IEEE 802.11 Committee

Tentative Minutes of the FH Group Meeting
held in West Palm Beach March 6-9, 1995.

IEEE802.11 FH MEETING - MARCH 1995

Meeting opened 0850, March 6th: Jim McDonald in the chair. Peter Chadwick volunteered to take minutes. Agenda presented by Jim McDonald, and agreed. It was noted that this was an interim meeting until the Plenary has happened and the 802.11 committee formally convenes.

Comments received on the D1 draft

Dean Kawaguchi reported on the Editor's meeting held Sunday evening, 5th March. He said that it had been proposed to authorize the editors to deal with editorial comments, while a joint session was needed to deal with many of the technical comments. This was proposed by Dean Kawaguchi, seconded by Ed Geiger. At a vote, passed with 10 votes for, no abstentions and no votes against.

There was some discussion on some of the comments raised by non regular participants of the FH group, and the comments that members of the group wish to make on other parts of the standard. On a straw poll, 3 were for 0 hours of FH meeting, for 2 hours 1, for 4 hours 3, for 8 hours 1, and for 16 hours ,1.

Jim McDonald presented his overview of the major points raised in the comments. Major areas of discussion raised:-

* Timing beacon requirements for hop synchronization.
* CCA with multi rate.
* Higher C/I requirements a 2Mbps: use of FEC.
* Spec changes for desense and IM

Jerry Loraine had a list:-

* Common PHY headers for DS and FH
* Different Tx vectors between DS and FH
* CCA

Other issues:

* Common scrambling method

CCA discussion.

Suggested that the requirement for CCA on random data be dropped. Discussion followed, with suggestions of the applicability of adaptive defer levels, and the determination of transitions being considered. The higher bit rates were discussed: there was general agreement that speeds above 3Mbps were unlikely to be implementable within the limits defined by the FCC. Ed Geiger suggested that the length field should be a duration field, with basic units of 1μs. A straw poll was suggested to fix the number of data rates, with Wayne Moyers suggesting that room is required for growth. On a straw poll, 5 were in favour of restricting the number of speeds to 1 and 2 Mbps, while 4 were in favour of allowing higher data rates. On a move to remove the requirement for random data detection, 3 were in favour of restricting the standard to 1 and 2 Mbps only, while 3 were in favour of allowing 2 higher speeds.

Moved that the length field for the FH PHY be made a duration field.

Moved Ed Geiger, seconded Wayne Moyers.

Moved to table the motion pending further technical input. Moved Ed Geiger, seconded Wayne Moyers. Carried by acclamation. Agreed that Naftali would present a proposal during the week of the meeting.

Discussion on the proposal to make the CCA pure power detection. Jim McDonald will talk further with the protagonists of this proposal. A straw poll on choice of defer levels gave:-

-60 to -40 dBm   2 votes
-40 to -60dBm   0 votes
>-20 dBm   3 votes

It was considered that the subject had been exhaustively covered and that further discussion would be fruitless without new technical input.

Meeting opened at 2030 EST.

Working through the comments in Section 10.

10. Wim Diepstraten, suggesting that the CCA should be operated by energy detection. DEFERRED to later.

10.5.4. Michael Fischer . Choose whatever model the MAC AND OTHER PHY GROUPS AGREE TO. CARRIED 7-0-0

10.2 Siep. Proposed to change sect 8 to agree with sect 10. CARRIED 7-0-0

10.2.2 Mahany. DEFERRED

10.2.2 McDonald. Delete number of antennas from Table 10-1 CARRIED 6-0-1

10.2.2.1 Tom T.DEFERRED

10.2.2 Sonnenberg. See McDonald above

10.2.3 Geiger. considered editorial.

10.2.2.3 McDonald, Renfro. DEFERRED

10.2.3. Sonnenberg. Considered as Technical. Suggested to make RSSI non mandatory. DEFERRED

10.2.3 Mahany. see Mahany 10.2.2

10.2.3.1 Fischer. Accepted 7-0-0

10.2.3.1. Geiger length comment judged editorial by contributor. Editor to correct.

10.2.3.1 Fischer. See Geiger 10.2.3.1

10.2.3.3 Dellacourt. see 10.2.3 from Sonnenberg.

10.2.3.3 Loraine, McDonald, Renfro. see 10.2.3 from Sonnenberg.

Adjourned to 0830 March 7th

Reconvene 0845.

Motion to accept minutes of the November FH meeting 94/177 prop Jim McDonald sec Dean Kawaguchi carried 7-0-1.

Motion to accept the minutes of the January FH meeting 95/07 prop Jim McDonald sec Brad Herrin. carried 7-0-0.

New Business raised by Dean Kawaguchi. He volunteers to reduce the work load on Ed Geiger by taking on the editing of Section 8 of draft D1. Meeting time suggested is evening of Tuesday March 7th.

Continuing review of the comments.

10.26.28. Dellacourt. Referred to 10.6.28. DEFERRED

10.3.1.1 Kubler and Mahany.. Remove the reference to repeaters, passed 8-0-0

10.3.1.1 Renfro. Need consistency between text and state diagrams. Consistency required throughout the document. Deferred to later.

10.3.2 O'Hara. Commentator to be asked to clarify by the editor.

10.3.2 Mahany. Length Field discussion DEFERRED.

10.3.2 Renfro. DEFERRED

10.3.2. Black. DEFERRED

10.3.2.2 Tom T. DEFERRED

10.3.2.2.1 Bolea. DEFERRED

10.3.2.2.1 McDonald DEFERRED

10.3.2.2.2 Bolea. Reserved parameter values should be set to 0. Vote 8-0-2

10.3.2.2.2 Kubler change of parameter values to reserved (0). see above from Bolea.

10.3.2.2.2 Kubler change undefined to reserved. 7-0-1

10.3.2.2.2 McDonald DEFERRED 6-0-0

10.3.2.2.2 Zuckerman. After discussion, decided that 6 voted to reject, 2 voted to defer. Felt to be unjustified technical complexity by 7-0-3.

10.3.2.2.2 Mahany. covered elsewhere

10.3.2.2.3. Kawaguchi, Kerry, Geiger. accepted 9-0-0

10.3.2.2.3 O'Hara. decided to remove the term BCH: insert CCITT CRC16. 10-0-0

10.3.2.2.3 O'Hara. word replacement. change accepted. 9-0-0

10.3.2.2.3 O'Hara. decided to delete the word correction. 11-0-0

10.3.2.2.3 Fischer. Covered by changes made above as the result of O'Hara's input.

10.3.2.2.3 Kuber covered above.

10.3.2.2.3 Mahany see O'Hara above.

10.3.2.3 Geiger. Editorial comment accepted.

10.3.2.2 O'Hara. Reject comment as different technologies require different scramblers. 9-0-2.

10.3.2.3 Demange. Committee cannot agree on the formation of the polynomial generator. To be examined further at a later stage. **ACTION DEAN KAWAGUCHI**

10.3.2.3 Demange. Suggestion to scrap the whitener. Felt by the committee that some advantages accrue from its use. 10-0-0

10.3.2.3 Demange. Disabling of the whitener on a per frame basis to meet Japanese requirements. To defer, on a vote 5. reject 1.

10.3.2.3 McDonald. Refer to polynomial generator above.

10.3.2.3 McDonald. Inclusion of privacy. moved to MAC group.

10.3.3 O'Hara accepted. **ACTION DEAN KAWAGUCHI**

10.3.3.1.1 Bolea. accepted. 10-0-1

10.3.3.1.1 Yao. Accept pro-tem10-0-1

10.3.3.1.1 McDonald on timings in the state machine diagram. After discussion, text accepted.

10.3.3.1.1 McDonald require generation of subfigure. Included in fig 7a. Text accepted.

10.3.3.1.1 McDonald Comment withdrawn.

10.3.3.1.1 McDonald Whitening algorithm verification . accepted as having been provided.

10.3.3.1.1 Renfro. 2Mbps whitener to be addressed. DEFERRED.

10.3.3.1.1 O'Hara refer to commentator **ACTION Ed Geiger**

10.3.3.1.1 O'Hara refer to commentator **ACTION Ed Geiger**

10.3.3.1.1 O'Hara refer to commentator **ACTION Ed Geiger**

10.3.3.1.1 O'Hara refer to commentator **ACTION Ed Geiger**

Move to adjourn to 1300. accepted by acclamation

Meeting resumed 1305.

10.3.3.1.2 McDonald Resolved, text accepted.

10.3.3.1.2 Renfro. DEFERRED by commentator to 10.6.13

10.3.3.1.2 O'Hara provide all PMD SAP primitives. refer to commentator **ACTION Ed Geiger**

10.3.3.1.2 McDonald DEFERRED

10.3.3.2 Boer DEFERRED

10.3.3.2.1 Belanger DEFERRED

10.3.3.2.1 O'Hara. Replace 'is unspecified.' DEFERRED

10.3.3.2.1 O'Hara accepted 9-0-2

10.3.3.2.1 Chadwick - comment lost. MAC is requested to ensure that CCA is clear before transmitting, except in the case of SIFS transmissions.3-2-6

Proposed that the current work be continued so that a D1.1 draft can be completed, with cross issues identified and documented. Volunteers to be assigned to deal with cross- and delayed issues, and a short Plenary to be held on Wednesday March 8th. On a straw poll, 14-0-1

10.3.3.2.1 Renfro. re antenna switching. withdrawn, text accepted.

10.3.3.2.1 Renfro. What are countdown and CCA timer?
Changed to an editorial comment. Suggested text to be produced **ACTION JIM RENFRO**

10.3.3.2.1 Renfro. Changed to an editorial comment. Suggested text to be produced **ACTION JIM RENFRO**

10.3.3.2.1 Sonnenberg DEFERRED to CCA discussion.

10.3.3.2.1 O'Hara refer to commentator **ACTION Dean Kawaguchi**

10.3.3.2.1 O'Hara complete names Accepted   5-0-3

10.3.3.2.1 Mahany / McDonald. Problems with defining end of transmission from amplitude. Editorial change to clarify requested.

10.3.3.3.1 McDonald. Accepted 9-0-4

10.3.3.3.1 Renfro. Remove Check packet format. Failed 5-3-4
ref to fig 10-10a accepted.

10.3.3.3.1 O'Hara Provide complete detail to show how Ph_DATA indication obtained.
refer to commentator **ACTION Dean Kawaguchi**

10.3.3.3.1 O'Hara Define requirements for Check packet format
refer to commentator **ACTION Dean Kawaguchi**

10.3.3.3.1 O'Hara state machine must be.....
refer to commentator **ACTION Dean Kawaguchi**

10.3.3.3.2 McDonald time within which to terminate receive procedure.
Text accepted by commentator.

10.3.3.3.2 Renfro. PLCP will take more than 1μs after air interface to send anything to the MAC. Decided to remove the time requirement. 6-0-4

10.3.3.3.2 Mahany re error correction .Accepted. 11-0-1

CCA Discussion

Accepted that pure RSSI based CCA was not acceptable.
Jim Renfro presented his paper. (doc 95/22)
After discussion

Proposed that 1) CCA time be changed to 42μs.
            2) Increase slot time to 60μs
            3) Remove the requirement for detection during the data portion of the
               burst.

On 1) Straw poll
   2) Straw poll   2 to change, 6 not to change, 2 abstentions
   3) Straw poll   3 want to detect data, 3 to delete, 1 want to use adaptive RC

Adjourned at 1735
Reconvene at 0845

10.6.2 Bole. Inconsistency between Table 10-10 and 10-12. Agreed to change Table 10-10 first line upper limit to. 9-0-2
Other comments considered to be editorial by a 9-0-1 vote.

10.6.3. Commentator considers them to be editorial.

10.6.5 Furuya/Renfro/Geiger/O'Hara. Occupied Channel Bandwidth. 20dB against 99% occupied bandwidth.
Moved by Dean Kawaguchi, seconded Jerry Loraine, to accept the Renfro comment.passed 8-3-1.

10.6.5 Mahany temperature range. Vote 10-3-1 to include temperature range.
Moved by Jim Renfro sec Wayne Moyers to use the DS temperature range.
Vote 11-2-1

10.6.6 O'Hara/Lewis Hopping control provision by the PMD.
vote to refer to commentator 12-0-1 **ACTION Ed Geiger**

10.6.6 O'Hara. Include all regulatory requirements. Motion to reject. moved Dean Kawaguchi, seconded Peter Chadwick. 15-0-0.

10.6.6 Renfro. Withdrawn.

10.6.6 Fischer.Max dwell time. Concluded to be a MAC Management issue by a 9-1-1 vote.

10.6.7 Bolea/Renfro Equation alleged incorrect. Refer to Dean Kawaguchi, Jim Renfro and others by a vote 10-0-4

NEW COMMENT by Chadwick. Suggest that where the comment "for Europe" appears, it should be replaced globally with "applicable parts of Europe". Ron Mahany to produce submission regarding various standards. **ACTION Ron Mahany**

10.6.9 Chayat. definition of frequency deviation. Decided not to make any change on a straw poll, 5-2-0.
moved to retain existing text, prop Ed. Geiger, sec Peter Chadwick
passed 5-4-4 .

(Chair's Note: This is not an action item. The issue is continued in the next discussion)

10.6.9 Chadwick centre frequency drift.   Commentator to work with Naftali Chayat.
No change at this time. 9-2-2
ACTION Peter Chadwick, Naftali Chayat, Jerry Loran

10.6.9 Silberman. Accept as peak error 11-0-1

10.6.10 Silberman. data rate tolerance. rejected 8-4-2. Chair requests submission on subject. submission promised by Jon Sonnenberg

10.6.11 Mahany. Withdrawn.

10.6.11 McDonald. Hop Synchronization issue. Moved that the matter be referred to the MAC group .
Prop Peter Chadwick sec Jim Renfro Friendly amendment Dean Kawaguchi to put the matter on the issues list prior to referral to the MAC group. 10-1-2

10.6.12 O'Hara/Fischer/Renfro. Complete timing specification required.
Felt that the definition of the timing is unnecessary.
Motion to delete 10.6.12 prop Dean Kawaguchi sec Jim Renfro passed 8-6-1

At 1149, Motion to adjourn prop Dean Kawaguchi, sec Brad Herrin, passed by acclamation

Meeting convened at 1400, with a motion to adjourn at 1630

10.6.13 Loraine/Renfro/Sonnenberg. Receive - Transmit times. On a straw poll, acceptance of Loraine's text 5-4 in favour. Jerry Loraine withdrew suggestion.
Motion to adopt the text At the end of this 19µs switch time, the rf carrier shall be within 1 dB of its final transmit power level and within the described modulation specifications. prop Jon Sonnenberg sec Jim Renfro passed 12-0-0

10.6.14. O'Hara/Mahany/Renfro. Vote to delete section 10-0-0 confirming the decision at the November meeting.

10.6.16 Bolea. Incomplete sentence. Proposed that the change is editorial. that EIRP be consistent with regulations. Passed 11-0-1

10.6.16 Mahany Power limits. Suggest addition of text as supplied, with the modification that the term " ANSI.C95.1-1991 or successor" replace "ANSI C95.1-1991"
prop Ron Mahany sec Wayne Moyers passed 8-0-2

10.6.16 Renfro EIRP Made an editorial comment, but 0dBm becomes 1mW.

10.6.16 Sonnenberg minimum output power level 100mW. Straw poll on minimum of no limit, 1, 10 or 100mw.
votes for no limit 8, 1mw 3, 10mw 6 , 100mw 2.
Moved that all conformant PMD implementations shall support at least one power level with a minimum EIRP of 10mW. Moved Jon Sonnenberg seconded Larry Zuckerman . vote 4-3-3

10.6.17 Loraine/Bolea/McDonald/Renfro/Sonnenberg. transmit power control. Accepted with the deletion of "as measured by geographically applicable regulations". and the addition of 'at or below' before 100mw in the second sentence.

10.6.18Loraine. Acceptance with the change that 2 failures are accepted at -40dBc.
Proposed Jerry Loraine seconded Peter Chadwick.passed 10-2-0

Dean Kawaguchi prop, Naftali Chayat seconded a move to change the agenda to revert to discussing issues after completion of section 10.6.18 carried 9-2-1 Agreed to carry on to 1800.

10.6.18 Kubler has been dealt with.

 QUESTION from the editor; action on fig 10-17.
Deletion proposed Jerry Loraine sec Peter Chadwick. accepted by acclamation.

10.6.18 Mahany Fig 10-17, Tx mask. no longer applicable

10.6.18 Silberman. Tx mask. moved Dean Kawaguchi, sec Peter Chadwick to reject.
Passed 6-1-3.

REVERTING TO ISSUES

Moved to start at the top of the list. Prop Dean Kawaguchi, sec Jerry Loraine.
accepted by acclamation.

PLCP Format

ISSUES: Length Field (how long) or Duration field, number of Bit Rates, Common Header with other PHYs, fields to be octet multiples.

Moved Ed Geiger, sec Dean Kawaguchi that the PLCP header remain at 32 bits.

Naftali Chayat feels that the length should be expanded to at least 40 bits inclusive of CRC.

Dean Kawaguchi suggests that length fields should be the number of octets, as in the other PHYs. The use of an even number of data rates fits with this, allowing calculation of lengths from the knowledge of number of octets and rate.

Larry Zuckerman wants a longer PLCP header so that advanced CCA could be accommodated.

Jon Sonnenberg agrees with Dean.

Jim McDonald suggested that the present length field was adequate in time, while others felt that doubling the length to 11 bits was desirable to allow the transmission of an Ethernet packet. On a straw poll, the motion passes 7-3-2.

Agreed to give Naftali Chayat the floor for his presentation of the reasons for the lengthening of the header.

Straw poll on going from length to duration. for length 9 for duration 1 abstention 2.

Question called Jim Renfro sec Jon Sonnenberg question called by acclamation.
Motion passed 9 for, 3 against. 1 abstention.

Ed Geiger moves extending the length field by 1 bit. sec Dean Kawaguchi.
Motion passes 12 for, 0 against, 1 abstention.

Ron Mahany moves to change the second rate bit in the PSF field (bit 4 in Table 10-3) to be reserved. sec Dean Kawaguchi. Naftali Chayat proposes a friendly amendment to reserve bit 5 instead. Not accepted by Dean Kawaguchi. On a straw poll, the motion would pass 10-2-1. Jerry Loraine calls the question, sec Peter Chadwick. On the vote, passes 11-2-0.

Ed Geiger moves to adjourn to 0830. Meeting adjourned.

Meeting reconvenes at 0830.

Discussion about changes and implementation mechanisms.

RSSI.

Moved to eliminate the requirement for RSSI. Prop Ed Geiger sec Jerry Loraine.
In discussion, the questions were asked as to how RSSI would be used, what it would be used, and how the MAC would use it. It was pointed that for roaming, RSSI would not be totally helpful because of the differing hop patterns between cells. It was suggested that RSSI might be useful for power control, or rate selection.

Ron Mahany suggested that network management would be aided by having RSSI.

Ron Mahany stated that the RSSI used in the DSSS standard was quite complex, and volunteered to prepare a submission for the next meeting.

Proposed to table the motion by Ron Mahany sec Wayne Moyers passed 7-2-4.
Dean Kawaguchi volunteered to provide a submission.

ACTION Dean Kawaguchi/Ron Mahany

Identical PLCP headers in all PHY's.

The result of the meeting held on the evening of the 8th showed this to be impractical.

Scrambler polynomial

On a motion by Ed Geiger, seconded Dean Kawaguchi, moved to table. passed 12-0-0
Matter tabled until next meeting. The polynomial was agreed to be correct.

Japanese requirements.

Stated by Dean Kawaguchi that then current standard met the Japanese requirements.

The issues include the call sign and the whitener. Wayne Moyers and Jon Sonnenberg will provide a contribution at the next meeting.

ACTION WAYNE MOYERS/JON SONNENBERG

Motion to table Jim Renfro sec Wayne Moyers to table until the next meeting. Passed 4-1-2

2Mbps Changes

Proposed Jerry Loraine that the 2Mbps modulation and bit stuffing described in paper IEEEP.802.11 - 94/297 be accepted. Sec Wayne Moyers. Ron Mahany said that there are still comments to be analyzed on this subject. The debate centred on the use of stuffing bits either as binary or 4 level FSK. On a straw poll, 1 in favour of binary, 3 in favour of 4 level, 9 abstentions.

Proposer of motion accepted the use of 4 level FSK as a friendly amendment. Accepted also by the seconder. Question called by Jerry Loraine, seconded Wayne Moyers. accepted 12-0-1.

Chairman's report on procedural matters

Issues that passed by 75% in the FH-PHY group will be treated as one block for submission.
Issues that passed by 50% in the FH-PHY group will be submitted as a separate block.

New Documents for discussion in the letter ballot are to be with Vic 29th March.

Ed Geiger and Dean Kawaguchi will deal with editorial and all the 755 issues.
Jim McDonald will do the 505 issues.

(755, 505 refer to the numbering adopted by Ed Geiger for each issue)

LB doc will have paras missing if these are unresolved issues.

Jerry Loraine and Jim Renfro will help as needed.

reverting to issues.

CCA

Energy detection.

Request by Jim Renfro for a straw poll as to desirability of discussing the deferral to the DS PHY. passed 9-1-3.
Prop Jim Renfro that a requirement be added that the FH PHY defer based on receive signal level for levels above a threshold defined in the MIB
 Sec Larry Zuckerman. Question called Jerry Loran sec Larry Zuckerman
Motion fails 0-11-3
Proposed Jerry Loraine that no deferral to energy only takes place. sec Jim Renfro
Friendly amendment that it is not mandated that the FH PHY will not be required to defer to energy only. prop Jim Renfro, agreed Jerry Loraine. Larry Zuckerman volunteered a submission on the standards process. question called Peter Chadwick sec Wayne Moyers.
Motion carried 9-1-4.
Dean Kawaguchi proposes that the FH-PHY does not require the use of energy detection to defer. sec Brad Herrin. motion passes 9-1-3,

Random Data Detection

Prop that the requirement for random data detection be deleted. prop Jim Renfro sec Jim McDonald.

Dean Kawaguchi proposes to amend to require the level at which random data is detected to be 20dB greater than the CCA Threshold for the detection of preamble. Accepted as a friendly amendment. Question called Peter Chadwick sec Wayne Moyers passed
11-0-2

Longer CCA slot times.

Considered to be cleared.

Motion to adjourn to Salt Lake City, 0830 MST, May 8th, 1995.Jerry Loraine
sec Wayne Moyers passed by acclamation.

Chair's Note:
Two action items from the November meeting were resolved this meeting and will result in new text for the next letter ballot. One was the deletion of Paragraph 10.6.14, Operating Channel Availability. The second related to section 10.7.9. This issue was addressed by submission 94/297. The motion to accept the text of this submission with an exception that the deviation during the stuffing symbols be +/-3 was passed 12/0/1.