH."

(For detail of the presentation, see App. 3)

Discussions:

K. Feher: Data file transfer time should be added to the criteria.

M. Rothenberg: Data file transfer time will depend on the network.

R. Carl: Modulation techniques also have an impact on file transfer time.

M. Rothenberg: For Gaussian noise I think BER is enough.

K. Feher: It is important to let people know what BER means. Most people will understand it if you translate it to file transfer time.

W. Moyers: I think this is related to the impact of modulation on throughput.

R. Carl: In criteria 14, what kind of channel model is this based on?

N. Silberman: This needs to be specified.

D. Kawaguchi: How about the switching time?

N. Silberman: This has not yet been decided.

M. Rothenberg: I think the preamble and throughput limits should be set for the proposed modulation schemes.

W. Moyers: The technical criteria for higher data rate will be modified based on the comments.

2. M. Rothenberg: "Simulation Results for Several WLAN Modulation Methods."

(For detail of the presentation, see App. 4)

Discussions:

R. Carl: What kind of Rx BPF is used in your simulation?

M. Rothenberg: Brick wall filter.

R. Carl: Brick wall filters are not available.

M. Rothenberg: This simulation is just for the comparison of different modulations.

J. McDonald: If more than 1 bit memory differential detection is used, better performance can be achieved.

M. Rothenberg: This is true for all modulation schemes. For GFSK, how many dBs is required to get BER = 10^{-5} with three bits memory?

J. McDonald: 15.5 dB.

N. Silberman: What is the possibility of phase flopping between I&Q caused by multipath transmission?

K. Feher: S. Kato from NTT, Japan will present a paper on this issue at Atlanta meeting.

N. Silberman: I think the phase flopping probability between I&Q should be added to the criteria.

J. McDonald: Frequency offset also needs to be considered.

K. Feher: Deviation tolerance should be added to the criteria.

3. K. Feher: "FQPSK Modulation NLA Radio Techniques for WLAN."

(For detail of the presentation, see App. 5)

Discussions:

J. McDonald: What is the resolution of the X correlator?

K. Feher: This will be presented at the Atlanta meeting.

J. McDonald: The detection is coherent or non-coherent?

K. Feher: Coherent.

J. McDonald: How much time does it require to get carrier recovery?

K. Feher: About 20 -30 bits.

C. Macnab: What is the difference in switching time between coherent and differential detection?

K. Feher: They are basically the same. The real penalty for coherent detection is that the chips for non-coherent detection are already in the market.

C. Macnab: The experiments in the ISM bands show that coherent detection needs more time to transfer a file.

K. Feher: How many bits are allowed for the preamble?

J. McDonald: 100 bits.

K. Feher: Then, STR: 20 bits; CR: 20 bits; rest: 40 - 60 bits.

N. Silberman: Some systems require STR within 5 bits, and a total preamble of 32 bits.

K. Feher: For higher Eb/No, it is true.

N. Silberman: 17 dB Eb/No.

J. McDonald: Actually 100 bit preamble is for diversity. Otherwise only 15 bits are needed.

K. Feher: We can offer our programs free if you send us the request in writing.

II. Discussions

M. Rothenberg: I think we should move out GFSK as the reference for high data rate modulation study. And we should decide which criteria are most important, and which are of secondary importance.

J. McDonald: What is the high data rate system?

K. Rothenberg: I think it should be more than 1.4 Mb/s. I will present our FLOQAM modem at Atlanta meeting. If it is accepted as the standard, I will offer it free. If it is not accepted, it will be patented.

J. McDonald: If there is not a significant increase, it is not worth it to try.

M. Rothenberg: What is the step in your mind?

J. McDonald: at least 50%?

M. Rothenberg: let's make a threshold of bit rate for high data rate systems. How about at least 1.4 Mb/s? I formally move 1.5 Mb/s as the MINIMUM threshold for the high data rate systems.

N. Silberman: Seconded.

W. Moyers: Let's vote. (6 yes, 3 no, 6 abstain) Pass.

M. Rothenberg: I would like to ask the people who don't agree with this motion, why?

J. McDonald: 1.5 Mb/s is not high enough, 2 Mb/s should be the minimum.

N. Silberman: Bit rate must be higher than 1.5 Mb/s, but not limited at 1.5 Mb/s.

M. Rothenberg: Motion: ask FCC to make FCC-15 be compatible with European standard (PRETS300 328).

J. McDonald: seconded.

W. Moyers: Vote. All pass.

M. Rothenberg: Motion: set the step size as 250 kb/s.

W. Moyers: Vote. (7, 0, 7) Pass.

W. Moyers: Should we use the conservative or aggressive definition?

M. Rothenberg: Conservative definition as in J. McDonald's paper.

N. Silberman: Seconded.

Vote: 12, 0, 4, pass.

M. Rothenberg: I suggest that all-pass Rx IF filters should be used for the performance comparison.

N. Silberman: Seconded.

Vote: 3, 6, 5. failed.

M. Rothenberg: Then the Rx IF filters in the proposed systems should be fully specified.

N. Silberman: Seconded.

D. Kawaguchi: The NLA also needs to be specified.

J. McDonald: The whole system should be fully specified.

Vote: 12, 0, 2. pass.

H. Mehdi: I suggest we should select the chairman for continuing work.

M. Rothenberg: I think we should select the chairman at next meeting. Let's schedule next meeting now.

W. Moyers: Next meeting will be on Sept. 22 (Monday), 6:30 pm. (all agree).

N. Silberman: The performance of proposed modulation schemes should be evaluated in AWGN at BER = 10^{-5}. (all agree)

High Data Rate FH-PHY Ad-Hoc Group

Meeting Announcement

Date: August 23, 1993
8:30 am to 5:00 PM

Place: Apple Computers Inc.
One Infinite Loop
Cupertino, California

Meeting room: Singapore room on the first floor.

Agenda

1 Social mix, Introductions / Roll call and meeting logistics
2. Review scope and purpose of interest group meeting.
3. Update meeting agenda and time allocations.
4. Informal presentations of technical concepts and directions:
   a. Data Rates, steps, feasibility.
   b. Other related standards in progress / status.
   c Enabling technologies; what are the applicable technologies / techniques to achieve higher speed / throughput; e.g. modulations, constellations etc. Practical techniques list. Bandwidth compliance issues.
   d. Advantages / disadvantages/ quantitative criteria / target parameters and specs.
   e. Discussion of switching issues to / from GFSK, including protocol issues
   f. Interoperability assessment and impacts on PHY, MAC, Management layers.
   g. Reduce alternatives to a workable consensus list including impact on
      - Stepped data rate
      - Modulation type
      - Switching scheme
      - Link parameters (C/I @ BER, etc.)
5. Break-Out in groups for completion of draft concepts for items in 5. above for generation of Core values /issues for a straw vote.
6. Reconvene for group reports and straw-votes.
7. Action list and assignments
8. Schedule for future meetings.

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