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**IEEE P802.11  
Wireless LANs**

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**Tentative Minutes of the IEEE P802.11 Full Working Group**

November 12-16, 2001

Hyatt Regency Town Lake, Austin, Texas

**Opening Session: Monday, November 12, 2001**

**1.1. Introduction**

- 1.1.1. Meeting called to order by Stuart Kerry at 1:00PM.
- 1.1.2. Agenda of 70th session of 802.11 is in doc.: 11-01-535r3-W
- 1.1.3. Secretary – Tim Godfrey

**1.2. Roll Call**

- 1.2.1. The 274 people in the room introduced themselves

**1.3. Announcements**

- 1.3.1. 802.11 has changed the private area passwords on the web sites. The new passwords have been emailed to members. Provides access to 802.11 documents and ETSI documents.
- 1.3.2. Pick up CDs with standards from the registration desk.
- 1.3.3. Award from Context magazine for 802.11b. Presented to Vic Hayes, former chair of 802.11, and John Fakatselis, chair of 802.11b. The award was then passed on the IEEE office for display at IEEE headquarters.

**1.4. Review of Policies and rules**

- 1.4.1. The documentation process, voting rights, voting tokens, attendance book procedures, registration rules, etc, are explained by Harry Worstell. Document 402r4 contains the details.
- 1.4.2. Members are reminded to update contact information in the attendance book.
- 1.4.3. Review of documentation – Harry Worstell and Rick Alfin (802.15) manage the documents.
- 1.4.4. Members are reminded to insure that they abide by the IEEE Patent Policy. We always ask for IP statements from parties at each meeting. Members are expected to take the initiative to provide letters.
- 1.4.5. Membership is individual, not by company.
- 1.4.6. Discussion of pricing is forbidden under anti-trust rules.
- 1.4.7. Copyright statement –
  - 1.4.7.1. Discussion of the copyright statement – is it the same as is used on our documents? It is an IEEE legal statement. Take offline.
  - 1.4.7.2. Discussion of patent statement – are we supposed to use the IEEE template? Yes – it will be discussed further in the agenda. Angela Ortiz,

IEEE: The letter of assurance should be submitted to Dave Ringle, secretary of RevCom. Copies should go to Stuart Kerry also. The letters will be put on the IEEE web site.

- 1.4.8. Are there any other IP statements.
- 1.4.9. Review of Wireless Network
- 1.4.10. Call for Chairs
  - 1.4.10.1. Publicity group is looking for a new chair.
  - 1.4.10.2. Report in Document 279r1 .
- 1.4.11. Meeting times are limited to 08:00 to 21:30
- 1.5. Report on membership and voting rights**
  - 1.5.1. In July there were three letter ballots, LB27, LB28, and LB29. As a result of non-voting, 37 members lost their voting rights.
  - 1.5.2. Details in document 402r2.
  - 1.5.3. We have 224 votes, with 69 potential, giving 293 potential voters here.
  - 1.5.4. We have a Quorum by default because this is a plenary.
  - 1.5.5. Voting tokens will be distributed after this session.
  - 1.5.6. There are 92 voters in 802.15, with 27 nearly voters.
- 1.6. Review of Agenda**
  - 1.6.1. The chair reviews the agenda.
  - 1.6.2. The 802.11 agenda is adopted without objection.
- 1.7. Summary of key working group activities**
  - 1.7.1. Interim meetings
    - 1.7.1.1. January 2002 meeting will be in Dallas. The contract is document 602. Hosted by Texas Instruments. Dates are Jan 21-25. Wyndham Anatoli. Registration \$350 in advance.
    - 1.7.1.2. May 2002 will be Sydney, Australia. We have a signed contract with Motorola. The Wentworth Ridges, in the harbor. Approximately \$125 per night US. May 12-17, 2002
    - 1.7.1.3. September 2002 will be in Monterey, CA. We have a contract in hand for Hyatt Monterey. Sept 16-20, 2002. Looking to line up a host.
    - 1.7.1.4. Looking for hosts for 2003 meetings.
  - 1.7.2. Financials
    - 1.7.2.1. Due to cancellation of the September meeting, there were costs incurred. We retained \$25 of each pre-registration to offset. Closing balance will be around \$1600 by the end of the year.
- 1.8. Objectives and activities for the session**
  - 1.8.1. Review of plenary meeting schedule and changes.
  - 1.8.2. Review of ExCom meeting. Jim Carlo is resigning as chair of 802. Paul Nicolich is taking over as chair as of the end of this meeting.
  - 1.8.3. Meeting to formalize the IEEE 802 network.
  - 1.8.4. 802.15.1 and 802.16 have submitted standard to RevCom.
  - 1.8.5. 802.16 wants to participate in 5GSG.
- 1.9. 802.11 Subgroup Updates**

- 1.9.1. TGbCor1 – Carl Andren
  - 1.9.1.1. Has been approved by RevCom and is print. The work is now finished.
- 1.9.2. TGe – John Fakatselis
  - 1.9.2.1. The goal for the week is to have a letter ballot out. A revised draft will be needed. We will continue to have the AV study group in parallel, led by John Kowalski. The proposed agenda has allocated fixed times for voting on the draft, on Thursday evening.
- 1.9.3. TGf – Dave Bagby
  - 1.9.3.1. Will be going through comments from last letter ballots, and working on new draft.
- 1.9.4. TGg – Matthew Shoemake
  - 1.9.4.1. Report in document 603. Selection procedure issues were resolved in last meeting. We will continue with the procedure and try to enable a draft and select an editor. We have a joint regulatory meeting with Vic Hayes. Fixed vote times Wednesday 8:00AM, and a 5PM vote on Thursday.
- 1.9.5. TGh – Mika Kasslin
  - 1.9.5.1. There will be joint meeting with the regulatory group. We will go through letter ballot comments. The target is to revise the draft for a new letter ballot by the end of the week.
- 1.9.6. TGi – Dave Halasz
  - 1.9.6.1. We hope to go to letter ballot by the end of the week. There will be motions tonight, and the editor will then revise the draft. There will be a vote to go to LB on Thursday.
- 1.9.7. 5GSG – Bruce Kraemer
  - 1.9.7.1. We missed the joint meeting with ETSI in September, and they are not present here. We will evaluate harmonization activities.
- 1.10. Review of 802.11 Document Submissions**
  - 1.10.1. We have over 600 documents this year.
  - 1.10.2. Harry Worstell gives instructions for requesting a document number, formatting rules, etc.
- 1.11. Opening Report for 802.15**
  - 1.11.1. 802.15.1 : Sponsor Ballot 2 for 802.15.1 has passed.
    - 1.11.1.1. Opening report is 463.
  - 1.11.2. 802.15.2 There will be vote on Tuesday on Partition Mapping part of Adaptive Frequency Hopping.
  - 1.11.3. 802.15.3 high rate PAN – 464r0. Goals and status. Draft 8 is out for review. Draft 9 will go to LB, and January Sponsor Ballot.
    - 1.11.3.1. There will be an UWB study group proposal.
  - 1.11.4. 802.15.4 – working to create a draft in 4 months. Will close remaining issues with draft this week. Will go to letter ballot if possible.
- 1.12. Publicity activity review**
  - 1.12.1. Publicity report (document 279r1) Al Petrick.
  - 1.12.2. Joint meeting on Tuesday.
  - 1.12.3. WECA update – conference call last week

- 1.12.3.1. Supportive of being publicity arm of 802.11.
- 1.12.3.2. Concerned about delays in TGg to combat negative press.
- 1.12.3.3. Will certify 802.11a product as soon as multiple vendors provide silicon. New logo will be WiFi5

### **1.13. 802 regulatory group**

- 1.13.1. Vic Hayes – report in RR 017r1.
- 1.13.2. Will hold joint meeting with TGg TGh and 5GSG.
- 1.13.3. Will produce draft position statements.
- 1.13.4. This initiative is backed by the 802.11 and 802.15 chairs.
- 1.13.5. Looking for radar expert to review incumbents studies.
- 1.13.6. Vic Hayes is resigning, and Carl Stephenson will take over Radio Regulatory by March 2002.
- 1.13.7. To aid the transition, Stuart Kerry awards Carl Stephenson voting rights.

### **1.14. 802 coexistence group**

- 1.14.1. Will be dealing with the group's organization, and introduce the 15.3 and 15.4 discussions.

### **1.15. Announcement –**

- 1.15.1. TGe people will have to walk through the tutorial.

### **1.16. Liaison Updates**

- 1.16.1. Overview in document 406r6.

### **1.17. Old Business**

- 1.17.1. Operating Rules
  - 1.17.1.1. Rules are in 00/331r2.
  - 1.17.1.2. Editorial issues have been reported.
  - 1.17.1.3. There is an issue with the rules on the abstain vote. We want to reflect the abstention percent from 25% to 30%.

### **1.18. New Business**

- 1.18.1. IEEE staff actions
  - 1.18.1.1. We have a number of amendments to 802.11. There is a rule that only two amendments can be outstanding before they are rolled into the main standard.
- 1.18.2. Proposal for support (document 561r0) defer to Wednesday.
  - 1.18.2.1. No objections
- 1.18.3. Clarification on 802.11a amendment.
  - 1.18.3.1. The editor of 802.11a evaluated the interpretation, and verified it was correct. We need to officially get paperwork back to 802.

### **1.19. New Members Orientation**

- 1.19.1. Immediately following this meeting, here.

### **1.20. Recess for subgroups at 3:10PM.**

## 2. Wednesday, November 14, 2001

### 2.1. Opening

2.1.1. The meeting is called to order by Stuart Kerry at 10:30AM

### 2.2. Review of Agenda

2.2.1. New business has been brought forward from several people

2.2.2. Any modifications to the agenda?

2.2.2.1. Request to discuss paper 340 regarding creation of corrigendum study group for the 802.11 standard.

2.2.2.2. Under new business, a request to present a paper on a request to ITU on 5GHz spectrum.

2.2.2.3. A request for time to present comments on document 00/331.

2.2.2.4. A request for time to discuss forming a standing committee to look at next generation wireless LANs.

2.2.2.5. A request to enter a motion to rescind the PAR of TGg.

2.2.3. Any further discussion on the agenda?

2.2.4. The agenda is adopted with unanimous consent

### 2.3. Announcements

2.3.1. An IP statement has been received by the chair from AT&T regarding TGe. It has been registered with IEEE.

2.3.2. There will be a 7:00AM chairs meeting Thursday.

2.3.3. Attendance book – the book has not been making it around. There will be an honor system this week. By January we will have a new system in place. Please verify the contact information and email addresses.

2.3.4. From TGg – the vote results are in document 638. The results are 55% for and 45% against.

2.3.4.1. A second round of voting on Thursday is changed to 4:15PM for TGg

### 2.4. New Business

2.4.1. Presentation by AT&T, document 561, Zoran Kostic.

2.4.1.1. “802.11 Radio Measurements in support of WLAN Management”

2.4.1.2. Intended to enable automated wireless LAN management.

2.4.1.3. Proposes extending the MIB, via IAPP, and over the air interface.

2.4.1.4. Straw poll: How many people are interested in pursuing this subject: 143 for: 4 against: 28 abstain.

2.4.1.5. The chair directs the group regarding the status of existing task groups. The amount of work already in process is at the capacity of the Working Group to support. This work needs to be completed before beginning more formal study groups.

2.4.1.6. The vice chair indicates that this work will begin as an ad-hoc group, outside of a study group, using teleconferences. The ad-hoc group will work on focusing the scope of the effort with the intention of starting a study group at some time.

2.4.2. Announcements on reflectors

2.4.2.1. There is one reflector for 802.11. It is the official forum for technical discussions. There have been complaints regarding a private group

within TGi. There is no problem with private emails, but matters regarding 802.11 should be on the main reflector

#### 2.4.3. Presentation of document 340r0, John Rosdahl

- 2.4.3.1. "Errata List Justifies Need for Corrigenda for 802.11"
- 2.4.3.2. This presentation outlines issues with the current 802.11 standard that justify the need for a corrigenda for 802.11. There is a list of discrepancies and errors in the standard
- 2.4.3.3. The IEEE editors will be rolling 802.11a, b, c, and d into a new published standard. This group needs to make these additional corrections
- 2.4.3.4. This can be done with a new SG, but we want to avoid this.
- 2.4.3.5. This list could also be submitted to the Standards Board, but that would still be sent back to this group to form a Study Group.
- 2.4.3.6. There are 78 items in need of correction.
- 2.4.3.7. The chair asks for a straw poll on how to proceed.
  - 2.4.3.7.1. Is there a need for doing this now? 21 yes
  - 2.4.3.7.2. Is there a need for this to be done sometime? 44 yes
  - 2.4.3.7.3. Should this not be done? None.
- 2.4.3.8. The chair feels this should be handled as a side issue, after we have "cleared the decks a bit"

#### 2.4.4. Presentation from the Spectrum Group, Bill MacFarland, Document RR 01/025, and RR 01/26

- 2.4.4.1. Regarding the World Radio Conference in 2003. They will set rules for the 5GHz spectrum. Radio LANs are secondary users. Satellite and radar users are agitating to inhibit RLAN uses.
- 2.4.4.2. We need to submit a paper to ITU showing RLAN use will not interfere with radar.
- 2.4.4.3. We will "ride with" HiperLAN and submit documents.
- 2.4.4.4. Radar users want RLANs to leave 20% time unused to listen to radar.
- 2.4.4.5. The chair stresses that this group needs to support this effort to avoid losing spectrum. We need to back this committee, and our appropriate regulatory bodies. This activity defends the position of all Wireless LANs.
- 2.4.4.6. Vic Hayes announces that 802.16.4 (HUMAN) now has DFS, so we may need to accommodate them.
- 2.4.4.7. Discussion
  - 2.4.4.7.1. Wouldn't separate submissions from 802 and ETSI carry more weight? Vic Hayes says the intent is to submit to the US joint Rapporteurs group. That carries weight. We will also send to JPT5T and ETSI BRAN in Europe.
- 2.4.4.8. There will be motions made on Friday.

#### 2.4.5. Document 00/331 comments from Ken Clements

- 2.4.5.1. This is the working rules for 802.11. We have revised it in Portland. The newest revision is 331r2. Due to problems on the web site, you get an older version.
- 2.4.5.2. Encourages the body to use the FTP site to get the latest version, and read them and abide by them.
- 2.4.5.3. The issue with the web site is an IEEE issue. The correct version is also on the server here. We will work with IEEE to resolve the problems there.
- 2.4.5.4. The chair concurs that it is important for members to read and understand the rules due to the rapid growth of this group.

#### 2.4.6. Standard Committee for Wireless LANs, Next Generation. (TK Tan) Document 639

- 2.4.6.1. The 5GSG asks for approval of forming a standing committee of
- 2.4.6.2. The 5GSG group has realized changes are needed to move forward. Being a Study Group has limitations. A limited lifetime. 5GSG will cease to exist after this plenary.
- 2.4.6.3. We desire to form a general standing committee to address all issues regarding next generations in wireless LANs, not constrained to any particular band.
- 2.4.6.4. This committee could then recommend formation of new study groups at a later time as needed.
- 2.4.6.5. The 5GSG request the chair of 802.11 to form this standing committee on Wireless LAN Next Generation.
- 2.4.6.6. The chair of 5GSG affirms that that SG will be allowed to expire as of the end of this meeting.
- 2.4.6.7. The chair of 802.11 indicates that this committee will not be involved with any activities currently underway with existing 802.11 Task Groups.
- 2.4.6.8. The chair of 802.11 recommends that we do form this committee, reporting to this working group.
- 2.4.6.9. Discussion
- 2.4.6.10. The proposed rules for this standing committee are different than 802.11 rules. The word "marketing" should be changed to "publicity"
- 2.4.6.11. The chair asks "are there any objections to forming this committee"? There are two objections.
- 2.4.6.12. This should come up after we complete some of the current letter ballots.
- 2.4.6.13. Will this committee get agenda time? Yes, 5GSG will disappear, and this committee will get some time. This is analogous to the standing committee for publicity. It has no formal authority.
- 2.4.6.14. The chair requests a straw poll: Should this standing committee be formed immediately, with time slots in January? 129 for, 79 against
- 2.4.6.15. Those members in favor of postponing establishing this committee until after we have cleared some of the outstanding PARS? 44 for.
- 2.4.6.16. The chair instructs that this decision be postponed until Friday.
- 2.4.6.17. The chair notes that this is an 802.11 standing committee. Radio Regulatory is an 802 committee. We will do our best to accommodate joint meetings with the 802 regulatory committee.

#### 2.4.7. Discussion of rescinding the TGg PAR (Carson)

- 2.4.7.1. Based on the unlikelihood of coming to a consensus.
- 2.4.7.2. Move to rescind the 802.11g PAR
  - 2.4.7.2.1. Moved Pat Carson
  - 2.4.7.2.2. Second Chris Zegelin
- 2.4.7.3. The chair has researched and coordinated with ExCom on whether this is procedural or technical. The 802.11 Chair and ExCom believe that this is a Technical Motion, requiring 75% approval.
- 2.4.7.4. The chair rules that this is a Technical Motion requiring 75% to pass.
- 2.4.7.5. Discussion
  - 2.4.7.5.1. Can we look at the motion to approve the PAR? Yes the motion to approve the PAR for 802.11g was technical, and had 75%.
  - 2.4.7.5.2. The vice chair researches the voting records from September 2000.
  - 2.4.7.5.3. The affirmation vote is not in the voting calculator.
  - 2.4.7.5.4. The affirmation of the PAR was done by a letter ballot.

- 2.4.7.5.5. The letter ballot did not state it was a technical motion
- 2.4.7.6. The chairs decision is appealed
  - 2.4.7.6.1. Bob O'Hara
- 2.4.7.7. Discussion on the appeal
  - 2.4.7.7.1. Speaks in favor of the appeal. There is lack of consensus.
  - 2.4.7.7.2. Letter ballot 23 required that no-votes required detailed technical reason to vote no. Supports the chair's ruling.
  - 2.4.7.7.3. Call the question
    - 2.4.7.7.3.1. John Fakatselis
    - 2.4.7.7.3.2. John Kowalski
  - 2.4.7.7.4. Vote on calling the question
    - 2.4.7.7.4.1. The chair announces the question is called. The count was not announced.
  - 2.4.7.7.5. Call for orders of the day
    - 2.4.7.7.5.1. The chair indicates we are out of time, the meeting is in recess.

## **2.5. Recess at 12:01 PM.**



### 3. Closing Plenary, Friday, November 16, 2001

#### 3.1. Opening

- 3.1.1. The meeting is called to order by Stuart Kerry at 8:15AM.
- 3.1.2. The chair reviews today's agenda.
- 3.1.3. The agenda is approved without objection.

#### 3.2. Announcements

- 3.2.1. Web site
  - 3.2.1.1. The chair requests web site updates by November 26<sup>th</sup>.
  - 3.2.1.2. Chairs meetings will be held Dec 17<sup>th</sup> and Jan 14<sup>th</sup>.
  - 3.2.1.3. The new agendas will be posted by Dec 21<sup>st</sup>.
- 3.2.2. IP Statements
  - 3.2.2.1. No new IP statements have been received
- 3.2.3. Operating rules update
  - 3.2.3.1. Document 331r2. We are looking at editorial changes
    - 3.2.3.1.1. Want to change the abstention rule from 25 to 30%.
    - 3.2.3.1.2. Send notes to Al Petrick

#### 3.3. Task Group Reports

- 3.3.1. TGi – Dave Halasz
  - 3.3.1.1. Document 586
  - 3.3.1.2. Dealt with fixes to WEP – moved to informative annex
  - 3.3.1.3. MIC framework, Rekeying will use 802.1x
  - 3.3.1.4. There will be two conference calls 12/4 and 01/11/02
  - 3.3.1.5. Request a 3 hour joint meeting with TGe at the next meeting.
  - 3.3.1.6. Discussion
    - 3.3.1.6.1. TGi is running a private email reflector? No, some individuals have exchanged email, but that activity has been discouraged. The chair notes that 802.11 business should be discussed on the 802.11 reflector.
- 3.3.2. TGf – Dave Bagby – report in 01/583
  - 3.3.2.1. Minutes in 575.
  - 3.3.2.2. Got through almost all comments
  - 3.3.2.3. Did not get to new draft.
  - 3.3.2.4. Issues with sequence number. It is all that is provided by the 802.11 MAC. There is no timestamp.
  - 3.3.2.5. Security IPsec issues – we have concluded that security is needed on the IP network. This will require a significant amount of work and will impact the schedule.
  - 3.3.2.6. There were 366 technical comments – 305 have been processed.
  - 3.3.2.7. Output papers 522r2 contains ballot comments. Currently at r6 at the end of this meeting.
  - 3.3.2.8. Draft 2.1 will show up before January, containing resolutions from this meeting.
  - 3.3.2.9. The PAR of TGf expires in March. ExCom instructed TGf to extend the PAR for 2 years. TGf passed the motion to extend.
  - 3.3.2.10. TGf also passed a motion to enable a LB in January.
- 3.3.3. TGg – Matthew Shoemake
  - 3.3.3.1. Report in document 584

- 3.3.3.2. The group completed the objectives for the week for the first time.
  - 3.3.3.3. The first vote had 55% acceptance, not enough to enable a draft.
  - 3.3.3.4. Several rounds of straw polls brought the group to consensus. The proposal was updated to embody the sentiment of the group in document 644.
  - 3.3.3.5. The ballot on that proposal had 76.4% support, enabling a first draft. There were 152 voters, no abstains.
  - 3.3.3.6. Carl Andren was elected as the editor of 802.11g.
  - 3.3.3.7. 802.11g draft 1.0 is out. The group will go to letter ballot in January. To meet pre-notification requirements, D1.0 will be put on the server.
  - 3.3.3.8. In January, TGg will issue a letter ballot. Will make a motion to empower the interim.
  - 3.3.3.9. There may be some teleconferences.
  - 3.3.3.10. There will not be a February 2002 interim.
  - 3.3.3.11. Discussion
    - 3.3.3.11.1. There were presentations yesterday of "802.11 a+b=g". Concerned if this might confuse the market and press. It could be misinterpreted.
    - 3.3.3.11.2. The TGg chair notes that the naming will be changed as we transition between the proposal and the draft.
    - 3.3.3.11.3. The chair asks that this discussion be moved to the Publicity committee.
  - 3.3.3.12. The TGg chair thanks the members of the three proposal teams for their work in achieving this milestone.
- 3.3.4. TGh – Mika Kasslin
- 3.3.4.1. Report in document 585
  - 3.3.4.2. Global harmonization efforts were discussed
  - 3.3.4.3. There was discussion about extending the PAR scope to other regulatory domains and 2.4GHz.
  - 3.3.4.4. Objectives
  - 3.3.4.5. Address remain comments, decide of DFS, enable a new draft
- 3.3.5. TGe – Duncan Kitchin
- 3.3.5.1. Report in document 582
  - 3.3.5.2. We had significant agreement on technical issues, and we have agreed on a new draft.
  - 3.3.5.3. Will describe changes to the draft, as required by rules to send new draft out to letter ballot.
  - 3.3.5.4. An editing team was created because it is required to have all editing completed before the letter ballot goes out.
  - 3.3.5.5. There are 14 changes to the draft described in the report document 582.
  - 3.3.5.6. The editors authority to make editorial changes without explicit motions was re-affirmed. The remainder of motions were technical.
  - 3.3.5.7. A number of clarifications of HCF rules were added.
  - 3.3.5.8. New definitions for signaling in parameterized QoS were added.
  - 3.3.5.9. A new mechanism for delayed (group) acknowledgement was accepted that is acceptable to all.
  - 3.3.5.10. Discussion
    - 3.3.5.10.1. There is a new section in the rules 2.81c that requires a notification of letter ballot on email. Has it been done? Yes.
- 3.3.6. 5GSG – Bruce Kraemer
- 3.3.6.1. Report in document 587r2

- 3.3.6.2. 5GSG was chartered to work on a global standard, coalescing the three existing standards. Have been working with ETSI/BRAN and MMAC.
  - 3.3.6.3. A number of beneficial relationships have been established.
  - 3.3.6.4. the PAR attempted to define an InterWorking mechanism between 802.11a and HiperLAN. This was not possible, and the PAR was rescinded.
  - 3.3.6.5. The SG looked for other work to undertake, but none has been found that would lead to a new PAR.
  - 3.3.6.6. The study group will not be renewed at this plenary, so it will expire with this meeting.
  - 3.3.6.7. The 5GSG wishes to thank Richard Kennedy, the first chair, and Jamshid Khun Jush, TK Tan, and Garth Hillman, who have contributed to the work of the group.
  - 3.3.6.8. The 5GSG desires to transition into the Wireless LAN Next Generation Standing Committee.
  - 3.3.6.9. T K Tan will be the WNG SC chair.
  - 3.3.6.10. Presentation in document 639r1.
  - 3.3.6.11. The primary objective is to advise the WG chair on new issues related to wireless LAN.
  - 3.3.6.12. It will still interface with other standard bodies.
  - 3.3.6.13. The SC requests approximately 8 hours of meeting time per session.
  - 3.3.6.14. Deliverables will be documents that describe recommended requirements for next generation WLAN, and a project plan to develop appropriate standard.
  - 3.3.6.15. The WG chair supports the formation this committee
  - 3.3.6.16. Discussion
  - 3.3.6.17. There seems to be no reason to form this committee. This group already knows what to do, and duplicates the purpose of study groups.
  - 3.3.6.18. This would serve to capture requirements in a single venue, and further synthesize into better documents and positions for standards.
  - 3.3.6.19. Uncomfortable forming groups with nebulous goals. Concerned with agenda time. There are Study Groups that do have specific goals that this committee might compete with.
  - 3.3.6.20. The WG chair will insure that the SC will not impact the agenda time of the TGs and new SGs.
  - 3.3.6.21. In favor of the general idea. The key is maintaining the relationships, and providing a formal place for them.
  - 3.3.6.22. The WG chair supports forming this body for the January meeting.
- 3.3.7. Publicity – Al Petrick**
- 3.3.7.1. Report in Document 279r2
  - 3.3.7.2. There are 4 nominees for chairs. The selection will be postponed until the January meeting.
  - 3.3.7.3. Review of conferences and events relevant to 802.11 and 802.15
- 3.3.8. Liaison Reports**
- 3.3.8.1. Mary DuVal will not be the 802.15 liaison anymore.
  - 3.3.8.2. No other Liaison reports.
- 3.3.9. Radio Regulatory**
- 3.3.9.1. Report in document RR 01/022r1
  - 3.3.9.2. Rules change proposal for 802 level regulatory work was completed. RR doesn't have to operate in parallel with working groups. Will report directly to Executive Committee.

- 3.3.9.3. Updated the Wireless PAR requirements for regulatory and coexistence requirements.
- 3.3.9.4. Worked on submission to WRC-2003 agenda. 802.11 will join HiperLAN in submission. DFS plans of 802.11h will be added. RR document 01/026
- 3.3.9.5. Document RR 01/82 describes a concern about 802.16 use of 5250-5350 band. Asking ITU to remove constraint.
- 3.3.9.6. Drafted letter regarding China rules for 2.45 GHz band.
- 3.3.9.7. Vic Hayes will resign from RR chair. Term ends in March 2002. Was appointed by the chair of 802. Carl Stephenson has been recommended as next chair.
- 3.3.9.8. The WG chair affirms the selection of Carl Stephenson as the new RR chair.
- 3.3.9.9. Discussion
  - 3.3.9.9.1. Regarding the Chinese regulation – who is responsible for insuring old devices cease operation at the end of 2004? The user or the manufacturer? We don't know.
- 3.3.10. 802 coexistence
  - 3.3.10.1. No report available

### 3.4. **Old Business**

- 3.4.1. Return to the motion on the floor (context from the previous session in green):
  - 3.4.1.1. Move to rescind the 802.11g PAR
    - 3.4.1.1.1. Moved Pat Carson
    - 3.4.1.1.2. Second Chris Zegelin
  - 3.4.1.2. The chair has researched and coordinated with ExCom on whether this is procedural or technical. The 802.11 Chair and ExCom believe that this is a Technical Motion, requiring 75% approval.
  - 3.4.1.3. The chair rules that this is a Technical Motion requiring 75% to pass.
  - 3.4.1.4. Discussion
    - 3.4.1.4.1. Can we look at the motion to approve the PAR? Yes the motion to approve the PAR for 802.11g was technical, and had 75%.
    - 3.4.1.4.2. The vice chair researches the voting records from September 2000.
    - 3.4.1.4.3. The affirmation vote is not in the voting calculator.
    - 3.4.1.4.4. The affirmation of the PAR was done by a letter ballot.
    - 3.4.1.4.5. The letter ballot did not state it was a technical motion
  - 3.4.1.5. The chairs decision is appealed
    - 3.4.1.5.1. Bob O'Hara
  - 3.4.1.6. Discussion on the appeal
    - 3.4.1.6.1. Speaks in favor of the appeal. There is lack of consensus.
    - 3.4.1.6.2. Letter ballot 23 required that no-votes required detailed technical reason to vote no. Supports the chair's ruling.
    - 3.4.1.6.3. Call the question
      - 3.4.1.6.3.1. John Fakatselis
      - 3.4.1.6.3.2. John Kowalski
    - 3.4.1.6.4. Vote on calling the question
      - 3.4.1.6.4.1. The chair announces the question is called. The count was not announced.
    - 3.4.1.6.5. Call for orders of the day

3.4.1.6.5.1. The chair indicates we are out of time, the meeting is in recess.

3.4.1.7. Vote on sustaining the chair: the appeal fails, the chair is sustained:  
53: 17: 24

3.4.1.8. The chair states that the vote on rescinding the PAR will be a technical motion requiring 75%.

3.4.1.9. Discussion

3.4.1.9.1. Is this setting a precedent for future motions regarding the rescinding of a PAR?

3.4.1.9.2. The parliamentarian states that this motion has no binding effect on what we may do in the future, and does not set a precedent. It is regarding this one item only.

3.4.1.10. There is no motion on the floor, because the chair did not read the motion to the body.

3.4.1.11. The chair has received an email from the mover:

From: pcarson@tdktca.com  
Subject: motion to rescind TGg PAR  
To: <stuart.kerry@philips.com>, <hworstell@research.att.com>, <tgodfrey@intersil.com>, petrick@bellsouth.net  
Cc: shoemake@ti.com  
Date: Thu, 15 Nov 2001 19:43:01 -0600

802.11WG Leadership

Gentlemen,

In view of today's successful 75% majority vote in TGg, I request to withdraw my motion to rescind the TGg PAR. I do understand the importance of the work in TGg and the effect my motion may have had in spurring the various parties to reach a compromise. I no longer see a need to move forward with my motion as it now appears that the stalemate has been broken and real work can proceed.

I again apologize that for business reasons I am not able to attend the 802.11WG Closing Plenary on Friday.

Pat Carson  
V. P.  
TDK R&D Corp

3.4.1.12. The chair asks if the seconder (Chris Zegelin) agrees with rescinding?

3.4.1.12.1. Chris states that he agrees with the mover (Pat Carson) and supports his withdrawing of the motion. States that this motion incited TGg to get their act in gear. Notes that the threat is still there – TGg must not backslide, or this motion will reappear.

3.4.1.13. The chair states that the motion to withdraw the PAR has been made by the mover and seconder, and is thus withdrawn.

### 3.5. **New Business**

#### 3.5.1. TGe Motions from document 582

3.5.1.1. Instruct the editor to create 802.11e draft standard revision D2.0 from the contents of 802.11e draft standard revision D1.9-1 and thereafter ask the 802.11 WG to create a letter ballot requesting the WG to forward the 802.11e draft standard D2.0 to sponsor ballot

3.5.1.1.1. Moved Duncan Kitchin, on behalf of the Task Group.

3.5.1.1.2. Discussion

- 3.5.1.1.2.1. Have we met the criteria for having this motion in order? Have all the technical issues been resolved according to rule 2.8?
- 3.5.1.1.2.2. The TG chair does not believe there are any open technical issues. The rule does not say that everything is in agreement. It is reasonable to assume that there will not be "no" votes.
- 3.5.1.1.2.3. At what time was the motion passed in TGe? At 9:00PM last night. D2.0 is time stamped at 8:00AM.
- 3.5.1.1.2.4. Asks the chair to rule if there has been sufficient time to review the document. The WG chair defers to Duncan the TG chair
- 3.5.1.1.2.5. D2.0 was created from D1.9. We verified we followed the rules. This has been voted on in the task group.
- 3.5.1.1.2.6. The 2.0 draft contains all the technical changes, and it
- 3.5.1.1.2.7. There is no objective definition of complete.
- 3.5.1.1.2.8. The WG chair personally has not had time to read the draft. Asks for a straw poll of those who have not had sufficient time to read the draft
- 3.5.1.1.2.9. 24 have not, 33 have. The chair rules that this draft has not had sufficient time to go to letter ballot.
- 3.5.1.1.3. Discussion
  - 3.5.1.1.3.1. Suggests that straw polls cannot make decisions. Suggests that the rules are ridiculous and impede process. What's the cost? Having to review it? Lets not lose two month intervals over rules.
  - 3.5.1.1.3.2. If an hour is not sufficient then what is? No one is ever going to be able to fully review it. We have to trust the group.
- 3.5.1.1.4. Appeal the ruling of the chair
  - 3.5.1.1.4.1. Duncan Kitchin
  - 3.5.1.1.4.2. Second John Kowalski
  - 3.5.1.1.4.3. Discussion
    - 3.5.1.1.4.3.1. The rules say one hour is sufficient. We cannot change and re-interpret the rules on the fly and make progress.
    - 3.5.1.1.4.3.2. Supports the appeal. Those people who are involved in E know what is going on and know this document is ready. Perhaps those who haven't seen it were doing something else.
- 3.5.1.1.5. Vote on the sustaining the chair: The chair's ruling is overturned 5: 66: 5
- 3.5.1.1.6. The motion is back on the floor
- 3.5.1.1.7. Discussion of the motion:
  - 3.5.1.1.7.1. In favor of the motion. We are asking to forward this draft to letter ballot to give those who disagree to tell us in their comments.
- 3.5.1.1.8. Move to amend the motion: change "ask" to "authorize", after letter ballot, insert "which may be conducted by electronic means".
  - 3.5.1.1.8.1. Moved Ken Clements
  - 3.5.1.1.8.2. Second Duncan Kitchin.
  - 3.5.1.1.8.3. Discussion on the amendment
    - 3.5.1.1.8.3.1. In favor. You can't have the word ask in there. Also, we have never explicitly authorized an electronic LB.

- 3.5.1.1.8.4. Vote on the motion to amend: Passes with no objection
- 3.5.1.1.9. Discussion on the motion
- 3.5.1.1.9.1. Given the draft 2.0 was put on the server we don't need to create it. Is 597r1 in the draft? It is not.
- 3.5.1.1.9.2. We have an open issue because it is not in the draft.
- 3.5.1.1.9.3. This is not pre-authorization for another letter ballot. This letter ballot is to go out now. We also have authorized a letter ballot for January if needed.
- 3.5.1.1.10. (Recess for 15 minutes)
- 3.5.1.2. Motion on the floor:
- 3.5.1.3. Instruct the editor to create 802.11e draft standard revision D2.0 from the contents of 802.11e draft standard revision D1.9-1 and thereafter authorize the 802.11 WG to create a letter ballot, which may be conducted by electronic means, requesting the WG to forward the 802.11e draft standard D2.0 to sponsor ballot
- 3.5.1.3.1. Discussion
- 3.5.1.3.1.1. We came here to do this. We met a more difficult requirement to make this available here
- 3.5.1.3.1.2. Call the question (Duncan) No Objection
- 3.5.1.3.2. Vote on the motion: Passes 56: 7: 0
- 3.5.1.4. Motion: Request the 802.11 WG to schedule a joint session of task groups e and i at all future plenary and interim meetings at which both task groups meet.
- 3.5.1.4.1. The chair notes that this is an informational motion.
- 3.5.1.4.2. The TG chair notes that this is a formal request from the Task Group.
- 3.5.1.4.3. Moved Duncan Kitchin on behalf of the Task Group
- 3.5.1.4.4. Vote: Passes 61:0:0
- 3.5.1.5. Motion: Request the 802.11 WG to schedule a joint session of task groups e and h at all future plenary and interim meetings at which both task groups meet.
- 3.5.1.5.1. Moved: Duncan Kitchin on behalf of the Task Group
- 3.5.1.5.2. Discussion
- 3.5.1.5.2.1. As a member of H, it is unclear what there is to talk about. Suggests that Ad-Hoc discussions might be adequate. Against the motion.
- 3.5.1.5.2.2. There are known issues, we just want to have time scheduled.
- 3.5.1.5.2.3. The chair of TGh asks for this to be ad-hoc, so we don't have to take 2 hours. Against the motion
- 3.5.1.5.2.4. This motion doesn't specify whether it is formal or ad-hoc session.
- 3.5.1.5.2.5. Regardless, it takes time from the agenda.
- 3.5.1.5.2.6. In favor – there are joint issues.
- 3.5.1.5.2.7. This is just a request, and doesn't specify times, which can be at the discretion of the chair.
- 3.5.1.5.2.8. Call the question (Harry W) no objection
- 3.5.1.5.3. Vote on the motion: 41:3:17

3.5.1.6. Motion: TGe asks the working group to empower the January Interim meeting of TGe to be able to ask the working group to issue a letter ballot.

3.5.1.6.1. Moved: Duncan Kitchin on behalf of the Task Group.

3.5.1.6.2. Discussion

3.5.1.6.3. This has no basis in Roberts Rules or our operating rules.

3.5.1.6.4. This is a topic for the chairs meeting.

3.5.1.6.5. The WG chair asks to move ahead with this vote, with the objection noted.

3.5.1.6.6. Vote on the motion: passes 60:5:2

### 3.5.2. TGf motions

3.5.2.1. Motion: On behalf of TGf. To ask SEC to approve an extension of the TGf PAR for 24 months.

3.5.2.1.1. Moved Dave Bagby

3.5.2.1.2. Discussion

3.5.2.1.2.1. The TG will end when the work is done.

3.5.2.1.2.2. The PAR was approved March 30, 2000.

3.5.2.1.3. Vote on the motion: passes 53:0:1

3.5.2.2. Motion: To authorize the January 2002 Interim TGf meeting to make decisions required to complete work to initiate a WG Letter Ballot fro TGf draft 3.0

3.5.2.2.1. Moved Dave Bagby on behalf of TGf

3.5.2.2.2. Vote on the motion: Passes 60:0:0

### 3.5.3. TGg motions

3.5.3.1. Motion: to empower 802.11 to issue a WG letter ballot on the 802.11g draft at the January 2002 interim.

3.5.3.1.1. Moved Matthew Shoemake

3.5.3.1.2. Second Jan Boer

3.5.3.1.3. Motion ID 322

3.5.3.1.4. Discussion

3.5.3.1.4.1. Draft 1.0 of TGg has been on the server since this morning.

3.5.3.1.5. Vote on the motion: Passes 59:0:2

### 3.5.4. TGe additional motions

3.5.4.1. Motion: To ask SEC to approve an extension of the TGe PAR for 24 months.

3.5.4.1.1. Moved Duncan Kitchin

3.5.4.1.2. Second Peter Johanssen

3.5.4.1.3. Motion ID 323

3.5.4.1.4. Vote on the motion: Passes 63:1:1

### 3.5.5. TGh motions

3.5.5.1. Move to empower TGh to hold an interim meeting in January 2002, conduct teleconferences, process letter ballot comments, and consequently, revise 802.11-01/482 before the March 2002 IEEE 802. Plenary.

3.5.5.1.1. Moved Mika Kasslin on behalf of TGh

3.5.5.1.2. Motion ID 324

3.5.5.1.3. Discussion



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| 3.5.5.1.3.1. | Notes that a 30 day notice on teleconferences is required |
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| 3.5.5.1.4. | Vote on the motion: Passes 50: 1: 1 |
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| 3.5.5.2. | Move that the WG, if necessary, conduct a second WG letter ballot after the January 2002 interim meeting to forward a revised 802.11-01/482 to Sponsor Ballot. |
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| 3.5.5.2.1. | Moved Mika Kasslin on behalf of TGh |
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|            |               |
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| 3.5.5.2.2. | Motion ID 325 |
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| 3.5.5.2.3. | Vote on the motion: 49:4:1 |
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3.5.6. TGi (no motions)

3.5.7. 5GSG (no motions)

3.5.8. Publicity

3.5.8.1. An article was published by EE Times, which contained incorrect information. We asked them to withdraw it.

3.5.8.2. A press release regarding TGg was written. It addresses the facts as the leadership sees them. It is jointly from Stuart Kerry and Matthew Shoemake. It does not have a document number. It is not an official document.

16 November 2001, Austin, TX - 1:00 PM

### “ IEEE 802.11g Advances the Future of Wireless LANs ”

This week, the IEEE 802.11 Task Group G reached an important milestone by approving its first draft. When complete, it will extend the highly successful family of IEEE 802.11 standards, with data rates up to 54 Mbps in the 2.4 GHz band. This draft is based on CCK, OFDM, and PBCC technologies. The Working Group will meet in January, 2002 to further refine the TGg draft in preparation for publication by the second half of 2002. Further details on the status of this draft and the other activities of the working group are available on the IEEE 802.11 website at [www.ieee802.org/11](http://www.ieee802.org/11).

Stuart J. Kerry  
Chair, IEEE 80211 Working Group

Matthew B. Shoemake  
Chair, IEEE 802.11 TGg

End.

3.5.8.3. This is the opinion of the chairs, and the authorized position. There is no motion.

3.5.8.4. Discussion

3.5.8.4.1. There is now a new article on EE Times – dated today.

3.5.8.4.2. The chair is concerned about what is happening in the press. We are looking at our technical expertise to develop the best technology.

3.5.8.4.3. Point of information – members request the text of the official release.

3.5.8.4.4. A liaison document between 802.15 and 802.11 has been brought to our attention. The document by James Gilb (official liaison) editorializes the progress in TGg as a “train wreck”, and calls the proposal “incompatible”. Believes this is totally inappropriate for an IEEE document.

- 3.5.8.4.5. The WG chair will follow up on this with the 802.15 chair.
- 3.5.8.4.6. The WG chair requests that the 802.15 chair pull the offending document off the server.
- 3.5.8.4.7. Documents on the MARS server are not under our control.

### 3.5.9. Radio Regulatory Motions

3.5.9.1. On behalf of the RR group, moves to request SEC to undertake the rules change procedure for addition of rules for a SEC Standing Committee and adjustment of the procedures for coordination with other standards bodies and communication with government bodies as proposed in doc RR 01/028.

- 3.5.9.1.1. Moved Vic Hayes
- 3.5.9.1.2. ID 326
- 3.5.9.1.3. Discussion

3.5.9.1.3.1. The WG chair supports this motion

3.5.9.1.4. Vote on the motion: 43:0:5

3.5.9.2. Motion to request SEC to undertake the Rules Change Procedure for amendment of the procedure for PARs as proposed in document RR-01/029r0.

- 3.5.9.2.1. Moved Vic Hayes
- 3.5.9.2.2. ID 327
- 3.5.9.2.3. Discussion

3.5.9.2.3.1. Request for a brief overview.

3.5.9.2.3.2. This was originally called the 6<sup>th</sup> criteria. Regarding regulatory and coexistence issues.

3.5.9.2.4. Vote on the motion: Passes 35:0:4

3.5.9.3. Motion to request SEC to approve, in principle, the submission of document RR 01/26r2 to the US joint Rapporteurs group 8A-9B.

- 3.5.9.3.1. Moved Vic Hayes
- 3.5.9.3.2. ID 328
- 3.5.9.3.3. Vote: Passes 41:1:6

3.5.9.4. To request SEC to approve, in principle, the submission of doc.: RR-01/27r0 to the US ITO for translation into the Chinese language and subsequently present to the Chinese Administration. To empower the Chairs of the Wireless Working Groups and the Regulatory Ombudsman to make final edits to harmonize the document according to the sentiments of the WGs.

- 3.5.9.4.1. Moved Vic Hayes
- 3.5.9.4.2. ID 329
- 3.5.9.4.3. Vote: 47:0:4

3.5.9.5. Request the WG chair to appoint Rapporteurs for the regulatory group.

### 3.6. Adjourn at 11:30AM

## *Attendance list for the meeting held at* **Hyatt Regency Town Lake, Austin, TX**

| <i>Full name</i>               | <i>status</i> | <i>att. %</i> | <i>phone</i>         | <i>company</i>                              | <i>e_mail</i>                     |
|--------------------------------|---------------|---------------|----------------------|---|-----------------------------------|
| Dr. Eric J. Addeo ()           | nearly voter  | 100           | +1 201 348 7778      | Panasonic                                   | addeoe@panasonic.com              |
| Dr. L Enrique Aguado (Enrique) | voter         | 100           | +44 113 233 2004     | Supergold Communication, Ltd                | enrique@supergold.com             |
| Mr. Masaaki Akahane (Masa)     | nearly voter  | 100           | +81 3 6409 3238      | Sony Corporation                            | akahane@wcs.sony.co.jp            |
| Mr. Areg Alimian ()            | aspirant      | 100           | 408 326 2229         | 3Com Corporation                            | areg_alimian@3com.com             |
| Mr. James G. Allen ()          | aspirant      | 100           | 404-849-3251         |   | jimallen@agere.com                |
| Mr. Richard Allen (Dick)       | voter         | 100           | +1 408 974 5265      | Apple Computer Inc.                         | rallen@apple.com                  |
| Mr. Baruch Altman ()           | voter         | 100           | +972 9 7667377       | Commprize                                   | baruch@commprize.com              |
| Mr. Keith Amann (Keith)        | voter         | 100           | +1 303 440 5330 x278 | Spectralink                                 | kamann@spectralink.com            |
| Mr. Carl F. Andren (Carl)      | voter         | 100           | +1 321 724 7535      | Intersil Corporation                        | candren@intersil.com              |
| Mr. David C. Andrus ()         | voter         | 100           | +1 801 320 7654      | 3COM  | david_andrus@3com.com             |
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| Mr. Larry Arnett ()            | nearly voter  | 100           | +1 408 774 3179      | Mitsubishi Electric & Electronics USA, Inc. | larnett@ieee.org                  |
| Mr. Brian G. Asee ()           | aspirant      | 85            | 408 269 3218         | Proteon Radio Networks                      | proteonradio.net                  |
| Mr. Drayton Avera ()           | aspirant      | 100           | (404) 897-4735       | RF Solutions                                | davera@rf-solutions.com           |
| Mr. Geert Awater ()            | voter         | 100           | +31 346 259 652      | Woodside Networks                           | awater@woodsidenet.com            |
| Dr. Deepak Ayyagari ()         | aspirant      | 100           | (617) 461-7942       | Moksha Networks, Inc.                       | dayyagari@mokshanetworks.com      |
| Mr. David Bagby                | voter         | 100           | +1 408 326 3762      | 3Com Corporation                            | david_bagby@3com.com              |
| Mr. Pradeep Bahl ()            | aspirant      | 100           | (425) 936-2528       | Microsoft                                   | pradeepb@microsoft.com            |
| Mr. Bill Bailey ()             | aspirant      | 85            | 781-418-2522         | NTRU  | bbailey@ntru.com                  |
| Mr. Jay Bain (Jay)             | voter         | 75            | +1 256 922 9229      | Time Domain                                 | jay.bain@tdsi.com                 |
| Mr. Rashmi Bajaj ()            | aspirant      | 100           | (650) 875-1503       | France Telecom R&D, LLC                     | rashmi.bajaj@rd.francetelecom.com |
| Mr. Simon Barber ()            | nearly voter  | 100           | 415 577 5523         | Instant 802 Networks, Inc.                  | simon@instant802.com              |
| Mr. Steve Bard ()              | voter         | 100           | +1 503 264 2923      | Intel Corporation                           | steve.bard@intel.com              |
| Mr. Michael Barkway ()         | nearly voter  | 100           | +44 1223 421025      | Tality                                      | mib@tality.com                    |
| Mr. Kevin M. Barry (Kevin)     | voter         | 100           | +1 516 244 4345      | SITA  | kevin.barry@sita.int              |
| Mr. Charles R. Bartel          | aspirant      | 100           | (412) 268-2665       | Carnegie Mellon                             | crb@cmu.edu                       |
| Dr. Anuj Batra (Anuj)          | voter         | 100           | +1214 480 4220       | Texas Instruments Incorporated              | batra@ti.com                      |
| Mr. Bob Beach (Bob)            | voter         | 100           | +1 408 528 2602      | Symbol Technologies Inc.                    | bobb@sj.symbol.com                |
| Mr. Maurice Begley ()          | aspirant      | 100           | +44 1473 641202      | BT Access Transport                         | maurice.begley@bt.com             |
| Mr. Randolph Beltz ()          | voter         | 100           | +1 978 684 1145      | Enterasys.                                  | rbeltz@enterasys.com              |
| Mr. Brett Bernath ()           | aspirant      | 100           | +1 858 546 2404      | Tioga Technologies                          | bbernath@tiogatech.com            |
| Mr. Simon Blake-Wilson ()      | voter         | 100           | (905) 501-3786       | Certicom                                    | sblakewilson@certicom.co          |
| Mr. Dennis Bland ()            | aspirant      | 100           | (403) 730-5741       | Wind River Systems, Inc.                    | dennis.bland@windriver.co         |
| Mr. Jan Boer (Jan)             | voter         | 100           | +31 30 609 7483      | Agere Systems, Nederland                    | janboer@agere.com                 |
| Mr. Jeffrey Boggie ()          | aspirant      | 100           | (425) 393-2944       | Connexion                                   | jeffrey.Lboggie@boeing.com        |

*Wednesday, January 16, 2002*

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| <i>Full name</i>                       | <i>status</i>   | <i>att. %</i> | <i>phone</i>                | <i>company</i>                           | <i>e_mail</i>                        |
|--|-----------------|---------------|-----------------------------|--|--------------------------------------|
| Mr. Jim Brennan ()                     | aspirant        | 100           | 208-773-2108                | Mabuhay Networks, Inc                    | jim_brennan@mabuhaynet<br>works.com  |
| Mr. Ronald Brockmann<br>(Ronald)       | voter           | 100           | +31 30 229 6081             | Intersil N.L. B.V.                       | rbrockma@intersil.com                |
| Mr. Keith Brombely ()                  | aspirant        | 85            | 408-731-2635                | Proxim Inc.                              | kbromberg@proxim.com                 |
| Mr. William A. Brown ()                | aspirant        | 100           | (831) 622-9035              | Protean                                  | brown@proteanradio.net               |
| Mr. Robert Brummer ()                  | voter           | 100           | 415 558 4709                | Dolby Laboratories Inc                   | rdb@dolby.com                        |
| Mr. Kevin Burak ()                     | voter           | 100           | +1 508 261 4726             | Motorola                                 | Kevin.Burak@Motorola.com             |
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IEEE P802.11  
Wireless LANs

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Minutes of 802.11 Task Group E  
MAC Enhancements - QoS

Hyatt Regency Town Lake, Austin, Texas, USA

**Date:** November 12-16, 2001

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## 1. Monday Afternoon

### 1.1. *Call to order*

1.1.1. Meeting called to order at 3:30PM by John Fakatselis

1.1.2. Secretary Tim Godfrey

### 1.2. *Review of proposed agenda*

1.2.1. In document 535r3

1.2.2. Objective is to complete a new draft and send to Letter Ballot.

1.2.3. New participants – about 20.

1.2.4. Wednesday 3:30pm, AV SG

#### 1.2.5. Discussion

1.2.5.1. *Will there be any presentations that propose changes to the draft? Suggestion that presentations are given in document number order, as a courtesy to those who get their numbers early.*

1.2.5.2. *We will allocate specific times per topic, and agree on the order at that point in the agenda.*

1.2.5.3. *Will the AV study group be in the vote at the end of the week? Only if they are adopted as changes in the draft.*

#### 1.2.6. Review of policies

1.2.6.1. *Review of voting on letter ballots. The chair cautions against too many abstentions. It can prevent passage of the LB.*

1.2.6.2. *We follow Roberts Rules. To make a motion and bring it to a vote you must be a voting member.*

1.2.6.3. *Three privileged motions – parliamentary enquiry, point of information (a question), point of order.*

1.2.6.4.

**1.2.7. The current draft is 1.3, which includes the changes made in July, and additional comment resolutions.**

1.2.7.1. *Version 1.4 has the revision marks removed (nominally “clean text” for further revision)*

**1.2.8. Approval of the agenda**

1.2.8.1. *Final Discussion*

1.2.8.1.1. *The break is at 5:30PM, not AM.*

1.2.8.2. *The agenda is approved without objection.*

**1.3. Approval of the minutes from July**

**1.3.1. The minutes from July are approved without objection.**

**1.4. Call for Papers**

**1.4.1. The chair would like to know about papers in advance to help with scheduling.**

**1.4.2. Sunghyun Choi**

1.4.2.1. *546 Frame Exchange*

1.4.2.2. *565 EDCF access categories*

1.4.2.3. *566 Frame exchanges during*

1.4.2.4. *??? 802.11e QoS signaling*

1.4.2.5. *??? HC Recovery and backoff rules.*

**1.4.3. Sato**

1.4.3.1. *??? 1394 requirements for 802.11e*

**1.4.4. Aman Singla**

1.4.4.1. *525 HCF and EDCF simulation results*

**1.4.5. Michael Fischer**

1.4.5.1. *127 MAC PHY interface*

1.4.5.2. *270 Terminology issues in D1.3 draft*

1.4.5.3. *408r2 EDCF channel access*

1.4.5.4. *478 HCF Frame Exchange Sequences*

**1.4.6. John Kowalski**

1.4.6.1. *558 Enabling HCF mobility*

1.4.6.2. *560 Adding rate parameter / Tspec capability*

1.4.6.3. *601 Delayed Acknowledgement*

**1.4.7. Srini Kandalas**

1.4.7.1. *604 Japan Local 4mS Rule*

1.4.7.2. *605 CFB ending rule and HCF*

1.4.7.3. 606 simulation results for CC mechanism

#### 1.4.8. Matt Sherman

1.4.8.1. 571r0 CCRR simulations

1.4.8.2. 526r0 Support for explicit loss notification

1.4.8.3. 410r1 MSDU Lifetime

1.4.8.4. 599r0 CPMA (overlap BSS)

1.4.8.5. 569 Periodic Contention Free Access

1.4.8.6. 570 Shield (overlap BSS)

1.4.8.7. ??? neighborhood capture (OBSS)

#### 1.4.9. Sid Schrum

1.4.9.1. 128 Inter BSS channel sharing

1.4.9.2. 557 QoS Signaling

1.4.9.3. ??? EDCF Issues

#### 1.4.10. Peter Johansson

1.4.10.1. 597 QoS for AV

#### 1.4.11. Duncan Kitchin

1.4.11.1. 608 802.11e draft editing process

#### 1.4.12. Other papers later this week - placeholder

1.4.12.1. Duncan Kitchin - two

1.4.12.2. Michael Fischer (Joint paper)

1.4.12.3. Matt Sherman

1.4.12.4. Keith Amman

1.4.12.5. We will allow for Five other presentations. The chair notes that we might not have time to take any other papers due to time constraints.

1.4.13. If papers are submitted too late for the 4 hour rule, we will still present, but not vote.

### 1.5. Presentation of Papers

#### 1.5.1. Document 608, Draft Editing Process, Duncan Kitchen

1.5.1.1. To complete a draft, we will have to complete the draft early in the week, and institute any updates to the draft

1.5.1.2. Proposes five new TGe Sub-Editors

1.5.1.3. Describes process for incorporating changes into the draft quickly and efficiently.

1.5.1.4. The intent is that volunteers are for this week.

1.5.1.5. Discussion

1.5.1.5.1. We have changes to other clauses. We should expand the first group to clauses 1-4. 10 and 11 should be extended to include annexes.

1.5.1.5.2. Straw Poll – do we have enough volunteers for sub-editors? We have about 7 people.



- 1.5.1.5.3. *Suggestion to reduce the micro-management. Just empower Michael to recruit sub-editors.*
- 1.5.1.6. *Motion that the working group reaffirms the editor's authority to recruit and supervise help in editing the working draft.*
  - 1.5.1.6.1. *Moved Peter Johanssen*
  - 1.5.1.6.2. *Seconded Kevin Burak*
  - 1.5.1.6.3. *Discussion*
    - 1.5.1.6.3.1. This motion doesn't have an effect. There needs to be an openness in the selection of the sub-editors. We need a process for selecting them. Against the motion – would like to present the original motion.
    - 1.5.1.6.3.2. Supports the motion – too much structure is a bad thing. We don't need formal partitioning.
    - 1.5.1.6.3.3. Presentation of the proposed motion (in the paper) as a point of information.
    - 1.5.1.6.3.4. What is the duration of these posts? Not specified
    - 1.5.1.6.3.5. Call the question Srin / John. No Objection.
  - 1.5.1.6.4. *Vote: procedural: passes 18:10:6*
- 1.5.1.7. *Motion – to enhance the process of enacting changes to the draft, as directed by the task group, by creating several new TGe posts of sub-editor as detailed in 802.11-01/608r1, and adopting the process and division of responsibilities for enacting changes, also detailed, in 802.11-01/608r1.*
  - 1.5.1.7.1. *Moved – Duncan Kitchin*
  - 1.5.1.7.2. *Second – Michael Fischer*
  - 1.5.1.7.3. *Discussion*
    - 1.5.1.7.3.1. Would like to eliminate the strict partitioning of the posts.
  - 1.5.1.7.4. *Amended Motion – to enhance the process of enacting changes to the draft, as directed by the task group, by creating several new TGe posts of sub-editor at the beginning of each meeting, as detailed in 802.11-01/608r2, and adopting the process and division of responsibilities for enacting changes, also detailed, in 802.11-01/608r2.*
    - 1.5.1.7.4.1. Motion to amend (Matthew Sherman / Kandala)
    - 1.5.1.7.4.2. Discussion
      - 1.5.1.7.4.2.1. This seems to add complexity to the beginning of each meeting.
    - 1.5.1.7.4.3. Motion to amend the amendment: to enhance the process of enacting changes to the draft, as directed by the task group, by creating several new TGe posts of sub-editor who will be empowered until a draft is submitted for letter ballot, as detailed in 802.11-01/608r2, and adopting

the process and division of responsibilities for enacting changes, also detailed, in 802.11-01/608r2.

1.5.1.7.4.4. Kowalski / Richards

1.5.1.7.4.5. Discussion

1.5.1.7.4.5.1. Volunteers are less likely to volunteer with this text.

1.5.1.7.4.5.2. This leaves it too open ended. Against the amendment.

1.5.1.7.4.5.3. Call the question (Duncan / Michael) no objection

1.5.1.7.4.6. Vote on the 2<sup>nd</sup> Amendment. (procedural) Fails 8:15:9

1.5.1.7.5. *Amended Motion – to enhance the process of enacting changes to the draft, as directed by the task group, by creating several new TGe posts of sub-editor at the beginning of each meeting, as detailed in 802.11-01/608r2, and adopting the process and division of responsibilities for enacting changes, also detailed, in 802.11-01/608r2.*

1.5.1.7.5.1. Discussion on the amendment

1.5.1.7.5.2. call the question (Greg P / Sri) no objection.

1.5.1.7.6. Vote on the amendment of the motion: Passes 19:7:5

1.5.1.8. *Discussion on the motion, as amended.*

1.5.1.8.1. *Call the question ( Peter / Duncan)*

1.5.1.8.2. Vote on calling the question: Passes 23:2:3

1.5.1.9. Vote on the motion as amended: Passes 22:1:9

1.5.1.9.1. *No protests regarding voting tokens*

## **1.5.2. Call for Volunteers for Sub-Editors**

1.5.2.1. *Sid Schrum*

1.5.2.2. *Matt Sherman*

1.5.2.3. *John Kowalski or Srinii Kandalas*

1.5.2.4. *Adrian Stephens*

1.5.2.5. *Greg Chesson*

1.5.2.6. *Steve Williams*

## **1.6. Recess**

## 2. Monday Evening

### 2.1. Opening

2.1.1. The chair moves to Duncan Kitchin

### 2.2. Ordering of paper presentations

#### 2.2.1. Editorial changes

2.2.1.1. 270

2.2.1.2. ??? *Duncan Kitchin*

#### 2.2.2. EDCF related

2.2.2.1. 525

2.2.2.2. 408

2.2.2.3. Possible – Greg Parks

2.2.2.4. 565

2.2.2.5. 566

#### 2.2.3. HCF related

2.2.3.1.

#### 2.2.4. Signaling

#### 2.2.5. Overlapped BSSs

#### 2.2.6. NAV and ACK policies

#### 2.2.7. Other

### 2.3. Presentation of Papers (editorial)

#### 2.3.1. Document 270 “Terminology Corrections and Improvements for the TGe Draft” (Michael Fischer)

2.3.1.1. *Deals with terminology*

2.3.1.2. *Discussion of whether changes are allowed.*

2.3.1.3. *MOTION 270-1: Move to empower the TGe editor to replace all instances of "EAP" with "QAP" and all instances of "ESTA" with "QSTA" in the next revision of the TGe draft, and to update the corresponding acronym definitions by replacing "enhanced" with "QoS".*

2.3.1.3.1. *Michael Fischer*

2.3.1.3.2. *Steve Williams*

2.3.1.3.3. *Discussion*

2.3.1.3.3.1. The editor will do the right thing with respect to [E] and [Q]? Yes

2.3.1.3.3.2. The chair moves to John Fakatselis

2.3.1.3.3.3. There is a problem with this – 802.11i defines how to implement security for AP, STA, and BSS, but not for a QAP, STA, or BSS. An alternate solution would be to leave the terms as is, and only refer to the enhanced terms as needed.

- 2.3.1.3.3.4. 802.11i is not approved yet – they can accommodate these terms. In favor.
- 2.3.1.3.3.5. against this particular suggestion, but for consistency in general.
- 2.3.1.3.3.6. It is inappropriate to base our work on the current state of another task group. The IEEE editors also deal with these sorts of issues. There are more substantive issues between TGe and TGi.
- 2.3.1.3.3.7. Call the question (Michael / John K)
  - 2.3.1.3.3.7.1. Vote on calling the question – passes 19:1:3
- 2.3.1.3.4. Vote on the main motion: Passes 23:4:2
- 2.3.1.4. *MOTION 270-2: Move to empower the TGe editor to remove the EDCF-specific restriction on TXOP usage by replacing the first paragraph of 9.10.3 with the version on slide 5 of document 01/270r0, and by changing wording on TXOP usage restrictions elsewhere in the TGe draft as may be necessary to make the revised TGe draft consistent with this replaced paragraph.*
  - 2.3.1.4.1. Michael Fischer
  - 2.3.1.4.2. John Kowalski
  - 2.3.1.4.3. Discussion
    - 2.3.1.4.3.1. Request to postpone this motion until tomorrow morning at 10:30AM. No Objection.
- 2.3.1.5. *MOTION 270-3: Move to empower the TGe editor to add the definition of Controlled Access Period and acronym CAP as given on slide 6 of document 01/270r0, and to use this term where appropriate in the revised TGe draft.*
  - 2.3.1.5.1. Michael Fischer
  - 2.3.1.5.2. Sri Kandalas
  - 2.3.1.5.3. *Motion to Amend to: Move to empower the TGe editor to add the definition of Contention Exclusion Period and acronym CEP as given on slide 6 of document 01/270r1, and to use this term where appropriate in the revised TGe draft.*
    - 2.3.1.5.3.1. Raju
    - 2.3.1.5.3.2. Peter
    - 2.3.1.5.3.3. Discussion
      - 2.3.1.5.3.3.1. This new terminology doesn't reflect the existing operation of the standard.
    - 2.3.1.5.3.4. Vote on the amendment: fails 8:12:9
- 2.3.1.6. *MOTION 270-3: Move to empower the TGe editor to add the definition of Controlled Access Period and acronym CAP as given on slide 6 of document 01/270r0, and to use this term where appropriate in the revised TGe draft.*
  - 2.3.1.6.1. Motion accepted without objection.
- 2.3.1.7. The chair moves to Duncan Kitchin
- 2.3.1.8. *MOTION 270-4: Move to empower the TGe editor to add definitions of "traffic identifier" and "traffic stream" and*

*the corresponding acronyms "TID" and "TS" to as given on slides 8 and 9 of document 01/270r0 ; to incorporate the restricted definitions and usage of "traffic category" and "priority" as given on slides 8 and 9 of document 01/270r0; to change any remaining instances of "TS" meaning traffic specification to "TSPEC" in the TGe draft; to change "TCA" to "TAID" in the TGe draft; and to update frame formats and behavioral descriptions in all clauses of the TGe draft to make consistent use of these new and changed terms.*

2.3.1.8.1. *Michael Fischer*

2.3.1.8.2. *Srini*

2.3.1.8.3. *Discussion*

2.3.1.8.3.1. *Motion to postpone until 10:30AM tomorrow (Sunghyun / Greg).*

2.3.1.8.3.1.1. *Discussion*

2.3.1.8.3.1.1.1. *Would like to see definitions and a hierarchical relation of the definitions. Yes will post tonight in R1 of this document.*

2.3.1.8.3.1.1.2. *In favor of postponing.*

2.3.1.8.3.1.1.3. *Question called without objection*

2.3.1.8.3.2. *Vote on the motion to postpone: passes*  
*24:3:5*

**2.3.2. Presentation of Duncan Kitchin's editorial changes are deferred.**

## **2.4. Presentation of Papers (EDCF related)**

**2.4.1. Document 525, "HCF and EDCF Simulations" Aman Singla.**

2.4.1.1. *Assume admission control for QoS data an overload for best-effort data.*

2.4.1.2. *CBR streams based around normal distribution arrival.*

2.4.1.3. *Shows scheduler phase contributes to end to end latency. Scheduler adds delay.*

2.4.1.4. *Discussion*

2.4.1.4.1. *This simulation is based on a 10% PER. Real life is more like 10e-4.*

2.4.1.4.2. *HCF doesn't suffer from capture effect. Was this shown in the simulation? No.*

2.4.1.4.3. *AIFS could be used to segregate traffic? Is there a starvation issue?*

2.4.1.4.4. *How do you explain the longer latency of HCF? Wouldn't an efficient scheduler help?*

2.4.1.5. *No motions arising from this presentation*

**2.4.2. Document 565r0 "EDCF Access Categories" Menzo Wentink**

2.4.2.1. *Problems with limited number of queues- assignment of TC7*

2.4.2.2. *introduce the concept of an access category – a single internal DCF queue. Four access categories are normative. 4 are mandatory.*

2.4.2.3. *Discussion*

2.4.2.3.1. *Is it a problem to mapping different traffic classes into the same Access Category? That seems to be wrong?*

2.4.2.3.2. *Is it out of order because it effect 802.1d? There is no motion, so no.*

2.4.2.3.3. *This is recommended practice from 802.1d, but it is really up to higher layers. We need a reasonable mapping. It is not defined at all.*

### **2.4.3. Document 566 “Multiple Frame Exchanges during EDCF TXOP” Sunghyun Choi**

2.4.3.1. *Proposes allowing EDCF fragment bursts to increase efficiency.*

2.4.3.2. *Uses duration rules similar to fragment bursts.*

2.4.3.3. *There is no motion – the normative text is not ready.*

2.4.3.4. *Discussion*

2.4.3.4.1. *This proposal provides behaviors that make it work the right way.*

2.4.3.4.2. *Discussion of ordering issues between motions from this presentation and the previous.*

### **2.4.4. Document 571r0 “CC/RR Model and simulations” Matt Sherman**

2.4.4.1. *Simulation results using 11Mb 802.11b of PCM MAC with CC/RR. Demonstrates that CC/RR and Standing Poll can maintain QoS over load conditions.*

## **2.5. Call for Documents related to HCF**

2.5.1. 128 Sid Schrum.

2.5.2. 560 John Kowalski

2.5.3. 478 Michael Fischer

2.5.4. 546 Sunghyun

2.5.5. 558 John K

2.5.6. 560 John K

2.5.7. 595 Peter J

2.5.8. 601 John K

2.5.9. 604 Srin

2.5.10. 605 Srin

2.5.11. 606 Srin

## **2.6. Presentation of documents related to HCF**

**2.6.1. Document 128 “HCF Channels Access and inter-BSS channel sharing” Sid Schrum et al.**

2.6.1.1. *Presentation contains a large motion – will be deferred until tomorrow*

2.6.1.2. *Discussion*

2.6.1.2.1. *Of all the things that can interfere with an HC, how many does this mechanism catch? How many are false positives? Every mechanism is subject to false collisions, but it doesn't penalize the HC that much.*

2.6.1.2.2. *Why can't this mechanism be dynamic? There are diminishing returns, and that would be too complex.*

**2.7. Recess at 9:30PM**

### 3. Tuesday Morning

#### 3.1. Opening

3.1.1. Call to order at 10:30 by John Fakatselis

#### 3.2. Scheduling of documents – HCF related

##### 3.2.1. Documents to present

- 3.2.1.1. 128 Sid Schrum.
- 3.2.1.2. 560 John Kowalski
- 3.2.1.3. 478 Michael Fischer
- 3.2.1.4. 546 Sunghyun
- 3.2.1.5. 558 John K
- 3.2.1.6. 560 John K
- 3.2.1.7. 595 Peter J
- 3.2.1.8. 601 John K
- 3.2.1.9. 604 Srimi
- 3.2.1.10. 605 Srimi
- 3.2.1.11. 606 Srimi
- 3.2.1.12. 615 John Kowalski
- 3.2.1.13. 616 Duncan Kitchin

##### 3.2.2. Discussion on procedure

- 3.2.2.1. *When motions are presented, the mover will have the opportunity to modify the motion before a second.*
- 3.2.2.2. *Please try to take issues offline with the presenter.*

#### 3.3. Presentation of documents related to HCF

##### 3.3.1. Continuing presentation of Document 128r3

- 3.3.1.1. *Motion: Instruct the TGe editor to incorporate the changes and additions on slides 11 and 12 of document 01-128r3 into the next revision of the 802.11e draft standard.*
  - 3.3.1.1.1. *Moved Sid Schrum*
  - 3.3.1.1.2. *Second Khaled Turki*
  - 3.3.1.1.3. *Discussion*
    - 3.3.1.1.3.1. Is this motion out of the category? No there is no prescribed order based on our agreed agenda.
    - 3.3.1.1.3.2. What is meant by transmission failure? The conditions where the HC recovers the channel are listed in slide 6.
    - 3.3.1.1.3.3. We want the AP regain the channel. Stations could be simpler by not having the recovery mechanism.
  - 3.3.1.1.4. *Motion to lay the motion on the table*
    - 3.3.1.1.4.1. Raju / Greg



3.3.1.1.4.2. (non-debatable)

3.3.1.1.4.3. Vote on laying the motion on the table:  
passes 15:13:12

### 3.4. Motions held from yesterday

#### 3.4.1. Motion postponed from yesterday - From document 270r1

3.4.1.1. *MOTION 270-2: Move to empower the TGe editor to remove the EDCF-specific restriction on TXOP usage by replacing the first paragraph of 9.10.3 with the version on slide 5 of document 01/270r0, and by changing wording on TXOP usage restrictions elsewhere in the TGe draft as may be necessary to make the revised TGe draft consistent with this replaced paragraph.*

3.4.1.1.1. *Michael Fischer*

3.4.1.1.2. *John Kowalski*

3.4.1.1.3. *Discussion*

3.4.1.1.3.1. The r0 version has no difference from r1 in this motion.

3.4.1.1.4. *Motion to amend to: MOTION 270-2: Move to empower the TGe editor to remove the EDCF-specific restriction on TXOP usage by replacing the first paragraph of 9.10.3 with the version on slide 5 of document 01/270r0, and by changing wording on TXOP usage restrictions elsewhere in the TGe draft as may be necessary to make the revised TGe draft consistent with this replaced paragraph. Additionally authorize the editor to incorporate the normative changes contained in document 01/566r1.*

3.4.1.1.4.1. Peter J

3.4.1.1.4.2. Wim D

3.4.1.1.4.3. Discussion on amendment

3.4.1.1.4.3.1. The editor is responsible to fix inconsistent terminology, without approval of the group.

3.4.1.1.4.3.2. Isn't it the intention that a motion address one point only? Not by rule, but a motion to divide could be made.

3.4.1.1.4.4. Motion to amend the amendment: :  
*MOTION 270-2: Move to empower the TGe editor to remove the EDCF-specific restriction on TXOP usage by replacing the first paragraph of 9.10.3 with the version on slide 5 of document 01/270r0, and by changing wording on TXOP usage restrictions elsewhere in the TGe draft as may be necessary to make the revised TGe draft consistent with this replaced paragraph. Additionally authorize the editor to incorporate the normative changes contained in document 01/566r1 including the adjustment of the number of ACs to be consistent with the events of this meeting*

3.4.1.1.4.4.1. Matt

3.4.1.1.4.4.2. Greg

- 3.4.1.1.4.5. Discussion.
  - 3.4.1.1.4.5.1. We need to enable the editor to make the change if 565 doesn't pass.
  - 3.4.1.1.4.5.2. The chair doesn't think this amendment is necessary.
  - 3.4.1.1.4.5.3. There are concerns about adjusting the number of ACs based on the table in 565.
  - 3.4.1.1.4.5.4. This is not a vote on 565. This is unnecessary, since the editor is already empowered.
- 3.4.1.1.4.6. Point of order – we can't vote on possible events in the future.
- 3.4.1.1.4.7. Vote on whether this motion is out of order: Ruled out of order 19:7:9
- 3.4.1.1.5. *Motion on the floor:*
  - 3.4.1.1.5.1. Motion to amend to: MOTION 270-2: Move to empower the TGe editor to remove the EDCF-specific restriction on TXOP usage by replacing the first paragraph of 9.10.3 with the version on slide 5 of document 01/270r0, and by changing wording on TXOP usage restrictions elsewhere in the TGe draft as may be necessary to make the revised TGe draft consistent with this replaced paragraph. Additionally authorize the editor to incorporate the normative changes contained in document 01/566r1.
- 3.4.1.1.6. *Point of order – document 566r1 has not been on the server for 4 hours.*
- 3.4.1.2. *Motion on the floor:*
- 3.4.1.3. *MOTION 270-2: Move to empower the TGe editor to remove the EDCF-specific restriction on TXOP usage by replacing the first paragraph of 9.10.3 with the version on slide 5 of document 01/270r0, and by changing wording on TXOP usage restrictions elsewhere in the TGe draft as may be necessary to make the revised TGe draft consistent with this replaced paragraph.*
  - 3.4.1.3.1. *Motion to call the question*
    - 3.4.1.3.1.1. Parliamentary enquiry – the motion on 566r1 is related to this, how is it brought forward again? Would like to postpone, but the question has been called.
    - 3.4.1.3.1.2. parliamentary enquiry – Is it possible for a subsequent motion to combine these? The chair feels that if this motion is voted on, it will not be possible to have a motion on 566r1 in this meeting.
  - 3.4.1.3.2. Vote on calling the question: fails 10:26:2
- 3.4.1.4. *Motion to lay the motion on the table*
  - 3.4.1.4.1. *John Kowalski*
  - 3.4.1.4.2. *Sid Schrum*
  - 3.4.1.4.3. Vote on laying the motion on the table: passes 17:15:11

3.4.1.5. *Discussion*

- 3.4.1.5.1. *Sunghyun could make an independent motion, or take this off the table first.*

**3.4.2. Motion postponed from yesterday - From document 270r1**

- 3.4.2.1. *MOTION 270-4: Move to empower the TGe editor to add definitions of "traffic identifier" and "traffic stream" and the corresponding acronyms "TID" and "TS" to as given on slides 8 and 9 of document 01/270r0 ; to incorporate the restricted definitions and usage of "traffic category" and "priority" as given on slides 8 and 9 of document 01/270r0; to change any remaining instances of "TS" meaning traffic specification to "TSPEC" in the TGe draft; to change "TCA" to "TAID" in the TGe draft; and to update frame formats and behavioral descriptions in all clauses of the TGe draft to make consistent use of these new and changed terms.*

3.4.2.1.1. *Michael Fischer*

3.4.2.1.2. *Srini*

3.4.2.2. *Discussion*

- 3.4.2.2.1. *Point of order – ask this to be ruled out of order as the editor is already empowered to make these changes.*

3.4.2.2.1.1. *Point of information – if this succeeds, the editor is empowered anyway. The implication is that the editor is empowered to make these sorts of changes.*

- 3.4.2.2.2. *Vote on ruling the motion out of order: the motion is ruled Out of order 19:3:14*

**3.5. Presentation of documents – EDCF related**

**3.5.1. Greg Parks withdraws his presentation**

**3.5.2. Document 613 “EDCF not simple and good enough” Khaled Turki.**

3.5.2.1.1. *EDCF is complex to implement. There are problems with maintaining parameters.*

3.5.2.1.2. *There is not enough room to provide differentiation from best effort based on CWmin.*

3.5.2.1.3. *There is a vulnerability to capture effects with EDCF*

3.5.2.1.4. *Shows simulation results indicating superiority of HCF compared to EDCF in latency and throughput.*

3.5.2.2. *Discussion*

3.5.2.2.1. *On slide 6, the implementation assumes separate EDCF and HCF queues? Yes*

3.5.2.2.2. *Is it important that the HC scheduler is specified in more detail? Doesn't think it needs to be re-specified. This is a simple scheduling algorithm. What about latency response of the HC to change in queue status?*

3.5.2.2.3. *The EDCF can collapse to a DCF. If it were HCF vs. DCF how much of this would remain true.*

3.5.2.2.4. *The ordering rules are allowed to be varied by using the Traffic Identifier.*

### **3.6. Suggestions from the chair**

#### **3.6.1. Concerned in lack of progress – would like to see a list of motions, and give priority of papers with motions.**

3.6.1.1. *John – 3*

3.6.1.2. *Duncan – 1*

3.6.1.3. *2*

3.6.1.4. *Michael – 4*

3.6.1.5. *Peter – 1*

3.6.1.6. *2*

3.6.1.7. *We have a total of 13 motions. They will have priority in the papers.*

### **3.7. Recess at 12:00**

## 4. Tuesday Afternoon

### 4.1. Opening

#### 4.1.1. Meeting called to order at 1:00PM by John Fakatselis,

4.1.1.1. *The chair moves to Duncan Kitchin*

#### 4.1.2. Prioritization of papers

4.1.2.1. *We have 13 motions -*

4.1.2.2. *Documents to present on HCF*

4.1.2.2.1. *478 Michael Fischer (not ready – may withdraw)*

4.1.2.2.2. *546 Sunghyun (not here)*

4.1.2.2.3. *558 John K (has a motion)*

4.1.2.2.4. *560 John K*

4.1.2.2.5. *595 Peter J*

4.1.2.2.6. *601 John K*

4.1.2.2.7. *604 Srini*

4.1.2.2.8. *605 Srini*

4.1.2.2.9. *606 Srini*

4.1.2.2.10. *615 John Kowalski*

4.1.2.2.11. *616 Duncan Kitchin*

### 4.2. Presentation of papers on HCF

#### 4.2.1. Document 558 “Enabling Hybrid Coordinator Mobility” John Kowalski

4.2.1.1. *Discussion*

4.2.1.1.1. *This is not intended to operate in environments where there are many HC.*

4.2.1.2. *Motion to instruct the editor to modify the draft by incorporating the normative text contained in document 01/558r0.*

4.2.1.2.1. *John Kowalski*

4.2.1.2.2. *Peter J*

4.2.1.3. *Discussion*

4.2.1.3.1. *Does and HC require a DS and does an AP require a DS? Not strictly speaking in either case. This covers the case where and HC can be separated if need be.*

4.2.1.3.2. *A QAP never polls. The HC polls. The HC is required to be located with the QAP so there is no distinction. This motion would allow the separation.*

4.2.1.3.3. *What happens if there are two HCs neither of which is the AP – how do they coordinate? Multiple HCs will not be allowed by an AP. Assuming all stations can hear the AP.*

4.2.1.3.4. *(the chair moves to John Fakatselis)*

4.2.1.3.5. *What is the compelling need for HC mobility?  
Against the motion*

- 4.2.1.3.6. *For the motion – very important to establish separable functions of the AP and HC. This is important for vendors that want to provide video services.*
- 4.2.1.3.7. *Against the motion – concerned that separation we could uncover unexplored nasty issues. Such as the three-point protocol between station, AP , and HC.*
- 4.2.1.3.8. *Separating the functions loses the ability to coordinate them unless there is a new protocol between them.*
- 4.2.1.3.9. *There is no way to provide parameterized services in an IBSS*
- 4.2.1.3.10. *What coordination is needed between HC and AP?*
- 4.2.1.3.11. *Call the question (Duncan / Greg)*

- 4.2.1.3.11.1. *No Objection*

4.2.1.4. *Vote on the motion: fails 9:19:10*

#### **4.2.2. Document 560 “Adding Rate Parameter to the TSPEC / Queue State Element” John Kowalski**

4.2.2.1. *Suggested improvement for rate negotiation, with a MAC-supplied minimum*

4.2.2.2. *No motion was made*

#### **4.2.3. Document 597 “Hybrid Coordinator simplifications: Queue state element and express traffic” Peter Johanssen.**

4.2.3.1. *TSPECs today have more information than the scheduler needs. It came from RSVP.*

4.2.3.2. *Suggests that TSPECs are eliminated, and moved to an L3 entity. Instead a Queue State Element should be defined.*

4.2.3.3. *Queue state elements are measured in units of time.*

4.2.3.4. *Motion – instruct the editor to incorporate the normative text in document 01/597r0 into the draft.*

- 4.2.3.4.1. *Peter Johanssen*

- 4.2.3.4.2. *Greg*

4.2.3.5. *Discussion*

- 4.2.3.5.1. *Move to table the motion*

- 4.2.3.5.1.1. *Sid S*

- 4.2.3.5.1.2. *Greg*

- 4.2.3.5.2. *Vote on tabling the motion. Fails 10:16:11*

- 4.2.3.5.3. *Against the motion – there are issues with getting rid of TSPEC. Needs closer examination.*

- 4.2.3.5.4. *Admission control is not there in the MAC now.*

- 4.2.3.5.5. *In this Qstate/express model, what is the concept of traffic category? It doesn't match the concept in the draft today?*

- 4.2.3.5.6. *When a station receives a poll, the station decides which traffic flow uses the TXOP.*

- 4.2.3.5.7. *There is a way to accomplish the goal of this motion but this isn't it. Moving to L3 doesn't guarantee*

*universality and interoperability. We need to better define this.*

4.2.3.5.8. *Oppose the motion – qstate is interesting, but tspec should not be removed. This is the intserve and diffserve war. We need to support both. This motion would remove the parameterized option.*

4.2.3.6. *Call the question (Matt / Srin)*

4.2.3.6.1. *Vote on calling the question: fails 19:13:6*

4.2.3.7. *Discussion*

4.2.3.7.1. *Against the motion because it makes too large a change in functionality, recently known to be of interest to the membership. This would lose a number of capabilities that are not replaced. Such as knowing about old queued data.*

4.2.3.7.2. *The proposal is not meant to interfere with priority scheduling. Feels that TSPECs are loosely defined, and admission control is not defined.*

4.2.3.7.3. *The Queue state idea is good. It communicates the necessary information to the scheduler. RSVP is widely supported, including DOCSIS and cable standards.*

4.2.3.7.4. *This is taking away parameterized QoS, which we need. Agrees that signaling needs to be better specified – a presentation will be made.*

4.2.3.8. *Call the question (Matt / Srin) no objection*

4.2.3.9. *Vote on the motion: fails 10:22:7*

#### **4.2.4. Document 624r0 (replacing 410r1) “Motion for MSDULifetime for the 802.11e D1 Draft” Mathilde**

4.2.4.1.1. *Wants to reinstate the MSDULifetime features in D1.0, which was generally acceptable.*

4.2.4.1.2. *This should be mandatory.*

4.2.4.1.3. *It prevents the broadcast of stale packets.*

4.2.4.2. *Motion – instruct the editor to modify the draft by incorporating the normative text in document 01/624r0.*

4.2.4.2.1. *Matt Sherman*

4.2.4.2.2. *Michael Fischer*

4.2.4.3. *Discussion*

4.2.4.3.1. *This MIB parameter would apply to all applications? It is per traffic class.*

4.2.4.3.2. *In favor. This has been indicated in simulations to be useful. The MIB application issue is related to the difference between parameterized and prioritized. Categories have no application specific setting. An application with specific requirements would need to use a TSPEC to set parameters.*

4.2.4.3.3. *Would prefer a per frame lifetime passed down. To pass the residual delay in a system.*

4.2.4.4. *Call the question (John / Sid)*

4.2.4.4.1. *Vote on calling the question: passes 12:3:18*

4.2.4.5. *Vote on the motion: passes 20:3:14*

**4.2.5. Document 560r0 (again) John Kowalski**

4.2.5.1.1. *Changes regarding burst size, rate field.*

4.2.5.2. *Motion – instruct the editor to modify the draft by incorporating the normative text in document 01/560r0 which do not pertain to Peter Johanssen’s presentation with the exception that the encoding of rate information be modified to use the definitions contained in the supported rates element.*

4.2.5.2.1. *Moved: John Kowalski*

4.2.5.2.2. *Discussion*

4.2.5.2.2.1. Any suggestions for changes before the second?

4.2.5.2.2.2. Use the same format of bits as the signal field.

4.2.5.2.3. *Seconded – Michael Fischer*

4.2.5.2.4. *Discussion*

4.2.5.2.4.1. explain how this can be used in the context of a TSPEC. This sets a lower bound of the negotiation for rate.

4.2.5.2.4.2. Is this optional or mandatory? It is part of the TSPEC, so it is mandatory. But it doesn’t have to contain information.

4.2.5.2.4.3. The rate is the lower bounded rate? Yes. If the PHY doesn’t support the rate, what happens? Supported rates are in the MIB.

4.2.5.2.4.4. This is not a signaling mechanism – those are in other proposals. As long as we have queue sizes in octets, this information his helpful

4.2.5.2.5. *Motion to table (raju / greg p)*

4.2.5.2.5.1. Vote on tabling the motion: fails 8:13:11

4.2.5.2.6. *Motion to postpone until the end of the signaling presentation.*

**4.3. Recess at 3:00pm**



## 5. Wednesday, November 14, 2001

### 5.1.1. Opening

- 5.1.1.1. *The meeting is called to order at 1:00PM by John Fakatselis*
- 5.1.1.2. *We are continuing discussions and presentations regarding changes to the draft. There are at least 10 motions to go. We need to have the draft ready for presentation at 7:30PM tomorrow.*
- 5.1.1.3. *How many motions for changes and additions to the draft do we have now?*

### 5.1.2. Outstanding documents

- 5.1.2.1. *HCF*
  - 5.1.2.1.1. *601 Kowalski – a motion*
  - 5.1.2.1.2. *604, 605, 606 Srini – 2 motions*
  - 5.1.2.1.3. *615 Kowalski – no motions, no presentation.*
  - 5.1.2.1.4. *546 Sunghyun –*
  - 5.1.2.1.5. *565 and 566 (updated on server) with Motions.*
- 5.1.2.2. *Signaling*
  - 5.1.2.2.1. *557 Jin Meng – Motion*
  - 5.1.2.2.2. *526 Sherman – motion.*
- 5.1.2.3. *OBSS*
  - 5.1.2.3.1. *630 Sunghyun – motions*
- 5.1.2.4. *NAV and ACK policies*
  - 5.1.2.4.1. *626 Fischer – motion*
- 5.1.2.5. *Other*
  - 5.1.2.5.1. *478 Fischer changes to 633 - postponed*
  - 5.1.2.5.2. *616 Duncan –*
  - 5.1.2.5.3. *408 Fischer – withdrawn*

### 5.1.3. Outstanding motions

- 5.1.3.1. *The motion to postpone (from the previous session) has been withdrawn.*

## 5.2. Continuation of presentations

### 5.2.1. 560r0 (again) John Kowalski

- 5.2.1.1. *Motion on the floor from previous session:*
- 5.2.1.2. *Motion – instruct the editor to modify the draft by incorporating the normative text in document 01/560r0 which do not pertain to Peter Johanssen's presentation with the exception that the encoding of rate information be modified to use the definitions contained in the supported rates element.*
  - 5.2.1.2.1. *Kowalski*
  - 5.2.1.2.2. *Fischer*
- 5.2.1.3. *The motion passes by unanimous consent.*

**5.2.2. Documents 565 and 566 (Menzo Wentink)**

- 5.2.2.1. *Motion: Move to empower the TGe editor to incorporate the concept of access categories, based on normative text changes as suggested on slides 14 - 21 of document 01/565r1, and by changing wording in the TGe draft as may be necessary to make the revised TGe draft consistent with the above changes.*
- 5.2.2.1.1. *Menzo Wentink*
- 5.2.2.1.2. *Sunghyun*
- 5.2.2.2. *Discussion*
- 5.2.2.2.1. *The information from higher layers has 8 categories. This automatically treats these as 4 categories, without allowing for different categories. In a pure EDCF it would be possible to have more than 4 categories. We shouldn't limit the possibility of 8 categories. HomePNA competes with 802.11. They have 8 access categories. There could be multiple queues feeding into these categories but that gets too complicated. The scheduler should be part of the standard. An alternative would be using the priority of the packet at the head of the queue. We need to deal with the post-backoff issue.*
- 5.2.2.2.2. *Would there be multiple queues with the same access category? Yes – the scheduler could schedule those queues into a single traffic category.*
- 5.2.2.2.3. *This doesn't mean we collapse all priorities down. Just the access to the medium.*
- 5.2.2.2.4. *This table of mapping is different than the 802.1d mappings.*
- 5.2.2.2.5. *This mapping table is informative, not normative.*
- 5.2.2.2.6. *Does this imply any scheduling strategy? No.*
- 5.2.2.2.7. *Against the motion. This limits the designer. Other standards have link layer mapping.*
- 5.2.2.2.8. *Suppose we had 8 queues – the AP sets the mapping. If there are 8 queues, there could be times where the higher priorities would need more differentiation.*
- 5.2.2.2.9. *The collapsing is informative. It is a MIB variable.*
- 5.2.2.2.10. *If you have access category – the queue should be a FIFO? Or can there be any choice for implementation? As long as you stick to the reordering rules, you can do anything you want.*
- 5.2.2.2.11. *Have never heard anyone make a case for more than four access categories. In support of this motion.*
- 5.2.2.2.12. *Against this – 802.1d has 8 priorities. This is being pushed into diffserve. Intserve prevents oversubscribing the line. We need Intserve.*
- 5.2.2.2.13. *This does not prescribe how the mapping is done. This only says how traffic priorities are mapped to access categories.*
- 5.2.2.2.14. *Against the proposal – QoS is as yet unknown. We can't predict what will be needed in the future. We can't be*

*smart enough to fully map everything. You need to allow more latitude in the standard.*

5.2.2.2.15. *In favor – simulations show it is hard to differentiate more than 4 layers*

5.2.2.3. *Call the question (Srini / Michael F)*

5.2.2.3.1. *Vote on calling the question: passes 21: 9: 5*

5.2.2.4. *Vote on the motion: Fails 15: 15: 11*

### **5.2.3. Document 566r1 ( Sunghyun Choi)**

5.2.3.1.1. *regarding EDCF TxOp bursting.*

5.2.3.2. *Motion: Move to empower the TGe editor to revise the non-pollled TXOP usage by incorporating normative text changes on slides 7 - 9 of document 01/566r2, other than the concept of access categories, and by changing wording on non-pollled TXOP usage elsewhere in the TGe draft as may be necessary to make the revised TGe draft consistent with the above changes.*

5.2.3.2.1. *Moved Sunghyun Choi*

5.2.3.2.2. *Second Menzo Wentink*

5.2.3.3. *Discussion*

5.2.3.3.1. *What effect does this have on HCF behavior? None at all. There is still the TXOP limit.*

5.2.3.3.2. *This minimizes the implementation difference between operating in response to a polled txop and one you initiate. In favor.*

5.2.3.3.3. *The numbers are wrong: 4 vs 8..*

5.2.3.3.4. *This is not in the draft yet. The editor makes in consistent. This is not an issue.*

5.2.3.3.5. *Does the editor believe the motion is unambiguous? Yes, the access category concept can be backed out.*

5.2.3.4. *Motion to call the question (John K /John F)*

5.2.3.4.1. *No Objection.*

5.2.3.5. *Vote on the motion: Fails 24: 12*

### **5.2.4. Document 546r3 (Sunghyun Choi)**

5.2.4.1. *Ack Policy.*

5.2.4.2. *Motion: Empower the TGe editor to revise the draft to incorporate the clarification in slide 4 of 546r3.*

5.2.4.2.1. *Moved Sunghyun Choi*

5.2.4.2.2. *Second Srini*

5.2.4.2.3. *Discussion*

5.2.4.2.3.1. *Allows the indication of an acknowledgement even in the case of CFack.*

5.2.4.2.3.2. *Against the motion. Is there a specific case where this is needed, it should be documented. This decreases clarity. The “no-data” cases are already encoded. All of these “nulls” do not get acked currently. We have a specific case in D1.3*

- that allows changing the ack policy. This introduces an asymmetry with no apparent use.
- 5.2.4.2.4. *Move to postpone this motion until after the presentation of 605r2.*
    - 5.2.4.2.4.1. Srin
    - 5.2.4.2.4.2. John K
    - 5.2.4.2.5. Motion postponed without objection.
  - 5.2.4.3. *Usage of NF Bit*
  - 5.2.4.4. *Motion: Empower the TGe editor to revise the draft to incorporate the modification in slide 7 of 546r3.*
    - 5.2.4.4.1. *Moved Sunghyun Choi.*
    - 5.2.4.4.2. *Discussion on the motion*
      - 5.2.4.4.2.1. The marking of reserved means the implementation has to allow any value. Agrees that clarification is needed.
      - 5.2.4.4.2.2. What is the use of this? There is a tabled motion regarding multiple frames in a TXOP.
    - 5.2.4.4.3. *The mover withdraws the motion*
  - 5.2.4.5. *CF ACK discussion*
  - 5.2.4.6. *Motion: Empower the TGe editor to revise the draft to incorporate the clarification in slide 10 of 546r3.*
    - 5.2.4.6.1. *Moved Sunghyun Choi.*
    - 5.2.4.6.2. *Discussion*
      - 5.2.4.6.2.1. The editor is already empowered to do this.
    - 5.2.4.6.3. *The chair rules the editor is already empowered to do this.*
  - 5.2.4.7. *PIFS or SIFS after error*
  - 5.2.4.8. *Motion: Empower the TGe editor to revise the draft as instructed in slide 13 of 546r3*
    - 5.2.4.8.1. *Moved Sunghyun Choi.*
    - 5.2.4.8.2. *Discussion*
      - 5.2.4.8.2.1. Wants to clarify that a SIFS is used after an erroneous received frame.
      - 5.2.4.8.2.2. The editor agrees that clarification would help.
    - 5.2.4.8.3. *Seconded Srin*
    - 5.2.4.8.4. *Discussion*
      - 5.2.4.8.4.1. What happens at the end of a TXOP? That's already covered. You don't overrun the TXOP.
    - 5.2.4.8.5. Motion adopted by unanimous consent.
  - 5.2.4.9. *RTS/CTS during CFP/CFB*
  - 5.2.4.10. *Motion: Empower the TGe editor to revise the draft as instructed in slide 16 of 546r3.*
    - 5.2.4.10.1. *Moved Sunghyun Choi.*
    - 5.2.4.10.2. *Discussion*

5.2.4.10.2.1. This is similar to the previous case, and more important. In favor.

5.2.4.10.3. *Second John Kowalski*

5.2.4.10.4. *Discussion*

5.2.4.10.5. *Motion adopted by unanimous consent.*

### **5.2.5. Document 601r1 (John Kowalski)**

5.2.5.1. *Delayed Acknowledgement vs Normal Acknowledgement*

5.2.5.2. *Motion: To instruct the editor to modify the draft by including the normative text contained in 601r1.*

5.2.5.2.1. *Moved John Kowalski*

5.2.5.2.2. *Discussion*

5.2.5.2.2.1. There needs to be a way to tell which poll an ack is for. This rules out anything but ping-pong, and makes it possible to get out of sync.

5.2.5.2.2.2. Is there a retry mechanism for delayed ACK?

## **5.3. Announcement from TGi**

5.3.1. **There will be a number of significant motions on direction starting at 3:30.**

## **5.4. Recess until 3:30.**

## **5.5. Call to order at 3:30**

## **5.6. Discussion**

### **5.6.1. Schedule of AV Study Group.**

5.6.1.1. *There is critical activity going on in TGi. Many members have left.*

5.6.1.2. *The chair feels that we have lost key people, we should do the AV study group now.*

5.6.1.3. *Tomorrow we will use the AV slot for TGe activities.*

5.6.1.4. *Straw poll –*

5.6.1.4.1. *how many want to have the AV SG today and have tomorrows slot be TGe? 10*

5.6.1.4.2. *How many would like to give up today's AV time and have it tomorrow? 5*

5.6.1.4.3. *How many want to maintain the original schedule for two AV slots. 0*

5.6.1.5. *We will have AV now, and TGe tomorrow.*

## 6. AV Study Group (John Kowalski)

### 6.1. Presentation of papers

#### 6.1.1. Document 625r0, Takashi Sato

- 6.1.1.1. *"1394 Requirements for 802.11e"*

### 6.2. Discussion

#### 6.2.1. Does the group understand what we mean by guaranteed services under 802.11e?

- 6.2.1.1. *Several in the group asks for elaboration.*
- 6.2.1.2. *There is no guarantee of delivery of delivery*
- 6.2.1.3. *How do you have guaranteed services without bandwidth reservation? The problem is not bandwidth reservation – admission control can help, giving preference to higher priority traffic.*
- 6.2.1.4. *How can admission control protocol cooperate?*
- 6.2.1.5. *Guaranteed service doesn't mean guaranteed delivery. We mean there is a guaranteed probability of delivery under specific channel conditions.*
- 6.2.1.6. *Some think that even guaranteed channel access would be adequate.*
- 6.2.1.7. *This is just an extrapolation of packet loss rates. You can't guarantee a packet loss rate. A provider gives SLA for a certain BER or packet loss rate. That is the same situation we have here.*
- 6.2.1.8. *Is the guaranteed service two way?*
- 6.2.1.9. *We are making reservations based on time. (assuming the channel doesn't change).*
- 6.2.1.10. *The 11e draft can provide QoS service in a standard way.*
- 6.2.1.11. *If the MAC could reserve access, could an application be built on that? We should provide the minimal tools in the MAC.*
- 6.2.1.12. *There still needs to be an admission control mechanism to support handoffs. Without that you can't hand off without losing the service*
- 6.2.1.13. *We may want an MLME primitive to set the contents of the load element to keep bandwidth available for non-active applications.*
- 6.2.1.14. *The total amount of available time that can be allocated could be MIB variable. So in a particular environment you could set it appropriate for the application.*

#### 6.2.2. What's in / out / in between 802.1e

- 6.2.2.1. *Open: TSPEC vs Express Data Class*
  - 6.2.2.1.1. *TSPEC is not likely to go away*

- 6.2.2.1.2. *The scheduler doesn't care where the parameters come from – they just need to be known.*
- 6.2.2.1.3.
- 6.2.2.2. *AP Mobility via upper layer signaling. Out of 802.11e, since proposal wasn't accepted.*
- 6.2.2.3. *The only node that can talk to every other node is the AP, so locate the HC there.*
- 6.2.2.4. *But it is also possible to locate the internet connection in a station, so the HC/AP collocation is not necessary.*
- 6.2.2.5. *What is really needed is HC mobility. One change in definition is needed. We can have a BSS without distribution. We need to change one sentence.*
- 6.2.2.6. *AP mobility introduces new problems.*
- 6.2.2.7. *Consider the case where a nonQoS AP is connected to the internet, but a new device contains the HC for QoS and AV.*
- 6.2.2.8. *We have WDS frames for AP to AP transmissions.*
- 6.2.2.9. *It is easy to separate the AP and HC, but mobility of HC gets complicated. There is no mechanism to transfer state of the HC.*
- 6.2.2.10. *You could move all the functions of the AP to the HC except for the connection to the distribution system.*
- 6.2.2.11. *Distribution of accurate time that is not TSF Timer. (Believes it can be done without changing the MAC)*
- 6.2.2.12. *If HiperLAN 2mS frame timing is adequate, then why isn't the TSF timer? If clocks are drifting rapidly, a faster update is necessary.*
- 6.2.2.13. *There have been two presentations of HCF vs EDCF. How can we factor this into the AV spec? The simulations have differing conclusions. .*
- 6.2.2.14. *We need to deal with this by making the total simulations available. So far they are irreproducible.*
- 6.2.2.15. *Would like to restart the simulation group. We need to agree on the models.*
- 6.2.2.16. *Signaling between MAC and application: how do we verify how it is used by 1394?*
- 6.2.2.17. *Informative description of a scheduler and normative requirements is needed?*
- 6.2.2.18. *Exactly what is meant by a scheduler? The thing that decides who gets a TXOP, or the thing that decides what to do with a TXOP?*
- 6.2.2.19. *Admission control – inside or outside the MAC? Don't we have consensus about limiting the MAC to channel access?*
- 6.2.2.20. *The admission control can be located in the SME in the HC.*

**6.3. Recess**



## 7. Thursday, November 15, 2001, Morning

### 7.1. Opening

#### 7.1.1. The meeting is called to order at 8:05AM by John Fakatselis

7.1.1.1. *The chair reminds the group of the objective of enabling a draft this week. We need to limit discussion of presentations.*

7.1.1.2. *There is an issue with the room not being available this afternoon.*

#### 7.1.2. Discussion

7.1.2.1. *There were off-line meetings on the delayed ack mechanism. We would like to discuss at the 3:00PM session. There is a broad range of support.*

7.1.2.2. *The chair recommends we present now and have the motions later.*

7.1.2.3. *John Kowalski withdraws his motion, and yields to Adrian*

#### 7.1.3. Other motions

7.1.3.1. *Michael Fischer has 2 motions*

7.1.3.2. *?? - 1*

7.1.3.3. *Matt S 1*

7.1.3.4. *Srini 2*

7.1.3.5. *Sid - 2*

7.1.3.6. *-----We have about 8 motions.*

#### 7.1.4. The chair moves to Duncan Kitchin

### 7.2. Presentation of documents containing motions

#### 7.2.1. Document 601r1 continued

7.2.1.1. *The motion on the floor has not been seconded. It is withdrawn by the mover, John Kowalski*

#### 7.2.2. Document 01/126, Adrian Stephens

##### 7.2.2.1. "Burst Acknowledgement Mechanism"

7.2.2.1.1. *Proposes a burst ack request / acknowledge protocol, allowing the ack of a burst of SIFS-separated MPDUs.*

7.2.2.1.2. *This mechanism is intended to replace the delayed ack.*

##### 7.2.2.2. Discussion

7.2.2.2.1. *Did we determine that the non-final bit is no longer needed. Could it be re-assigned as the burst ack request? It is not clear that the NF bit is in fact not needed. We are still entertaining and queuing proposals regarding error recover and backoff and OBSS issues. Originally the NF bit was for scheduled TXOPs which are gone, but the purpose is defined to allow a TXOP that ends early to be*

reclaimed. That is a reasonable purpose and should be preserved.

7.2.2.2.2. Do bursts have to be consecutive – a single burst with SIFS? Could they be in separate frames with larger delays, or in separate TXOPs? The intention is in a single TXOP.

7.2.2.2.3. Why would the burst be limited to a single traffic class? Sequence numbering is per traffic class.

7.2.2.2.4. Is there any support for selective retransmission? You re-transmit any MPDUs that have not been acknowledged in the burst ack.

7.2.2.2.5. The selective acknowledgement and retransmission is the same as with delayed ack. The bitmap has to be per traffic class because they have different sequence number spaces. That was done for simplicity, and because there is a requirement that the burst and burst ack must fit in the TXOP. It is still possible to send multiple bursts in a TXOP, each with its own burst ack.

7.2.2.2.6. Can this concept extend to multicast? That has not been considered – but we don't want to delay this motion.

7.2.2.2.7. QoS-null+CFack cannot be used, since a retry would be a messy case. A QoS Null or a new control frame would be a better solution. A control frame might not support some FEC PHYs.

7.2.2.2.8. How many bits are encoding for TCID? Editorial issue depending on other resolutions – take offline.

7.2.2.2.9. The receiver can either support re-ordering or not, depending on how it acknowledges.

7.2.2.2.10. The NOack bit means the sender is still in control of the medium at the end of the transmission.

7.2.2.2.11. Does the current format allow selective retransmission MSDU? No, that is the same as delayed ack. The change that is needed is that the sequence number has to be the concatenation of the MSDU number and fragment. That widens the field.

7.2.2.2.12. Could multiple burst be acknowledged in a single burst ack? Yes.

7.2.2.3. Motion to modify the agenda to schedule time to consider motions related to document 01/126 at 3:50PM today.

7.2.2.3.1. Moved John Kowalski

7.2.2.3.2. Second Peter J

7.2.2.4. Discussion on the motion

7.2.2.4.1. none

7.2.2.5. The motion passes with unanimous consent

### 7.2.3. Document 604, Yoshiro

7.2.3.1. "Japan local 4mS rule"

- 7.2.3.1.1. *This rule applies to the 5GHz band states that stations should perform carrier sense and not transmit if there is any RF energy.*
- 7.2.3.1.2. *The exception is if a station is controlled by another station. This means that the first in a TXOP or an ACK can be sent without carrier sense.*
- 7.2.3.1.3. *The channel needs to be sensed at least once per 4mS.*
- 7.2.3.2. *Motion - Move to instruct the editor to incorporate the text in document 01/604r2*
  - 7.2.3.2.1. *Moved Yoshihiro Ohtani*
  - 7.2.3.2.2. *Second Sid Schrum*
- 7.2.3.3. *Discussion on the motion*
  - 7.2.3.3.1. *Request to also limit TXOP duration to 4mS.*
  - 7.2.3.3.2. *In favor of the motion – will help address other markets.*
  - 7.2.3.3.3. *In favor – it uses a mechanism we already have. Regarding TXOP duration limits, suggest that we already have to honor the medium occupancy limit, which is sufficient constraint.*
  - 7.2.3.3.4. *Call the question (John K / Michael) No Objection*
- 7.2.3.4. *The motion is adopted by unanimous consent.*
- 7.2.4. Document 605r2, Srini**
  - 7.2.4.1. *“CFB Ending Rule under HCF”*
    - 7.2.4.1.1. *Addresses problem where the HC can lose control of the channel because of an error frame in a CFB.*
    - 7.2.4.1.2. *Proposed text to prevent reset of NAV during TXOP in this case.*
  - 7.2.4.2. *Motion: To instruct the editor to insert the normative text in slide 4 of document 01/605r2a.*
    - 7.2.4.2.1. *Moved Srini*
    - 7.2.4.2.2. *Second John K*
    - 7.2.4.2.3. *Discussion*
      - 7.2.4.2.3.1. *no one against the motion*
    - 7.2.4.2.4. *The motion passes by unanimous consent*
  - 7.2.4.3. *Further discussion on the presentation*
    - 7.2.4.3.1. *Proposal of a “final frame” to inform the HC that the TXOP holder is done with the TXOP so the HC can reclaim it.*
  - 7.2.4.4. *Motion: instruct the editor to incorporate the normative text in the Word document 01/605r1.*
    - 7.2.4.4.1. *Moved Srini*
    - 7.2.4.4.2. *John K*
    - 7.2.4.4.3. *Discussion*
      - 7.2.4.4.3.1. *There is a discrepancy between the PPT and Word text*
    - 7.2.4.4.4. *Motion to postpone until after 11:00AM.*

- 7.2.4.4.4.1. Moved Raju
- 7.2.4.4.4.2. Second Srini
- 7.2.4.4.4.3. Motion to postpone passes by unanimous consent.

### 7.2.5. Announcements

- 7.2.5.1. *We will meet in Texas 3 at 3:30PM today.*

## 7.3. Documents on Signaling

### 7.3.1. Document 526, Matt Sherman

- 7.3.1.1. *Explicit Loss Notification mechanism in 802.11 data networks for reliable transport"*
  - 7.3.1.1.1. *Congestion control techniques are not the same as handling media errors.*
  - 7.3.1.1.2. *The idea is that if the receiver gets a header but it is corrupted, it notifies the sender it was corrupted, and not treat it as congestion with a larger backoff.*
  - 7.3.1.1.3. *802.11 doesn't allow corrupted frames to be passed to higher layers.*
  - 7.3.1.1.4. *This proposal suggests that partial packet headers be passed up if requested by higher layers.*
- 7.3.1.2. *Motion – instruct the editor to adopt the normative text in document 526r0.*
  - 7.3.1.2.1. *Moved Matt Sherman*
  - 7.3.1.2.2. *Discussion*
    - 7.3.1.2.2.1. *This change enables a change to TCP/IP to enable performance enhancements.*
    - 7.3.1.2.2.2. *How do you know how much to send? It would send whatever had been received when the retry limit is exceeded.*
    - 7.3.1.2.2.3. *How does this relate to FEC? It is against the 1999 draft. So what is the editor to do with FEC? Deal with on a fragment by fragment basis.*
  - 7.3.1.2.3. *Second John Kowalski*

### 7.3.2. Break for 30 minutes 10:00 to 10:30

### 7.3.3. Announcements

- 7.3.3.1. *There will be a joint TGe / TGi ad-hoc meeting by the registration desk at 1:00PM regarding areas of overlap (encrypt early / late).*
- 7.3.3.2. *We have a request to recess this meeting at 4:15 for the TGg fixed agenda vote.*
- 7.3.3.3. *The chair moves to Duncan Kitchin.*

### 7.3.4. Document 526, Matt Sherman, continued

- 7.3.4.1. *Motion on the floor – instruct the editor to adopt the normative text in document 526r0.*
  - 7.3.4.1.1. *Moved Matt Sherman*
  - 7.3.4.1.2. *Second John Kowalski*

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#### 7.3.4.1.3. Discussion

- 7.3.4.1.3.1. Against the motion – recognize that TCP is pile of heuristics and interpretations. There are starting to be hardware based TCP implementations. The idea of trying to fool TCP is non universal and could be dangerous. It also doesn't belong in the MAC layer.
- 7.3.4.1.3.2. In favor – It allows us to do things we couldn't do before. There are possibilities of doing things with error-ed packets.
- 7.3.4.1.3.3. TCP utilization is of questionable value, but UDP could use the information in a real-time application.
- 7.3.4.1.3.4. Higher layer functions are not the reason for this. This proposal just enables such functions. This is not a protocol specification.
- 7.3.4.1.3.5. The mechanism does not have a flaw. The use of the mechanism may cause problems. Could this be abused to create a “covert” channel to get information through a system? It's impossible to guarantee something can't be abused.
- 7.3.4.1.3.6. This is just a MIB parameter. It isn't a big issue. In favor.
- 7.3.4.1.3.7. This does not pass up bad CRC packets. It only passes up partial fragments that were successfully received, and they are marked as partial. It defaults to “off”
- 7.3.4.1.3.8. A real world application needed a mechanism like this proposal. It would help. In favor.
- 7.3.4.1.3.9. Call the question (Jin Meng / Srini)
  - 7.3.4.1.3.9.1. The question is called without objection.

#### 7.3.4.1.4. Vote on the motion: Fails 17: 10: 12

### 7.3.5. Return to Document 605r2, Srini

- 7.3.5.1. *Return to postponed motion:*
- 7.3.5.2. *Motion: instruct the editor to incorporate the normative text in the Word document 01/605r1.*
  - 7.3.5.2.1. *Moved Srini*
  - 7.3.5.2.2. *John K*
  - 7.3.5.2.3. *Motion to amend: change the document in the motion from 605r1 to r2 and add the following text: “If the CCA is busy at the ESTA which is expecting the ACK response during the first slot following SIFS after the end of the transmission of the final frame, it means that the channel control has been successfully transferred and no further action is necessary, even though the ACK from HC is not correctly received. And add an explicit frame that can end a TXOP: A QoS Null frame with NF=0, NoACK = 0 And add to all occurrences of QoS Null frame with NoAck=0 with the phrase “duration/ID field set to 0”.”*
    - 7.3.5.2.3.1. *Moved Raju G*

- 7.3.5.2.3.2. Second John K
- 7.3.5.2.3.3. Discussion on amendment
  - 7.3.5.2.3.3.1. The amendment has an error
- 7.3.5.2.3.4. Motion to amend the amendment: change "duration id field" to "TXOP Duration Request Field"
  - 7.3.5.2.3.4.1. Sunghyun
  - 7.3.5.2.3.4.2. Srin
- 7.3.5.2.3.5. The motion to amend the amendment is passed with unanimous consent.

7.3.5.2.4. Vote on the amendment: passes by unanimous consent

7.3.5.2.5. *Motion as amended: Instruct the editor to incorporate the normative text in the Word document 605r2 and add the following text: "If the CCA is busy at the ESTA which is expecting the ACK response during the first slot following SIFS after the end of the transmission of the final frame, it means that the channel control has been successfully transferred and no further action is necessary, even though the ACK from HC is not correctly received. And add an explicit frame that can end a TXOP: A QoS Null frame with NF=0, NoACK = 0 And add to all occurrences of QoS Null frame with NoAck=0 with the phrase "TXOP Duration Request field set to 0"."*

7.3.5.3. Vote on the motion: Passes 26 : 7 : 11

### 7.3.6. Document 546, Sunghyun

- 7.3.6.1. *Motion : Empower the TGe editor to revise the draft to incorporate the clarification in slide 4 of 546r4*
- 7.3.6.2. *Moved Sunghyun*
- 7.3.6.3. *Second John K*
  - 7.3.6.3.1. *No discussion*
  - 7.3.6.3.2. *The motion passes by unanimous consent*

### 7.3.7. Document 557, Michael Fischer

- 7.3.7.1. *"Signaling for Parameterized QoS Support"*
  - 7.3.7.1.1. *This proposal defines a sufficient but simple set of functions for signaling which are not currently defined.*
  - 7.3.7.1.2. *We need to communicate between higher layer entities and the MAC in a QBSS.*
  - 7.3.7.1.3. *MLME handshakes "ADDTS" are defined to allow communication of the TSPECs.*
- 7.3.7.2. *Motion: To incorporate the changes and additions provided on slides 11-42 of document 557r0 into the next version of IEEE 802.11e draft.*
- 7.3.7.3. *Moved Michael Fischer*
- 7.3.7.4. *Second Srin*
- 7.3.7.5. *Discussion*
- 7.3.7.6. *Afraid there hasn't been enough time to review. It has been on the server since Monday. This is needed for the draft. Since there aren't competing proposals, this will allow us to go to ballot and get comments.*

- 7.3.7.7. There are no other proposals for signaling in the queue.
- 7.3.7.8. In favor of the motion. This is essentially correct and provides the missing mechanisms. Is fundamentally sound.
- 7.3.7.9. In favor – it fixes the problems with TSPEC by adding rate. It provides a necessary control path.
- 7.3.7.10. In favor
  - 7.3.7.10.1. *Call the question (Matt / Srin) Question called without objection*
  - 7.3.7.10.2. *Vote on the motion: Passes 43 : 0 : 3*
- 7.3.7.11. *Motion: To incorporate the changes and additions provided on slide 66 of document 557r0 into the next version of IEEE 802.11e draft.*
  - 7.3.7.11.1. *Moved Michael Fischer*
  - 7.3.7.11.2. *Discussion*
    - 7.3.7.11.2.1. This prohibits retries from occurring? No.
    - 7.3.7.11.2.2. Would rather have a minimum of two CCOPs.

### **7.3.8. Announcements**

- 7.3.8.1. *Sub-editors will meet at 12:55PM to enact changes.*

## **7.4. Recess until 3:30PM**

## 8. Thursday, November 15, 2001, Afternoon

### 8.1. Opening

8.1.1. The meeting is called to order at 3:30 by John Fakatselis.

#### 8.1.2. Announcements

8.1.2.1. *The TGi and TGe joint meeting request that this group pass a motion to request the WG to schedule a joint TGi / TGe session during meetings*

8.1.2.2. *The chair moves to Duncan Kitchin.*

### 8.2. Presentations and motions, continued

#### 8.2.1. Continuing: Document 557, Michael Fischer

8.2.1.1. *“Signaling for Parameterized QoS Support”*

8.2.1.2. *Motion: To incorporate the changes and additions provided on slide 66 of document 557r0 into the next version of IEEE 802.11e draft.*

8.2.1.2.1. *Moved Michael Fischer*

8.2.1.2.2. *Discussion*

8.2.1.2.2.1. *This prohibits retries from occurring? No.*

8.2.1.2.2.2. *Would rather have a minimum of two CCOPs.*

8.2.1.2.2.3. *This provides a basis for a station to set up traffic streams so it can be determined whether it is polled or not. So a single stream will not get TXOPs from both Polling and contention and waste time on the medium.*

8.2.1.3. *Motion after friendly amendments: incorporate the changes and additions provided on slide 66 of document 557r0 into the next version of IEEE 802.11e draft with the change of the first parameter of the “max” function reference in 9.10.4.4 from “4” to “2” and a change of the “shall” in the first line of the of the change in 9.10.3 to “should”.*

8.2.1.3.1. *Second Peter Johanssen*

8.2.1.3.2. *Motion passes by unanimous consent.*

#### 8.2.2. Return to scheduled postponed motion from document 126r1.

8.2.2.1. *Empower the TGe editor to revise the TGe draft according to the instructions in 11-01-126r1 replacing all text relating to the Delayed Acknowledgement.*

8.2.2.1.1. *Moved Adrian Stephens*

8.2.2.1.2. *Second John Kowalski*

8.2.2.1.3. *Motion passes by unanimous consent.*

### 8.3. Presentations and motions – overlapped BSS

#### 8.3.1. Document 630r1a, Sunghyun Choi

8.3.1.1. *“HC Recovery and Backoff Rules”*



8.3.1.1.1. *The HC may need to backoff in case of overlapping BSS, which may result in collision with stations in local QBSS.*

8.3.1.1.2. *There are also cases that result in the loss of a TXOP.*

### 8.3.2. (Short Recess for TGg vote)

8.3.2.1.1. *Proposes HC backoff rules to prevent OBSS collisions.*

#### 8.3.2.2. Discussion

8.3.2.2.1. *Does this make it impossible for an ESTA to recover a TXOP? No, the recovery is still up to the TXOP holder.*

8.3.2.2.2. *Does this proposal contradict Jin-Meng's? Yes.*

8.3.2.2.3. *If someone implemented HCF and didn't implement this, could anyone tell? Is there any way to verify conformance? Is it observable? Today we have backoff and recovery. It doesn't say which to use when. It is up to the HC.*

8.3.2.2.4. *We need to decide how to resolve this with the tabled motion of Jin Meng.*

8.3.2.2.5. *Jin Meng has a new revision of the document with the motion on the table, that is a compromise. We would need to take it from the table.*

8.3.2.3. *Move to take the motion regarding document 128r3 from the table.*

8.3.2.3.1. *Moved Jin Meng*

8.3.2.3.2. *Second Sid*

8.3.2.3.3. *Vote on taking the motion from the table: Passes 24: 5: 7*

8.3.2.4. *Motion on the floor: Instruct the TGe editor to incorporate the changes and additions on slides 11 and 12 of document 01-128r3 into a future revision of the 802.11e draft.*

8.3.2.4.1. *Moved Sid Schrum*

8.3.2.4.2. *Second Khaled Turki*

8.3.2.4.3. *Motion to amend: change to "provided on slide 12 and 13 of document 01/128r5."*

8.3.2.4.3.1. *Moved Jin Meng*

8.3.2.4.3.2. *Second Khaled*

8.3.2.4.3.3. *Motion to amend passes with unanimous consent.*

8.3.2.5. *Motion on the floor: Instruct the TGe editor to incorporate the changes and additions on slides 12 and 13 of document 01-128r5 into a future revision of the 802.11e draft.*

8.3.2.5.1. *Discussion*

8.3.2.5.1.1. *It is inappropriate to select and OBSS proposal before other alternatives that have not been presented have been seen.*

8.3.2.5.1.2. The chair notes that is the appropriate time to bring forward that presentation, as part of the debate on this motion.

### 8.3.3. Presentation of document 599r1, Matthew Sherman.

8.3.3.1. *“Cyclic Prioritized Multiple Access (CPMA): An Access Mechanism for Contention-Free Sessions”*

8.3.3.1.1. *A random backoff of the HC allows the possibility of a collision. Especially in the case where HCs can't hear each other. Jin Meng's proposal only helps if the HC can hear each other.*

8.3.3.1.2. *Proposes fixed deterministic post-backoff.*

8.3.3.1.3. *Provides a collision free protocol.*

8.3.3.2. *Discussion*

8.3.3.2.1. *Motion to put the motion on the floor back on the table.*

8.3.3.2.1.1. John K

8.3.3.2.1.2. Srin

8.3.3.2.1.3. Vote on tabling the motion: Passes 19 : 14: 7.

8.3.3.3. *Move to remove the motion from document 270 from the table.*

8.3.3.3.1. *Moved Michael F*

8.3.3.3.2. *Second Peter.*

8.3.3.3.3. Vote on removing from the table: Passes 19: 8: 8:

8.3.3.4. *MOTION 270-2: Move to empower the TGe editor to remove the EDCF-specific restriction on TXOP usage by replacing the first paragraph of 9.10.3 with the version on slide 5 of document 01/270r0, and by changing wording on TXOP usage restrictions elsewhere in the TGe draft as may be necessary to make the revised TGe draft consistent with this replaced paragraph.*

8.3.3.4.1. *Michael Fischer*

8.3.3.4.2. *Motion to call the question (Michael F)*

8.3.3.4.2.1. Vote on calling the question: Passes : Vote 27:8:3

8.3.3.4.3. Vote on the motion: Fails 23: 12: 5.

### 8.3.4. Recess at 5:30PM

## 9. Thursday, November 15, 2001, Evening

### 9.1. Opening

9.1.1. Called to order at 6:45 by Duncan Kitchin.

#### 9.1.2. Discussion

9.1.2.1. *Motion to modify the agenda to change the time of the draft vote to 8:30PM, and remove the word "presentation" from the item.*

9.1.2.1.1. *Moved Adrian Stephens*

9.1.2.1.2. *Seconded Peter J*

9.1.2.1.3. *Vote on the motion to modify the agenda: passes 19: 5: 3:*

9.1.2.2. *Motion to reconsider the motion on document 597r0 (Motion 4.2.3.4 in minutes).*

9.1.2.2.1. *Moved Srimi*

9.1.2.2.2. *Second Sunghyun*

9.1.2.2.3. *Discussion*

9.1.2.2.3.1. *Believes that the level of support has changed. In favor*

9.1.2.2.3.2. *The TSPEC that was adopted can serve the purpose? The Queue state element is needed, there is no argument that TSPEC could also be useful.*

9.1.2.2.3.3. *Clarify the intent of this motion: The intent is to update the motion brought back for reconsideration to an r1 version.*

9.1.2.2.3.4. *Request for the chair to rule on whether reconsidering a motion is the right way to bring forth a new paper. Believes the motion is out of order.*

9.1.2.2.3.5. *The chair rules the motion is not out of order. What we have here is a new revision, based on the debate from the first motion. The movers realize why the motion failed, and have revised the document to address the concerns. Believes this is the proper way to address this.*

9.1.2.2.3.6. *Call the question (Greg) without objection.*

9.1.2.2.4. *Vote on the motion to reconsider: Passes 16: 7 : 8.*

9.1.2.3. *Motion on the floor – instruct the editor to incorporate the normative text in document 01/597r0 into the draft.*

9.1.2.4. *Move to amend the motion to reference document 597r1.*

9.1.2.4.1. *Moved Peter J*

9.1.2.4.2. *Second John K*

9.1.2.4.3. *Point of Order – can a motion brought back for reconsideration be amended?*

- 9.1.2.4.3.1. Upon reading the section, the chair determines that the motion is put back on the floor, and amendments are in order.
- 9.1.2.4.4. Vote on the motion to amend: Passes 19: 4: 9
- 9.1.2.5. *Motion on the floor – instruct the editor to incorporate the normative text in document 01/597r1 into the draft.*
  - 9.1.2.5.1. *Discussion*
    - 9.1.2.5.1.1. This revision has been changed to delete the suggestion of deleting the TSPEC.
    - 9.1.2.5.1.2. (A quick summary of the document revision is given)
    - 9.1.2.5.1.3. This still looks like it is deleting the TSPEC.
    - 9.1.2.5.1.4. Suggestion to delete the periodic bit.
    - 9.1.2.5.1.5. In favor. It has a useful feature – it allows you to support layer 3 signaling.
    - 9.1.2.5.1.6. This needs to be harmonized with the fields that have been modified by other motions passed in this meeting. Editorial issues.
    - 9.1.2.5.1.7. It is possible to use report queue state elements and TSPECs at the same time.
    - 9.1.2.5.1.8. This is a simplifying technique. The objections from before have been fixed. The queue state is valuable.
    - 9.1.2.5.1.9. Queue states and TSPECs are viewed as orthogonal.
    - 9.1.2.5.1.10. Against this – there is another way of achieving this.
    - 9.1.2.5.1.11. This replaces a series of messages for each flow, with a single message for all flows. That is the simplification.
  - 9.1.2.5.2. *Call the question (matt S / Srin)*
    - 9.1.2.5.2.1. Question is called without objection
  - 9.1.2.5.3. Vote on the motion: Passes 22: 6: 6:
- 9.1.2.6. *Motion to reconsider the earlier motion concerning document 526r0.*
  - 9.1.2.6.1. *Moved Peter J*
  - 9.1.2.6.2. *Second Harry W.*
  - 9.1.2.6.3. *Discussion on reconsideration.*
    - 9.1.2.6.3.1. Why reconsider? There is new information, which is credible.
  - 9.1.2.6.4. The motion to reconsider is passed with unanimous consent.
- 9.1.2.7. *Motion on the floor – instruct the editor to adopt the normative text in document 526r0.*
  - 9.1.2.7.1. *Discussion on the motion*
    - 9.1.2.7.1.1. This motion allows incomplete message fragments to be passed up out of the MAC with the partial bit set.

- 9.1.2.7.1.2. What is the new information? How does it change how we thought about this? One person suggested that they didn't understand what this was about. Thought that it was an attempt to do higher layer processing in the MAC. It only enables the MAC to provide incomplete fragments on request. Individuals indicated they would change their vote based on that.
- 9.1.2.7.1.3. Given that there is no higher layer processing going on, how do you know what you are passing them to? Why shouldn't we look at this as something IP specific? The SBM protocol has visibility of all parts of the stack.
- 9.1.2.7.1.4. That would make it a sideways handoff. Not a layering violation. The normative text needs to make it clear that it is to the side.
- 9.1.2.7.1.5. There is only one interface – the MAC SAP.
- 9.1.2.7.1.6. In support of the concept. There needs to be some sort of reporting entity to register to receive this information.
- 9.1.2.7.1.7. SBM is a defined standard.
- 9.1.2.7.1.8. Against this. This is bad from a network engineering point of view. The MAC SAP can't randomly decide to pass up bits of information.
- 9.1.2.7.2. *Call the question (John K / Bob M)*
- 9.1.2.7.2.1. Vote on calling the question: Passes 26: 7: 2
- 9.1.2.7.3. Vote on the motion: Fails 16: 12: 7
- 9.1.2.8. *Point of order – the motion on reconsidering 597r1 was not in order on the day it was made.*
- 9.1.2.8.1. *Matt Fischer.*
- 9.1.2.8.2. *The chair rules the point of order is not timely.*
- 9.1.2.8.3. *Appeal the chair's ruling*
- 9.1.2.8.3.1. *Matt Fischer*
- 9.1.2.8.4. *Harry Worstell takes the chair.*
- 9.1.2.8.5. *Discussion on the appeal*
- 9.1.2.8.5.1. Roberts rules are read - indicating that points of order are out of order once the debate has begun.
- 9.1.2.8.6. *Call the question*
- 9.1.2.8.7. vote on the appeal : The chair's ruling is sustained 21: 3 : 7
- 9.1.2.8.8. *Duncan Kitchin resumes the chair.*

## 9.2. Review of the draft.

- 9.2.1.1. *The draft was put on the flash card and server at 7:59PM.*

**9.2.2. A 10 minute recess is called for by the chair, without objection.****9.2.3. Call to order at 8:25PM**

9.2.3.1. *Motion to modify the agenda to move the time specified for the draft vote from 9:01PM.*

9.2.3.1.1. *Moved Greg Chesson*

9.2.3.1.2. *Second Adrian*

9.2.3.1.3. *Point of information – why? Because one hour is needed for the correct version posted at 7:59PM.*

9.2.3.1.4. *Point of information – do we need a presentation? No, it will take place in the working group.*

9.2.3.1.5. *Discussion*

9.2.3.1.5.1. *If we vote at 8:30, it is a vote for previous version? Yes, we have been issuing versions of the draft as we proceeded with editing.*

9.2.3.1.6. *The motion to amend the agenda passes by unanimous consent.*

**9.3. New Business**

9.3.1.1. *The chair moves to Harry Worstell*

**9.3.2. Motions**

9.3.2.1. *Motion: Request the 802.11 WG to schedule a joint session of task groups e and i at all future plenary and interim meetings at which both task groups meet.*

9.3.2.1.1. *Moved Duncan Kitchin.*

9.3.2.1.2. *Second Michael Fischer*

9.3.2.1.3. *Discussion*

9.3.2.1.3.1. *Is there a minimum time for the session? It will be set by the chairs of the group and the chair of the WG. This is an action item for the WG chair.*

9.3.2.1.3.2. *There is concern about the way TGh is involving the MAC. They need to be involved also.*

9.3.2.1.3.3. *Suggestion to make an additional motion with TGe and TGh.*

9.3.2.1.3.4. *Call the question (Srini)*

9.3.2.1.3.4.1. *Vote on calling the question: passes 21: 1: 3*

9.3.2.1.4. *Vote on the motion: Passes 30: 0: 1*

9.3.2.2. *Motion: Request the 802.11 WG to schedule a joint session of task groups e and h at all future plenary and interim meetings at which both task groups meet*

9.3.2.2.1. *Moved Duncan Kitchin*

9.3.2.2.2. *Second Greg Parks*

9.3.2.2.3. *Discussion*

9.3.2.2.3.1. *TGe and TGi and TGh all have common issues. It would have made more sense to have e, h, and i all in one session.*

9.3.2.2.3.2. *We do have some down time this week.*

- 9.3.2.2.3.3. The need for e, h, and i together is not immediate. The open issues could be clarified in one meeting, not continually. We don't need to address that now. Would like to go ahead with these two separate motions.
- 9.3.2.2.3.4. Not sure we need to meet with h every time. Ballot comments might be adequate.
- 9.3.2.2.3.5. Motion to amend: remove the word "all"
- 9.3.2.2.3.5.1. John Kowalski
- 9.3.2.2.4. *The chair moves to Duncan Kitchin*
- 9.3.2.2.4.1. This motion is requesting the WG chair for time. If the TG chairs say we don't need the time, the WG chair will comply.
- 9.3.2.2.4.2. Nothing in these motions preclude having both of the meetings concurrently.
- 9.3.2.2.4.3. If the chairs are meeting to do this anyway, why are we making these motions at all? This makes the request come from the group, not the chair. Without this formal action, it might fall through the cracks.
- 9.3.2.2.4.3.1. Second to the amendment: Sid Schrum
- 9.3.2.2.4.4. Discussion on the motion to amend
- 9.3.2.2.4.4.1. Call the question (Duncan / Michael)  
Called without objection
- 9.3.2.2.4.5. Vote on the motion to amend: Fails 6: 10: 11
- 9.3.2.2.5. *Discussion on the main motion*
- 9.3.2.2.5.1. Withdraws objection and entrusts the chair
- 9.3.2.2.5.2. Call the question - no objection
- 9.3.2.2.6. Vote on the motion: Passes 20: 2: 9
- 9.3.2.3. *Motion: That TGe asks the working group to empower the January Interim meeting of TGe to be able to ask the working group to issue a letter ballot.*
- 9.3.2.3.1. *Moved Duncan Kitchin*
- 9.3.2.3.2. *Second Greg Chesson*
- 9.3.2.3.3. *No discussion*
- 9.3.2.3.4. *Adopted by unanimous consent.*
- 9.3.2.4. *The chair moves to Duncan Kitchin.*
- 9.3.2.5. *Motion – to request the 802.11 WG to schedule meeting sessions so as to stagger times of lunch and dinner breaks.*
- 9.3.2.5.1. *Moved John Kowalski*
- 9.3.2.5.2. *Friendly amendment – and “and further to distribute menus.*
- 9.3.2.5.3. *Motion to recess for 5 minutes*
- 9.3.2.5.3.1. Vote on the motion to recess: Fails 7: 13: 10:
- 9.3.2.5.4. *Friendly amendment – and “and to further instruct the chair to request mints.*

9.3.2.5.5. The motion fails because of no second.

9.3.2.6. Call for orders of the day: it is now 9:01

9.3.2.7. Motion: Instruct the editor to create 802.11e draft standard revision D2.0 from the contents of D1.9-1, and thereafter ask the 802.11 WG to create a letter ballot requesting the WG to forward the 802.11e draft standard D2.0 to sponsor ballot.

9.3.2.7.1. Moved Harry Worstell

9.3.2.7.2. Second John Kowalski

9.3.2.7.3. Discussion

9.3.2.7.3.1. If this fails we will have to go back through the comment resolution process. Would encourage waiting until the next meeting.

9.3.2.7.3.2. This group doesn't operate that way. There will be the same work to do either way. They still have to be resolved.

9.3.2.7.3.3. We have seen great improvement from the last letter ballot.

9.3.2.7.3.4. Call the question

9.3.2.7.3.4.1. John

9.3.2.7.3.4.2. Srin

9.3.2.7.3.4.3. Point of information – how many letter ballots have been resolved? No formal record is kept since the previous ballot failed.

9.3.2.7.3.4.4. What happens to motions that were made and not included? They will be in the next draft.

9.3.2.7.3.4.5. Vote on calling the question: passes 35: 2: 4

9.3.2.7.4. Vote on the main motion: passes 35: 2: 6

9.3.2.8. Any further new business?

9.3.2.8.1. None

### 9.3.3. Move to adjourn

9.3.3.1.1. Matt

9.3.3.1.2. Harry

9.3.3.2. Adjourn with no objection.



**IEEE P802.11  
Wireless LANs**

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**Minutes of TGf Austin, TX November 2001**

**Date:** November 14, 2001

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**Abstract**

Minutes of the November 2001 Meeting in Austin Texas.

TGf Mtg Nov 12, 2001

Call to Order 2:45pm.

Minutes Number for TGf Austin Number 575

**Motion to Approve Minutes:**

**moved: Harry H, Kevin H. unanimous**

Goals: for Nov.

Review comments resulting from LB.

Under Venus//Submissions/GroupShareArea/TGF/802-11F temp.docs/

Are letter ballot comments sorted in different manners. (Clause, author, or type).

Also 2.0 draft is there for reference.

Also a file from Bernard B. which has his comments for the LB.

Discuss possible plans for getting the work done.

No Vote primary issues:

- Sequence numbers

- Context block – who defines what.

- IPSec vs “reasonably secure”

- Various notes about SAPs etc.

- Remove config of Aps

If we work on the topics in this order then we might get all done in a timely fashion.

**Move to Adopt Agenda:**

**Moved: Jon R. Second: Richard Paine**

**Vote: 6,0,0**

Proceed to resolve No Vote issues.

Sequence Numbers:

- Comment that Sequence numbers could cause a problem.

- The .11 MAC is the source of the Sequence number and thus the size is defined elsewhere.

Only 5 places use sequence numbers: 4.5, 4.7, 4.8, 4.10, 4.11.

.11 Standard requires that only one association is maintained at one time.

In the standard there is no place that enforces this situation.

The use of sequence number will help to enforce this requirement.

The sequence is the only reliable piece of information that the APs have to determine the most recent request of association. The station must recent the number at each MAC reset. The APs can then use this number to help determine the correct AP to be associated with.

There is a chance that the number will roll over often, but the AP can still expect the number to be one greater than the previous number mod 4096. So if the AP says that the last sequence number was 4095 then the association frame would use 0, then how is the AP to make the reassociation determinations.

The discussion continued looking at some more examples.

The idea was that the first AP would have an association.

The AP might think that he is associated with a mobile station, but when it receives the Reassociate message

Conformant Mobile stations will only attempt to associate to one AP at a time.

Discussed more scenarios of how the sequence number is/is not used.

If an Association request comes in, then the AP should do all the IAPP first prior to replying to the station, thus the sequence number would not have changed. This helps maintain the ordering that was desired. The “oldest” number should be from this request, and not in any other message to this or any other AP.

Choices:

- Remove Seq Number usage for single Association requirement.

Explain how to couple Seq Number & time for AP to compare Age.  
Add backup language that says don't send assoc resp until AP and DS work is done. To avoid out of sync problems.  
Use Time instead of sequence number.

More discussion, review comments from letter ballot comments.

After looking at all the comments, the consensus was that what was needed was a description of how the sequence was used, and how an AP can use it to determine the age of the request.

With only 20 minutes left, we looked at some of the remaining issues to think about overnight:

Context Block definition. The idea was that the owner of the context is who should be defining the block. The idea is that other .11 groups may want to pass information from an old AP to the New AP, then the set of information would be defined by the originator of the context block. The idea is that .11f is adding a transportation of information, not the decoding of said data.

IPSec vs "reasonably secure". If your AP's are able to talk with each other via some DS system, the .11f document is not defining a new Data transport. IPSec is only one way of doing something. If the network is secure enough to send data, then it should be secure enough to send the IAPP frames. IPSec would be one way to increase the level of security.

Mtg to resume 8am in Texas 1, then from 1-9:30 in Hillcountry D.  
Mtg on Wed and Thurs. is in Hillcountry D

**Recess 5:32.**

**Nov 13, 2001:**

**Meeting resumed Tuesday 8:05 am.**

A Paper about removing SLP maybe presented later today by B. Boskowitch.

Text to address comments about Sequence numbers was to be prepared by Bob and Kevin.

Kevin was not able to feel good about the use of Sequence numbers to determine the age of the request.

Kevin felt that the AP would get a Sequence number and then the next time it got a number may be some time in the future that would make the number be some value from 0 to 4095, but there is no way to determine the relative value of the new sequence number.

Bob didn't agree with the argument, and proceeded to give an example of how to determine this relative relationship.

Kevin argued that a timebased scheme would be better. Although, because there is not a global timebase, this is not guaranteed either.

Discussion continued on whether or not sequence numbers were of some value.

Time of arrival of an IAPP message vs the arrival of a management frame directly from a STA has less determination than the sequence number.

The IAPP mechanism allows AP to deliver information when a STA associates with a new AP, and to allow AP to do garbage collection faster than it could otherwise.

The use of the sequence number allows us to convert to a common timeline.

If we derive the minimum time between two sequence number, which is the min size packet at the max rate, and as long as that time has elapsed, then I can recognize that that the new sequence number is newer. If I get a sequence number with a lesser number, then this indicates that the local association is newer. A small sequence number is stored, and then a larger sequence number is received, then I must determine the time elapsed in order to determine which event was earlier.

Discussion continued on usage of sequence number to anchor time vs usage of time only.

If the original number is a. and the new value is x, the questions are if  $a=x$ ,  $a<x$ , and  $a>x$ .

If  $a=x$  then the AP should accept the request.

If  $a<x$  then the AP should accept the request.

If  $a>x$  then this is the issue to resolve. This is the one that causes the concern.

If you make the wrong decision, the station must correct the problem, and all reasonable protocols are two-way protocols, and even if they get confused for a moment, they should be able to resolve the connection.

While we think about this , we then looked at the context block definition.

A comment was made that TGf is thinking that they need to accommodate the TGf group, and therefore a joint mtg should/maybe needed to be held.

The Context block needs to be defined by the originator/consumer of the information itself. IAPP should only be concerned with transporting the information.

The restatement of the issue:

Context Block

Who defines?

What happens if the contents instruction fails?

When sent? Bi directional or single?

All the comments seemed to be of one of these.

Propose: leave text in draft as is: 11MAC extensions spec content of context block and use of the info therein. 11F only transports and does not interpret that info. Bi-direction -- since since TGf does not look inside, it can state that single direction is (or is not) not sufficient.

Move to reaffirm current TGf position per above:

Moved: Jon Rosdahl

Second: John Hughes

Vote: 6,0,1. motion passed.

(Comment to be posted to all tan colored comments (burnt sienna for those color professionals)).

discussion of 5.3 Secure operation of the IAPP.

The issue is whether IPSEC is being required or if it is a suggestion.

Review of the comments on the issue:

Why is IPSEC and 802.1X mentioned?

Is IAPP secure or not secure enough?

How do you secure Broadcast IAPP Traffic?

IPSec is too complex.

How does IAPP protect against non-Aps from sending AP msgs?

Assumption: not all connections to the net interconnecting APs are trusted – Therefore, need to segregate TGf msgs into separate AP-AP msgs set that has message integrity ( has authentication and validity)

Can we prove who it is that sent the message?

Complexity: Scalability of the use of IPSec. (n\*(n-1)) seems too much.

Details of when to use IPSec or any other security means?

Choices:

Leave TGf msgs “open”, i.e. protected only to extent other msgs are protected in the interconnecting fabric.

Secure communication between Aps to only AP in the ESS

Need to spec how to do this.

APs authenticate to what/whom?

A straw poll was taken to determine if there was interest in pursuing either or both choices for discussion, and there seemed to be some indication that there was some interest.

What is the consequence of leaving this open? If a machine inserts a rogue message, then it could send malicious messages to effect the AP usage.

One suggestion was to point out that the usage of a VPN between the APs could be done to solve the security issue.

If the problem you are solving is the connection of the APs over a public domain, then a VPN may be a good solution.

What real goal is, is that only APs use our messages and only APs communicate the messages.

Suppose each AP uses a shared Key, and because it knows that there is one key per ESS then we have reduced the issue to only the initialisation issue.....rather it doesn't because it keeps the tunnels still setup and have to maintain. Other options would be to create the tunnel on demand, but it would be overly burdened, but the use of 802.1X which gives authentication of Identity, but not the security of the message itself.

Use of IPSec for crypto, but collapse keys to shared (same) key for all APs. Key received from "SLP" during initialization.

Use of IPSec and it's protections vs encryption of AP messages (with common key).

Look to recess, and then reconviene at 1 pm in the Hillcountry D (panhandle room)  
We will resume discussion at that time.  
Recess 9:58am .

Called to order in the Hillcountry D Mtg room 12:03 on November 13, 2001.

Resume the Sequence number discussion to try to resolve the open issue.

Bob O'Hara's text:

Use of the sequence numbers for determining age of association requests:

1. Record the sequence number,  $s$ , of the Association Request or Reassociation Request Frame and the local time at which the frame was received.
2. When an IAPP-MOVE.indication or IAPP-ADD.indication is received for a station for which is indicated to be locally associated, compare the sequence number in the IAPP packet,  $x$ , with  $s$ , and the itme,  $t$ , is the difference between the arrival of the IAPP packet and the arrival of the local association request as follows. Use  $m$  as the value for the time to transmit the minimum number of null data frames to a multicast address at the highest supported data rate that would cause the sequence number to wrap to the current condition.
  - a.  $x < s$  and  $t < m$ ,      Keep association.
  - b.  $x < s$  and  $t \Rightarrow m$ ,      drop association.
  - c.  $x > s$  and  $t < m$ ,      drop association
  - d.  $x > s$  and  $t \Rightarrow m$ ,      keep association
  - e.  $x = s$  and  $t < m$ ,      keep association
  - f.  $x = s$  and  $t \Rightarrow m$ ,      drop association

This gives us a window of time where the information is useful to determine if an association is stale. The only thing available to the IAPP is the sequence number.

Discussion on case e: what is the likely hood of this case and the corresponding outcome.

There were examples of if  $x=s$  should the association be dropped or not. Both cases were exemplified, and the comment left unchanged. The idea is not to include this algorithm with the recommended practice, but rather to be the response to the comments from the letter ballot.

#### Proposed Response:

**Recommended practice to say: AP is to determine if Association is stale (and take specific action) when notification is received from OLD AP. The Sequence number from 802.11 MAC is provided to help with this determination.**

**See further explanation above ( Bob O. text). Note that while the sole use of sequence number is not necessarily sufficient, it is all that is provided by 802.11 MAC and is the best hint we can acquire.**

Moved: Jon R.

2<sup>nd</sup>: Bob O'Hara

vote: 3,1,0

Return to the Security discussion:

Either a policy of security by the IT manager or something on the AP has to change?

Start discussion on the Policy method.

Can you trust the users on the network?

Bob bosowitch, Remember to Hypocratic Oath :” Do No Harm”

Don't add something that will add complexity and won't scale.

An hierarchy approach can be used to solve the scaling problem.

Allow one AP to become a relay to APs that are far spread and disparant.

“Internet has only one problem: Scaling” (quote from Michael Dell).

Use of TLS or Radius or IPSec could all be used for the Relaying protocol.

Discussion on how Radius is used which is not a tunnel.

In Diameter(sp?), there is a tunnel. In Cops(sp?), it is a tunnel.

If one of these services are to be used, what is to be done to get them to relay data as they are all for key management?

IF you share the key , you still have to have n tunnels.

You can construct tunnels in realtime, and there would be 9 packet exchanges, and would take too long.

Discussion of keys and IPSec.

Any mesh network will not scale. You must find a way to relay in a reasonable method. So if you are not using mesh, then you have two alternatives: Star, or Point-to-point.

Possible Approaches:

Set up APs in ESS into an VPN.

Use IPSec for Crypto, but collaps keys to shared (same) key for all APs. Key received from “SLP”.

IPSec and it's protections vs encryption of AP messages (with common key).

Use hub to relay.

Point to point with dynamic connection crypto.

More discussion.

Discussion was about Ipsec and the use of keys and how the keys are to be managed. The questions that were asked if there was a real need to use IPSec and if there were concerns with getting keys and having unique keys or would we have to have a separate key for the AP and IAPP and .11i. 802.1X is used to get initial keys.

How does 802.1X correlete to the Wireless infrastructure?

If Radius or TLS or some other system is used, there still is a case for suffering a denial of service attack.

Recommended practice should indicate that a secure way should be available, but not dictate which it is.

Requirement = key to AP in secure manner

One way to do this is 1X for DS to AP then have way to get key to AP.

So we can assume AP has shared key.

So using key for ESP and need security parameter index for ESP – this can be function of

Destination AP address. Function may be null? MAC address is unique, IP may not be if V6.

Need to rekey every  $2^{32}$  packets between pair of AP (one direction). Then what? How change all AP keys....? IF not rekey, can not have replay protection.

Could not do the rekey, and skip replay protection

Exposure is diff depending on cryp algorithm (DES vs AES).

Is hassle of rekey worth replay protection?

You can take a learning approach, and only start to create a secure exchange after the first reassociation.

This gives a sparce matrix which is easier to manage. This does cause an itial hic-up that would be very slow on the first transition. You only have to authenticate at the start, and then just use the key given there.

More questions Is hassle of rekey worth replay protection?

Issue is deficulty of “instant” rekey of AP set?

$2^{30}$  reassociation would have to occur prior to needing to rekey.

Recess 2:45

Reconvene 3:26

Taking the notes from the Security issues, a call for volunteers to take and create text to present to the group as a prepared text.

Proposal: that a few people turn the following outline into some draft text, bring it back to TGF for review/approval as the position for TGF to take to resolve the LB comments regarding IPsec.

The following did: Robert, Dave and Kevin.

The cipher attack is  $2^{32}$  uses of the key rather than packet exchanges.

Now having looked at the top 3 main consolidated issues, we need to look at the remaining comments.

Bob O'Hara will lead the main group through the comments looking for consenses.

Dave and other volunteers secluded to the hallway to work on text.

Row 366 of "working Nov mtg copy of 11-01-522R3-F-LB 28 Ballot Comments (sort by type, clause, name).xls"  
Which was located in the shared folder of the Venus server.

Comment # 426:

Proposed Response: no changes to text have been made. The description of the relationship between the apme and the IAPP SAP is clearly described in clause 4. The IAPP does not use nor interface with the SME or MLME.

Line 370 Comment # 71:

Proposed Response: The Document is a draft Recommended Practice. It is a Recommended Practice and not a standard because it does deal with things above the layer 2 interface. The fact that it is a recommended practice does not preclude it defining packet and or Frame formats and protocols. The commenters recommend changes are rejected.

Line 371 Comment #72:

Proposed response: accepted.

Line 372 Comment # 1:

Discussion: is the deletion of the portion of the sentence make sense. Note that the AP wouldn't know that the WSTA is using Mobile IP. Does the sentence need to be reworded a little more to make it more clear?

Proposed response: Comment accepted in spirit. Text change made, end sentence at "... or to use Mobile IP."

Line 373 Comment # 2:

Proposed response: accept comment.

Line 374 Comment # 79:

Proposed response: This was removed for lack of support at letter ballot #1 and will not be reincorporated without supporting text and rationale.

Line 375 Comment # 93:

Proposed response: Add " and incorporating the station mangement entity (SME) of 802.11" to clause 1.3.

Line 376 Comment #179:

Proposed response: Text changed was made. This text is simply explanatory and has no effect on the IAPP implementation. It does have an effect on the reader of the IAPP recommended practice, however, and will be retained.

Line 377 Comment #268:

Comment: we have had some proxy suggestions to use CTCP or other transports.

Proposed response: UDP was chosen for the simplicity of not maintaining connection state or having to setup and tear down connections for each short IAPP exchange. The reliable delivery of TCP does not effect the operation or IAPP.

Line 378 Comment #348:

Proposed Response: The APME is simply the name used by this document to describe whatever is using the IAPP SAP. If an implementor chooses to have one (or ten) different items that access the SAP, IAPP doesn't care. They all behave as if they were the APME as far as this document is concerned.

Line 379 Comment # 365:

Line 380 Comment # 370:

Proposed Response: Comment accepted and text change made.

Line 381 Comment #513: See Comment # 514.

Line 393 Comment #514:

Discussion: short comments on what SCTP is, and not very many folks knew what it was. IF we change from UDP to SCTP, we would open ourselves for more comments that it is worth and would prevent us from making progress. If SCTP were to be accepted, it might make sense, but for now it does not.

Proposed Response: It is unknown whether SCTP is or will be widely accepted. Util that can be supported. UDP will be used, due to its wide support.

Line 382 Comment #539: See Comment #79.

Line 389 Comment #366: removed References.

Line 390 Comment # 373: Removed references.

Line 391 Comment #367: Removed NAT and DNS definitions.

Line 392 Comment #374: Removed NAT and DNS definitions.

Line 383 Comment #539:

Discussion on whether IAPP is a routing protocol or not.

Proposed Response: The sentence refers to layer 3 addressing, described later in the same paragraph. Since IAPP causes no changes to layer 3 devices, it is not a routing protocol.

Line 384 Comment #55:

Discussion of the ramifications of the Subnet participation. (Page 3 Line 9 of draft.)

Bob wanted to look at Section 5.5.

We have an hour scheduled for dinner, if we break early, we will still resume at 6:30 pm. This will give us more time for dinner. The preliminary text for Security will be posted and we will discuss this after dinner.

A Sign-up sheet was sent around as the book didn't make it into this session.

Approx 23 folks to sign in.

Recess at 5:11pm

Resumed 6:45 pm.

Reviewed List of comments to ensure that we hadn't missed any.

Line 385 Comment # 147

Proposed Response: It is described, see section 6.1.4 and 6.4

Line 386 Comment # 146:

Proposed Response: This paragraph is describing the Context Block parameter and how it affects the Status parameter. The valid values for the Status parameter described in the subsequent paragraph.

Line 387 Comment # 149:

Discussion: We do not see an issue here.

Proposed Response: The two Context Blocks are entirely different from each other and the parameter values in the two referenced services are not the same.

Line 388 Comment #150:

Review the IAPP-MOVE.response section. There is an issue that we don't provide status to the IAPP-MOVE.response packet.



Proposed Response: The Context Block can be null, but it is always present. This will be clarified in the text in 4.11.2,

Line 394 Comment #133:

Proposed Response: Accepted Done.

Line 395 Comment # 5: Accepted comment.

Line 396 Comment # 18:

Discussion the commenter is advocating for TCP adjustments when we are not referencing TCP.

The RFC indicated (2988) indicates a Round Trip Timeout of 3 seconds. If we add the offered Paragraph, then we reference a TCP RFC. This could lead to more NO votes. If we put just 3 seconds in , this may lead to more No votes.

Proposed Response: Accepted in Spirit. The Text will describe that retransmissions take place no more often than 3 seconds ..... (see editor's copy of response.

Line 397 Comment # 174: Accepted, and Editor will make change.

Line 398 Comment #197: Accepted

Line 399 Comment #199: Accepted.

Line 402 Comment #80: We find no use for the suggested service. Nor can we find a condition that would require one AP to cause the removal of a station association with another AP except through reassociation. That condition is already provided for in the service specification.

Line 403 Comment #81:

Proposed response: This was removed for lack of support at letter ballot #1. It is declined to be reincorporated without supporting text and rationale.

Line 404 Comment #540: See comment #80.

Line 405 Comment #541: See comment #81.

Line 406 Comment #646:

Commenter made no recommendation for change. Although his comment implies an implementation specific issue.

Proposed Response: The requested changes that are implied are details of an implementation and not required to be enumerated in the recommended practice.1

Line 407 Comment # 96: Done

Line 408 Comment #181: Done

Line 409 Comment #454: Done

Line 410 Comment #641:

We had to look up the word idempotent.(left as an exercise for those reading after this meeting.)

Discussion ensued.

Line 411 Comment #643: Done

Line 413 Comment #167: Done

Line 412 Comment #97: See comment #368

Line 414 Comment #368: Accepted with slight modification.

Line 415 Comment #378: Accepted with slight modification.

Line 416 Comment #715: See Comment #368

Comments were considered as a group and resolved.

Line 417 Comment #26:

Proposed Response: The Referenced language has been changed.

Line 418 comment # 31: Accepted comment change.

Line 419 Comment #218:

Reading of the comment took some time, but after review of the comment the discussion proceeded.

Proposed Response: Accepted the proposed change.

Line 420 Comment #379:

Review the MLME primitives to ensure proper operation.

Proposed Response: Deleted the last sentence of 4.1.4.

Line 421 Comment # 455:

Proposed Response: The language used in the document is correct for a recommended practice. This is not a standard, which uses the language requested by the commenter.

Line 422 Comment #474:

Line 423 Comment #707: See #474.

Comment #474 and #707 are identical.

Discussion of how to deal with rogue requests will be solved in the security comments from before.

Half of the comment may be resolved by IAPP security, but Tgi will be dealing with the other half.

Proposed Response: We believe the problem of a client sending an IAPP message to an AP will be solved by securing AP to AP traffic (see clause 5.3). The second threat noted of hijacking data by impersonating MAC addresses should be an issue for TGi, since that is in an 802.11 MAC Protocol.

Line 572 Comment #72:

Line 424 Comment #73:

Line 445 Comment #74:

Line 619 Comment #75:

Line 727 Comment #78:

Comments were all the same, and were resolved by Comment #71.

Line 430 Comment #163:

Because of the sort done, section 4.10 is being done prior to the comments for the add. Section.

Proposed Response: The text is clarified to indicate that the APME is the entity issuing the Move.request.

Line 431 Comment #226:

Proposed Response: Accepted.

9:00pm. Dave Left to go find ice cream for the group staying to the end.(9) but the Hotel informed him to that with only 2 servers in the hotel, we would not be able to get the ice cream in time. The hotel indicated that he could go get it himself.

Line 432 Comment #253:

Proposed Response: The order is now specified.

Line 435 Comment #438:

Proposed Response: The IAPP-Move.request can be sent to the old AP to which it was originally sent. The important part of this action is the Layer 2 Update fram that is sent to correct the forwarding direction of Layer 2 devices.

Line 437 Comment #498:

Proposed Response: The order is now specified.

Line 440 Comment #553:

Proposed Response: The order is now specified.

Line 441 Comment #676:

Discussion on the correct response was enjoyed as we joked at the facitious answer should be.

It was determined to postpone comment at this time.

Line 446 Comment #160:

Proposed Response: Text is added to 4.11.4 to indicate that the Status is transferred to the other AP. The text in 6.5 will be updated to include the Status, as well.

Comment from Jagannatha found that the port number for IAPP was assigned. To 2313/tcp and 2314/udp they were obtained by Henri Moelard from Lucent.

Line 448 Comment #254:

Proposed Response: See Comment # 160.

Line 450 Comment #444:

Proposed Response: Not accepted. The Context Block may be null, and test to this effect is added to 4.11.2, but may not be invalid.

Line 451 Comment #477:

Proposed Response: See comment #160.

Line 452 Comment #499:

Proposed Response: See comment #160.

Line 453 Comment #594:

Proposed Response: See comment #160.

Line 454 Comment #710:

Proposed Response: See comment #160.

Line 456 Comment #118:

Proposed Response: Added text to 4.11.4. "the peer IAPP instance in" .

Line 457 Comment # 192:

Proposed Response: See Comment #160.

We will start at Line 458 Comment #407 tommorrow.

A Copy of the working file was saved out to Venus Rev4. which includes the colors and proposed responses.

Meeting recessed at 9:30pm.

Meeting resumed 1:13 pm.

Review the current status of comment resolution.

LB Tech Comments:

458-366 = ? alas, last technical comment is 734.

LB E Comments

365, editor has done some of them.

Discussed possible roadmap to finish the work.

Possible extension time of either 12 or 18 months to keep the .11f PAR alive. PAR will expire Mar02 if no action is done.

Report from Security Volunteers:

As they started down the path, they determined that they may need to do something significantly different, but that would cause a significant change that may not be acceptable having we have gone through 2 letter ballots already. The concern was whether we would/could remove SLP or not.

Kevin: If .11i uses 802.1X for authentication, then the back-end security service would be to use RADIUS. This leads us to a possible choice of if the AP has to talk to a RADIUS server anyway, so one place it could place the binding lookup (name service). The one major distraction is that it doesn't support push for re-keying.

Robert: RADIUS can be set to rekey on a periodical basis.

Kevin: If we use some other authentication service, and don't use the RADIUS server, we have to add more services in a more complex way.

Dave: But it won't help in the small business case where the RADIUS server is not available, and so we need to determine whether or not the Security service is really worth the price to pay for it.

Kevin: You want to have a model that supports both the Enterprise and SOHO, but still have the full level of Security.

Robert: You can define the algorithm to make even the 2 AP SOHO case can work by manually loading the Security keys.

How long is Robert's presentation: 8 Slides: 15 minutes or more if questions were to be asked.

Presentation is 11-01/564r0: Improvements for formation of

Robert Moskowitz.

Will show why SLP is not as good a choice as RADIUS/AAA model.

SLP Model of forming ESS.

Challenges of SLP were listed.

RADIUS/AAA model of forming ESS.

AS = Authentication Server

Diameter requires TLS.

RFC2945 talks about how to set up the Diameter session.

RADIUS, TLS, and SRP required in place of certificates.

There is some issues from 11i that it is progressing on the use of SRP, AES and other schemes.

AAA policy to AP:

When an AP authenticates to an AS: AP receives List of all active APs, and Equivalency Policy.

Permits greater breath of Equivalency Principle: Avoids Flag days for upgrades.

AS as IAPP relay: can provide encrypted/authen channel, and can be used when individual state is impractical.

Conclusions: SLP by 802.11f is unnecessary, and RADIUS/AAA can met the requirements of .11f.

Adding Radius may cause more "no" votes that not removing SLP.

Changes to WECA are due by Nov of the year preceeding the year it will appear in the WECA test suites.

We asked for the AP's to use 802.1X for authentication, and received a lot of "NO" votes.

Those who care about security vs those that don't, will cause the answer to be different.

The idea of having options in a recommended practice seems to be odd.

The question of if the wire is secure enough.

Robert: 19 years of corporate experience. The new items may not make the network worse. (relative to the security issues). 10 years ago, you could get away with just throwing packets across the wire. After an experience of \$10M at Chrysler, we must secure any and all new additions.

Kevin: What is happening here in the most general sense. We have a device that is generating some packets, and thus according to Robert would need to be secure.

Robert: you would need to at the very least show the risk and the vulnerabilities of the proposed device. Evaluate the different attack models and show that how you would deal with it.

The text from the volunteers to look at:

The message exchanges of the IAPP should be protected via the use of the mechanisms specified in this section.

When the AP first contacts the registration service, the service will identify to the AP a radius server from which it may obtain a key and Cipher Suite.

The Key and Cipher suite will be shared by all the APs in the ESS and is used to protect AP to AP Communications.

The Ap.....

Discussion of the text in its entirety was done, the remaining lines were not typed in, as the block of text will change. Question is how often does the ReKeying get done, and how does this occur.

This seems to imply that in order to get a more secure system, you will need to add a crypto engine and some backend services.

If we change our definition of Reasonably secure, we will need to have more time to solve the issue.

2 of 19 (4 didn't vote) said that securing the traffic from AP to AP is not a critical issue to solve.

One view (Jon) is that the traffic channel should be as secure enough to handle data, it should be secure to handle IAPP.

The other disenter, stated that the risks involved, are so much lower, and if you are worried about the AP issues, you would have secured the channel anyway, and then you wouldn't have a problem with the eAP traffic.

The IAPP messages are generated external to the Station, and so it cannot attempt to solve the security issue.

But that was pointed out that this is a problem with or without AP messages.

IF you are the only one on the AP, and then you move to another.....

Discussion continued.

Securing the traffic should be the same importance for the main traffic stream as the AP messages.

If we assume we secure IAPP traffic, should we also then replace SLP with RADIUS/AAA?

Brief history of RADIUS/AAA was given.

The question was rephrased to say :

If we assume we secure IAPP traffic, should we also then replace SLP with "AAA"?

More comments:

"AAA" is not a service location framework or service. Stating we are replacing SLP with "AAA" is not strictly precise.

When do you need discovery,

SLP is providing a lookup service, the question is does AAA protocols provide a lookup service?

We tagged SLP as a lookup service and registry service, and then allowed it to be the address mapping service also.

Mark: We have identified we need the following 4 services: Address mapping lookup, discovery, Authentication, Privacy.

Kevin: AAA is essentially a database of some preconfigured stuff. Then it can be used to do some authentication.

This identifies that AAA is missing two of the 4, but we do get the other 2.

IF RADIUS is used, you have to touch the device to deploy anyway.

Discovery is hard, and DHCP and SLP do provide the solution for this.

Recess for break 2:45:

Reconvene 3:37pm

Formal Motion:

**Move that TGF shall include Authentication, privacy, address a mapping lookup, discovery services and secure IAPP traffic between APs..**

**Moved: Butch, 2<sup>nd</sup> Jo-Ellen**

Discussion: Victoria wanted to think about if it is necessary to define the mechanisms to meet the requirements. It was noted that mechanisms needed in the motion are not differing mechanisms of the same type.

**Vote: 5, 0,1 Motion Passed.**

Now having made this vote, we will go back and look at some more letter ballot comments.

Currently the rules require that text is available at the Meeting to start a letter ballot.

Drafts that include what was determined during this meeting, and then maybe having another revision that includes the alternative text that is assigned out.

Editing by the Editor will need to be done to create the Draft.

Return to Editing Proposed Responses:

Line 458 Comment #407:

Line 459 Comment #679:

Discussion of 458 and 459. The Move request is issued, and the move confirm has a timeout. The New AP can wait until the timeout and then retry. What is missing is possibly an acknowledgement that the context was received. It might be that this is a case that TCP would sure be nice to resolve this issue.

If we add a Move\_response requires an ack on the Move\_Reply packet.

If we use TCP, there are 7 packets extra needed to establish/cleanup the connection.

There may be some associations set up in TCP for the Security anyway.

The only way to get the benefits is to pay the cost of the overhead.

Add\_notify is addressed to the subnet, and so would use UDP.

Utilizing both would be requisite.

Can multiple sources open the same well known port? Yes, ftp is kicked in the head.

The entire move exchange would be done via TCP, and then the destruction of the context would be done after the return from TCP.

Proposed response: TCP will be defined to be used for the MOVE handshake between new AP and old AP. When the ACK is received for the Move-response packet, the context can be discarded. This does not require that a connection be set up and torn down for each MOVE handshake, An implementer can be smarter about adding hysteresis to the connection.

Line 460 Comment #651:

Proposed response: This is an abstract service interface and not an implementation. The services are completed in zero time. Conceptually, the instant the request is issued, the confirm comes back. There is not any epsilon.

Line 461 Comment #307:

Proposed Response: the second status value has been added.

Line 462 Comment #99:

Proposed Response: Added text to 4.2.4 and removed from 4.2.1

Line 463 Comment #380:

Proposed Response: See comment #99 (he was happy to accept it.)

Line 464 Comment #7

Line 465 Comment #32

Line 466 Comment #100

Line 467 Comment #182

Line 468 Comment #219

Line 469 Comment #234

Line 470 Comment #241

Line 471 Comment #352

Line 472 Comment #381

All the from lines listed from 464 to 472, are accepted.

Line 473 Comment #482

Line 474 Comment #577

Line 475 Comment #59

Proposed Response: Failure status added

Line 476 Comment #523

Line 477 Comment # 648:

Proposed Response: accepted.

Line 478 Comment #154:

Proposed Response: Failure status is added

Line 479 Comment #168:

Proposed Response: Failure status is added.

Line 480 Comment #456:

Proposed Response: Failure Status is added.

Line 481 Comment #153:

Proposed Response: 5.1 will be made consistent with the text in the revised 4.1 and 4.2.

Line 482 Comment #382:

Proposed Response: Accepted

Line 483 Comment #102:

Proposed Response: accepted

Line 484 Comment #184:

Proposed Response: accepted

Discussion ensued to look at the next 3 comments as they seemed to address the same issue:

Line 485 Comment #103:

Line 486 Comment #185:

Line 487 Comment #220:

Proposed change for the 3 is Accepted:

Line 488 Comment #242:

Proposed Response: Since this is in the "Effect of Receipt" clause for this service primitive, it is the IAPP that is responsible.

Line 489 Comment #353:

Proposed Response: The Text has been clarified.

Line 490 Comment #458

Proposed Response: Because.

Line 491 Comment #483

Proposed Response: Text is clarified.

Line 492 Comment #515: See Comment #514.

Line 493 Comment #578  
Proposed Response: Accepted.

Line 494 Comment #653  
Proposed Response: See Comment #460

Line 495 Comment #654:  
Proposed Response: See Comment #460

Line 496 Comment #8:  
Proposed Response: There is not a possibility of a failure to terminate.

Line 497 Comment #104  
Proposed Response: The request will be executed successfully and the SUCCESSFUL status will be returned.

Line 498 Comment #235  
Proposed Response: Insufficient information in the comment to determine the change that is requested.

Line 499 Comment #243  
Proposed Response: As an abstract service interface, the status values do not need to be implemented and take up just as much code and storage as if it is not present.

Line 500 Comment #354  
Line 501 Comment #484  
Line 502 Comment #579  
Line 503 Comment #60  
Line 504 Comment #525  
Proposed response to 500-504: There is not a possibility of a failure to terminate.

Line 505 Comment #221  
Proposed Response: Accepted.

Line 506 Comment #244  
Line 507 Comment #485  
Line 508 Comment #580  
Proposed Response: declined.

Line 509 Comment #538  
Line 510 Comment #187  
Line 512 Comment #657  
Proposed Response to 509, 510, 512: Text was clarified.  
Discussion on proper text.

We will need to start on Line 511 Comment #475 tomorrow.  
Updated file posted as R5 in the shared folder.  
Meeting recessed: 5:30pm.



11-15-01

Meeting Resumed 8:15.

Announcements of TGg status. TGg will have some votes today at 11:30 and 4:15.

We will be done at 3:00 pm today for our allotted time slots.

Friday Plenary will start new business with the TGg question.

We hope to complete the security topic by Jan Meeting, and to be done in an Ad Hoc meeting.

Resume Comment resolutions.

Line 511 Comment #475:

Line 513 Comment #708

Proposed Response: The IAPP manages station context in APs in a fashion that allows only a single AP to hold context for a particular station..... See comment file.

Line 516 Comment #107:

Line 518 Comment #188:

Proposed Response: Clarify wording to make it clear that TIMEOUT is generated in 3 out of 4 possible cases and SUCCESS in the other. (editor to make change).

Line 519 Comment #245

Line 520 Comment #488

Line 521 Comment #583:

Proposed Response: Decline, the working is accurate and matches the usage in the 802.11 standard.

Line 523 Comment #660:

Proposed Response: Reference has been added.

Line 524 Comment #662:

Proposed Response: Reference has been added.

Line 525 Comment #222:

Discussion if TGg does or does not make a change, will it be effected by this comment. Association was allowed prior to Authentication to allow WSTA to pre-Associate prior to roaming. Unless we send a layer-2 packet is sent, bridges and routers will not be updated to correctly shown the correct route. More discussion on the 802.1X exchanges that occur, and what happens if the roam happens in between the exchange. Some question what is the real concern. Seemed that leaving it as is may be a good answer.

Proposed Response: IT is not clear what problem the commenter is trying to address. The current behaviour of an AP using the proposed 802.1X authentication of 802.11i would be to drop all packets destined for the station until the authentication has completed. Thus no frames, other than 802.1X would reach the station. This is the same behaviour that would result from the proposed change since all frames might not reach the AP until after the Layer 2 Update Frame is sent. The reason to send the Layer 2 Update frame as early as possible is to direct all frames for the Associating station to the new AP, so that they can be dropped into the bit bucket until 802.1X authentication completes, rather than being sent to the old AP, where they will be transmitted (and retransmitted) into the BSS that the station has left. This eliminates the potential waste of bandwidth in the old BSS from transmitting frames that have no hope of being delivered successfully.

Line 526 Comment #403:

Proposed Response: See disposition of Comment #222.

Line 527 Comment #489: done

Line 528 Comment #584: Done

Line 529 Comment #663:

Proposed Response: No. The commenter is encourage is perform such analysis and provide results to the working group, however the working group believes it is not a problem.

Line 531 Comment #459

Proposed Response: This is not a show stopper. The loss of the ADD-Notify packet will simply leave another AP with the believe that a station is associated with it, causing that AP to forward traffic for it to the BSS. The loss of the layer 2 Update frame may cause frames for a station to be sent to a segment on which the AP with which the station is associated can not receive those frames. When this occurs, the station will not get its traffic until it makes a transmission of its own. At this point the layer 2 devices will be updated to forward in the direction of the station.

Line 532 Comment #712

If this is a totally Wireless LAN, then there is no Wired LAN to substantiate his comment.

Proposed Response: There is nothing in 802.11f that is dependent on a specific DSM. Therefore, the concerns expressed are not a concern.

Line 533 Comment #247

Line 536 Comment #491

Line 537 Comment #586

Proposed Response: See disposition of Comment #489.

Line 534 Comment #749

Discussion: Since the commenter invented these status values, the working group does not know when they are generated.

Proposed Response: The ADD.confirm is generated only when a station causes the generation of an ADD.request by successfully associating through an Association Request. There is no OLD AP in this request. So, there is no possibility of Unregistered current-AP. If the association Request was successful, there is also no possibility of an Unrecognisable STA address. The Unregistered NEW-AP cannot be generated because the IAPP must have been successfully initiated in order to generate this confirmation, implying that it is also registered (see 4.1). Finally, the cause of an Unknkown Failure is unknown.

Line 535 Comment #384

Proposed Response: Done.

Line 538 Comment #108:

Discussion resulted in Clause clarified

Proposed Response: Accepted in spirit, different text inserted.

Line 539 Comment #223

Discussion of the specifics. If the ADD.notify fails the worst thing is that some other AP believes that a WSTA is still associated with it. Upon Receipt, regardless of the status, the action is the same.

Proposed Response: Declined. It is not felt that forwarding frames for a station should be dependent on the IAPP status.

Line 546 Comment #203:

Proposed Response: done.

Line 550 Comment #190:

Proposed Response: done.

Line 557 Comment #442:

Kevin said, if the MAC address is sufficient to cause a DOS, then "WOO WHO!" Snoop the wire and reak havoc.

Proposed Response: This problem must be solved by preventing the association initially, not having the APs try to solve this by restricting them to only responding to MOVE-notify packets.

Line 561 Comment #667

Sherry pointed out that excel does have auto correct if it is turned on. See options for Spelling.

Proposed Response: Reliability of a broadcast is dependent on the DSM used. IT is not in the scope of this recommended practice to invent a reliable broadcast mechanism that will work over any arbitrary medium.

Recessed for AM break: 10:04

Resumed Meeting at 10:33am.

Line 567 Comment #250

Line 568 Comment #494

Line 569 Comment #589:

Proposed Response: Text in 4.8.4 has been changed to clarify this.

Line 570 Comment #669:

Proposed Response: The difference is in having a way to identify old AP from the Reassociation Request frame and not having a way to identify the old AP (or even determining if there is one) from an Association Request.

Line 576 Comment #191:

Proposed Response: accepted.

Line 578 Comment #252

Line 583 Comment #497

Line 586 Comment #592:

Discussion...Using 802.11-99 as the precedence and source of recommendation.

Longer discussion. Straw Poll was taken to see if MIB value was to use. Small majority to add.

Proposed Response: This is an implementation choice that does not affect interoperability. It might affect the experience of the mobile station, when context is not returned from the old AP before the timeout expires. A MIB attribute will be added (text to be provided by Kevin)

Line 580 Comment #405:

Buzzer sound: Thanks for playing Please try again ☺.

Proposed Response: This is a request to change the 802.11 standard, not the recommended practice. This is not within the scope of the PAR.

Line 581 Comment #447:

Proposed Response: Since this is a recommended practice, leaving unspecified alternatives in the document is not conducive to the goal of interoperability. Further, other decisions have been made to resolve security comments that secure the mapping database. Therefore it would be a security hole to allow obtaining this information from another source.

Line 590 Comment #701:

Proposed Response: See disposition Comment #191.

Line 593 Comment #358:

Proposed Response: This is a definition of a service primitive, not a frame or packet. In the actual packet definitions in clause 6, the order is as requested by commenter.

Line 594 Comment #225:

Proposed Response: See disposition Comment #222.

Line 595 Comment #394:

Proposed Response: Accepted.

Line 596 Comment #445:

Discussion on what layer is the action happening on. How do we respond in light of the responses we have already done.

Proposed response: This may unnecessarily delay forwarding frames to the mobile station until the arbitrarily long delays between APs have expired. The layer 2 update frame should be sent as early as possible to prevent traffic being sent to the old AP and being sent to the wrong BSS (max retry times).

Line 597 Comment #205

Proposed response: accepted.

Line 598 Comment #446:

Discussion.....

Proposed Response: DONE

Line 600 Comment #476

Line 601 Comment #709:

Discussion .....

Discussion: if a response comes in after the timeout, the old AP number and the sequence number allows the AP to determine the context of the response. IF the information that is coming is useless, it is simpler for the higher layer to throw it out than have the lower layers try to maintain state.

Proposed Response: The effect has been clarified to indicate that the primitive is generated both on timeout and if a subsequent response is received from the old AP.

Line 602 Comment # 40:

Discussion:

If while you are doing your QOS operations, and ROAM, you must put things on hold while you are roaming.

Proposed Response: A Solution acceptable to the commenter can not be determined from the information provided.

Line 603 Comment #116:

Proposed Response: done

Line 604 Comment #137:

Line 605 Comment #136:

Sherry noticed that we were editing in the wrong col.

Proposed Response: The commenter has not provided enough information to identify the location to which the comments

Line 606 Comment #10:

Proposed Response: Done

Line 607 Comment #271:

Proposed Response: This is not a technical comment.

Line 611 Comment #560:

Change to Pink color and postpone response.

Line 612 Comment #42:

The order has been clarified and made consistent.

Line 613 Comment #82:

Proposed Response: This information is no longer needed and superceded by the information in 5.1.1 of the current draft.

Line 614 Comment #119:

Proposed Response: Accepted.

Line 615 Comment #132:  
Color change of the comment and left open.

We will meet back here at 1:00pm.  
Recess for Lunch 11:58, The room temperature will hopefully be corrected as the current temperature is "very cold."

Meeting Resumed 1:10 pm

Review the TGF Meeting Report that Dave will give to the Closing Plenary.

Motion re Misc Comment Resolutions.

**Moved: To Formally reaffirm the positions already recorded for comments since Monday as given in 522R6 (as of end of TGF sessions).**

**Moved : Butch Gladly 2<sup>nd</sup> Kevin**

**Vote: Unanimous (4,0,0)**

**Plenary Motion:**

**On Behalf of TGF: To Ask SEC to approve extension of the TGF PAR for 24 Months**

**-Note TGF expects 12 months to be sufficient to complete sponsor Ballots, but Exec Com Recommended a 2 year extension.**

**Moved: Bob O. 2<sup>nd</sup> Kevin**

**Approved Unanimously.**

**Moved: To Authorize the January 2002 interim TGF mtg to make decisions required to complete work to initiate a WG LB for TGF draft 3.0**

**-I.E. to prepare for and conduct a working group letter ballot to forward the 802.11F draft to sponsor ballot.**

**Moved: Butch eagerly 2<sup>nd</sup> Bagby; Vote: 3,2,1**

Jan. Goals:

- Complete LB28 comment processing
- Complete revised Draft probably v2.2
- Initiate New LB.

An E-Mail will be sent to announce when the draft(v2.1) is available prior to Jan Interim to allow some work to be done prior to the Interim mtg.

Resume to processing comments.

Line 616 Comment #364

Line 618 Comment #702:

Proposed response: The ESS is not limited to a single subnet. Thus the premise on which this comment is based is flawed.

Line 617 Comment #542 : See Comment 82.

Line 620 Comment # 210:

Proposed response: Accepted.

Line 621 Comment #259:

Line 623 Comment #504

Line 624 Comment #599:

Proposed response: Discussion: Kevin volunteered to write some text.

Line 622 Comment #399:

Proposed Response: The correct usage for a recommended practice is “recommended”

Line 625 Comment #682:

Proposed Response: UPnP was considered.

Line 626 Comment #725:

Proposed Response: This information is specified completely in the RFC 2608. The mandatory portions of SLP must be implemented.

Line 627 Comment #726:

Proposed Response: Done

Line 628 Comment #727:

Proposed Response: This is necessary for the service.

Line 629 Comment #11

Proposed Response: accepted.

Line 630 Comment #209:

Proposed Response: accepted.

Line 642 Comment #531:

Discussion: Declined: a hub has ports, just as a switch. Current designs may not utilize 802.1X, but this does not preclude such usage in the future.

Change comment color to Blue, and will be delt with the new text.

Line 643 Comment #15

Proposed Response: Accept “11-01-522R2 suppliment - Aboba MIB proposal LB 28.doc”

Editor to add text and information from file.

Chairman mumbled something about Secretary.

Line 644 Comment # 122:

Proposed response: Accepted.

Line 645 Comment #366

Proposed response: no Such a frame does not exist.

Line 646 Comment #369

Line 647 Comment #388:

Discussion: The request doesn't have a return, the confirm issues the status of the request.

Proposed response: Accepted

Line 648 Comment #409:

Discussion: Some installations the routers are not configured to pass some of the broadcast packets that the IAPP uses, so the question is if the Multicast address would provide any better coverage/support.

Proposed response: Without the registration service or its equivalent, it is not possible to determine the IP address of the old AP from its wireless MAC address. IP multicast is not commonly deployed and its inclusion here would add more protocols and complexity with little expected gain.

Line 649 Comment #464:

Proposed Response: clarified.

Line 650 Comment #465:

Proposed Response: According to 802.11, the DS is an arbitrary network, which may include multiple disparate layer 3 subnets.

Line 651 comment #123:

Proposed Response: Clarity is provided by reserving the other values, and action

Line 652 Comment #686

Color was changed to pink. (Kevin provided the following clarificatoin. Text will be added to drop duplicates.

Line 653 Comment #339

Response proposed: The maximum length that must be handled by a receiver that is defined by the network protocol used to transport, IP.

Line 654 Comment #125

Response proposed: No change is required. The term Sequence Number is not ambiguous.

Line 655 Comment #261

Response Proposed: The permitted values are implied form the size of the field , 0 to 255 bytes. The currently used address length is 6.

Line 656 Comment #432:

Response Proposed: Clarification Added to text

Line 657 Comment #448

Response Proposed: In the case described by the commenter the security of an association is not the responsibility of the IAPP, but of the association policies of an AP. The added complexity is not proportional to the momentary denial of service to the original legally associated station.

Line 658 Comment #506

Response Proposed: see comment #261.

Line 659 Comment #516

Line 670 Comment #517

Response Proposed: See disposition of comment #513

Line 660 Comment #601

Response Proposed: see #506

Line 661 Comment #729,

Response Proposed: see #409

Line 662 Comment #262

Line 663 Comment #507

Line 664 Comment #602

Text in the service primitives has clarified that this frame is generated by IAPP. Clarification as to the reference is added.

Line 665 Comment #730

Response proposed: DSAP and SSAP are 8 bits each.

Line 666 Comment #46: the correct usage for a recommended practise is followed.

The summary of the meeting is that we processed 305, we have 63 unprocessed as of the end of the mtg.

Closing statements.

Draft will be put up on the server as soon as it is available.

**Move to adjourn:**

**Moved: Butch ecstatically**

2<sup>nd</sup> Kevin

Vote: Unanimously.



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**IEEE P802.11  
Wireless LANs**

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**Minutes of meeting of TGg**

**Date:** November 12, 2001

**Author:** Carl Andren  
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**Abstract**

Minutes of meeting

Note: Synopses of comments are due to the secretary and may contain words not spoken by the commenter .

Meeting opened by Chair, Matthew Shoemake at 6:45 PM John Terry VC

Selection of Secretary:  
Carl Andren volunteered. Approved by acclamation.

Update and announcements by chair. History of the task group and voting rules. Review of agenda as shown at opening plenary. Strategy to meet objectives. Rules for submissions. Network rules.  
Above shown in: Document 11-01-607r0-G-TGg-Chairs-Status-Update-November-12-2001.ppt

Review of Agenda in document 11-01-545r0-G-802.11-Tentative-Agenda-for-November-2001.xls

- The Minutes of Portland are in: 11-01-347r0-H-TGh Minutes for the July 2001 session.doc
- Times are for guidance except those with a + sign. Those are for balloting.
- Discussion of closed balloting

**Motion to adopt agenda**

Dave Rickets, Stuart Kerry

Discussion:

Suggestion to move discussion times to decrease amount of time between 1 and 2 votes  
**Straw poll** on this suggestion. **33/17/5 passed**

**Move to remove 60 minutes from Thursday by deleting item 8.5 on that day.**

Fung/Zyren

No discussion

**Vote on amendment: 35/11/8 Passed**

**vote to approve agenda: 56/0/0 Passed**

**Move to approve adopt minutes**

Stuart Kerry/ Barry Davis

By unanimous consent the Chair will fix some editorial errors noted by John Coffey and return with a later vote to approve.

Call for additional papers to present.

Zyren 11-01-612r0 15 min  
Halford 11-01-436r2 45 min

Presentation of submissions:

11-01-480r0-G-Thoughts on ieee802\_11g.ppt by Weishi Feng  
(Marvell Semiconductor, Inc.)

Synopsis: if none of the existing proposals can get 75%, then he suggests a DQPSK with RS code. This would give 20 Mbps and 3 dB coding gain.

A discussion of patents was started. Author suggested that many patents exist on OFDM. Carl asked if the author knew how many existed for DQPSK.

Jim Zyren suggested in a **point of order** that the IEEE rules do not allow discussion of patents.

Ken Clements said that it only effected questions of the validity of patents.

Chair said that he would cut off debate if questions of patent validity came up.

None of the other presenters were ready to present tonight.

**Recess for the evening at 7:47 PM**

**11/13/01**

**Meeting called to order at 10:30AM by chair, Matthew Shoemake**

General submissions

Dr. Diaz GCM Communications Technology

11-01-513r0-G-Over 90Mbps IEEE 802\_11 applications using GCM.ppt

Synopsis: GCM (Golay Code Modulation) can achieve rates up to 90 Mbps reliably.

Questions:

Richard Van Nee Is this a single carrier modulation? Answer yes

Carl Andren You show it beats Shannon's theorem, how can that be? Answer: The correlation properties of orthogonal waveforms decouple the process.

J. Terry On your graph shouldn't the label be noise power not noise density? Answer: The flows separate the energies of the symbol into parallel streams, so noise density is right.

Shawn Coffey: How do you get unlimited processing gain? Ans: You can overlap unlimited number of flows.

Chris Hegard, TI

11-01-477r1-G-RvR.doc (Range versus Rate in IEEE WLANS)

Synopsis: Overhead of CCK-OFDM will cause the achieved rate to be less than achievable with PBCC.

Questions:

Steve Halford: On slide 27, you have added rates to the proposal, but without them, the rates are poorer.

Jim Zyren: where do you cross over from the exponent of 2 to 3 in your model? Ans: 8 meters

Don Sloan: Are you proposing a pure 11a option? Yes

R. Allen: Wasn't there difficulty in implementing the 33 Mbps rate? No, we dropped it as a gesture to seek a compromise.

Don Sloan: On Time Computer Systems

11-01-614r0

Synopsis: We believe that a dual band radio supports the use of CCK-OFDM

Questions

Clements: Do you want the same technique in both bands? Are you asserting that there is an advantage by using OFDM in 2.4 GHz even though you have to single tone in 2.4 for backwards compatibility? Yes, by not creating another decoder we have a simpler system. And OFDM may replace CCK eventually.

Chris Heegard: We proposed a compromise, do you have a problem with it? Ans: It is a complicated system.

Shoemake: Is it important that there will be 54 Mbps in both bands with different characteristics? No, that is not a problem.

Meeting recessed at 11:50 for lunch

Meeting reconvened at 1:05

Carlos Rios, RiosTek

11-01-320r0-G-Independent-TGg-Resolution-Proposal.ppt

Synopsis: Multi-mode, multi band WLAN. Backwards compatibility addressed by MAC and protocol. Call this CCK+OFDM. No new waveforms. Just use b+a in 2.4 GHz band.

Questions:

Tim Wakley: If you are doing CCK and OFDM then why not include PBCC? Ans: It is not necessary to include more waveforms.

Chris H: Are you suggesting sending 11a packets in a network talking 11b? Ans: Yes

11-01-618r0-G-Encoders.ppt

Srikanth Gummadi, TI

Synopsis: Adding the PBCC modulation to the transmitter is easy. High Performance Encoders, what must be added to .11b transmitter

Question:

Mark Webster: The inability for a group to select a single waveform can cause a burden to the network and harm the workplace.

Chris: The Purpose of this body is to encourage competition and get the best compromise.

W. Feng: What is the advantages of using a cover code? Ans: there is sufficient detail in the documents already presented.

11-01-627r0 Range and Rate of CCK-OFDM

Steve Halford, Intersil

Synopsis: Does adding PBCC to CCK-OFDM have any value? No, the added range advantage exists only over a small range and complicates the MAC.

Questions:

Clemens: What are you using for a definition of multiple waveforms. Answer: The waveforms may be similar, but having multiple waveforms doing the same rates is not good.

Heegard: Why throw out our optional rates and include the OFDM optional rates to show higher throughput? They were not adequately described.

Coffey: Does not your waveform violate the PAR on having a single high rate waveform. The PAR says a single PHY.

Jim Z: In the real world, the difference is more in multipath, not range.

Srikanth: What does the market want? Throughput and range. Ans: Market confusion could result from the two transmitter idea and that should be avoided. How would you present this to the market? It is a smooth transition towards dual band devices.

Chris: Does the 54 Mbps mode really get only xx Mbps? Yes due to the fixed overhead.

11-01-628r0-G-Issues-with-TI's-2-Transmitter-Proposal.ppt

Ron Brockman, Maarten Hoeben, Intersil

Synopsis: This is a point to multipoint protocol. Broadcast, RTS, CTS and other control frames must be received by all stations. You can't get basic rates beyond 11 Mbps CCK if there are two HR transmit waveforms. Therefore it breaks the MAC operation.

Questions:

Shoemake: Did not you have the same problem with the original CCK-OFDM proposal with 59.4 Mbps? Yes

Clemens: You anticipate that the market place will move beyond having 11b as the standard rates? This would violate the PAR's restriction to be backwards compatible. Ans: We are not advocating eventually kicking out 11b. We are interested in growing the 11g standard.

Srikanth: Is it true that you could have two waveforms with the same rate? Ans: Yes, there is no mechanism to indicate what modulation is being used.

Shoemake: There are no multiple rates. Ans: There is no mechanism to indicate both transmit and receive capabilities if they are different.

Carney: Are there no compromises? Most of the Intersil papers do not support a compromise. Ans: Zyren, the objections are to the mandatory two transmit suggestion, not to optional suggestions which can be discussed.

End of General submissions.

Administrative notes by chair:

Document 521r0 is for group to submit technical comments for resolution by the proposers.

Approval of minutes? John Coffey is still unsure of the minutes. Postponed until later to give him time to edit them.

There was a suggestion to have a motion to indicate which way the group wants to go on the closed ballot issue.

**Move to have a closed ballot.** Mathew Shoemake/Clemems

Discussion: Zyren: a roll call vote is always an option, so secrecy is not an option.

John: There is some concern that there might be fraudulent voting, so we need to be able to go back.

Ohara: What is a closed ballot, a secret one? Ans: Yes

Chair: The Excecom discourages closed balloting.

Chris: This is an open society No one knows I votes for GB

Allen: Open voting makes sure that the fraudulent voting does not take place.

**Vote: 25/36/3 motion fails**

Recess at 2:55 for break

Reconvened at: 3:30PM

Chair's discussion of the Technical Comments form

Presentation of proposer's summaries

11-01-436r2 CCK-OFDM normative text summary

Steve Halford, Intersil Corporation

Summary: CCK-OFDM is the way to go.

Questions: None

11-01-612r0-G-TGg Closing Summary.ppt

Jim Zyren, Intersil Corporation Closing comments on CCK-OFDM

Synopsis: If we adopt OFDM lots of wonderful things happen.

Questions:

Richard Allen: One of the goals is to retain OFDM, so how do you explain all the changes needed to marry CCK and OFDM. Ans: The changes are mostly in the legacy portion and are necessary to make the marriage work well.

Richard: Is the scrambler the same as 11a? Yes, the intent is to have the scrambler the same.

Ken Clements: 1. For the companies that have signed IP statements for 11a, which have signed them for 11g? We do not have any knowledge of any. Chair: We have IP statements from Wi-Lan, SuperGold, Intersil, and TI.

2. Regarding the optional mode for a pure 11a style mode, it seems against the PAR. Is this a coexistence issue? In our case we have a mandatory backward compatible mode, so it is not just like putting 11a in the band. You are only allowed to use it if you have the rest.

3. I have a cludge versus gain factor issue. Why is the cludgness versus wonderfulness a good tradeoff? Ans: If you the carry the same overhead for all waveforms, then the tradeoff is well done.

Tim, How does one transition from the backwards comp mode to the pure mode? Ans: You must configure the network for this mode and only if you do not have lots of legacy radios.

Tim Wakeley: How do you propose to transition to a dual band radio radio? Ans: First you can do it with the AP. You could have two radios in the same box, but later on the same card. Also, you can sell NICs with the dual band.

Tim W.: Can you support OFDM on ch 11 and CCK-OFDM on ch 6? Ans: Yes, the channels are better separated in the 2.4 GHz band.

Chair: 11-01-437r1 is the normative text to be voted on tomorrow.

Recess at 4:47 PM

Meeting opened 8:10 on Wednesday, 11/14/01

Explanation of the voting procedure by chair.

By unanimous consent we will recess right after the balloting to leave time for counting before the plenary 200 ballots were printed and numbered by the vice chair and secretary.

154 ballots signed and received. All the rest are destroyed.

Will be reported in document 11-01-638r0

Meeting recessed at 9:00

Announcement: Ad-Hoc Radio resource management telecons; e-mail Harry Worstell if you are interested.

Meeting re-opened at: 1:10 PM 11/14/01

Results are: 55% for, 45% against.

**Move to modify the agenda** to immediately take up the topic of the TGg PAR being rescinded and to entertain motions on resolutions to be forwarded to the 802.11 WG on Friday

Chris Zeglelin /John Hughes

Arguments:

Chris: for

Carl: Against, it is too soon

Frank: For, We have been doing this too long already

Jim Z, against, this morning was really the first vote and we should take the time to discuss compromises

**Call the question** Zyren/Halford **41/14/4**

**Main motion vote: 18/32/6 fails**

**Move** to have above discussion at 1:00 on 11/15/01

Chris Hegard/Chris Zeglin

Chris: for, this lets us have 24 hours to think about it

Jim Z. against, we should do this after we vote the next time otherwise the decision might conflict with the vote.

**Move to amend** the motion to make the time after the next vote. (6:30PM Friday)

Tim Wakeley/Andren

Tim W, for, it only makes sense to do this after the next vote

Jim for, this serves the purpose to make progress

Ken C. against, waiting to later will make people waste time voting in our group needlessly

Chris Z, against, there will be fewer people if we wait until then

Steve H, for, it makes sense to see what the results of the next vote are

**Call the question on the amendment**

**Vote on the amendment 28/32/1 fails**

Discussion:

???, for, we have had enough time to make compromises

Steve H, against, to inset a heated debate in this forum will take time we need for the next vote

Ivan Reede, for, **call the question and call for the order of the day**

**Vote on motion: 33/29/2 fails**

Zyren, I would like to get the group's feeling on suggested compromises such as the two transmitter proposal and other optional techniques

K. Clements, I support the two transmitter proposal

Tim, I supported the CCK-OFDM proposal because it would eventually get to a pure OFDM proposal

Steve Halford, I am not in favour of a dual transmit idea due to the MAC issues. I also feel it would make it hard to get beyond 20 Mbps

Tim O'farrell, I think it should be multiple modes with MBCK

Ken Clemens., The base rate is existing 11b. The market place will pick one of them. Yes, at some point, there might be a pure high rate, but you need to keep the low rates for greater ranges.

Jan Boer, I don't think the dual TX is a good idea. It forces you to test the unused transmitter and get a receiver to use to test it.

**Point of order** Zyren, there should be a poll on optional techniques.

Frank Howley, I propose the 11a mode as the solution. CCK+OFDM

Patrick Yu, the dual transmitter will not help. We must have a simple thing. The market will not decide Steve H, the CCK+OFDM is not compatible with the PAR. Having multiple functions makes it hard to test the chips. The MAC issues would limit us to the lowest common denominator

Tim O. , our proposal would be for mandatory CCK-OFDM and MBCK both TX and RX

Jim Z. , we suggest the following: CCK-OFDM with optional elements of PBCC and/or MBCK

Ivan Reede, We have to get ownership before we make too many options. The user will only care what speed it connects and not what modulation it is.

Chris Hegard., We should not put possibilities up that have no supporters.

Tim Wakley, would the PBCC only platform have more than 22 Mbps if it stand alone?

Graham Melville, We should do the PBCC+CCK+MBCK and put OFDM in the band on another PAR

Steve H., characterizing CCK-OFDM as simply a method of getting 3 extra channels for 11a is out of line.

**POI** Frank, aren't we looking for new proposals for compromise? Chair: we are trying to be open minded

Chris Z., the 3 extra channels idea came from one of our customers. You need a rational story on how the structure will migrate to the next stage. Otherwise the customers will be confused.

John Hughes, how many think a dual mode product would be a good idea CCK+OFDM.

Jim Z., Dual PHYs are a bad idea.

Graham, I thought that the ultimate objective is to have only OFDM in the band

Jeff Dunnihoo, if the idea here is that one group is filibustering, then we have can never resolve this

Weishi Feng, I would like to propose a 16 QAM with rate 10/11 RS code with BCC

Matthew Shoemake, let's try another compromise, PBCC with the OFDM codes and with 16 QAM and 64 QAM

Art Carney, PBCC and CCK-OFDM mandatory TX and RX

From the above, the chair listed the 9 possible compromises suggested for straw polls.

Recessed at: 3:00

Reconvened at: 3:32

**Straw poll** on #1, dual transmitter proposal CCK-OFDM and PBCC

24/32/3 fails

**Straw poll** on #2, dual mode with MBCK and CCK-OFDM

7/42/17 fails

**Straw poll** on #4, CCK-OFDM with optional elements from PBCC and/or MBCK

32/32/7 fails

**Straw poll** on #5, CCK with no OFDM

20/42/8 fails

**Straw poll** on #6, dual band 11b + 11a (remove 2.4 GHz requirement)

29/22/25 passes, sort-of

**Straw poll** on #7, single carrier system with RS and BCC codes

3/50/15 fails

**Straw poll** on #8, single carrier with 16-QAM and code from OFDM

5/42/19 fails

**Straw poll** on #9, mandatory PBCC and CCK-OFDM at TX and RX

16/58/2

**Straw poll** on #3, 802.11b and 802.11a in 2.4 GHz band

44/30/10

chair deleted the 4 with the least # of votes, #2, #7, #8, #9 and noted that the number of voters grew during the process

Jim Z. Are we going to do another round again? We should try to go with the #1, #4, and #6

Frank Howley, I think that it is possible that we could make #3 work and it got the most votes.

Jim Z., Any mandatory mode must have backwards compatibility.

Chris H, it is the proposal team that must make the modifications

Ivan **POI** is there a vote at 4:30 today? No

**Straw poll**, should we continue to discuss #3?

53/23/4

**Straw poll**, should we continue to discuss #9?

(clearly most against) no count taken

**POI** ?? What are we doing now?

Chris H., proposal #3 did not go through steps 1 to 18. To go forward, we need to only consider the proposals that have gone through the process.

Steve H., I don't know if I understand #3. Does this mean that the station would have to switch over from one type to the other?

Frank H, Yes, that is the idea. It would take mucking with the MAC.

Zyren, we have until 4 PM tomorrow to work out the details.

Richard van Nee, I like the idea of combining CCK and OFDM. The only thing that came up is compatibility. The only problem is that it will never be forward compatible.

Ivan, I have a suggestion, you ask people who voted no what it would take to change their votes.

Jim Z., Frank could modify the proposal and do another poll

How about: use CCK and OFDM as currently described at 2.4 GHz.

John C., I am not sure this is compatible with the PAR.

Don Sloan, I think this is OK, but we should also keep the optional PBCC 22

Chris H., I don't think this is in compliance with the PAR

Bill Cofey, I don't think that this is in accordance with the PAR unless PBCC22 is mandatory

Kevin, I like it in that it is like what had been in May

Jim Z., This has good properties.

Chris Z., You would have to separate the traffic to make this work. How does that effect all the QOS stuff? I think it would break that. If you separate the channels, then there are not enough to go around. I couldn't think of a worst case scenario.

Vic Allen This might be getting into the MAC area. You have a green field opportunity. There may be something that can be done to make it work.

Wakley, There are three camps, so I don't think this approach will get us to 75%.

K. Clemans, If we are willing to go into the MAC, then how would we make this work? It is not worth it. It seems that the current scheme is just a way to get the OFDM name in the band without benefit. So, let's use PBCC.

Carl **POI** what does #6 mean? Ans: Hughes, it is that we use CCK at 2.4 GHz and OFDM at 5GHz with dual band equipment.

**Straw poll** on CCK+OFDM and optional PBCC 22 and optional CCK-OFDM

69/17/5 passes 80%

**Straw Poll** on eliminating the 2.4 GHz band requirements and standardize in 802.11 and 802.11b

20/53/16 fails

**Straw Poll** on CCK-OFDM with optional items of PBCC and MBCK

15/40/9 fails

**Straw Poll** on Dual transmitter proposal CCK-OFDM and PBCC

20/65/3 fails

Chair suggests that Frank and the CCK-OFDM team get together and make a new compromise proposal.

Chris Z. I am impressed that we got together.

Recessed at 5:16 PM 11/14/01

Meeting opened 1:08 11/15/01 by chair

Presentation by Vic Hayes in document: RR-01/30-r0

Rules change proposal for 802 regulatory work and wireless PARs.

Letter to China to request more power allowed. RR-01/27-r0

Ballot for next vote shown.

Call for papers

11-01-644r0 Steve Halford

11-01-646r0 Ron Brockman

11-01-645r0 Chris Heegard  
11-01-649r0 Colum  
11-01-647r0 Colum Normative Text

11-01-649r0 Colum Caldwell, Tim O'farrell Supergold: MBCK deserves a shot at the options

Q: was any other coding scheme considered to combat erasures? No

Colum: We would like a Straw Poll on: Should MBCK be included in the options?

Q. John: does this mean to include it now or wait until the proposal is voted in?

We would like it in now.

**Straw Poll** on including the MBCK option now  
**18/32/53 fails**

presentation of paper:

11-01-645r0 Chris Heegard What the new compromise 802.11g proposal is

Questions: Kevin Smart: Have you included the ultra short preamble PBCC option. Ans: No, it can be added later if desired.

Wakley: How will the 11b know when there is 11a traffic? Ans: Ron Brockman will discuss that.

presentation of paper:

11-01-644r0 Steve Halford, The new b+a=g proposal

We have combined the best of the offered techniques. There will be some changes needed to make it work.

R. Allen: para 1.0 states changes needed to implement the changes for mandatory modes, but the changes are really needed for optional modes. Yes, it is perhaps mis-worded a little bit.

presentation of paper:

11-01-646r0 Ron Brockman, Maarten Hoben "Why the compromise will work."

Questions: How much better will throughputs than 11b. That has not been fully calculated. In the limits you would approach the 11a rates.

Since the receiver sees both types of preambles, how can it see both. That is in the receiver design.

Since the collision probability is independent of length, then how can you say it is low probability of collision with the short packets.

Dirk: Assuming that all of the problems associated with 11a at 2.4 GHz have been solved, what is the advantage of having CCK-OFDM? We will study that as we go along. This removes reliance on RTS/CTS. We can't quantify that.

With multicast would the highest basic rate be used? If you don't have legacy equipment in the network, then you can use higher rates.

Can you avoid using the RTS/CTS mechanism? Yes.

Is the SIFS period different in 11a and 11b? They are different for 11a due to the processing time of 11a.

Ken Clemans I request a straw poll on: Under conditions that the next vote achieves 75% , who will be here tomorrow to defend the PAR.

Barry Q: What is the reason for that? The answer is for strategic planning procedures.

**Straw Poll** on who will be there tomorrow to vote positively on this  
59//

**POI** Carney, when the will occur? Ans: Sometime before 10:00 AM.

Wakeley: I am shocked that this resulted from my suggestion. It seems to me that it is not in our best interest to go on with this with the limited amount of time spent on it.

Zyren: We have had a lot of time spent on this in part and is based on the straw polls as what the group wants to do.

Halford: There may be a few items to work out, but to a large degree, it is based on both the proposed techniques that were in the last round.



Clements: I agree with Zyren. What's going to happen tomorrow is that it takes only 50% to kill the group. We need to make this proposal the property of the body. I would ask the members to hold your nose and vote in the affirmative.

Coffey: What wasn't scrutinized was odd modulation schemes. We took elements of existing proposals and went with them. All the elements have been in the proposals for months.

Many of the proposers said the other didn't work, so you need to go back and re read the documents.

Heegard: We used elements of the other guy's stuff in ours.

Is the ultra short preamble part of this?

Halford: Ultra short preambles were in both proposals. It is now mandatory rather than optional.

Ken: With the existing mechanisms in the MAC you can keep a legacy equipment out of the network.

Does this work if two independent BSSs on the same channel?

Recess until 4:00 to await the vote.

Vote on the CCK-OFDM proposal as modified to be the **b+a=g** proposal as presented in 11-01-644r0

**Vote taken at: 4:15PM**

**116/36/0 passed with 76.3%**

reconvened at 6:30

Selection of editor.

**Vote for editor**

**Carl 34/0/1**

Approval of minutes. John Coffey edited the minutes and made a few minor changes of an editorial nature. It is in 11-01-347r1, but did not seem to be on the server, so it will be taken up next session.

Session adjourned at: 6:56PM Thursday.

**IEEE P802.11  
Wireless LANs**

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**Minutes of 802.11 TGh**

**Date:** November 12, 2001  
November 13, 2001  
November 14, 2001  
November 15, 2001

**Author:** Albert L Garrett  
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**Abstract**

This document contains the minutes of the November 2001 plenary meeting of 802.11 Task Group H. This meeting covered sessions from November 12, 2001 to November 16, 2001 and occurred in Austin, TX.

## Session 1, Joint Radio Regulatory and TGh, Nov 12, 3:30pm

3:45pm Vic Hayes calls meeting to order and offers agenda.

3:47pm. Carl Stevenson presents RR-01-019r0

"Status and work requirements relating to the Global Harmonization of the 5GHz Spectrum".

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Andrew Myles: time allowed for detection of radars?

Carl: much talk about this. Working documents discussing this with link budgets and timelines that contain only place holders. Looking to develop conformance tests to prove validity of independent designs.

Andrew: How often do you have to look for the RADARs?

Carl: May be necessary to continuously look for radar...Something comes along while receiving a packet... other ideas for detection while receiving packets...

Carl: There is an impression that RLANs fall apart with interference. Need to convince that this is a graceful degradation.

Power seen by RLANs...

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Carl: There is concern that they will do significant physical damage to radios. Powers into RLAN devices can be -20dBm to -7dBm.

Mike: I wouldn't be concerned about -7dBm.

Carl: The issue is that the spec is derived from an assumption of significant distance. Changes in distance can result in significant changes in power.

Mike: Max tolerable Power seems like it would have to be on the 20dBm scale based on current 5 GHz designs (800mW transmit power with antenna gain). What is a typical pulse width?

???: power question repeated...

Denis: quotes power and pulse duration numbers from ERC doc...

Mike: Two questions. Does strong signal really burn the device and does it degrade CCA? Are they concerned with our 800mW transmit power?

Carl: That is the primary concern. These others are secondary. They are worried with this issue because proliferation of devices may result in political pressure for the RADARs to move.

David Skellern: Offers input on saturation due to RADARs. Saturation wipes out reception regardless of band of RADAR. The weather RADAR we looked at comes every 60 seconds.

Chris H, Denis and Andy Gowen enter discussion on bands of interest. ERC is interested in the threshold that results in recognition of interference, how often you can detect.

Carl: First pass evaluation indicates that a -61dBm threshold is always below the peak signal level seen by RLANs from RADARs.

Discussion on what RADAR community wants...

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Bruce: The information you present indicates that testing must be done and must be done prior to CPM.

Carl: That is the ideal situation.

Bruce: Won't happen!

Carl: Potential for contingency agreements. Give a warm fuzzy to the reg group and they grant permission with contingency based on proof at the end.

Peter E: Speak more directly on what these studies would be to set the group at ease...

Andy: Prove normal mode and start-up mode for DFS...

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### 8a-9b/89.

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Vic: Document 8a-9b/89-e addresses this. This is the document with holes that need to be filled by the end of the week.

Denis: Provides arguments for DFS in both HiperLan/2 and 802.11a.

Bill McFarland and Carl enter a discussion on these results. Why do they claim the -61dBm threshold is insufficient?

Mike: How wide are these RADARs?

Carl: Some are 1MHz. They chose issues beyond worst case. They estimate seeing the full 20MHz channel when they utilize a 1MHz signal. There are a lot of details to look at in order to put together a coherent, convincing argument.

???: Airborne RADAR typically 250MHz.

Carl: RADARs may be spread for LPI which would argue that they could handle significant interference. SARs tested with RADARs tested 30dB better than expected based on paper.

Ron: You call out maximum distance. How do you deal with the minimum distant situation?

Carl: The point of 8a-9b/89-e was to prove the issue of how we handle minimum signal levels.

Denis: They are trying to paint the worst-case picture for their own security.

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### UNII Rules

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Evan Green: Did they raise these issues?

Carl: In discussing this with them, we asked how the UNII rules were passed? Answer was that the UNII rules were desired by the current administration and it would be unwise to stand against them.

Andy: If you can convince the RADAR community that DFS works, we will make significant progress.

Evan Green: RADAR community is pressuring ETSI to establish conformance testing.

---

### 8a-9b/86. Spectral Requirements for RLANS

---

Vic: Discuss 8a-9b/86, spectral requirements document submitted by HiperLan/2.

Carl: 86 is the spectrum requirement study for Hiperlan/2, 87 is the methodology for the study.

Vic: Any other AB documents of interest?

### 8a-9b/110r1. 5GHz Analysis

---

Carl: Document 8a-9b/110r1. 250kW power, 2us pulse, 46dBi antenna gain. Lots of TBDs. Probably a relatively narrow-band receiver. -110dBm discernable signal.

Denis: 5dB indoor attenuation, but 17 dB was agreed as the typical case. Again they chose the worst case system.

Carl: In discussions with RADAR community, they are looking for a 6dB below noise floor as margin. For safety of life equipment, they want a 10dB below noise floor as margin.

Andy: All these documents assume no DFS and basically just concur with the statement that we can't enter the band without mitigation (DFS). I think doc 111 is actually the more interesting document of the group.

### Providing input to RADAR Community

---

All the discussions with the RADAR community indicate that there is a general misunderstanding of 802.11a system. Request from Vic to put together a document that describes 802.11a and 802.11 MAC functionality. Volunteers?

Discussion from group on the applicability and validity of 802.11h to all regions rather than just Europe. Many voice opinion that the climate of the RADAR community requires TGh to apply to all 802.11a PHYs.

Bill McFarland takes lead on putting together description for 3:30pm 11/13/01.  
Bill has requested a small team.

Bill McFarland, David Skellern, Venkay Vadde, and Teekay Tenn volunteer. Team will meet at end of this session.

Vic: 11/20/01 meeting of 8a-9b group. Request paper is submitted to 8a-9b group and that some authors attend. Meeting adjourns at 5:30pm. Next meeting of TGh is 6:30pm 11/12/01.

## Session 2, 802.11 TGh, Nov 12, 6:30pm

Doc 01/593 has agenda for the week

### Chairs Status Update:

Mika Kasslin reported from the 802.11 chairs meeting where Stuart said the Task Group members should vote yes or no, as there were too many abstentions. They should vote yes if the draft is good and they have no comments.

Objective of the session is a revised draft by end of the plenary.

Mika reviewed the agenda, and added the papers to be presented.

### Motion 2.1

Motion to approve the revised agenda

Mover Andrew Myles, Seconded David Skellern

Yes 13 No 0 Abstain 0

### Motion 2.2

Motion to review and approve 01/288 Hilton Head, SC

Mover Andrew Myles, Seconded David Skellern

Yes 10 No 0 Abstain 2

### Motion 2.3

Motion to review and approve 01/289 Orlando, FL

Mover Andrew Myles, Seconded David Skellern

Yes 10 No 0 Abstain 2

### Motion 2.4

Motion to review and approve 01/347 Portland, OR

Mover Andrew Myles, Seconded David Skellern

Yes 10 No 0 Abstain 2

Mika reported on the TGh calls held since the July plenary, and all of those were minuted and reported on the 802.11 server.

### Start Comment Resolution

Mika discussed comment on changing the scope of the PAR to expand from Europe to Worldwide, and other question about 2.4GHz

Vic Hayes urged the group to expand the par to the spectrum under discussion in WRC 2003 item 1.5

David Skellern asserts that the existing PAR allows us to address changes in the European regulatory requirement.

Venky Vadde asserts that it is already difficult to get a solution, and expanding regulatory domains makes the task that more difficult

Carl Stevenson says the world has changed, and urged the group to broaden the scope of the PAR from Europe, as the radar community is worldwide, and other radars outside Europe use more of 5GHz

Amjad Soomro underlines the fact that the US can use 802.11h as well as 802.11a, and as far as DFS is concerned, it is equally applicable to detecting US radars, and favors not changing the PAR

Andy Gowans says the WRC question 1.5 is the same as the European RLAN allocation as the other frequencies from 5.35-5.47GHz are for aeronautical radio navigation allocations and the safety of life.

Many people are concerned about changing the scope of the PAR from Europe at this stage, and want a concrete proposal first.

### Straw poll 2.1

Do you favour deleting the words in the 802.11h PAR title "in Europe" at this time.

Yes: 6

No: 10

Abstain: 7

With respect to 2.4GHz, a straw poll (favour extending 802.11h to 2.4GHz Yes 0 against 18, abstain 4) said not to consider changing the PAR to address the requirements in 2.4GHz, and wants to see a concrete proposal first

Mika requests that we address draft integrity and PAR scope as we review each of the questions, and is confident we have all the basic tools in the draft and lets work from them.

Charles Wright asked about 802.11e concern for overlapping BSS, and it is our intention to build tools to make DFS and TPC work, not so much to address network problems that are being addressed in other task groups.

01/529r1 has a consolidated list of draft ballot comments

Presentation of David Skellern, Andrew Myles paper on 802.11h straw poll of 24 questions conducted recently, and answered by fifteen people.

An important point about TPC is that the regulatory goal is to reduce the aggregate power seen by EESS and others license holders.

Are deferring all motions until after all TPC presentations.

## Session 3, 802.11 TGh, Nov 13, 8:00am

8:00am

Meeting called to order...

Andrew Miles continues with Document 11-01-619r0  
Straw Poll Discussion.

---

Discussion on range control documentation for TPC portion of TGh draft. Group indicates that extra material should not be included.

Chris Hansen offers document 11-01-520r0  
"Benefits of Request and Response Frames for 802.11h"

---

Ron McAllister: Your approach places some bounds on maximum velocity for 802.11a devices. Could you offer your some assumptions and an order for device speed?

Chris Hansen: These are short frame sequences and thus you could get a lot of control packets in short amount of time. Aren't really interested in fast power control for application reasons. Could result in instability.

Andrew Myles: Questions for clarification. What does margin pertain to, transmit power of the response packet?

Chris: Yes.

Bent: Leveraging CDMA experience on 802.11h mobility. Need to be careful of speed of power control loop.

Chris: Tight, closed-loop power control is not intended here in 802.11h. Don't believe power control with that rate is relevant here.

Andrew: In what mode do you intend this to be most applicable?

Chris: I wouldn't claim this to be more applicable to any mode of operation.

Andrew: Are there issues with application in DCF?

Chris: They have been discussed often. And we'll have more in another presentation.

?????:

Andrew: Offers situation where method/assumed algorithm would drastically increase probability of hidden nodes.

Chris: True, but you assumed an implementation. This is a mechanism not an algorithm.

?????: Is there a way out? What happens if someone is incapable of measuring?

Chris: We need a clean way to respond rather than just say "I can't."

Joonsuk Kim offers document 11-01-519r1  
"Power saving and Interference Reduction with TPC under DCF"

---

Andrew: Presentation claims you can reduce collisions. Is that for multiple BSS cases?

Joonsuk: True.

Andrew: Increasing hidden nodes. How do you deal with it? Require RTS/CTS?

Joonsuk: That is implementation. I can't say.

Chris: Must be used judiciously.

Peter Larson: Could estimate power to reach everyone in a BSS rather than power to reach only the intended receiver. Would mitigate hidden station.

Peter E: May be service based. Voice services could run lower power level and lower data rate.

Joonsuk: We need to allow for this operation, not recommend against it.

Amjad Soomro offers document 11-01-536r0.  
"Proposal to Add Link Margin Field in 802.11h"

---

Evan: This is optional. In draft, there is a MIB variable. Is this always optional, or is it mandatory for spectrum-managed systems.

Amjad: Always optional.

Andrew: Encoding of TPC is in 3dB steps. Encoding of margin in proposal is in 1dB steps. Is there an incompatibility?

Amjad: No, that is just a measure.

Peter E: Would prefer not to use the service field...

Joonsuk: Not enough room for this. Bits are already used.

Peter Larson offers documents 11-01-567r1  
"Proposal to improve link margin function in IEEE 802.11h"

---



Stopped due to computer glitch and time...

Mika requests all to come with opinions on

1. link margin needed
2. use service field or mac
3. retain or delete

Will continue with Peter's presentation at 6:00pm...

oopsie... we have until 10:00am...

Peter continues.

Sungyun: How is this better than the other methods?

Peter: Starts on second frame rather than third frame. Dynamics of interference requires a faster scheme. More generic, up to implementer to determine if open-loop or closed-loop.

????: In receive chain you can use RSSI or Energy detector. The RSSI in most implementations is a relative measure and changes with temperature as much as 6dB. Thus, you would require calibration to achieve absolute values.

Peter: That is the purpose for closed-loops.

????: Margin, how much do you need? How accurate do you have to have?

Peter: Use the margin to accommodate the uncertainty. Used closed-loop to remove uncertainties.

Charles Wright: Could be applied to rate-adjustment also?

Amjad: Margin is a fixed number for a receiver...

Peter: I think so, but in closed-loop case it could be adapted.

Amjad: How is path loss estimation taken care of?

Peter: Do transmit power estimation, not path loss estimation.

Andrew Myles offers document 11-01-XXXr0

"Should dynamic TPC support be removed from TGh's draft"

---

Evan: So we penalize the range of our systems in Europe.

Peter: Simulations suggest that DCF

Andy: The lower you keep the power the better you are. You might not understand the history of the Regulatory regulations. As a regulator, I would be against this suggestion.

Andrew: I suggest the mitigation is much greater than 3dB.

Andy: From point of view, the conformance test is a max and min test. The range could be 6dB to 15dB.

Now, we will recess. First, here are the major questions.

1. dynamic TPC
2. retain or delete
3. service field or management frames.
4. link margins needed
5. tx power and link margin
6. retain hidden station
7. tolerances for all power levels (0.5dB, 1.0dB)
8. power control granularity (3dB, 1dB)
9. power control range
10. capability issue

## Session 4, 802.11 TGh, Nov 13, 3:30pm

3:30pm, Mika calls session to order.

Mika offers a recommendation of the next several decisions that need to be made.

1. dynamic TPC
2. retain or delete
3. service field or management frames.
4. link margins needed
5. tx power and link margin
6. retain hidden station
7. tolerances for all power levels (0.5dB, 1.0dB)
8. power control granularity (3dB, 1dB)
9. power control range
10. capability issue

Motion 4.1:

The editor is directed to remove explicit support for dynamic TPC from the draft.

Proposed: Andrew Myles

No second.

Mika: It shall be retained.

Motion 4.2:

Motion to direct editor to remove the second sentence in second bullet of 9.11.3 of draft D1.1.

Proposed: Chris Hansen

Second: Joonsuk Kim

Point of information: Bill McFarland.

What is the effect of removing that text in practice?

Mika: None.

Chris: Supported by Andy Gowen, Mika, and several presentations today.

Joonsuk: In support of motion.

Sunghyun: Do you have a response to Steve Gray's presentation.

Joonsuk: What I offered is a counter to offer information presented earlier. I am saying that the draft doesn't have to recommend anything and that it is not necessarily true that dynamic TPC degrades performance.

Joonsuk and Amjad debate DCF and dynamic power control.

Motion 4.2 Results.

Yea: 14

Nay: 2

Abstain: 2

Motion PASSES.

Motion 4.3:

Motion to add Link Margin information to draft D1.1.

Proposed: Chris Hansen

Seconded: Peter Larsson

Yea: 15

Nay: 0

Abstain: 2

Motion PASSES.

Motion 4.4:

Move not to use the SERVICE field to indicate values used in transmit power control.

Proposed: Peter E.

Seconded: Chris Hansen

Yea: 14

Nay: 4

Abstain: 2

Motion PASSES.

Motion 4.5:

Move to incorporate the T parameter mechanism as described in 01/567r1 in the MAC frame exchange.

Proposed: Peter Larsson

Not seconded.

Motion 4.6:

Move to incorporate the TPC information request and response frames as described in 01/520r0 in draft D1.1.

Proposed: Chris Hansen

Seconded: Joonsuk Kim

Yea: 6

Nay: 3

Abstain: 8

Motion FAILS.

Motion 4.7:

Move to incorporate the TPC information request and response frames as described in 01/520r0 in draft D1.1 with link margin information in the response element as an option.

Proposed: Chris Hansen

Seconded: Raju Gubbi

Yea: 10

Nay: 3

Abstain: 4

Motion PASSES.

Motion 4.8:

The editor is directed to remove all text dealing with Hidden Station Reporting.

Proposed: Andrew Myles

Seconded: David Skellern

Yea: 12

Nay: 0

Abstain: 4

Motion PASSES.

Motion 4.9:

Motion to reconsider motion 4.

Proposed: Sunghyun

Point of Order: Is this in order since brought by member on losing side.

Stuart Kerry: Motion to reconsider can only be brought by prevailing side.

Therefore, motion to reconsider is out of order.

Motion 4.10:

The editor is directed to insert tolerance tables into the Draft D1.1 for all power levels and measurements and mark as TBDs.

Proposed: Chris Hansen

Seconded: Evan Green

Move to amend motion 10 to delete “and mark as TBDs” and insert “as decided By TGh before letter ballot.”

Proposed: Amjad

Chris accepts as friendly amendment.

Ammended Motion 4.10:

The editor is directed to insert tolerance tables into the Draft D1.1 for all power levels and measurements as decided by TGh before the letter ballot.

Proposed: Chris Hansen

Seconded: Evan Green

Yea: 19

Nay: 0

Abstain: 1

Motion 4.11:

Move that the editor remove all text related to power capability elements from draft D1.1 including text in 9.11.2.

Proposed: Andrew Myles

Seconded: Peter E.

Yea: 4

Nay: 12

Abstain: 3

Motion FAILS.

Motion 4.12:

Motion to empower the editor to revise the draft to reflect motions 4.1 through 4.11.

Proposed: Chris Hansen

Seconded: Evan Green

Yea: 11

Nay: 0

Abstain: 7

Motion PASSES.

## Session 5, 802.11 TGh, Nov 13, 6:30pm

6:42pm. Mika calls the meeting to order.

Motion 5.1:

The editor is directed to include informative text on the reason for TPC and its requirements in draft D1.1.

Proposed: Evan Green

Seconded: Andrew Myles

Yea: 12

Nay: 0

Abstain: 2

Motion PASSES.

Amjad offers Document 11-01-532r0

“Dynamic Frequency Selection in Independent BSS”

---

Discussions captured in the following.

Peter E: Do I understand that when a STA takes over the as DFS Owner replaces channel characteristics.

Peter Larsson: What would it take to modify this iBSS approach to work for BSS? I would prefer BSS to be a degenerate case of iBSS, basically use the same method.

Amjad: Too complicated to align the too. The concept is good, but the reality is different.

Andrew Myles: discussion on other methods to resolve. Spectrum of answer to problem is between not using it and using an elaborate complicated protocol. Is there something in the middle?

Amjad: Don't view this as that complex.

Evan: Regulators wouldn't buy disabling iBSS in Europe. Approach is impossible to enforce.

Andrew: Claims there is a simple protocol.

Venkay Vadde, Andrew, Amjad, and Peter E. continue debate on iBSS approaches.

Mika asks for clarification. All stations are required to move if requested?

Amjad: Yes.

Andrew: You are going to lose people in iBSS because not everyone will hear your announcement.

Sunghyun: Definition of iBSS is that all STAs can hear you.

Many members disagree and offer counter-example.

Discussion has gotten out of order. Returning to order at Mika's request.

Joonsuk: Why did you choose the priority order for the channel characteristics as you did? (Periodic bit is not good enough to detect RADAR. May not be enough information to deduce the proper channel.)

Amjad: If RADAR is detected, it is required that the iBSS move. Moving into a channel without knowing its state is even worse than moving to a RADAR channel, because you don't know. In the domain of things known, you must avoid RADAR. If there is a better way to reflect the presence of a RADAR, we can change this to match that approach. Continues discussing the others bits...

Peter E: Bit 5 "Periodic" is intended more as "I see something that I think is a primary user."

Amjad: Yes.

: What are the secondary effects of not being able to complete the protocol? What if a STA misses a beacon? What if he can't hear them at all?

Amjad: Miss one, hear the next. Would try to transmit his own beacon.

:

David Skellern: I didn't hear your answer to Peter's questions.

Amjad: BSS and iBSS have elements in common and elements that are different. I don't see a method to make one a subset of the other.

Edward Ruess: Most RADARs are swept, scanned, or pulsed. I can imagine odd scenarios that could break this system. Have you considered robustness against those robust interferers?

Amjad: I think you have a misconception. This is not intended to for constant waveform detection and avoidance. Your question, is how reliable is the measurement? This is just the mechanism. We all must derive the detection/measurement methods.

Evan: I can envision situations where there is no available channel and the system just bounces around looking for a channel.

Amjad: I don't think that situation is a problem. There is no requirement to move just because there is a better channel. Other situation is that all channels are occupied.

Evan: Suppose, you just don't switch.

Amjad: That is fine.

Peter E.: In BSS, STAs could maintain local maps and just provide them when requested. Doesn't that go to Peter's point.

Sunghyun: responds to Peter's statement...

Joonsuk and Amjad discuss channel switching in dense environments running iBSS.

Discussion on iBSS/BSS subsets continues...

-----  
Mika returns to agenda. Next item to discuss is the vacancy in the MIB. Document 533 was submitted to address this issue. The author is not present to offer the document to the group. Please review the document and be prepared to discuss and apply it.

Sunghyun Choi offers Document 11-01-538r0  
“Layer Management Extensions for Spectrum Management”

---

Mika returns to agenda item 12, Comment Resolution for DFS.

David Skellern offers document 11-01-619r0  
Straw Poll Results

---

Good discussion on DFS, goals, and measurements provided. General discussion has identified 1) we must avoid any channel with a licensed user. 2) on the remaining channels, we must provide channel spreading.

Questions arise as to the measurements required for reporting. Specific discussion on the use of BSS identification versus pure energy detection has been expressed.

## Session 6, 802.11 TGh, Nov 14, 8:00am

8:05am. Meeting called to order by Mika Kasslin.

There will be a brief recess from 8:30am to 9:00am for voting in TGg.

Mika requests proposal team to attempt to apply the iBSS DFS presentation from Amjad to the BSS mode. He would like to accept the proposal as the solution for iBSS DFS mode.

Andrew Myles requests time to offer other options for DFS in iBSS.

Mika offers sometime after the break.

David Skellern continues with document 11-01-619r0  
Straw Poll Results

---

### Question 10: CCA busy periods...

---

Evan: I was against this because I don't see how it performs any better than RSSI. If we desire to keep this, we need more information.

Sunghyun: Are we talking about CCA busy period or CCA busy fraction? We need to clarify what elements we are talking about.

Evan: CCA busy period.

Andrew: Eventually we are talking about both.

Sunghyun: Frankly speaking, it is not proven that this works to detect RADAR.

Andrew: Another approach is to set a high threshold. If you receive noise above that level you assume that it is a licensed user.

Sunghyun: Seems like if you miss a strong packet you declare it to be a licensed user.

Recess for TGg vote...

8:59am. Mika calls the meeting back to order.

David Skellern continues with document 01/619r0 question 10.

Amjad, Sunghyun, and Andrew discuss options on RADAR detection methods (CCA vs. alternate undefined methods).

Amjad: Requests that we stick to the current format and not move to other issues.

David: The purpose of this format is to discuss all the issues.

Mika: Concurs

#### **Question 11: Measurement of RSS**

---

E-mail straw poll results indicate all in favor of retaining.

Question 15: Indication of energy in the PLCP preamble of most recent Beacon.  
Sunghyun and Amjad explain the use of this feature. This is a reference for RSSI so that decisions algorithm can remove uncertainty due to implementation.

Charles: It needs to be relative to something or else it has no meaning. My question is relative to what?

Evan: It seems to me that this isn't useful because we have tolerances on the RSSI measurements.

Andrew: If this is necessary, why do we not have this in iBSS?

????: To Evan, if you don't calibrate somehow, you don't know. This is a method to calibrate.

Evan: A device is calibrated at the factory.

CC: Can be calibrated within 3dB.

#### **Question 22: Record and indicate the received signal levels during the measurement period.**

---

Joonsuk: offers explanation of RSSI histogram... indicates how channel is occupied on a time basis.

David: and that helps in the detection of licensed users?

Amjad: histogram is a convenient method for relating the information. Useful because it aggregates the measurement period to a concise statement of the information of RSSI over time.

Andrew: Offers two scenario for RSSI histogram results.

Chris: Feels this could be useful for detecting specific signatures of RADARs. Also, 12 to 1 is hardly a debate.

Charles: If you are going to do signature or signal identification you must have a reference.



Mika: This is RADAR detection discussion that we should all be involved in but not here.

---

**Question 23: Record and indicate the RSS for the PPDU with a correct PLCP header but an incorrect CRC during the measurement period.**

---

This is a very divided question according to e-mail straw poll.

Bill: Speaks against this. The general perception is that our approach is far too complex. We should remove those things that have no clear usefulness.

Evan: I am against this is a requirement. If you want it as an option, I am against this.

---

**Question 12: Indication of a new frequency channel and switching time.**

---

Clear agreement

---

**Question 13: Indication of the channels a STA is capable of operating in**

---

2 no-votes in e-mail straw poll. One withdrawn. No one claims ownership of the other no-vote.

---

**Question 14: Indication of maximum transmit power for the channel currently in use**

---

Venky: Sounds like TPC to me. How is it helping DFS.

Sunghyun: Thought this could be used to determine relative distance for overlapping BSSs.

Mika: If we address overlapping BSSs specifically, we are getting ourselves in trouble.

Amjad: Use this as a reference for other measurements

---

**Question 16: Indication that at least one valid MAC header detected.**

---

Sunghyun: Must use this in conjunction with other data...

Amjad: Further affirms the use of this bit in conjunction with other information. RSSI and BSS bit could be used to determine whether strong RSSI presence is BSS or licensed user.

Edward: Requests presentation to distill the issue. Show me how all the information can be used.

---

**Question 17: Indication of at least one BSS found running in QBSS mode**

---

Sunghyun: When we proposed this bit, there was parallel work with Tge. Due to current circumstances, I would advise dropping it.

---

**Question 18: Indication of at least one frame with 'from DS' and 'to DS'**

---

Sunghyun: More information similar to BSS bit. Can be used for overlapping BSSs.

Charles: Sounds like we are attacking overlapping BSSs when Tge is handling it.

Evan: I would convert if this is optional.

---

**Question 19: Detailed information about a BSS operating on a channel**

---

Charles:

---

**Question 24: Indication of at least one PLCP preamble with an invalid Signal field detected**

---

Sunghyun: It is good to know if you see a channel with HiperLan/2 running on it so you can prioritise the channel (in use but not a licensed user).

Andy: Are you really planning on using the same channel as HiperLan/2?

Mika: OK. Plenary starts here in one-half hour. We need to wrap up.

Offers general comments on DFS portion of draft. Proposal group needs to help us move to a complete draft of DFS.

Andrew offers 542r1 as a starting point.

Any volunteers: Andrew Myles.

Mika: We are recessed until tomorrow.

## Session 7, 802.11 TGh, Nov 15, 8:00am

8:12am. Mika calls meeting to order.

Mika offers modified agenda with the reasoning that we cannot achieve the original purposes of these last few meetings (letter ballot) and should reset.

Mika solicits other submissions for presentation.

Chris has 518.

Andrew has document 622.

Amjad has document 629.

Andrew offers document XXX "Blobs"

TGg vote occurs at 4:15pm. Vote will take more than half an hour. I propose we plan to adjourn before that, take care of all business required to wrap-up for the week.

No one voices disagreement with proposal.

Motion 7.1:

Move to approve the modified agenda.

Proposed: Peter E.

Seconded: Chris Hanson

No discussion

Yea: 11

Nay: 0

Abstain: 0

Motion PASSES.

On to the presentations.

Joonsuk offers Document 01-11-518r0

“Length field of the channel measurement report element for DFS”

---

Peter: We are running more than 14 STAs in this room. So this limit is not sufficient.

Chris: We don't need that many. Just trying to get a feel for the environment.

David: What you have done is fine for the constraint that we have set on ourselves. In truth we don't know what we need in terms of measurements. Is this really what we want to do.

Amjad: Is there a limit on number of element 43s that we can send? Could you have multiple 43s?

Joonsuk & Chris: Yes.

Amjad offers document 11-01-629r0

“Clarifications on Measurement Duration and Report Time Limit Fields”

---

Andrew: I propose we remove most of this anyway.

Andrew offers document 11-01-622r0

“What DFS measurement reporting mechanism should be included”

---

Al: Seems that you mixing philosophy and mechanism.

Andrew: Agreed.

Amjad: Why is this different from the current method for modifying elements?

David: You can change fields of a message without changing the standard. Much like D where they can add country fields without going through the Task Group.

Chris: We cannot wait to make decisions on extensions. The extensions would result in backwards compatibility issues. We must have all the information that is going to be used and not mix them.

Mika: I would like to brake this into two issues... 1) the container and 2) the philosophy.

Andy: DFS has not been finalized. It is important to be flexible. At the moment you don't really know what you have to do.

Charles: I am in favor of the blob idea.

Peter E.: Looking at the draft, it appears we can accomplish what we are doing, but the devil is in the details.

David: Clarification of previous statement. Modifications still must get approval.

Victoria: You will have to come up with a maintenance PAR to achieve this.

David: That would be an on-going PAR. In addition, we must define the elements of the container.

Mika: I encourage people to look into the other groups that have used this approach to understand the process.

Venky: Someone explain how detailed we would be in defining the elements of the blob.

Peter E.: We need to be prepared for an iterative process because this is not going to be solidified before we finish.

Andy: Really, you will get a conformance document eventually and that will be the rule. The issue is the process until the conformance test is finalized.

Peter L.: Can you only send one element at a time? That is the way I read this.

Andrew: You can concatenate these elements into a single frame.

Charles: I think this is a good balance of overhead versus flexibility.

Joonsuk, Andrew and Amjad discuss how this differs from the current approach.

Moving to part 2 of this approach... using the answer instead of filtered results.  
Discussion on developing mandatory and optional reports.

### Peter E. talks to Quantum Energy Detection for RADARs

---

Bill: How does this relate what is already in the text.

Peter E.: If you want to use CCA, we can just add timestamp. But then CCA has two definitions  $>-82\text{dBm}$  for OFDM and  $>-61\text{dBm}$  for QED.

Charles: Could you clarify the difference between QED and CCA?

Peter:  $-82\text{dBm}$  and  $-61\text{dBm}$ . QED should only go high on  $>-61\text{dBm}$

Amjad: Current draft allows 2 mechanisms for CCA.

Andy: Great idea except some RADARs are really slow (up to 120 seconds).

Peter: OK. We have timestamps of CCA minutes.

## **Session 8, 802.11 TGh, Nov 15, 10:30am**

Mika: We have two new concepts to discuss and decide on: container and timestamps.

Andy: Radio Reg community most interested in DFS characteristics.

Andy talks to report of joint experts group of RADAR and HiperLan community. Makes point that conformance testing/type acceptance is a national issue, not an ITU issue.

Bill: I thought ITU would recommend the conformance test.

Andy: True, but not going to handle the testing.

Andy: Need a statement on the DFS measurement periods.

These documents will be available on Vic's RR server.

Bill McFarland talks to modified document RR-01-026r0 as requested by Vic in Session 1.

Discussion ensues on Free Time assumptions of the graph offered.

Lots of discussion on how to achieve free time, what are valid assumptions, what we can and cannot achieve.

Charles: Requests information on regulatory meetings.

Mika: Meetings are advertised on Vic's web page.

Recess for lunch.

## Session 9, 802.11 TGh, Nov 15, 1:00pm

1:12pm. Called to order .

Editor is asked to present the results of the last few days.

Let's take time to go through and discuss the changes to the TPC text.

File will be placed on Venus/submissions/workinggroups/802.11h...

Evan: I am just going to cover the TPC related stuff. First time as editor so go easy...

Peter: Need to use the ISO 1999 version. You started with the 1997 draft.

Evan: Everything done to the draft has been the result of one of several motions that passed earlier.

Motion 9.1

Move that modification to section 5.2.3 of draft is removed.

Proposed: David Skellern

Seconded: Andrew Myles

No discussion

Yea: 12

Nay: 0

Abstain: 1

MOTION PASSES.

Modifications made to section 7.1.3.1.2 Type and Subtype fields.

## Motion 9.2

The editor is directed to split the *dot11SpectrumMangamenetCapability* variable into two variables called dot11DFSCapability and dot11TPCCapability variables. This modification will require changes throughout the document.

Proposed: Andrew Myles

Seconded: Evan Green

## Comments:

Amjad: We need to be sure that it is simple to determine if the station is H compliant.

Peter: Raised more concern as to the number of bits used and what is available.

## Amendment

The editor is directed to split the *dot11SpectrumMangamenetCapability* variable into two variables called dot11DFSCapability and dot11TPCCapability variables **and to add text to explain how to determine that a station is 802.11h compliant**. This modification will require changes throughout the document.

Proposed: Amjad

Seconded: Peter Larsson

## Comments:

Evan: Don't need it.

Andrew: Agreed.

Amjad: There is such a thing as compliance. I offer this to empower the editor to remove ambiguity.

Andrew: Call the question.

Raju: This is too vague. There is no action.

Peter, Raju discuss.

Yea: 2

Nay: 8

Abstain: 0

MOTION FAILS.

## Returning to Motion 9.2.

Raju: Avoid this. Save bits. This is not necessary to accomplish your goal.

Amjad: Used to agree with this. Changed mind. Thinks both DFS and TPC will go together so no need to split the functionality.

Evan: Independent control is a good thing.

Victoria: If both modes mandatory, you only need one bit. If both are optional, you can separate control.

Andrew: E has already addressed the bit limitations.

Evan: This section is optional to all of 802.11.

Raju: If I claim 11h compatability, then both DFS and TPC are required.

Andrew: Calls the question.

Amjad: Objects. Offers further explanation for optional and mandatory.

Many voice opinions...

David: Offers a scenario for reg compliance without H's TPC.

Yea: 6

Nay: 7

Abstain: 0

MOTION FAILS.

Continue with review of TPC changes.

Ruling on procedure requested by Andrew, Amjad, etc.

Motion 9.3:

Move to change TPC and DFS bits in the Capability Information Fixed Field to a single bit named Spectrum Management.

Proposed: Raju

Seconded: Peter Larsson

Comments:

None.

Yea: 10

Nay: 1

Abstain: 0

MOTION PASSES.

Andrew: Section 7.3.1.4 has no information about Spectrum Management. Need to modify.

Motion 9.4:

Move that text in 7.3.1.4 be changed as follows “All STAs compliant with IEEE 802.11 Spectrum Management, specified in Clause 9, shall set the Spectrum Management Bit in the Capability information field.”

Proposed: Raju

Seconded: David

Comments:

Andrew: I think I disagree. Should set with MIB variable.

Friendly Ammendment

Move that text in 7.3.1.4 be changed as follows “A STA shall set the Spectrum Management subfield in the Capability Information field equal to 1 if the Boolean MIB attribute dot11SpectrumManagementCapabilityEnabled is true, otherwise it shall be set equal to 0.”

Comments:

None

Yea: 11

Nay: 0

Abstain: 0

MOTION PASSES.

Motion 9.5

Move that the editor be empowered to change TPC and DFS to Spectrum Management in list on 7.3.1.4.

Proposed: David

Seconded: Andrew

Comments:

None.

Yea: 10

Nay: 0

Abstain: 0

MOTION PASSES.

Recess...

## Session 10, 802.11 TGh, Nov 15, 3:30pm

3:30pm. Meeting called to order.

Mika gives Peter E. the floor.

Peter offers some ideas on what we need to move forward for the next meeting (procedurally).

### Motion 10.1

Move to empower TGh to hold an interim meeting in January 2002, conduct teleconferences, process letter ballot comments and, consequently, revise 802.11-01/482 before March 2002 IEEE 802 Plenary.

Proposed: Peter E.

Seconded: Evan Green

|          |   |
|----------|---|
| Yea:     | 8 |
| Nay      | 0 |
| Abstain: | 0 |

### Motion 10.2

Move that the WG, if necessary, conduct a second WG letter ballot after the January 2002 interim meeting to forward a revised 802.11-01/482 to Sponsor Ballot.

Comments:

Chris asked something.

Proposed: Peter E.

Seconded: Victoria

|          |   |
|----------|---|
| Yea:     | 8 |
| Nay:     | 0 |
| Abstain: | 0 |

Mika: 20 minutes remain. Let's continue with review. BTW, we are under a tornado watch. Stay away from windows!



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**IEEE P802.11**  
**Wireless LANs**

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**Tentative Minutes of TGi for Austin November 2001**

**Date:** 11/12

**Author:** Jesse Walker  
Intel Corporation  
jesse.walker@intel.com  
(503) 712-1849

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## 1 Monday Afternoon

### 1.1 Call to Order

3:40 PM.

### 1.2 Agenda Discussion

Proposed agenda:

- Monday and Tuesday morning
  - Chait Status
  - Normative text presentations and motions
- Tuesday afternoon and Wednesday
  - Other security presentation
- Thursday
  - Prepare for next meeting
  - Vote on letter ballot

### 1.3 Agenda Discussion

Q: Discussion of recommended practices.

Chair: Yes. WECA+Recommended practices+TGi: which course do we take. Ultimate goal: bring fixes of WEP into TGi. Do we change TGi draft text, or take this work to WECA. TGi has to decide whether it wants the WEP2 work in 802.11. 3 notions: per-packet key construction, MIC, and rekeying. As far as dealing with WECA, we want to give WECA our status. Letter ballot is a means of doing this. Must decide what next steps with WECA.

Comment from WECA: needs to talk about what to do.

Comment: Upper layer authentication not defined in TGi. What are we going to do about that?

Chair: Talked with David Cohen/Stewart Kerry about this. TGi viewed this as out of scope. WECA can make up its own rules for what ULA to use. If WECA can't do this, we can create a PAR for this. We don't have ULA mechanisms in draft, so would have to have motions to change this. Good discussion for Tuesday/Wednesday

Q: Suppose we can't complete some feature, e.g., the MIC? Can we go to letter ballot?

Chair: Sole criteria to go to letter ballot is for group to vote to do so. 802.1X had 11 letter ballots. It is more important to show progress than it is to have draft complete.

Q: Does WECA think this a good idea?

Chair: David and Stewart receptive to this. What WECA does is up to them.

Agenda adopted without objection

## **1.4 Chair status**

### **1.5 Monday/Tuesday presentations**

Russ Housley/Doug Whiting/Jesse Walker – 550/572

Doug Smith – 594 Message Integrity

Nancy Cam-Winget/Jesse Walker – 556, AES Associated Data

Nancy Cam-Winget/Greg Chesson/Russ Housley/Jesse Walker – 573

Albert Young – 540

Tim Moore – not known

### **1.6 Tuesday/Wednesday Presentations**

John Volbrecht – EAP and access control

Bob Moskowitz – 592

Carlos Rios – not known

William McIntish – not known

### **1.7 Discussion**

Chair: Will entertain motions for 572, 594, and 556. We will hold off on motions on rekeying until we have heard all three.

### **1.8 Presentation of Document 572, Jesse Walker**

Question: Is there a document number for WEP enhancements document? Answer: 572

Comment: Jesse had a list of participants of Akron interim meeting.

Question: What does consensus mean? Answer: Authors trying to represent agreement heard on conference calls. It seemed like that the people participating in the calls agreed that the proposal was as good as it was going to get for existing hw.

Comment: Consensus among the cryptographers is all 4 components of the proposal are always required to achieve security. If you want to fix what's there and you want to retain a RC4 cipher on a per pkt basis, this is the solution.

Question: Since I am not a cryptographer, I did not participate in the calls. I thought that this meeting was to come up with a consensus. Not on the calls. Answer: Not recorded

Question: Can we look at the proposals in terms of their longevity and use that to drive the consensus? Answer: wonderful idea

Comment: It is not clear that this works on legacy hardware. Answer: Agreed it will only work on legacy hardware we took into consideration.

Question: Is there actual text for the motions? Answer: Yes and no. This is an outline. It has to look something like the text on slide 18. We don't what the rekeying or MIC looks like yet.

Question: How does the hardware differentiate between new & old hardware? Answer: if you are running rekeying protocol, you will know a priori.

Chair: Packet will tell you if it is encrypted, through the process of associating, you would know

Consensus Intent was not to exclude anyone. Complete solution requires all four components

Question: Should this be a supplement?

Chair: our PAR covers MAC enhancements. Splitting the document takes time

Editor: Concern over political feasibility for documents

Question: All four fixes being done now will have to be done in the future for the long-term fix? Answer: Only mixing will not be needed

Question: This is not a short term solution – it a solution for the hardware that exists at November 2001? Answer: Agreed.

## **1.9 Recess**

## **2 Monday Evening, November 12, 2001**

### **2.1 Call to order**

6:40 PM

### **2.2 Doug Smith Presentation on MIC Framework Text**

Paper includes major contributions from Russ Housley, Doug Whiting, Jesse Walker.

Noted that we must encrypt the MIC, as the MIC being used is too weak to defend against attack on its own. Consensus on using a 4 byte MIC otherwise the performance hit will be too high

Noted countermeasures needed to slow the attacker.

Need noted to periodically change the MIC key. Use old and new MIC keys to

Noted need to accommodate packets out of order.

Discussion:

Question: Is there a way to tell whether a MIC has been applied to the packet? Answer: MIC usage will be negotiated in associate/probe messages as for AES/enhanced WEP.

### **2.3 Motion by Jesse Walker: Replace Clause 8.2 with the outline on slide 18 of document 572r0**

#### **8.1 Overview and Theory of Operation**

#### **8.2 Placement Cryptographic Processing**

#### **8.3 IV Sequencing and Replay**

#### **8.4 WEP2 Mixing Function**

#### **8.5 WEP2 MIC and Counter-measures**

#### **8.6 WEP2 MPDU Expansion**

#### **8.7 WEP2 Interaction with Re-Keying**

Second: Dorothy Stanley

Comment: Speak against the motion. Appreciate the work. Now need to vote. Need Time to read, study it. Premature to vote now. Chair: Has been on the server 4 hours, per rules.

Comment: All agree that if want a secure solution, need the 3 elements (key mixing not needed with RC4). Start with parts for strong .11a solution

Question: Is “Outline” to be understood literally? Where is the text? Answer: Yes, Additional motions will provide content. Changes will be made to Draft 1.5.

Comment: First 4 clause numbers exist in the standard. Aren't these already in the standard. Probably a numbering problem. Answer: Clarify: first 4 already in the existing standard. Existing 8.2 in the standard was re-numbered to be

8.1. Original was written assuming only WEP existed. Took that down a level – editorial judgement. Intent is to keep all text in the existing standard. Renumber to include new material.

Question: What is the relationship between this motion and the previous presentation? Answer: Motion’s objective is to determine if TGi wants to adopt the direction that the study group has identified. Follow with subsequent motions to provide content.

Question: Is 8.2.7 in draft version 8.7? Answer: no This is the new outline, if the motion is adopted.

Question: Numbering – Will there be a motion to add “WEP3” – AES?, or should we adjust the numbering now?

## ***2.4 Motion: Motion to amend by Jesse Walker: Change the original motion to replace “8” with “8.2”***

Second: Onno Letanche

Discussion? None

Motion to amend passes: 11-0-5

## ***2.5 Motion on the Floor: Replace Clause 8.2.2 with the outline on slide 18 of document 572r0***

### ***8.2.1 Overview and Theory of Operaion***

### ***8.2.2 Placement Cryptographic Processing***

### ***8.2.3 IV Sequencing and Replay***

### ***8.2.4 WEP2 Mixing Function***

### ***8.2.5 WEP2 MIC and Counter-measures***

### ***8.2.6 WEP2 MPDU Expansion***

### ***8.2.7 WEP2 Interaction with Re-Keying***

Discussion on Main Motion:

Question: Goal is to get a statement on direction from TGi. What are we going to do with this work? Answer: Insert into normative WEP2 text.

Question: Is this an outline with no text? Answer: Yes. If this is adopted, further motions will provide text.

Comment: When draft 1.5 was generated, there was a desire to improve WEP. Inferred desire to improve WEP.

Answer: Yes, do we want to follow the direction of the ad-hoc subgroup.

Question: In section 7.?? – will we have to replace WEP2? Answer: Will need a selector. Don’t have a preference at this time

No additional Discussion.

Motion is normative.

Vote: 13-6-1, Main Motion Fails

Chair: Open for discussion. Possible to bring another motion.

Comment: We need 2 motions. First one to delete WEP2, then another to adopt a replacement.

Comment: Tried before to delete, failed, since people wanted to know the replacement prior to voting.

Discussion: Can we ask the people who voted “no” to say what would enable them to change their vote.

Comment: Need more time to look at the proposal.

Comment: Perhaps discuss proposals now, and then discuss motions tomorrow. Answer: On behalf of the group, welcome additional participants, and suggestions.

Comment: Where are the documents? Chair: Continue with discussion, make motions tomorrow.

Comment: This could drag on forever. What is the selection process? Put in proposals, with a deadline, and then perhaps proceed without a WEP2. Answer: People just need more time to understand the proposal.

Chair: Goal to bring a next draft Friday. Need to vote out of the subgroup on Thursday. Needs to be on the server 24 hours ahead of time. Draft need not be complete to go on.

Comment: There was a vote in the past to throw out WEP2. People said – no, let's see what the proposals are. Need to set a deadline.

## **2.6 Straw poll – after reviewing the proposals, would you consider changing your vote?**

Would change to 15-4-1. Would pass.

Comment: Would you consider putting this material in an annex, for legacy products. May get more votes. Don't have a PAR to do an annex.

Chair: Are there any other proposals that chair knows of? Answer: Perhaps have portions of what has been proposed.

Comment: Procedurally a question, annex path would address his concerns.

Comment: There is an immediate problem with pushing WEP through WECA. WECA agrees that technical discussion needs to happen in TGi. Annex, in draft, recommended practice is the proper vehicle for dissemination. Work on content first.

Comment: Not convinced this is the best way to get there. Prefer annex.

Comment: Purpose of a draft is to collect material which will go into the standard. If get 75%, rules change. Draft could pass.

Response: Yes, but pragmatically not. Need to fix WEP2, which is known to be flawed. Press will ask "Why wasn't this fixed?"

Chair: We added new material to the draft, can go to letter ballot. View as an iterative process. Can debate this. Use 802.1X experience as a learning exercise. First draft didn't pass, and we learned much from it.

Comment: Would like to work on another framework for tomorrow. Answer: Yes, come together tomorrow with motions.

Comment: Can't keep coming back with the same proposal. Answer: Correct.

Comment: What if half are opposed to WEP2, and half must have it. Need a formal selection process.

Chair: Any more discussion? No:

## **2.7 Next Presentation: Jesse Walker 556 AES Associated Data Optimization**

Nancy and Jesse have been discussing changes with Phil Rogaway

Question: Does the BSSID need to be protected? Comment: We can discuss this. In the analysis thus far, didn't need to be protected. If there is a reason why, let us know. Care about the source address, not the BSSID.

Question: Looks fragile. If need one more bit needing protection, have to re-do. Answer: Correct. There is an extension to protect arbitrary data, but it is based on a cryptographic MAC that is XOR-universal.

Question: Which paper from Rogaway are you referring to? Answer: New one from Rogaway, on his website.

Comment: Should adopt what NIST adopts. What is being proposed here isn't covered by the Rogaway NIST submission. Is he planning to add it? Answer: don't know.

Comment: BSSID – Don't need to protect, since association between the AP and station is known – protect DA from STA to AP, source from AP to STA.

## **2.8 Motion by Jesse Walker : Adopt use of nonce-stealing for protecting associated data with the suggested optimisations, as defined in text from document 556 for appropriate clauses.**

Second: Nancy Cam-Winget

Discussion: Where did key-id bits end up? Answer: All existing used bits preserved. 4 high order unused bits not preserved

Discussion: What assumption was made on encrypt early/last. Answer: The draft current uses the encrypt early model.

Discussion: What is the IP status for OCB? Answer: Rogaway filed a patent. Gligor has filed a patent and believes OCB infringes on his claims. IBM has filed a patent.

Motion: 15-0-7 Passes

## **2.9 Motion by Jesse Walker: Specify AES to use Bi-directional Keys and use directional replay counter where order STA addresses lexicographically and the traffic in the direction from larger address to smaller uses even sequence number and the direction from smaller to larger uses odd sequence numbers.**

Second: Nancy Cam-Winget

Discussion: In An ESS, what is the context of an address – BSSID? Which address? Answer: Address of the peers communicating on the secure channel. BSSID and the Station MAC addresses. TA and RA.

Comment: Does this mean that the replay window is reduced to 27 bits? Answer: Yes

Question: How do you do key management, key derivation? Answer: Simplifies, since only have to synchronize a single key. Question: What if a RADIUS server gives you 2 keys? Have to decide which one to use. This raises a fundamental concern. Answer: Yes. TGi is addressing all like issues through out its entire piecemeal.

Question: Is this futureproof? Works for 11Mbps, what about Gbps? Answer: Haven't worried about it. MAC will break down first at OC3 speeds. Next generation will have to re-do this work. In future, may have more processing available. Comment: desire for additional encapsulations.

Question: Send and receive keys for WEP, could we use the same structure? Should this be done in WEP? Answer: Not needed.

Motion: 20-0-2 Motion Passes.

## **2.10 Doc 11-01-610 by Tim Moore Key Interactions**

Question: Who is the user? Answer: The admin of the AP. Question: Does the station authenticate the AP? Answer: Could have a UI appear to ask the station user if they want to authenticate to the AP. No easy ways. Many configuration options exist. Challenge to make it easy to use.

Question: Why bother with self-signed certificates? Could use hash on random data. Answer: Yes. Would require a new EAP method. This example uses EAP-TLS, an existing EAP method.

Question: Is a unique identifier really needed? Answer: Send a per broadcast key to each VLAN. Question: Would this trigger counter measures? Answer: This would lead to CRC errors, not MIC errors

Question: Could you use TLS session resumption instead of self-signed certificates? Answer: Provides mutual authentication and avoids public key operations. Need to provide a master secret. Perhaps manually provisioned. On the AP, implement session resume. No need for GUI to ask for valid user. Station would have to obtain the secret (manually).

Question: Should some of these be normative, and some recommended practices? Answer: Yes, quite a few of these recommended implementations.

Question: Why are 802.1X frames to be unencrypted? Answer: Issue is on roaming. Messages are encrypted and won't be understood by the new AP.

Chair: Any objection to recessing until tomorrow AM? None.

## **2.11 Recess**

## **3 Tuesday AM**

Call to order 9:06

Chair: Confusion. This time is set aside for proposals for normative text. Is presentation 573 this?

Authors: yes.

### **3.1 Doc 11-01-573 by Nancy Cam-Winget, Greg Chesson, Russ Housley, and Jesse Walker**

### **3.2 Recess**

## **4 Tuesday Evening**

### **4.1 Call to Order**

Not recorded.

### **4.2 Doc 11-01-573 by Nancy Cam-Winget, Greg Chesson, Russ Housley, and Jesse Walker (continued)**

### **4.3 Paper 540, Albert Chang**

Question: Are you assuming encrypt last model? Answer: This is an implementation issue, not a protocol issue.

Question: But there is a hard point in time where key id is redefined? Answer: Yes.

Question: How accurate do you have to synchronize to make this work? Answer: The transition request/response is just like in doc 11-01-508. There are no packets encrypted under the old key.

### **4.4 Discussion**

Chair: We won't get to letter ballot this time. We have been pre-occupied on WEP problems. Open to make motions. Does anyone have any motions to make?

Point of Information: Please comment on current status of TGi with respect to current pressues.

Chair: There is great external pressures. PAR says to make MAC enhancements to security. There is a risk that external forces will take over if we do nothing here. Chair's view we have to do something.

Point of information: When do you think external forces will take over this work?

Chair: It is possible some organization like WECA will intervene. WECA wants technical discussions here.

Comment: Precent for WECA to do things here. We have to be concerned about press attention and that we do the right things here. Concerned that IEEE does right thing.

Comment: Different perspective. There is a huge problem due to WEP, and no question that it has to be solved by industry. Original goal was to create MAC enhancement with long-lasting progress. This rapid progress led to splitting of PAR because we would have a solution. But the group has slowed down by trying to solve WEP issue. If we continue to try WEP2 and long term, it will take too long and won't achieve rapid solution for security, and companies want to start now. We can't because long term is delayed. People have been making extraordinary process toward making process. This has been done outside of TGi. This is an industry problem and effects only the incumbent vendors. Think that work should continue, but not subsidized by TGi. Want work to continue, but WEP2 not part of TGi deliverable. Want to remove WEP2 from TGi.

Comment: Agree to some extent, but some fallacies in this. Same people fixing WEP are also working on TGi long term, so won't speed anything. Think the statement that WEP problems only affect installed base, because everyone being tarred with the same brush. We have to fix it.

Comment: IEEE set WEP and screwed it up, so it needs to fix the problem. New standard won't be credible if we don't.

Comment: Notion of security here is time-to-live. Technology is going faster, cracks getting better. Standards provide a time-to-live. Need a "socket" to plug security into and standard designed to die. If we had prepared another level we would be prepared.

Comment: Is there a motion on the floor?

Chair: No

Comment: then can we have a debate?

Comment: The pragmatic interest is the standard will be assessed by most prying eyes, and we will get crucified we do not take half-way solutions out.

Comment: We get one chance. Industry is not going to distinguish between WEP and TGi. Public opinion will focus on the next standard.

Comment: First comment. Plugging security in has performance consequences. Second point is the problem is not cryptographic algorithm, it is the protocol. If you want to solve the problem, hire 5 cryptographer and give them 2 years.

Comment: We don't have an algorithm problem. We need a protocol that uses cryptography correctly. We have to take the time to design a protocol that works.

Comment: The comment that group was making headway before is that the progress was illusionary. Tremendous progress has been made this fall. The draft calls out three environments, WEP, WEP fix, and the long term solution. What are you going to put in the next draft?

Comment: Will accept the cryptographers that progress has been illusory, but will agree with how world will view this work. Companies are already announcing their own fixes. This group is going to be bypassed by individual companies.

Comment: No matter how secure individual algorithm, you still have to take end-to-end context and also have to focus on the key management.

Comment: Very important that this group gets focused. WECA is a marketing arm. We are the technical body. It is important for you to choose a path and stick to it. If it requires two efforts, split the PAR. It is important to get the work done.

Comment: Think we are doomed, because the nature of the IEEE is to get a whole lot of people without expertise who want to change things. There is no chance that 5 cryptographers will get sufficient time to fix the problem.

Comment: I hear you. Everyone is concerned. People keep asking for simplicity and complaining about complexity. But everything is there for a reason. If we simplify too much we get WEP2.

Comment: The group that has been working outside has made tremendous progress. It has done this because it is small and focused and not subject to all the constraints the meeting. Seems that solving WEP2 is even harder than solving the long term. Fear energy is being put on wrong problem for short term gain instead of long term.

Comment: Question of focus. There seem to be two tasks: short term and next generation. The most important problem is the current implementation. We are hamstrung by hardware on the street, but this is a blessing. Think the WEP2 solution is very close. Focus on short term solution and publish it however and then move on.



Comment: Agree with idea that we have to fix WEP, but return to “time-to-live” point. The WEP fix doesn’t have to live forever. It has to live until we get next generation done and ready to deploy. Mixing up fix with next generation is not a good idea. More in favor of using something simple for rekeying and solves simple problem and then doing something else for future generation products. There is a tendency to want to reuse, but we won’t have these for another year. Don’t worry about reusing anything for next generation.

Comment: Don’t think we have been illusionary about developing protocol. It wasn’t protocol but it is a good protocol. We do need to focus on AES as fast as possible.

Comment: Isn’t the fix for WEP the new AES-based protocol? We are trying to fix something in WEP that is already broken and sometimes the best we can do is to start over.

Comment: WEP being broken is not our problem, it is the people who bought our gear. Doing something new doesn’t solve their problem; it solves the vendor’s problem. Second, there is no prize for almost right. Look at IPsec. Don’t agree with lots of complexity disappearing by moving directly to AES. The extra complexity WEP introduces is actually very small. Once you have the code, you don’t reduce the complexity by running it less often.

Comment: Thought slapping AES would fix this, but we have found out this would not work. It seems like things like the session management is very important, and the WEP2 work has been very educational. It is responsibility of IEEE to fix the 15 million systems in the field.

Comment: Have to reiterate that if we get something out that meet market expectation, then we will not have a next generation.

Comment: If you move forward without fixing already deployed equipment, then worried about law suites by consumers of already deployed equipment. You have to address these. Need to start a motion to get WEP fixes in.

Comment: Reiterate comments on interoperability. We are getting bad comments on WEP because we were successful. This is because we had interoperable solution. If we don’t do something that address problems with WEP, the industry may fragment. That will be fatal. We have to keep this as a multi-vendor standard. Also discussion of allowing WECA take over WEP fix. WECA doesn’t have these resources. The same people in this room would work on that activity.

Chair: we still start tomorrow with motions on this topic.

## **4.5 Recess**

# **5 Wednesday PM**

## **5.1 Call to Order**

3:33 PM

## **5.2 Discussion**

Chair reviewed the status. We have completed presentations related to normative text. Last night left off with discussion.

## **5.3 Motion by Dorothy Stanley: Adopt the following agenda for Wednesday pm and Thursday AM timeslots**

## **5.4 Point of order: Jon Edney has submitted prior motions.**

Chair agrees, but notes that Jesse has submitted motions previously.

## **5.5 Point of order: Jon Edney asks whether Jesse can withdraw them from the queue**

Jesse does so.

## **5.6 Motion by Jon Edney: I move that TG<sub>i</sub> should focus its effort by specifying one and only one encryption cipher suite.**

Second: Aaron Friedman

Discussion: 5 reasons. Important to speed up process and focusing on a single one does this. Two proposals results in a conflict of priorities, dividing precious meeting time. The problem is process: balloting much lengthier if we have to cover both in the draft. Draft has to be circuited and balloted before either is accepted.

Comment: Speak against. Agree with objective, but think there are other ways to accomplish this. Need solution for existing hardware and a future solution, and we can accomplish both.

Comment: Working not what point is about. Number of algorithms is not the point. We can do a security protocol that we can plug in any algorithm. Baffled by motion.

Glen Zorn assumes chair to allow Dave Halasz to comment.

Comment: Point of motion to point group on what to work on: AES or fixes for WEP. If you were voting for this motion you have to pick which to work on.

Comment: Next motion will address this.

Dave returns to chair.

Comment: Speak in favor of motion. Purpose is to focus TG<sub>i</sub> on a single problem. Need a scheme into the market place, not two.

Comment: Speack against. For long term need algorithm independent protocol with AES as first mandatory suite. Short term we owe it to 802.11

Comment: Don't think intention to concentrate on encryption algorithm, it is to work on protocols

## **5.7 Motion to amend: Aaron Friedman: to change the words "cipher-suite" to "protocol".**

Point of information: what does motion mean.?

Mover: Focus on one protocol

Comment but we only have one?

Comment: no.

No second, back to main motion.

Comment: Speak against motion, because group will not be able to choose just one.

Comment: Would author comment which one to focus on, and secondly what we are talking about, security architecture?

Mover: Not presenting self as cryptographer. Intent simple: choose AES or WEP2 protocol and build protocol around selected cipher suite. Thing to focus one and move.

Comment: Feel comfortable which one is favor?

Mover: If this passes, will move to use AES as basis.

Comment: Speak against, since it speaks to take WEP fix out of this body, which will lead to market fragmentation, which is bad for interoperability. Vendors are already shipping proprietary solutions undercutting WECA. If group feels necessary to focus on AES in the near-term, then that may make sense.

Comment: Call the question – caller not identified

Second: Nancy Cam-Winget

Chair: This motion is technical

Vote: Motion fails 23-28-2

Jon Edney withdraws his second motion.

**5.8 Motion: Dorothy Stanley moves to adopt the following agenda  
3:30-5:30 pm Modifications to WEP 2 text:**

**Goal: Include new WEP2 Solution Elements**

- 1. Motion to add Key Mixing (Doc 550)**
- 2. Motion to add MIC Framework (Doc 594)**
- 3. Motion to add IV Sequencing on transmit side (Section 5, Doc 550) add text to capture issue on receive side.**
- 4. Motion to enable editor to eliminate any WEP2 Overlap with motions 1,2,3**
- 5. Discussion – Re-key Solution Summary Comparison (Docs Albert, 573, 610)**
- 6. Possible Motion – Include a re-key mechanism**
- 7. Identify remaining protocol issues, work items**

**MIC Definition**

**Default key MIC coverage**

**Replacement name for “WEP2”**

**Proper positioning of WEP2 solution**

**8. Discussion - Positioning of WEP2 .11i solution**

**Primary goal of solution is to provide improved solution for existing hw**

**Solution intended to be “competent”, not “final/target/” solution**

**Normative or non-normative (informational)?**

**Explanatory text in normative, WECA positioning**

**Others**

**8:00-10:00 AES based Solution**

**Goal: Identify, Discuss and Resolve remaining issues on AES based solution**

**Presentation – doc 11-01-634: AES Counter Mode & CBC MAC option**

**Straw Poll (Proceed with development of text for AES CM/CBC-MAC) or motion to develop text, include in the draft as replacement for AES-OCB**

**Identify Remaining protocol issues, work items re: AES****Extensibility of frame format definition****Positioning of the AES solution****Thursday: 3:30-5:30****Identify Other work areas in the working draft, people to work on text:****MIB****Pro Forma****Security Summary – Problems/Solved/Not solved by each solution****WEP2 – Continued****AES - Continued**

Second: Bob Beach

Discussion: Duncan

**5.9 Motion to amend: Duncan Kitchin moves to insert discussion of future direction as first item, and to use times as guidance instead of rigid schedule**

Second: Dave Richkas

Discussion: Speak against motion, since we voted on first direction. Just don't agree with abandoning current customers. We voted against that already.

Response: Clear from previous motion, there is a significant level of disagreement.

Comment: Speak against. Wasting time discussing what we are doing instead of discussing what to focus on.

Comment: So still open for proposals.

Call question.

Vote: 20-21-1, motion fails, back to main motion

**5.10 Motion to amend: Tim Moore moves to add a time slot to agenda tomorrow afternoon at 3:30 to discuss rekey proposals**

Second: Greg Chesson

Point of Information: Does this speak to AES rekeying?

Mover: none of the proposals are specific to either WEP2 or the AES protocol. Rekeying is not a WEP2 discussion.

**5.11 Motion to amend amendment: Glen Zorn moves to say instead of "add a time slot..." to change existing agenda item to remove reference to WEP2**

Second: None

Back to motion to amend

Call the question

Vote: 36-0-2, motion passes

### **5.12 Main motion on floor:**

**3:30-5:30 pm Modifications to WEP 2 text:**

**Goal: Include new WEP2 Solution Elements**

- 1. Motion to add Key Mixing (Doc 550)**
- 2. Motion to add MIC Framework (Doc 594)**
- 3. Motion to add IV Sequencing on transmit side (Section 5, Doc 550) add text to capture issue on receive side.**
- 4. Motion to enable editor to eliminate any WEP2 Overlap with motions 1,2,3**
- 5. Discussion – Re-key Solution Summary Comparison (Docs Albert, 573, 610)**
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**MIC Definition**

**Default key MIC coverage**

**Replacement name for “WEP2”**

**Proper positioning of WEP2 solution**

- 8. Discussion - Positioning of WEP2 .11i solution**

**Primary goal of solution is to provide improved solution for existing hw**

**Solution intended to be “competent”, not “final/target” solution**

**Normative or non-normative (informational)?**

**Explanatory text in normative, WECA positioning**

**Others**

**8:00-10:00 AES based Solution**

**Goal: Identify, Discuss and Resolve remaining issues on AES based solution**

**Presentation – doc 11-01-634: AES Counter Mode & CBC MAC option**

***Straw Poll (Proceed with development of text for AES CM/CBC-MAC) or motion to develop text, include in the draft as replacement for AES-OCB***

***Identify Remaining protocol issues, work items re: AES***

***Extensibility of frame format definition***

***Positioning of the AES solution***

***Thursday: 3:30-5:30***

***Rekey discussion (non-protocol specific)***

***Identify Other work areas in the working draft, people to work on text:***

***MIB***

***Pro Forma***

***Security Summary – Problems/Solved/Not solved by each solution***

***WEP2 – Continued***

***AES – Continued***

Question called

Vote: 28-3-6, motion passes

### ***5.13 Motion by Dorothy Stanley: to add Key Mixing (Doc 550)***

Second: Ron Brockman

Point of information: Text to appear in normative or informative section?

Mover: Would appear in normative, in clause 8.2.2. We saw presentation saying there are 4 pillars to fix WEP. There will be a second discussion of whether or not WEP2 will be normative.

Question: Whether IV is included in key. Which version of text is this?

Answer: There has never been a proposal where the IV is not included in key

Vote: 22-10-5, motion fails (technical)

Observation: This motion might have passed if we had had the normative/informative discussion first.

Point of information: Isn't necessary to change agenda to be modified to continue on motions?

Chair rules we could

Point of information: Could make same motion to make it informative instead of normative.

### ***5.14 Motion by Dorothy Stanley: to add Key Mixing (Doc 550) but add as informative instead of normative***

Point of information: Is this permitted? 8.2.2 would be labeled information

Answer: The key mixing only would be informative.

Comment: So 8.2.2 contains some normative and some informative content?

Chair: It would be better not to rule. We would have to go through this over again if this is ruled in order, and if chair is wrong then all would be out of order and have to do this over.

Mover: Leave it to editor to put it in appropriate spot.

Second: Albert

No discussion

Vote: 42-1-1, motion passes

***5.15 Motion by Dorothy Stanley: to add MIC Framework (Doc 594) in appropriate normative location***

Second: Glen Zorn

Discussion: Possible for some implementations with key mixing optional

Comment: have to resolve encrypt early/encrypt last before knowing whether this is ok

Comment: incomplete

Vote: 15-17-8, motion fails

***5.16 Motion by Dorothy Stanley: to add MIC Framework (Doc 594) in appropriate informative location***

Second: Glen Zorn

Editor: This document is still WEP specific. Would support it if it were made more specific. More work is needed for it to be suitable as a general framework.

***5.17 Motion by Duncan Kitchin: to add to end “with additional qualification specific to WEP2”***

Second: Albert Young

Discussion: Speak against. We have been told there should only be one framework. Also heard opinion this is not ready.

Glen assumes chair

Comment: WECA and others looking for direction. Speak for motion.

Dave reassumes chair

Comment: Can't see why need same framework for different things. Speak for motion.

Comment: Agree. Introduce commonality for different solutions unnecessary distraction.

Comment: Worried about design for reuse. If we need one for future, no problem. If this one works in future, no problem. We can add it to normative text in future.

Vote: 21-3-12, motion passes

***5.18 Motion on the floor: to add MIC Framework (Doc 594) in appropriate informative location, with additional qualification specific to WEP2***

Comment: Speak against motion. Wording indicates this is a framework, with algorithm to be discussed later. Standard in normative tells what to do, and informative section say how.

Comment: rule out of order?

Chair: No, in order.

Comment: Seems full of contradictions due to word framework.

Comment: There is no MIC algorithm specified in WEP. This allows choice of MIC algorithm when it is specified

Question: Then why specify framework now?

Point of information: What in normative text would cause this informative text to be used?

Comment: If not normative, so not in PIX, so this is a way to make non-interoperable systems.

Chair: There is precedent in the annexes already, e.g., channel hopper.

Comment: But how can a frame format be informative; it can only be normative. This has no normative hooks.

Comment: But WEP 2 is still normative.

Question: Are both text and state machine normative?

Answer: Yes

Call the question.

Vote: 28-7-4, motion passes.

### ***5.19 Motion by Dorothy Stanley: Motion to add IV Sequencing on transmit side (Section 5, Doc 550), and instruct editor to add editorial comments to capture issues on receive side.***

Point of information: Refer to WEP2? Answer: Yes

Question: Normative? Answer: it applies to something that is informational, so is informational.

Question: does it need to be more specific?

Chair: This applies to informative text, so is informative as well.

Mover: 1<sup>st</sup> motion adopted doc 550, but we still need to instruct editor to add comments.

Second: Alber Young.

Discussion: Need description of replay protection

Question: Editor lots of discretion? Answer: This instructs editor to document the issues, so the problems get documented

Comment: Editor is already empowered to do this, because it is editorial. Don't need motion.

Comment: Agree.

Vote: 35-0-5, motion passes

### ***5.20 Motion by Dorothy Stanley: Motion to enable editor to eliminate any WEP2 Overlap with motions 1,2,3***

Withdrawn after it was noted that the editor already has this authority.

### ***5.21 Motion by Dorothy Stanley: Move to change text added by previous motions 5.14, 5.18, 5.19 to normative and optional to implement***

Point of order: This is out-of-order because it is same question.

Chair: Rules motion in order.

Point of order: Needs clarification

Second: Onno Letanche



Discussion: Speak against motion, because it is still normative. It is still a weak protocol

Comment: Speak in favor for sake of interoperability

Comment: agree

Comment: Speak against. Doesn't need to be elevated to get interoperability.

Comment: Speak against. Disrupts political balance that allows progress.

Comment: Speak in favor because we want to avoid procedural problems.

Comment: Speak against. Already had motions to incorporate text as normative and they failed. If we passed this, there is a large enough minority that dislike that we couldn't pass letter ballot.

Call question

Objection

Second

Vote on calling question: 34-4-3, question is called

Vote on question: 21-16-2, motion fails

### **5.22 Discussion – Re-key Solution Summary Comparison (Docs Albert, 573, 610)**

This agenda item has been moved to 3:30 Thursday.

### **5.23 Possible Motion – Include a re-key mechanism**

This agenda item has been moved to 3:30 Thursday.

Point of information: How can we identify remaining protocol issues

Comment: we can.

### **5.24 Motion by Glen Zorn: Move to recess**

Second: Aaron Friedman

Recess without objection.

## **6 Thursday AM**

### **6.1 Call to Order**

8:19 AM

### **6.2 doc 11-01-634, Russ Housley: AES Counter Mode & CBC MAC option**

Question: Are counter mode and CBC-MAC firmly in public domain? A: Yes. CBC-MAC used since the 70s. Counter mode since 1982. Question: Anything on broad implementation?

Point of Order: Not allowed to give opinions regarding patents

Question: do the hardware estimates include external memories? Answer: no.

Code Size? Answer: not very big.

Question: With OCB you can protect more data. Answer: Yes, but cheapness of nonce-stealing goes away, and cost increases to that of AES-counter+AES-CBC-MAC proposal.

Question: Is your key derivation technique for CBC-MAC ok? Answer: If that is not adequate, then counter mode is broken

Question: Could you summarise counter mode attack? Answer: Same as OCB mode: can't reuse IV, nonce.

Question: Won't initial implementations be in software? OCB has performance advantage for early implementation. Answer: Yes

Comment: Counter mode design uses 1 key instead of two. Is that a behavior employed before? Answer: It's ok. This is a fairly canonical construction.

Comment: Positively agree with preference for unencumbered IP. But those claims in the air. There is risk, but better plan is to ask your legal representation to resolve the risk. If the IP issues can be resolved, that takes away the biggest boogie man. If they can't be, maybe we should switch. Answer: Asked NIST. At this point not on roadmap, because has been unable to resolve IP issues. Comment: They told us that they would if the IP issues could be resolved. Answer: Several people have asked them not to put anything in that is royalty-free.

Comment: Need to make decision quickly, because we need to design silicon.

Comment: If we made this change we would need normative text.

Comment: There is one other differences. A small group of group of cryptographers have said there is a proof, but a large number of cryptographers have not established that they are comfortable with that proof.

Comment: How would you compare cryptographic strength of OCB v. WEP2? Answer: One is what can you do with the past, versus what can you do in the future

Comment: Make OCB informative.

Comment: OCB has not been analyzed a lot. David Wagner won't analyze it because it is patented. He is just an example.

Comment: Phil Rogaway came and presented an overview of it. Wonder to get his review on this proposal. Answer: yes.

Chair: Rogaway expressed interest to stay out of argument.

Comment: The CBC-MAC proof was by Rogaway as well.

### **6.3 Straw Poll (Proceed with development of text for AES CTR/CBC-MAC) or motion to develop text, include in the draft as replacement for AES-OCB**

Comment: We want a straw poll.

Comment: The intent is to capture a straw poll to capture sense of the group to have the authors develop their proposal, so we know better what they plan to do.

Comment: start with a straw poll.

Question: what do presenters want to put forward, the agenda suggests one of two possible actions. Which one do presenters want to put before. Answer: None of presenters have voting rights. Dorothy proposed adopted agenda.

Comment: Straw poll is to settle question whether this is a waste of the presenters' time or whether it is a good idea.

Question: Is it possible not to replace AES-OCB but to support both? Can we separate the first and second options.

Comment: Want presentations comparing the two. Hard to claim we should replace text.

Comment: Think it is responsible to throw out OCB at this time. But if we are never going to get this to happen, don't want to waste.

Straw poll: Proceed with development of text for AES CTR/CBC-MAC. Straw Poll Vote: 42-11-10

Straw poll: Based on the presentation for AES CTR/CBC-MAC, would you vote for replacement of AES-OCB with AES CTR/CBC-MAC: Straw Poll Vote: 35-21-7

Comment: This included non-voting members, too.

Question: Can we have another straw poll on resolution of IP issues?

Straw Poll; If the IP issues were resolved, would you support AES-OCB? Vote: 30-16-17.

Comment: We advised not to use OCB, because it is so new. Advise not to use for 5 years.

Comment: One difference to consider by people here. Is the different size of implementation a consideration?

Comment: Reiterate the point the point is that OCB can be implemented more efficiently in software.

Comment: AES-OCB has been an island of stability in the draft. We shouldn't kick it out.

Comment: Hope OCB is secure. But 802.11 just got burned really bad, why do it again? No one just doesn't know yet, because

Comment: Straw poll says we are deadlocked, so more work needed.

Comment: Crypto community is traumatized by patents. People use patents in cryptography to block implementations, use particular software etc. NIST banned patentable algorithms because this. Don't use OCB until patent issues are resolved.

Comment: People saying this is interesting in software, IP concerns, wondering whether OCB option, counter mode mandatory. Long term everyone migrates to CTR/CBC-MAC

Comment: Rogaway did proof of CBC-MAC. If you trust that proof, why not OCB proof. Answer: Trust 20 years of analysis, not the proof.

Comment: Comment to newness of algorithm. Temper it, because we are proposing other new things like rekey protocols. Have to view newness in that light.

Comment: Newness argument has some merit. But we are using AES which is not fully analysed. There are protocols that are old and have been broken only after many years. The reality is you have to look at the merit.

Comment: Understanding there is an IP statement from Phil Rogaway. Chair needs to get similar letters from other claimants.

Comment: People need to get past pro forma IP statements. Each vendor can ask terms. Which is going to be broken first? AES or OCB?

Comment: Not sure what drives this group to pick latest cryptographic ideas. We should pick safest, proven technology.

Comment: If we get some kind of letter, ask . Early on Gligor claimed to have a proof, but it was broken. Possibility that it can be broken, because the model may be wrong. OCB is only a year old. AES is 3 years old. Every cryptographer has tried to break AES.

Editor: a year ago there was not the political will to put in MIC, so it was politically impossible to satisfy the PAR. OCB forced the acceptance of a MIC until this understanding grew broad enough to stand on its own. If you do not support OCB mode, you are committing to either fight for a MIC or to rescind the TGi PAR.

Comment: there was an understanding that WEP was broken.

Comment: Speak in favor of doing work on CTR/CBC-MAC, even though voted against replacing OCB.

Comment: What is metric for success? 3 smart people breaking with 108 hours of effort? Answer: Goal is measured in MIP years. It must not be possible to break using techniques known and existing resources. Attacker has to break every key, not break the whole system. It's not that much more expensive to make it infinitely hard to break, if you design properly up front.

## **6.4 Identify Remaining protocol issues, work items re: AES**

- Extensibility of frame format definition
- Positioning of the AES solution

Editor: Encrypt early/Encrypt Late decision missing from list. We cannot complete replay, rekey designs without resolving this.

Comment: Encrypt early/late has implications for rekey too

Comment: This is an important issue. Any way to resolve it this week? It involves people outside of TGi.

Comment: One possibility for moving forward is to change approach in current draft from classify-encrypt-queue to classify-queue-encrypt.

Comment: TGe is out of session 1-3 as well.

Comment: Time period sounds good, TGe preference will be for classify-encrypt-queue.

Editor: unavailable, but group must go ahead anyway.

Russ Housley volunteers to lead this discussion. To contact Duncan Kitchin, Michael Fischer, Simon Black.

Point of information: How long will work for CTR/CBC-MAC will take. Answer: When do you need it? Comment: Need know which bits will be protected, frame format. Need it yesterday, so as soon as possible.

Jesse assumes chair for Dave

### **6.5 Motion by Dave Halasz: Move to change all references in draft from “WEP2” to “Temporal Key Packet Protocol (TKPP)”**

Second: Nancy Cam-Winget

Discussion. Doug Whiting has offered WSP.

Comment: This is backward looking to WEP 2. Suggest name for both

Groans of disapproval...

Comment: Recommend against WSP, since there is an .11a similar name.

Comment: should be called PMP

Comment: Step in the right direction, but too specific. Solution includes a temporal key, but also working on a MIC definition. We have time to work on a better name.

Mover: People are going ask what 802.11 has done about the issue. If we do nothing, WEP2 is going to be in the press. Not married to name.

Comment: Replacing WEP2 good, but this is not a good name yet. We are working on a protocol that will work for both. Suggest “Austin” and no relation to comments.

Mover: What we have now is a temporal key. If we were to change it, we can change the name.

Comment: Word “Packet” doesn’t do anything.

### **6.6 Motion to Amend by Greg Chesson: Change “Packet” to “Integrity”**

Second: Richard Paine.

Comment: need two names, for old and new stuff. Austin, Dallas.

Call Question

Vote: 15-5-7, motion passes

New Main Motion:

### **6.7 Motion by Dave Halasz: Move to change all references in draft from “WEP2” to “Temporal Key Integrity Protocol (TKIP)”**

Vote: Passes 21-9-6

Recess

## 6.8 Recess

# 7 TGi/TGe ad hoc, Thursday Afternoon

Chaired by Russ Housley from TGi.

Agenda: discuss interaction between QoS and Security; close on placement of respective components in the 802.11 architecture, as this affects interoperability.

Chair: TGi wants short replay window. This appears to imply encrypt is close to RF

Comment: does this mean a MIC per traffic class? Answer: Not necessarily.

Comment: Assume sender is creating IV and applying MIC to this. Some implementations encrypt close to PHY, and others farther upstream. We need to define where this function logically resides.

Chair: where the sequence number is assigned is important, regardless of encryption point. WEP uses sequence numbers as IVs, and we need to control the ordering effects of the MAC on this. It is critical that if an IV is used with one traffic class, it is not reused with any other traffic class.

Comment: If traffic class is protected by the MIC, then IV can be reused. Answer: No.

Comment: Could use separate IV space per traffic class, or different keys per traffic class; no way to bound the amount of reordering between traffic classes.

Chair: unused sequence space is no problem, but sequence collision is completely fatal.

Comment: could say that the sequence space within a traffic class must increase monotonically.

Chair: So the only problem is retransmission?

Comment: retransmission destroys the time inference in sequence numbers.

Chair: We don't need time inference, other than when it is exhausted the bad guy can't use unused sequence numbers since he can't construct the MIC. Replay protection doesn't care about time, only that sequence numbers are never reused.

Comment: Then just make sure that within a traffic class each received sequence number is larger than the last one.

Question: No reordering possible within a traffic class? Answer: TGe allows large asymmetry in number of packets in each class.

Comment: Delayed packets also cause problems. Send it assuming it will be discarded or repair it (re-MIC it) before sending. It doesn't hurt to freeze the queue to re-encrypt and MIC if the queue is already stalled.

Comment. Can send when you have the wrong key. What happens if at rekey time you have a frame ready to retry?

Chair: There are proposals that handle this correctly. Don't have to go into it here.

Comment: Then this is not a reorder problem, but a rekey.

Chair: We know ways to solve it. If we re-encrypt, we must use a different sequence number; we don't want to help the attacker with two views of same cleartext, but it's OK if same ciphertext goes out twice.

Comment: So if rekey with key overlap, the new packets use new IV from new sequence space? Answer: Yes.

Chair: 3 proposals: a) change key now, and too bad for traffic encrypted under old key, b) clean handshake to tell when old key no longer available, c) two key ids, and ping-pong between them

Question: Replays observe window size. How are these related? Answer: New key always starts a fresh sequence space.

Comment: frame header sequence number has small sequence space, and used only for retries. Response: TGi doesn't use this; it uses the WEP IV for sequence space.

Comment: IV for replay protect is independent of order of retries.

Chair: Think the consensus is:

- Ensure value of IV is greater than that of any other previous packet in same message class, then it's not considered a replay.

Comment: This works because QoS guarantees in-order delivery

Chair: just has to say 16-bits. We do have to make sure the traffic class is covered by the MIC.

Comment: Also consider how to do STA-STA in a BSS, for instance, with more than one hops. How to encrypt?

Answer: Each station pair needs its own set of keys.

Question: What to do about STA-STA side-band traffic? Comment: Must also consider when this is multicast.

Comment: This needs master key in more than one space. Chair: This means you either have distinct key spaces or mix Tx MAC with IV or synch the IV space across stations.

Comment: Possibl for multiple stations to rekey simultaneously.

Chair: This works for key-mapping keys but not default keys.

Comment: Could pool IV space in some way among stations

Chair: this can be separated into two problems? Perhaps WEP2 doesn't run with QoS and AES is required. RC4 is sensitive to IV collisions but not AES (sic)

Comment: Maybe sidechannel won't use broadcast? Answer: Right now only AP can broadcast.

Comment: Before receiving on side-channel, STA informs AP it will do so.

Comment: ad hoc is more generatl problem than side-channel problem.

Comment: in an ad hoc, each station judges for itself whether to receive.

Comment: the assumption is that if you say you'll accept STA-STA traffic, you take it from and STA the AP says is authentic. Observation: This model is not ratified.

Comment: could have STA-STA participants treated like APs for key distribution.

Chair: TGi will have a description of rekey soon. Hope TGe will too.

Comment: Suggest a motion in TGe for external/new business to request 802.11 to set up one joint meeting.

Comment: Concerned with Associate before authenticate—it's too slow.

Comment: Agree. Want to make motion for a STA to associate with more than one at a time.

Comment: may be no active PAR for that motion; possibly TGe.

Comment: TGe affected by changing it in TGi

## 8 Thursday Afternoon

### 8.1 Call to Order

At 3:32 PM.

Chair: would someone want to make a motion to recess to TGg vote at 4:15? (No)

### 8.2 Rekey discussion (non-protocol specific)

#### 8.2.1 Presentation of doc 11-01-650r1

Comment: IV associated with a particular key. Can't assume that packets arrive in order (except within traffic class).

Question: Can't transmitter assume drained when exceeds high water mark? Answer: But the receiver can't.

Question: 1X messages in the clear because no "secure IAPP"? A: IAPP is not mandatory, so don't know, and have to cover this case.

Question: Mean change key in plaintext? Answer: No. 1X message is in the clear, but the key gets wrapped by a key.

Question: Since there is no link between master key from 1X and what we use here, how to detect weak key?

Answer: we don't. We assume service delivers a good key. We assume 256 bits. If we get less, we generate it from the key we are given. 1X makes the same assumption.

Comment: There is hardly a block cipher where the weak keys are an issue.

Question: if 1X does rekey protocol, it is done where 1X resides? Answer: yes.

Comment: implementor views development complexity of AKE as much greater, not the same.

Comment: It is always harder to do a protocol in the MAC layer.

Question: Driving factor for choice of cipher algorithm for the MIC? Answer: need full-fledged MAC.

Comment: MD5 has been deprecated. Should use SHA-1

Comment: Saying that you are using a common algorithm is not saying much. Answer: trying to allow people to use same core. AES cheaper than MD5 or SHA-1.

Comment: Thanks for comparison.

Question: On 2 key ids / key-mapping key. This is not what the spec says. Answer: Right. This requires a change to how spec uses default keys. Some may require hardware changes. If they do make change, AKE is better. Comment: AKE will work without change. Comment: This is not an issue for 11b vendors.

Question: You mean must rekey at half the lifetime, not twice? Answer: Yes.

Question: What is risk of dangling authentication? Answer: the client can't transmit.

### **8.2.2 Motion by Glen Zorn: Move that we pick one**

Second: Tim Moore

Discussion: Speak against until we have implementations. If we make wrong choice now, it will cause significant problems.

Comment: Want white paper from Tim explaining details.

Comment: Everything is implemented

Comment: This binds us until we choose one

Mover: Don't understand the first one. We already have an implementation of 1X, close to shipping.

Vote: 5-6-7, motion fails.

Question: Where do we go from here?

Comment: We have stopped progress. Is there a plan to restart? Take two more months to study more?

Chair: Do we want to impose a time limit

Comment: We need to specify criteria for making decision.

Comment: Lack actual models. Have to try it and see what works.

Comment: Want to see prototyping on AP side.

Comment: How long for cryptanalysis of either protocol? Comment: No, need protocol analysis.

Comment: If we take request of working code, we need to know how long to implement AKE? Answer: This can be done, but we are not prepared to make estimates today.

Question: Ask people why they voted against this.

### **8.3 Motion by Kevin Hayes: Move that 802.1X rekey be accepted**

Second: Glen Zorn

Discussion: Speak in favor of this motion because will be deployed soon. We can influence this process.

Speak in favor of this motion because it is easier to implement on access point, and it avoids lots of issues

Comment: What does "accepted" mean? Add to informative text?

#### **8.4 Motion to amend by Albert Young: Move to change to "accepted as normative text"**

Second: Glen Zorn

Comment: This is the glue.

Question: Can you address as power save?

Point of order: discussing amendment, not main motion.

Call the question

Vote: 17-0-2, motion passes

#### **8.5 Motion on the floor: Move that 802.1X rekey be accepted as normative text**

Discussion: Can you address the power save question? Answer: There is no problem. Response: Yes there is. Chair: Fffssppssp. Comment: the default key is an issue.

Comment: Could some explain how the default key case work for 1X? Answer: When the client wakes up it will receive the messages. Answer: now client is required to receive broadcast messages. Answer: When it wakes up it will receive the right message with the right key. Broadcast keys are unicast.

Question: Difference for ad hoc? Answer: Every station is an authenticator. The STA sending the beacons has to send the broadcast keys. Comment: So entire ad hoc database has to have content of back-end database. Comment: you can have a web-of-trust model instead.

Comment: If base on 1X, are we assuming 1X always? Don't have to do authentication in ad hoc. Are we saying that you have to run 1X on top of shared key authentication?

Comment: Issue. 1X is not sitting on top of MAC, but beside; it has carnal knowledge of MAC and must know internals. These are special messages unlike any other, and that is different from what happens instead of others. Need SAP interface. Second point is the ACK (confirm). That needs to be exposed. Question: Can we do this?

Question: was that an amendment? Answer: No

Question: which ACK are you talking about?

Vote: 18-2-2, Motion passes

#### **8.6 Motion by Kevin Hayes: Move that appropriate SAP interfaces be added to provide better separation.**

Second: None, motion fails.

Point of information: Was prior motion seconded? Answer: by Glen Zorn.

Question: 802.1X is defined and not being changed, and have 802.11 has SAP interfaces. What connects to SAP interfaces. Answer: if no mechanism for control message to go up a layer, it won't go. Just want indication. No expected ack, and if provided won't be used. Answer: We send ack. If station doesn't do what we told it, don't care; it gets kicked out. Question: Implemented on NDIS? Answer: No implemented on the AP.

#### **8.7 Identify Other work areas in the working draft, people to work on text**

##### **8.7.1 Review of ad hoc meeting with TGe**

Russ presented. He closed presentation by noting that the TGe side channel breaks the security of all the rekey proposals.



Recording secretary note: The TGe side channel also breaks all proposed encapsulations. We cannot solve this problem without requiring a block cipher in CBC mode, because it is impossible to specify an appropriate IV management algorithm.

Comment: side channels not a main stream application and don't need as much support. Answer: TGe hasn't got this feature into spec.

### **8.8 Motion by Russ Housley: Move to ask 802.11 WG to allocate a joint TGe/TGi at next 802.11 meeting**

First: Jesse Walker, Second: Kevin Hayes

Discussion:

Comment: This is a good idea, but what is scope? Need some idea of time. Answer: asking for one block of time.

Comment: To be effective someone needs to lead this, organize agenda, present material, etc.

Chair: we would ask for presentations.

Vote: 16-0-0.

Chair: At closing plenary there will be call for motions, will make motion to ask TGi for this.

### **8.9 List of other issues**

MIB

Pro Forma – PICS = list of all mandatory, optional, etc. features

Security Summary – Problems/Solved/Not solved by each solution

Side channel – direct communication between two stations

Direct AP-AP communication

Encryption of source and destination address, as opposed to transmit and receive address

Security of AP-AP (wireless distribution service) traffic

Comment: need protected storage in AP. Plus you need something to provide computation without leaking key.

Comment: wanted to list outstanding work, so people could bring proposals addressing outstanding work items.

Chair: Not sure side channel is in TGe, so it doesn't make sense to solve it.

Comment: Would it be appropriate to set date/time for teleconference, to start work.

Chair: We will discuss that this evening.

Interaction with power save. Comment: This makes it no worse. May want to expose MIB variables to help timeouts.

Comment: This means interaction with 1X and power save? Chair: people need to bring up their concerns.

Comment: Ad hoc and its implications for rekey. Need to verify it operates as stated.

### **8.10 WEP2 – Continued**

#### **8.10.1 Identify remaining WEP2 protocol issues, work items**

Chair: There is no MIC algorithm yet.

Replay – need text

## **8.11 Recessed until 6:30**

# **9 Thursday Evening**

## **9.1 Call to Order**

At time unknown

## **9.2 Straw Poll people for physical meeting between now and Dallas meeting**

Straw Poll Vote: 0-5-0

## **9.3 Straw Poll against physical meeting (no date specified) between now and Dallas meeting**

Straw Poll Vote: 10-1-0

Chair reviews prior actions for recording secretary, who arrived late.

## **9.4 Straw Poll for a conference call for December 4 and January 11, 12-1:30 EST**

Comment: there is one scheduled for November 30

Chair: This has no standing. It is ad hoc.

Straw Poll Vote: 13-1-7

## **9.5 Motion by Jesse Walker: Move to authorize a TGi conference call for December 4 2001 and January 11 2002 at 12-1:30 EST**

Second: Albert Young

Discussion: None

Vote: 7-1-5, motion passes

Point of Information: who will set up the conference call?

Chair: Dave Halasz volunteers.

## **9.6 Other business**

Chair: are there any of the other presenters present? (None ready)

Chair: Any more motions for normative text?

Chair: Are we ready for letter ballot? Don't expect to go. Does anyone want to make such a motion? (no)

Question: Speak to what we will see in draft 1.6

Editor: will incorporate the AES algorithms and TKIP, but have no text to describe the normative rekey.

Tim Moore volunteers to provide editor with text by November 29, 2001.

## **9.7 Motion by Jesse Walker: Move to have chair to update TGi web site status page to call for proposals at Dallas meeting**

Second: Tim Moore

Discussion: None

Vote: 13-0-1, motion passes

**9.8 Motion to Adjourn by Jon Edney**

Second: Frank Ciotti

Vote: 14-0-0, motion passes