IEEE 802.11
Wireless Access Method and Physical Specification

Title: **Minutes to IEEE P802.11 FH-PHY Ad Hoc Group**
Montreal, Canada
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DRAFT MINUTES OF THE IEEE 802.11
FREQUENCY HOP AD HOC GROUP MEETING

MONTREAL, CANADA, NOVEMBER 6/7/8/9, 1995

The Chair, Dean Kawaguchi. opened the meeting at 0945. Peter Chadwick volunteered to act as Secretary. The agenda was proposed as:-

1) Appointment of Editors.

2) Resolution of FH Group issues

3) Resolution of Section 11 comments on Draft D2.0 of the Standard.

4) Review of a PICS pro-forma

5) Any Other Business

This Agenda was accepted.

The Chair stated that it was not possible for him to continue as Editor and Chairman. Ed Geiger pointed out that he did not have Word 6.0, and any new editor should have Word 6.0. Dean said that Word 2.X should be adequate. Ed said that he could supply comments to the Editor. After

discussion, it was AGREED to table the matter to allow possible volunteers to confer with their employers.

The outstanding issue is that of the Frequency Hop tables, which are not acceptable to the FCC. It was agreed to postpone discussion until the afternoon of November 7th to allow submissions to be read.

Resolution of the Comments.

It was AGREED that the Editors be empowered to deal with those comments designated as editorial.

Discussion on the duration comments by Johnny Zweig in the PLCP header DEFERRED to the MAC-PHY meeting•.

Discussion on the RSSI comment by Jim McDonald 11.2.3.3. Jim proposed that the RSSI requirement be removed. Mike Rothenberg proposed a friendly amendment that the text be left as is, excepting that it be specified as an option. This was not accepted. Mike proposed that the motion should be amended. Seconded by Nathan Silberman. After discussion, the question was called by Wayne Moyers, seconded Nathan Silberman. The motion to amend was voted 10 - 4 - 4.

On the amended motion, after discussion, the question was called by Jim Renfro, sec. Peter Chadwick. Voted 7 - 3 - 4. The amended motion passed.

As there is no Editor, it was proposed by the Chair that where amendments are made that do not have associated text, the proposer of such amendment should produce text, and where text is not submitted in time for the D3.0 issue, the amendment fails. Jim McDonald proposed a friendly amendment that a time limit of close of PHY meeting on Thursday. This was seconded by Stuart Kerry.

Jim McDonald proposed that the amended motion be amended such that the judgement of the Chair of the FH Group be the final arbiter of the applicability of the proposed text. Seconded Peter Chadwick. Question called by Wayne Moyers, seconded Peter Chadwick. Motion passes 9 - 0 - 5.

Jim Renfro's comment 11.3.2 withdrawn.

The comment in 11.3.2.1 regarding the CS/CCA state machine indicating busy during hop time was discussed. Peter Chadwick commented that the SYN_LOCK primitive provided the information: Jim Renfro commented that a CCA_BUSY

would lead to back off initiation, which is undesirable. Ed Geiger commented that the MAC timer should handle this. Jim McDonald said that the matter was connected with the synchronisation. After discussion, it was AGREED to table the matter to the MAC/PHY meeting.

Michael Fischer's comments in 11.3.3.1.2 and 11.3.3.3.2 regarding PHY service primitives time significance were discussed.

Moved Ed Geiger seconded Jim Renfro that the amendment be accepted.

Voted 6 - 0 -6.

Jim McDonald's comment in 11.3.3.2.1 and his related CCA comments were explained by the author. After much discussion, it was agreed to finish the topic prior to adjourning. After further discussion, it was suggested that the matter be tabled until Wednesday 8th, when Dean Kawaguchi proposed to present text.

ACTION: Dean Kawaguchi

On acclamation, adjourned for lunch.

On resumption of the meeting, it was AGREED that the issue of FH Hopping patterns be addressed.

Jim McDonald took the chair while Dean Kawaguchi presented doc 231. Naftali Chayat presented doc 246. After discussion, it was proposed that a straw poll be held. The approach in doc 231 received 3   while those in 246 received 11.

Peter Chadwick proposed adoption of the recommendations in doc 246, seconded Ed Geiger. Question called Mike Rothenburg, seconded Naftali Chayat.

Vote 13 - 1 - 3.

Peter Chadwick proposed that the European and US hop patterns be identical, seconded Bill Huhn. Vote 11 - 1 - 5.

Peter Chadwick proposed that the hop table for Japan be that proposed in doc 95/246 Appendix B with minor changes. Seconded Jim Renfro.

Stuart Kerry proposed tabling the motion until the text is available, sec. Ed. Geiger. Vote 7 - 6 - 3.

ACTION: Naftali Chayat to produce text   ACTION: Dean
Kawaguchi to ensure that the matter is raised during the meeting.

Reverting to resolution of comments.

Jim McDonald's 11.3.3.2.1 was discussed. Peter Chadwick proposed acceptance of the modification: Jim Renfro seconded. Voted 2 - 1 - 6. Jim McDonald proposed changing the wording to allow optional choice of CS/CCA retiming.

Peter Chadwick proposed that in view of the small majority and low vote, the issue be re-opened to allow further discussion, sec Wayne Moyers. Ed Geiger produced, in association with Jim McDonald, further text to suggest that the ability to detect a signal appearing over another signal and resetting the CCA timer be optional. Jim McDonald proposed the change, Wayne Moyers seconded, Peter Chadwick called the question, seconded Wayne Moyers, Voted 6 - 0 - 5.

11.3.3.3.1 comment from OMi tabled until text prepared by Naftali Chayat.

ACTION: Naftali Chayat

11.5.5.10 removal of section on synthesiser locking. Vote to remove 6 - 1 - 4.

11.6.10. Peter Chadwick proposal on average center frequency. With modifications, proposed acceptance by Jim McDonald, seconded Peter Chadwick. Question called Jim McDonald, sec Peter Chadwick. Voted 7 - 0 - 4.

11.6.11. Ron Mahany commented on a tolerance on the data rate. Peter Chadwick moved acceptance of the comment, sec Ron Mahany. Voted 10 - 0 - 1.

11.6.12 Peter Chadwick. Comment accepted in principal, re wording required. After rewording, acceptance moved by Jim McDonald, sec Peter Chadwick. Vote

8 - 0 - 5.

11.6.13 Peter Chadwick. Principle accepted. Proposed Jim McDonald, sec Ron Mahany acceptance of the comment of YI to change 1 dB to 2 dB. Amendment proposed Ed Geiger to change text in 11.6.1.3 to remove the reference to 1 dB and to substitute a reference to the limits in 11.6.14.1, and to change the text in 11.6.14.1. Proposed Ed Geiger, sec Peter Chadwick. Vote 9 - 0 - 3

11.6.14.3 Jim MCDonald proposes modification of the Transmit Power Control requirement. Seconded Dean Kawaguchi. Question called Peter Chadwick, sec Jim Renfro. Vote 5 - 8 - 0.

11.6.14.4. Channel offset N changed to channel number N and accepted, and definition of M added. Section on Correction Factor withdrawn. Proposed Peter Chadwick Sec Wayne Moyers. Vote 7 - 0 - 2

11.6.15. Motion to reject Wayne Moyers sec Naftali Chayat. Vote 4 - 1 - 9

11.6.15 Receiver Leakage. Proposed Peter Chadwick that the comment of SKy be accepted with a level of -50 dBm EIRP, and be 11.6.15.7 entitled 'Receiver Radiation' Sec Jim McDonald. Question called Peter Chadwick Sec Wayne Moyers

Vote 12 - 0 - 1

11.6.15.1 Jim Renfro. Withdrawn.

11.6.15.1, .4, .5. FER to BER change. Resolved.

11.6.15.3 CCA detection of 2 Mbit/s. Comment from Jim McDonald re 11.6.15.4 should be 11.6.15.3, After discussion, a straw poll proposed to determine;-

a) leave as is

b) delete random data requirement

c) accept this change.

vote 3, 4, 5. Jim McDonald moved acceptance of Peter Chadwick's comment, sec Jim Renfro. Voted 12 - 1 - 0.

Jim McDonald accepted that the changes incorporated answered his comments.

11.6.15.4 withdrawn.

11.6.15.7. Inband Receiver Emissions. Proposal from Jim McDonald. After discussion, proposed by Peter Chadwick that existing level be maintained. sec Jim Renfro. Question called Stuart Kerry, sec Jim Renfro Vote 7 - 1 - 1.

11.6.26. Proposed Jim Renfro that this be referred to the full PHY meeting. Sec Peter Chadwick. Question called Ed Geiger, sec Jim McDonald. Vote 9 - 1- 0

11.7 Jim McDonald comment withdrawn.

11.7.2 Ron Mahany on 4 GFSK frequency drift. It was agreed that 'nominal' should become 'actual' center frequency. Peter Chadwick pointed out that there was no specification for the frequency accuracy of the 2 Mbit/s section. This will be dealt with by the editor. Discussion followed on the maximum allowable frequency drift, and rate of drift. It was agreed that '4 GFSK data word' be replaced by 'PLCP_PDU'. It was suggested that the slope remain at 10 kHz/ms

over the maximum length MPDU word. It was then suggested that the peak to peak variation of less than 10,15,20 or 25 kHz be maintained over a frame. On a straw poll, 10 kHz 6   15 kHz 8   20 kHz 4   25 kHz 2

Proposed by Peter Chadwick that a peak to peak deviation of less than 15 kHz be maintained. Question called by Stuart Kerry, sec Jim McDonald. Vote 8 - 0 - 2

Adjourned until 0830 EST 8 Nov 1995.

Meeting resumed at 0950 EST •8 Nov.

AGREED to finish the NO votes.

Agreed to table Chadwick's comment on 11.7.2 until after the morning break, during which an attempt will be made to produce text.

11.8.2.1.5 comment from Ron Mahany. After discussion, moved by Ron Mahany to adopt his comment, seconded Nathan Silberman. Friendly amendment by Dean Kawaguchi that PHY_TXSTART.request be substituted for PMD_TXRX.request. Friendly amendment accepted. On a vote 10 - 0 - 1. ACCEPTED.

11.8.2.1.6 Jim Renfro. After discussion, moved Jim Renfro, sec Ed Geiger to accept the change. Jim Renfro to ensure that those persons dealing with Sect 4 be informed. Vote 9 - 0 - 2.

<p align="center">ACTION: Jim Renfro</p>

After discussion on CCA timing, it was proposed by Jim McDonald seconded by Dean Kawaguchi that the new text proposed by Dean Kawaguchi be accepted. Question called Ed Geiger, seconded Wayne Moyers. Voted 12 - 0 - 1.

After discussion, proposal by Naftali Chayat to change the wording of the whitening algorithm accepted 13 - 0 - 0.

Some discussion followed on the hop patterns for Japan. Dean Kawaguchi felt that there was no good reason to change from the original proposals embodied in Draft D2.0. Peter Chadwick proposed that the tables in Draft 2.0 be kept for Japan. Seconded Nathan Silberman. Vote 6 - 0 - 6.

Naftali Chayat proposed new text to address the 4 GFSK issues. Seconded Wayne Moyers   Vote 8 - 0 - 0. (This resolved the comments of Ron Mahany and Peter Chadwick)

Issues for the MAC/PHY meeting.

It was AGREED that the issues of 100 mW power Control, RSSI, Antenna Selection and provision of syn lock be raised at the MAC/PHY meeting to see if the MAC group had any comments on their inclusion.

The issue of the time stamp and the delay in the whitener was to be raised by Jim Renfro.

CCA Busy indication during a hop.

Adjourned for lunch at 1210 EST.

Resumed at 1545 EST

Dean Kawaguchi commented that the proposal accepted by the full MAC/PHY group affects several sections for which there was no text, and additionally, several pictures needed changing.

Jim Renfro announced that he was available to act as Co Editor: Proposed Dean Kawaguchi, sec Keith Furuya. Carried 7 - 0 - 1.

Further discussion followed on the change to the header contents.

Stuart Kerry called for the orders of the day.

It was agreed that the meeting should proceed with review of comments.

Sect. 11.1 Mahany. Accepted by acclamation.

Jim Renfro moved, Ron Mahany seconded to table until all other technical comments have been reviewed, the comments on duration by Johnny Zweig. Question called Stuart Kerry, sec Ron

Mahany. Vote 9 - 0 - 0.

Proposed acceptance of Jim McDonald's comment re deletion of ANT_SEL by Dean Kawaguchi, sec. Jim Renfro, question called Peter Chadwick, sec Jim Renfro, vote 4 - 2 - 2.

Jim McDonald 11.3.2.2.1 on the PLCP_PDU length Word (PLW). Acceptance proposed by Dean Kawaguchi with a change from 31/32 to 32/33 coding algorithm. Sec. Peter Chadwick. Carried unanimously.

Dave Bagby comment on sect 11 and 12. Stuart Kerry reported that the PAR says that the MAC shall support PHY's: additionally, the decision made in 1992 suggests that the requirement for multiple RF PHYs has been recognised for several years. The wording produced in rebuttal by the DS group was presented.

It was suggested that the elimination of one of the PHY's at this stage could be viewed as an illegal restraint of trade.

Motion to table until the full PHY Meeting, proposed Jim Renfro sec Stuart Kerry, voted 7 - 0 - 0

Sect 11.3.2.2.1 comment from YI re extending the PLCP_PDU field. Proposed acceptance by Ron Mahany, sec Jim Renfro. question called Peter Chadwick, sec Ron Mahany. vote 6 - 1 - 2.

11.3.3.1 Ron Mahany on 4 GFSK bias suppression. The previous changes made on 4 GFSK resolve this: author withdrew.

11.3.3.1.1 OMi comment on PHY_TXstart accepted.

11.3.3.1.2 Wim Diepstraten on PLCP header preamble. Moved to reject by Jim Renfro, sec Ed Geiger. Voted 5 - 2 - 2.

11.3.3.2.1 Jim MCDonald - clarity improvement SFD/PLCP header. Acceptance moved Dean Kawaguchi, sec Ron Mahany, 5 - 0 - 1.

11.4.2.2 Wim Diepstraten on derivation of channel number. Dean Kawaguchi moved to delete in 11.8.2.1.33 though .35 the references to set zero and pattern zero used for probing. Seconded

Ralph Yeager. Friendly amendment to answer No to the question posed by Wim Diepstraten. On a vote, 6 - 1 - 1.

11.4.3 Wim Diepstraten on the "Busy" indication during Hopping. Already voted in full MAC/PHY group: thus decision can be made by the group. Moved to table the issue pending guidance from the MAC Group, proposed Ed Geiger sec Wayne Moyers, carried by acclamation.

11.5.4.3 Jim Renfro. Number of antennas. comment changed to editorial.

11.6.11 Peter Chadwick accuracy of rate previously accepted.

11.6.14.4 Keith Furuya. Replace last sentence in section with (6,0,0)

"Within the frequency band of operation, two failures are permitted providing they are less than -50 dBc."

11.6.15 Jim Renfro, See previous response.

11.6.15.3 YI, See above comment.

11.6.3 Jim McDonald. Typo to be fixed - accepted

11.6.3,.4,.5 change 'USA' to 'North America' FK. Proposed Ron Mahany, sec Dean Kawaguchi. question called Ron Mahany, sec Stuart Kerry. 5 - 1 - 2.

11.6.7. FK Deletion of last sentence. Acceptance of change, with deletion of second sentence, proposed by Ron Mahany, seconded Keith Furuya.

Voted 7 - 0 - 1

11.6.8 FK Changing US to North America - new text is required for this section, so this change will incorporated therein.

11.7.3.4 Desensitisation comment by Bob Marshall. rejected for inaccuracy on a vote of 7 - 0 - 0.

11.8.2.1.5 MB,RXTX turn round time. Moved that the time be not more than 20µs. Proposed Jim Renfro sec Ed Geiger on a vote 7 - 0 - 0.

11.x, 12.x, 13.x, TM. Fix all rates at 2 Mbit/s. Moved to reject prop Jim Renfro sec Keith Furuya. 7 - 1 - 0.

Meeting resumed 9 November.

Agenda for the session

Hop Pattern Text

Timestamp delay

2 Mbit/s statement on 1 Mbit/s requirement

Duration Field implementation.

PICS Proforma

AOB

Replacement text on frequency hop tables in 95/246 R1 proposed Jim Renfro sec Wayne Moyers passed 8 - 0 - 2.

Timestamp delay. Agreed in principle.

2 Mbit/s/1 Mbit/s compatibility. Discussion on the anomalies, agreed that 2 Mbit/s equipments operating in the 1 Mbit/s mode meet all the 1 Mbit/s requirements, except where the parameters are specified for 2 Mbit/s.

Acceptance proposed Ron Mahany, seconded Naftali Chayat. Vote 10 - 0 - 3.

(This resolved the comments of Peter Chadwick in 11.7.3.3 and 11.7.3.4, so these editorial comments were withdrawn by the author)

Discussion on the Duration field. After discussion, Jim Renfro proposed, Peter Chadwick seconded that the Duration Field be rejected because of lack of text, and the lateness of the approval. Mike Rothenburg disagreed, saying that the proposal made a major improvement in throughput in various areas. Unfortunately, without simulation results it was impossible currently to quantify the improvement. Mike Rothenburg moved to table the motion until Johnny Zweig is able to provide edited text, seconded Wayne Moyers. Question called Stuart Kerry. Vote 3 - 6 - 5.

Wayne Moyers said that he had voted for the proposal, and the DS group are preparing the text. Ron Mahany yields, Naftali Chayat said that the 16 bit PLCP header can be re-arranged so that extra bits are not required. Ed Geiger said that the change impacts sections 9 and 10 and various drawings, so there is a lot of missing information. Peter Chadwick calls the question, Stuart Kerry seconds. Mike Rothenburg claims this is out of order: Dean Kawaguchi rules Mike Rothenburg out of order. On calling the question, the voting 5 - 7 - 3. Question not called. Mike Rothenburg said that the Plenary had agreed the change, so that the discussion was invalid. He suggested that the matter be re-opened at the joint MAC/PHY. Jim Renfro called question, Peter Chadwick seconds. Vote 5 - 8 - 3, Question not called. Wayne Moyers asked Johnny Zweig on the status of the text. Johnny Zweig said that the text provided was vague: in the case of Section 11, the hardest part would be the drawings: exact cut and paste text was not currently available, but he did not believe that the amount of text required was large. Stuart Kerry proposed to table the motion until the full PHY meeting: Mike Rothenburg seconds. 14 - 1 - 2.

Moved to adjourn ~~until 1030~~ for the session.