Tentative Minutes of the Frequency Hop Ad Hoc Group, November 1994

IEEE 802.11 COMMITTEE November 7 to November 1, 1994

Monday, November 7

8:00am

- •Jim McDonald is Chair
- •Charlie Jenkins volunteered to be recorder of the minutes
- •Jim reviewed working rules for this session
 - Stated this is an interim meeting prior to the Nov plenary session reopening closed issues is OK but will require a 75% vote for technical motions.

To require 75% vote in the FHSS Phy working group to bring motions to change the FHSS Phy to the Phy and Plenary after doc94/68 is accepted by the Joint M/P 802.11 committee.

Moved:

Nathan

2nd:

Wayne

Vote:

15/0/1

Chair's Note: In the closing plenary, the 802.11 chair, Vic Hayes, ruled this motion out of order, following challenge and debate. Vic Hayes' ruling is that motions passing with greater than 50% plurality in the Frequency Hop group are to be brought to the Plenary for consideration by the Plenary body.

- Agenda
 - -Tutorial
 - -High data rate and 1Mb Phy integration
 - -Editor tour of the PMD
 - -Remainder of 68r5
 - -Motion to bring 68/r5 and errata sheet to Phy on Weds 11am and to joint mtg Weds afternoon

Motion:

Approve Agenda

Moved:

Larry

2nd: Dean

Vote:

16/0/0

- •Ed/Dean presented Tutorial on 68/r6 amiss discussion of issues
 - -Dean to keep open issues log for FH ie Pwrlvls, RSSI, antsel etc.
- -Dean review of PLCP frame format_header, scrambling/whitening, state machines, CCA etc
 - -Break
 - -Dean continuation of state machines

discussion of RxSM in terms of losing carrier during a reception due to interferer.

-Ed review of 9.4 PLME, MIB and PMD

- Jim recap of PMD issue list
- straw poll to meet from 1 to 3 for FH Phy, 9/3/4
- straw poll to meet 5 to 5:30 for FH assuming full 802.11 convenes before 5pm, 11/0/5
- straw poll to meet 7 to 9 for FH Phy assuming 1 hour for dinner, 14/0/2
- Dave Bagby address FHSS group and asks for the group to attend the 802 Plenary to assist in the tug-a-war over conference room assignments.
- motion to reconsider 1 to 3 straw poll Nathan, pablo, unanimous
- motion to not meet 1 to 3 for FH to attend plenary and raise tent issue dean, nathan, 15/1/0
- 1,2 Mb gear shift submission from Pablo
 - -adjustments to PLCP header 2 bits to define 1,2,3 & 4Mbps
 - -use duration [Length/rate] not length indicator
 - -Mac is submitting appropriate complimentary adjustments
 - -Significant discussion of gear shift vs separate FH Phys
 - -Verbal agreement from advocates to submit docs detailing gear shift parameters

Motion to Table until next session.

Moved: Pablo 2nd: Wayne Vote:

10/2/0

Adjourn at noon. No afternoon meeting because of 802 Plenary and 802.11 Plenary

Evening

-Discussion of gear shift for multirate

Motion to Table until next session. Motion:

Moved: Pablo 2nd: Wayne

Vote:

10/2/0

Tuesday, November 8

10:30 (Agenda continuation of last evening)

-Multirate, gear shift discussion

Motion: Motion to Table multirate until next session pending vote of MAC.

Moved:

2nd: Keith Vote:

5/13/1

Motion:

Motion to limit time to multirate discussion to 11:30am.

Moved: Ed

Keith 2nd:

Vote:

5/13/1

Straw poll on proposed motion

Moved: Ed 2nd:

Kieth

Vote:

15/1/4

Motion: Motion to call question

Moved: Dean 2nd: Wayne Vote: 19/0/1

The FHSS PLCP preamble and header per figure 9-3 shall be at PLCP_ **Motion**: rate. The PLCP_PDU may run at 1,2 Mbps & higher rates.

Moved:

Pablo

2nd:

Wayne

Vote: 17/1/2

-Discussion of editing parameters such as bias, length field_subgroup to resolve and submit

Motion:

Call the question

Moved:

Dean

2nd:

Nathan

Vote: 16/0/2

Motion:

Accept frame coding per 94/287

Moved:

Mike

2nd:

Wayne

Vote: 16/2/2

•PMD issues in 068/r6

- 9.6.2 Operating Freq range International specs

Motion:

Call the question

Moved:

Ed

Jerry 2nd:

Vote: Consensus

Motion: Add the international specs back into 068/r6. The numbers are subject to the regulatory authorities.

Moved:

Dean

2nd:

Kieth

Vote: 17/0/1

- 9.6.3 to 9.6.4 changes as required

- 9.6.5 Occupied channel BW.

Motion:

Change ± -25 ppm to ± -60 khz in 9.6.5

Moved:

Jim

2nd: Nathan

Vote: consensus

- 9.6.6 NA

- 9.6.7 Minimum Hop Rate Discussion

Motion:

Call the question

Moved:

Ron

2nd:

John

Vote:

Consensus

Motion:

The default dwell time for FH will be 20ms.

Moved:

Ed

2nd: John M Vote: 12/0/1

Motion:

Approve Changes to 9.6.1 to 9.6.7

Moved:

2nd: Mike

Vote: 14/0/0

Motion:

adjourn for lunch

Moved:

Mike

2nd: Jim Vote:

Consensus

- 9.6.8 Hop sequences

editing the equations & text. Dean to notify Francois Lemaut concerning mods.

- 9.6.9 Out of band emissions

.editing for European/Japanese regulations & text

- 9.6.10 Modulation

editing text.

- 9.6.11 Channel data rate OK
- 9.6.12 Channel switching OK
- 9.6.13 TxRx switch time
- 9.6.14 RxTx switch time

significant discussion on switching times Ed presented timing diagram.

Motion: Move to table 9.6.13 & .14

Vote: consensus

- 9.6.15 Operating channel availability OK
- 9.6.16 PMD transmit specs OK
- 9.6.17 Transmit power levels

Motion:

Reopen issue

Moved: Peter

2nd: Stuart Vote:

consensus

Motion: Add Equivalent <u>Isotropically</u> Radiated Power in text and add * in table to reference regulatory authorities.

Moved:

Peter

2nd: Stuart Vote: no vote

Amend motion to delete section 9.6.17 altogether Motion:

Moved:

John

2nd: Peter

Vote: 10/4/2

failed

Motion: Add Equivalent <u>Isotropically</u> Radiated Power and reference to

regulatory authorities in text and delete table.

Moved:

John Sonnenberg

2nd: Wayne **Vote**: 15/0/1

- 9.6.18 Transmit power level control

.paper 94/211 Jim M discussion of RF sensitivity as it pertains to CCA threshold

Motion:

Reopen closed issue

Moved:

Stuart

2nd: Peter Vote:

consensus

Motion: Delete section 9.6.18

Moved:

Stuart

2nd: Peter

Vote: 12/1/1

•Motion: discussion will end by 5:30_consensus

- 9.6.19 Transmit power classes

Remove power classes requirement from 94/068 Motion:

2nd: Peter Vote:

Friendly Amendment: The RF power control will be optional and hooks will be included to permit this option under MAC or management control.

Moved:

Mike

Moved:

2nd: Wayne Vote: 8/4/2

Motion:

Table power control until MAC decision

Moved: Nathan 2nd: Wayne Vote: 7/8/0

. Discussion flowed to CCA threshold issues_see section 9.6.28

• Adjourn for reconvention at 7:00pm

- 9.6.20 Transmit spectrum shape

Motion: Accept the text as defined in 068r5 sect 9.6.20 withdrawn for final

wording

Moved: Jerry 2nd: John Vote: no vote

- 9.6.28 CCA

Motion: Accept the text as defined in 068r5 sect 9.6.28

Moved: Charlie 2nd: Jerry Vote: 9/5/0

Motion: Reopen closed issue 9.6.28

Moved: Dean 2nd: Ed Vote: 10/5/0

Motion: Accept the text as defined in 068r5 as result of meetings prior to Nov

94 sect 9.6.28

Moved: Ed 2nd: Ron M Vote: 9/5/0 failed

Motion: Reopen closed issue 9.6.28

Moved: Dean 2nd: Ed Vote: 13/1/1

Motion: Accept the text as defined in 068r5 sect 9.6.28

Moved: Ron 2nd: Charlie Vote: 9/5/0

Motion: reconsider topic on Weds

Moved: Ed 2nd: Dean Vote: consensus

- no number_clock recovery time

Motion: Strike section clock recovery time

Moved: Ed **2nd**: John M **Vote**: 12/0/0

- 9.6.21 Transmit center frequency tolerance

.discussion on temp operating range and tolerance spec in Hz vs ppm.

Motion: Accept the text as defined in 068r6 sect 9.6.21

Moved: Ed 2nd: Keith Vote: 11/0/2

- 9.6.22 PMD receiver specs OK

- 9.6.23 Input dynamic range

.discussion on

Motion: Modify title to Input dynamic range

Moved: Peter 2nd: Dean Vote: 10/0/0

Motion: Accept the text as defined in 068r6 sect 9.6.23

Moved: Peter **2nd**: Dean **Vote**: 13/1/1

- 9.6.24 Selectivity

Motion: Delete section

Moved: Peter **2nd:** Dean **Vote:** 11/0/2

- 9.6.25 Channel BER

Motion: Delete section

Moved: Jerry **2nd**: Peter **Vote**: 11/2/1

- 9.6.26 Rx center freq acceptance range Modify title to above and reflect changes as in 068r6 sect 9.6.21 Moved: 2nd: Charlie Ed **Vote**: 11/0/0 - 9.6.27 CCA response time Motion: Ed and Dean to capture spirit of wording from previous meeting Moved: Peter 2nd: Dean Vote: consensus - 9.6.29 Rx data jitter tolerance **Motion**: Delete section as interface is not exposed Moved: Ed 2nd: Jerry Vote: 12/0/0 - 9.6.30 Ramp up period Motion: Move to table pending submission of mods **Moved**: Ed 2nd: John Vote: consensus - 9.6.xx _ Rx data DC offset & Max run length **Motion**: Delete these sections Moved: Ed **2nd**: John Vote: consensus - 9.6.32 Rx sensitivity OK - 9.6.33 Intermodulation OK with minor edits - 9.6.34 Desensitization Accept editorial changes pending submission of mods **Motion**: Moved: Ed 2nd: Dean Vote: consensus - 9.7.1 Introduction: FHSS Phy Medium Dependent sublayer 2.0M bit **Motion**: Accept text as in 068r6 Moved: Ed 2nd: Dean Vote: consensus - 9.7.2 thr 9.7.9 OK **Motion:** Accept text as in 068r6 [similar to 1Mbit sections] Moved: Ed 2nd: Dean Vote: consensus - 9.7.10 4 level GFSK Modulation Action: Modify text as submitted by Naftali on Weds - 9.7.11 Channel Data rate Motion: Accept text as in 068r6 Moved: Ed 2nd: Jerry Vote: consensus - 9.7.12 to 9.7.24_OK as 1M Phy except for 9.7.23 below - 9.7.23_Input dynamic range **Motion**: Accept text as in 068r6 Moved: Ed 2nd: Jerry Vote: consensus - 9.7.25 Channel BER **Motion**: Delete text as in 068r6 **Moved**: Ed 2nd: Jerry Vote: consensus - 9.7.26 to 9.7.28_OK as 1M Phy - 9.7.29 Jitter tol

Motion: Delete section

6

Moved: Jerry 2nd:

Peter

Vote: consensus

- 9.7.30 to 9.7.31_OK as 1M Phy

- 9.6.32 Rx sensitivity

Accept text as in 068r6 Motion: Moved: Jerry

2nd: Peter

Vote: consensus

- 9.6.33 Intermodulation

Motion:

Accept text as in 068r6

Moved:

2nd:

Jerry

Vote: consensus

- 9.6.34 Desense

Motion:

Accept text as in 068r6

Moved:

2nd: Jerry

Vote: consensus

Wednesday, November 9

8:30am

- review of minutes
- Jim M to reopen Tx Power @ Phy level
- Agenda
 - -Hopping table issues
 - -9.6.20 Tx spectrum mask
 - -9.6.13 RxTx switch time
 - -CCA threshold
 - -Carrier detect time
- •Motion reopen 9.6.20 _ Peter, Kieth, 6/6/1
- •Motion accept hopping tables _ Dean, Kieth, consensus
 - -9.6.20 Tx spectrum mask

Motion:

Accept inputs as defined by Jerry and edited into 068r6

Moved:

Jerry

2nd: Nathan

Vote: consensus

Chair's Question: Is the editors' translation of Jerry's input accurate as shown in r6?

- 9.6.13 RxTx switch time

Motion:

Moved:

Add figure

Moved:

Jerry

2nd: Nathan

Vote: 7/8/1

Motion:

Accept inputs as defined by Jerry and edited into 068r6 Jerry **2nd**:

Vote: consensus

- 9.6.18 Tx power level control

Motion: Power level adjustment, if performed will be done by a management

entity and deletes Twpwrlvl parameter in 9.2.2 of 068r5

Moved:

Jerry

2nd: Ed

Vote: consensus

- 9.6.17 Tx power levels Action: Tabled pending Mac vote

- 9.6.28 CCA Threshold

Motion: Reconsider previous motion

Moved: Jerry 2nd: Charlie Vote: consensus Motion: Accept edits in 068/r6 (motion of 11/8 by Charlie amended by Dean)

Moved: Jerry 2nd: Charlie Vote: 10/1/2

- 9.6.23 CCA response time

Motion: Add sentence to 9.3.3.2.1 to cover async case (Deans wording)

Moved: Dean 2nd: Charlie Vote: consensus

Motion: Delete section 9.6.23 (covered in 9.3.3.2.1)

Moved: Dean 2nd: Charlie Vote: consensus

- 9.6.30 & 31 Ramp up & Ramp down periods

Motion: reopen .31

Moved: Peter 2nd: Charlie Vote: consensus Motion: Modify text as defined in 068/r6 - remove slope limit, change bit

period to uS & power levels relative to full Tx power in 9.6.30 & 31

Moved: Peter 2nd: Charlie Vote

Moved: Peter 2nd: Charlie Vote: consensus

- 9.7.10 4 level GFSK Modulation

Action: Naftali and Jerry to clean up text for submission this evening

- 9.2 FHSS service parameter lists

Motion: Modify text as defined in 068/r6 - put in text for antsel and RSSI

Moved: Ed 2nd: Charlie Vote: consensus

- 9.7.10 4 level GFSK Modulation

Motion: Modify text as defined in 068/r6

Moved: Jerry 2nd: Brian Messenger Vote:

consensus

• Motion: Accept text as defined in 068/r6 with understanding that text is being updated to reflect changes approved during FH Phy session to date.

Moved: Dean 2nd: Keith Vote: 16/0/1

• **Motion**: Present to Phy & Plenary, a motion "Accept the 068/r5 plus the errata 94/242 which summarizes the 94/068r6 document."

Moved: Dean 2nd: Keith Vote: 13/0/0

• Dean to make errata sheet

Thursday, November 10 8:30 Am

Open Issues

- Scrambling discussion_important to understand the function of the scrambler in this application to maximize transitions in data which has long strings of "1 or 0"s, not to randomize a data stream thus a short 7 bit scrambler
- PLCP length word for both 1 & 2Mb and higher rates _ at 1M length is used as both byte count and duration this is a problem for higher rates

Motion: Table motion

Moved: Ed 2nd: Dean Vote: consensus

- Par req of 99.5% probability of channel availability

Motion: Delete 9.6.14

Moved: John 2nd: Nathan Vote: consensus

Action: Jim M to prepare a motion to present to plenary in Jan.

- 4 level FSK _ Text has been generated jointly by Naftali and Jerry and given to the editors

Motion: Accept the text as defined for 94/068r7 for Jan.

Moved: Jerry 2nd: Wayne Vote: 13/0/1 Chair's Note: After consultation with the secretary for the meeting, it is apparent that this motion requires clarification. The intent is that motions passed during the Thursday, November 10,1994 meeting and future meeting of the Frequency Hop group need to be submitted to the Plenary for consideration. It is not likely, however, that there will be further revisions of the 94/68 document, now that it has been accepted into the draft

standard. The intent of this motion is that future motions approved by the Frequency Hop

group will be incorporated into the draft standard if they are approved by the Plenary.

Adjourn