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**IEEE P802.11**  
**Wireless LANs**

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**Tentative Minutes of the IEEE P802.11 Full Working Group****May 14-18, 2001****Radisson Hotel at Universal City, Orlando, Florida****Opening Session: Monday, May 14, 2001****1.1. Introduction**

- 1.1.1. Meeting called to order by Stuart Kerry at 8:00AM. Agenda of 67th session of 802.11 is in doc.: IEEE P802.11-01/206r5
- 1.1.2. Secretary – Tim Godfrey

**1.2. Review of 802.11 Organization****1.3. Roll Call**

- 1.3.1. The 137 people in the room introduced themselves.

**1.4. Review of objectives for this meeting:**

- 1.4.1. TGb – reviewing comments on sponsor ballot
- 1.4.2. TGe – PAR has been split into TGe and TGi. TGe is only QoS. TGi is Security
- 1.4.3. TGf – review comments on letter ballot
- 1.4.4. TGg – completing selection process.
- 1.4.5. TGh – looking at comparison criteria
- 1.4.6. TGi – looking at comments from letter ballot
- 1.4.7. 5GHz Globalization – Bruce Kraemer taking over chair, moving to become TGj
- 1.4.8. Radio Regulatory AdHoc – looking at 6<sup>th</sup> criteria, and output statements
  - 1.4.8.1.
- 1.4.9. Publicity Ad Hoc -
- 1.4.10. WG Chairs Ad-Hocs
  - 1.4.10.1. Possible changes to ISO version of 802.11 standard.

**1.5. Review of Policies**

- 1.5.1. The chair reminds members to abide by the IEEE Patent Policy. Will be reviewed in new members orientation.

**1.6. Review of Logistics, , etc**

- 1.6.1. New procedure and equipment for attendance book

- 1.6.1.1. Dennis Kuahara
  - 1.6.1.2. Trial of bar-code based attendance system.
  - 1.6.2. Review rules
    - 1.6.2.1. Individual representation
    - 1.6.2.2. Anti-Trust laws
    - 1.6.2.3. Copyrights
  - 1.6.3. Review of ExCom meeting in March
    - 1.6.3.1. Record attendance for 802 – 1096 people
    - 1.6.3.2. 802.15.1 was giving conditional approval
    - 1.6.3.3. Review of 802.1 architecture modification for WPAN.
    - 1.6.3.4. Bob O'Hara approved as recording secretary of ExCom.
    - 1.6.3.5. 802 co-existence
  - 1.6.4. Call for new IP statements
    - 1.6.4.1. A new statement from Intersil will be provided
  - 1.6.5. Looking for volunteer for Publicity Chair.
    - 1.6.5.1. Al Petrick would like to relinquish.
  - 1.6.6. Graphic Agenda – Time Limits
    - 1.6.6.1. Start at 8:00AM, finish at 9:30PM. Hard time limits
    - 1.6.6.2. Friday a hard cutoff at 12:00 noon.
  - 1.6.7. Motion to adopt the agenda
    - 1.6.7.1. Any objections to accept the agenda
    - 1.6.7.2. Approved without objection.
    - 1.6.7.3.
  - 1.6.8. Review of minutes from Hilton Head
    - 1.6.8.1. No matters arising from the minutes.
- 1.7. Subgroup Updates**

- 1.7.1. TGbCor1 – Carl Andren
  - 1.7.1.1. 45 votes out of 57. There was one no-vote,
  - 1.7.1.2. There are technical comments due to changes on Japanese standard.
  - 1.7.1.3. Planning on work this week, and a vote to send out for recirculation ballot on Wednesday.
- 1.7.2. TGd – Bob O'Hara
  - 1.7.2.1. 802.11D draft 2.0 passed sponsor ballot, and will be an approved IEEE standard after the next NESCOM meeting – within 30 days.
- 1.7.3. TGe – John Fakatselis
  - 1.7.3.1. TGe is only QoS now. A letter ballot in process, will close on May 20<sup>th</sup>. We will discuss and resolve comments that have already been submitted during this week. We will continue ad-hoc discussions on video services. About 60-70 ballots have been received.
- 1.7.4. TGi – Dave Halasz
  - 1.7.4.1. Letter Ballot in process due Tuesday at midnight. An interim meeting in Chicago was used to process comments. This week comment resolution will continue.
  - 1.7.4.2. Discussion of voting rights – what about people who become voters at this meeting? Those people cannot / are not required to, vote on the current 3 letter ballots.
  - 1.7.4.3. The chair reminds the group of the closing times of the current outstanding letter ballots – May 15<sup>th</sup> and 20<sup>th</sup>, at 11:59PM EDT. Email to TG chair and CC Stuart Kerry.
- 1.7.5. TGf – Dave Bagby
  - 1.7.5.1. Less than half the membership has responded. Encourages voters to vote ASAP. Meetings are early in the week. TG plans to process comments this week.
- 1.7.6. TGg – Matthew Shoemake
  - 1.7.6.1. Continuing the selection procedure. The objective is to enable a draft this week. At step 19, the downselection vote. Some time will be set aside for discussion of new regulatory developments. The TG is looking for an editor. The voting is tentatively set at 10:30AM on Wednesday.
- 1.7.7. TGh – Mika Kasslin
  - 1.7.7.1. Cutoff for proposals was April 14<sup>th</sup>. There are 4 proposals that have been received. This week, the proposals will be reviewed, and proceed according to the selection process
- 1.7.8. 5GSG – Bruce Kraemer
  - 1.7.8.1. Working towards a single global standard for 5Ghz. There will be two phases. 5GSG will be an interworking mechanism, will become TGj. There will be another SG/TG to work on a new draft standard that will be called 5WING. The interworking proposals will be updated to take into account the TGe HCF mechanism. 5GSG is alternating between BRAN and IEEE.
- 1.7.9. Regulatory Ad Hoc – Vic Hayes
  - 1.7.9.1. Document 01/236. Review of March activities. Questions were prepared and sent on April 18<sup>th</sup>. Consideration of 6<sup>th</sup> criteria was postponed. Document 11-01-095 will be brought to a vote this week.
  - 1.7.9.2. Rules are in RR-01-009. Objectives are to work on rules, 6<sup>th</sup> criteria, position statements as needed.
  - 1.7.9.3. Julius Knapp promoted to Deputy Chief of FCC. Request for members to submit comments for WRC2003 matters. Review of US positions, and agenda items for WRC2003.

- 1.7.9.4. Further NPRM docket 99-231 was published.
- 1.7.9.5. Meeting this week for IWG2 in Washington. Teleconference bridge. Interest in participating? Approximately 7. Will take place in Suite 1204, Thursday at 10:00.

#### 1.7.10. Publicity

- 1.7.10.1. Al Petrick is not present. Look at presentation on website, market forecast, conference calendar. WECA coordination – report during the Wednesday meeting. OFDM forum update.
- 1.7.10.2. Looking for a new chair for Publicity.

### 1.8. *Liaison Updates*

- 1.8.1. Mary DuVal – 802.11e and 802.15.3.
- 1.8.2. Peter Johansson. P1394.1 –
  - 1.8.2.1. formation of ballot group is going to close on Wednesday.
- 1.8.3. Bruce Kraemer 802.15 liaison – document 01/239
  - 1.8.3.1. 802.15.1 in sponsor ballot. IEEE is not going to standardize Radio 2. 802.15.2 working in interference simulation models, working on recommended practice for active and passive coexistence. 802.15.3 high rate PAN – have selected PHY and MAC and are working toward first letter ballot. 802.15. – low rate. An IEEE version of RFID. Reviewing 8 MAC and PHY proposals this meeting.
- 1.8.4. Peter Murray – Regulatory Ad Hoc Group.
  - 1.8.4.1. 802.15 has not been concentrating on regulatory. The Ad Hoc group needs to take action based on the recent NPRM changes.
- 1.8.5. John Kowalski – 802.16. Fixed wireless access
  - 1.8.5.1. TG1 air interface 10-66GHz. Draft in letter ballot
  - 1.8.5.2. TG2 passed sponsor ballot with 100% approval. Enhancements to recommended practice for systems below 10GHz. This should be moved to the new study group in 802
  - 1.8.5.3. TG3 – 2-11GHz
  - 1.8.5.4. TG4 – unlicensed , still in study group.

### 1.9. *Voting members in attendance*

- 1.9.1. 83 are present

### 1.10. *Review of Agenda for Wednesday Joint session*

- 1.10.1. Review of meeting financials, future meeting locations, Task Group reports, (as specified in published agenda)
- 1.10.2. Agenda of Joint Meeting approved without objections.

### 1.11. *Review of Documents and Submissions*

- 1.11.1. Harry Worstell
- 1.11.2. Document numbering system to be made automatic by next meeting.
- 1.11.3. Documents must be formatted properly when submitted.
- 1.11.4. Requests for document numbers require the title and author on a slip of paper given to Harry.
- 1.11.5. Document number format: 11-01-xxxrn-TGz-mmmmmm.
  - 1.11.5.1. Use r0 even for initial release.

### 1.12. *Old Business*

- 1.12.1. 6<sup>th</sup> Criteria – Vic Hayes
  - 1.12.1.1. Document 11-01-95r2
  - 1.12.1.2. Move to submit document (11-01/095r2 / 15-01/71r1 / 16-??) proposing a rules change for adding a 6<sup>th</sup> criterion to the 802 operating rules to the SEC, when all three wireless working groups have approved the submission.
    - 1.12.1.2.1. Moved Vic Hayes
    - 1.12.1.2.2. (on behalf of Radio Regulatory)
  - 1.12.1.3. Discussion
    - 1.12.1.3.1. Quorum Call
      - 1.12.1.3.1.1. We have 93 voting members. We have a Quorum.
    - 1.12.1.3.2. Review of proposed rules change: Regulatory Conformity and Spectrum Sharing Feasibility.
    - 1.12.1.3.3. Would part c) preclude non-FCC regulatory activity? ExCom will gather the information necessary to make up their minds to approve a PAR.
    - 1.12.1.3.4. The wording of a) would be better if it said “degree of conformance” rather than strictly “conformance”. The intent was to allow referencing of any existing conformance, not to be a gating factor based on conformance. The word “address” means it needs to be looked at, not necessarily strictly conform.
    - 1.12.1.3.5. Item c) cannot really be met. It would require anticipating rulemaking before the fact. The idea is that this provides information to ExCom, to help them make their decision. It is not a hard rule.
    - 1.12.1.3.6. The point of this is to help ExCom, with limited wireless experience, to make a good decision on going forward with a new PAR.
    - 1.12.1.3.7. The word “address” does work to specify that the PAR must deal with these issues, not necessarily be conformant.
    - 1.12.1.3.8. Question is called without objection
  - 1.12.1.4. Vote on the motion: 86:5:6. Motion Passes.
- 1.13. **802.11 WG operating rules**
  - 1.13.1. Deferred to Wednesday
- 1.14. **ISO Standard Errata**

- 1.14.1. John Rosdahl
  - 1.14.2. Document 01/233
  - 1.14.3. How do we resolve questions regarding the standard. IEEE Standards Companion. If the standard has a problem, a balloting process must take place to correct the process. If the standard is ambiguous, the loose interpretation has to be used. If there is a contradiction, the committee has to go through the process to resolve it.
  - 1.14.4. There are numerous errata sheets for standard available on line.
  - 1.14.5. 802 standards define the difference between an amendment and a corrigendum (errata).
  - 1.14.6. What would the 802.11 group be willing to work on. There are 26 known errors in the standard.
  - 1.14.7. Soliciting assistance in bringing this work forward. Would require creating a PAR,
  - 1.14.8. This is referring to the ISO standard. First the IEEE has to approve the PAR and approve the changes, then a project in ISO has to be started. To get started, 802.11 WG has to start a study group.
  - 1.14.9. Discussion
  - 1.14.10. There is nothing new here. All we need to do is call this a maintenance PAR, which is already defined.
  - 1.14.11. Is it in order for a working group to accept a document that is internally inconsistent?
  - 1.14.12. What benefit is a maintenance PAR at this time, based on the work going on in TGe and TG<sub>i</sub>, which will update the SDL and supplement the existing standard. TGe and TG<sub>i</sub> will most likely replace the SDL in Annex C. This is TBD – we should not rush letter ballots
- 1.15. Announcements**
- 1.15.1. None
- 1.16. New Members Orientation**
- 1.16.1. New members should stay
- 1.17. Recess for subgroups at 10:16AM**

## 2. 802.11 / 802.15 Joint Plenary Session – May 16, 2001

### 2.1. *Opening*

2.1.1. The session was called to order by Stuart Kerry at 1:00PM

2.1.2. Agenda Review

2.1.3. Announcements

2.1.3.1. Looking for new publicity chairs in 802.11 and 802.15

2.1.4. Adoption of the agenda

2.1.4.1. Adopted without objections

2.1.5. Matters arising from the minutes

2.1.5.1. None

### 2.2. *Old Business*

2.2.1. Review of Interim Meetings

2.2.1.1. September Meeting – Hotel under contract, but problems with guarantees of meeting space. We have two other properties under negotiation in Sydney Australia. Planning to close within a week.

2.2.1.1.1. Straw Poll – All those planning to attend September Interim in Sydney Australia : 116 : Who would prefer a US location 60 Who would prefer a non-Sydney location 59.

2.2.1.2. We continue working on the Sydney location, with a back up plan for the US. It will be resolved by last week.

2.2.1.3. Future meeting – January and May 2002. Volunteers for hosts are requested.

2.2.2. Financials

2.2.2.1. Information is not available at this meeting. Deferred until July.

2.2.3. Review of Wireless Network status

2.2.3.1. Thanks to MobileStar for providing fast Internet access

2.2.3.2. Thanks to Wayport for the use of their in-building wiring to connect the Mezzanine room.

### 2.3. *Reports from Task Groups*

2.3.1. 802.11b-cor1

2.3.1.1. Sponsor ballot for Corrigendum. 45 affirmative, none Negative. Technical comments regarding changes to the channel numbers for Japanese channels. Another recirculation ballot will be required

2.3.2. TGd

2.3.2.1. Nothing to report

2.3.3. TGe

2.3.3.1. The PAR for TGe has been split between QoS (TGe) and Security (TGi). In the process of resolving comments from Letter Ballot 27. The letter ballot closes on the 20<sup>th</sup> of May.

2.3.3.2. We have received 80 votes so far. Resolutions made this week are provisional until the closing of the ballot.

2.3.3.3. The Study Group on AV has been working in parallel. Papers have been presented.

2.3.4. TGf

2.3.4.1. The group has completed scheduled meeting time for the week. All comments have not been processed. The final vote has not been tabulated, but it was not 75%.

2.3.5. TGg

- 2.3.5.1. TGg has processed a number of submissions this week. There were regulatory documents on the recent FCC further notice on 99-231. There were also technical submissions. The group continued the selection procedure.
- 2.3.5.2. There was a vote in the selection procedure, the results are in document 310. CCK-OFDM 96: PBCC 70: Abstains: 11.
- 2.3.5.3. A corrected version of the document will be released as version r1. One voters entry was put onto the wrong line.
- 2.3.5.4. There will be another vote to complete the selection procedure: a 75% affirmation is required.
- 2.3.5.5. This will take place at 9:30AM Thursday. It will be another written ballot.
- 2.3.6. TGh
  - 2.3.6.1. TGh has been reviewing the 4 proposals. Each proposer has answered a number of questions. Two proposals have been merged. There are three remaining proposals. There will be a vote at 4:30 this afternoon.
  - 2.3.6.2. Document 169r1, 215r0, 217r0 are the proposals.
  - 2.3.6.3. TGh is continuing to seek further compromise and mergers.
- 2.3.7. TGi
  - 2.3.7.1. Letter ballot 25 closed this week. The group has been processing the comments, and categorizing duplicates. There were over 700 comments. Comment resolution will continue this week.
- 2.3.8. 5GSG
  - 2.3.9. Richard Kennedy announces his resignation as chair, and turns the chair over to Bruce Kraemer. 5GSG is working toward a single global standard in the 5Ghz band. The group is working on a two phase process. First, an interworking standard that would allow communication between the existing standards. This study group will become IEEE 802.11 Task Group J. The group is also working on a future global standard, called 5WING. This is a longer term activity. Meetings alternate between IEEE and ETSI locations, with participation from MMAC.
- 2.3.10. 802.15.1
  - 2.3.10.1. The group worked to resolve issues that came up in the last letter ballot. Last letter ballot 56:1:1
- 2.3.11. 802.15.2 coexistence
  - 2.3.11.1. Activity for the week was regarding adaptive frequency hopping for Bluetooth. There are three proposals for Bluetooth looking for where 802.11 is an hopping around it. Continuing meetings the rest of this week. The FCC NPRM has been reviewed, and seems to support the needs.
- 2.3.12. 802.15.3 high rate
  - 2.3.12.1. Working on draft 0.4 of the baseline specification. Mostly addressing MAC issues. Will have version 0.5 out in 2 weeks. Will have a recirculation in July, and Sponsor ballot in September.
- 2.3.13. 802.14.4 low rate
  - 2.3.13.1. The goal is a baseline MAC and PHY by July. Moving forward to create a draft at that time
- 2.3.14. Publicity
  - 2.3.14.1. Low attendance at this weeks session. Looked at the conference calendar, WECA coordination, WLAN Market Forecast.
  - 2.3.14.2. There was a teleconference with WECA in March. WECA will have regular communication between 802.11 and WECA. We will cross-reference 802.11 and WECA logs on the web sites.



### 2.3.15. Radio Regulatory

- 2.3.15.1. Working groups are voting on the 6<sup>th</sup> criterion approval. 802.11 has approved, other will vote later.
- 2.3.15.2. Plans for a permanent regulatory group. The Radio Regulations TAG (RR-TAG) will have official liaisons with radio working groups.
- 2.3.15.3. document 11-01-291 describes rules for handling regulatory matters. There will be rules for Working Groups, and rules for LMSC overall rules.
- 2.3.15.4. Requesting comments on FCC docket 99-231 by May 29<sup>th</sup>. Teleconferences on June 1 and June 22.
- 2.3.15.5. The draft to be sent to the WG by July 2<sup>nd</sup>, before the next meeting. It will be put up for approval at that meeting.
- 2.3.15.6. Work continues this week to prepare input for WARC 2003.
- 2.3.15.7. Proposal for permanent regulatory group – document 291. It will be a TAG – RR-TAG. Interface between Radio working groups and radio regulatory bodies. Coordinate spectrum sharing between 802 devices and other devices. Operation of the TAG based on published rules.
- 2.3.15.8. Planning a fixed meeting schedule.
- 2.3.15.9. The ad hoc RR group requests approval of the Radio Working groups for the establishment of the RR-TAG proposed operation and rules changes.

### 2.3.16. 802 Coexistence Study Group

- 2.3.16.1. Document 15-01-253. This is a newly created study group. Still getting organized and getting feedback. Current plans: Keep 802.15.2 unchanged to continue working on their PAR. Keep 802.11 5GSG working as currently chartered. 802.16 will deal with licensed band issues independently.
- 2.3.16.2. Participants support forming a TAG from this Study Group.
- 2.3.16.3. Goal to have draft of operating rules by July meeting.
- 2.3.16.4. This SG will recommend to ExCom the policies and procedures for future wireless standards.

## 2.4. **New Business**

### 2.4.1. WECA – 802.11 Liaison Report

- 2.4.1.1. Phil Belanger – WECA chair.
- 2.4.1.2. Discussion: confusion of branding WiFi in place of 802.11. There was a miscommunication that WiFi wanted to replace 802.11. WECA only wants to certify and promote the 802.11 standard. WiFi is an informal marketing name, like Ethernet is to 802.3. WECA does feel that a marketing name does help the market understand products.
- 2.4.1.3. WECA provides “recommended practice” for setting parameters for maximum compatibility.
- 2.4.1.4. WECA has done a press tour to position 802.11 and WiFi. A distinct brand name and logo will be developed for 802.11a.
- 2.4.1.5. WECA has fielded press question and has a PR agency. We will work towards a formal PR liaison between 802.11 and WECA.
- 2.4.1.6. Discussion
  - 2.4.1.6.1. What about the additional testing in Ad Hoc mode? The baseline test matrix didn't cover Ad Hoc. Older products won't have to be re-certified. There will be a grace period where Ad Hoc won't have to be certified, but at a certain date Ad Hoc will be required. There will not be a new brand identifier to identify Ad Hoc certification.

- 2.4.1.6.2. What about market confusion over Ad Hoc capabilities? All products will have the baseline capability for infrastructure. That is the key requirement.
  - 2.4.1.6.3. Old products will not need to be re-certified, but a vendor could "upgrade" to the higher level certification.
  - 2.4.1.6.4. The next meeting is in Helsinki, to prepare for 5GHz. A lab will be available by fall.
  - 2.4.1.6.5. WECA is doing interoperability testing, not compliance testing. WECA does not insure a product correctly implements every aspect of the standard.
  - 2.4.1.6.6. How does WECA deal with interference? Primarily in education – writing white papers, etc.
  - 2.4.1.6.7. WECA is not getting hammered about Bluetooth as much anymore.
  - 2.4.1.6.8. Future revs for security and QoS will be added to the tests. Probably next year.
  - 2.4.1.6.9. Membership – to attend meetings, membership is required, but costly. Will there be a provision for others? By contacting WECA board members, visitors can be invited. Other membership forms will be considered in the future.
  - 2.4.1.6.10. How will customers distinguish future products with QoS or Security? There will not be differentiation via the logo program. WECA has decided to live with the possibility to maintain simplicity.
- 2.4.1.7. The 802.11 chair announces that WECA has granted IEEE 802.11 the right for the WECA logo to appear on the 802.11 web site.

## **2.5. Adjourn at 2:45PM**

# **3. 802.11 Plenary Session – May 16, 2001**

## **3.1. Opening**

3.1.1. The session was called to order by Stuart Kerry 3:30PM

3.1.2. Review of Agenda for this session.

3.1.2.1. Changes to the agenda:

3.1.2.1.1. The chair of 802.11b-cor1 requests an addition of an item in New Business for a motion.

3.1.2.1.2. John Rosdahl requests an agenda item to present a paper.

3.1.2.2. Modified agenda accepted without objection

## **3.2. Documentation Update**

3.2.1. Do not open documents on the server

3.2.2. Use the Group Share areas for temporary working group storage

3.2.3. Please use the Templates.

3.2.4. File Format is Office 97. Acrobat is only accepted as a last resort.

3.2.5. Only completed submissions should be put in To\_Doc\_Keeper.

3.2.6. Subsequent revisions need the exact same title.

3.2.7. Does the r0 belong in the template header line? Yes, the templates need to be updated, will be done tonight.

## **3.3. 802.11b-cor1 actions**

3.3.1. Seven comments were received and accepted:

- 3.3.1.1. Comment 1 – change of X'40'MKK to X'41'Japan. X'41" represents a new set of allocated channels.
- 3.3.1.2. Comment 2 – Editorial: change HDRS into HRDS
- 3.3.1.3. Comment 3 – Add a row with the 14<sup>th</sup> channel
- 3.3.1.4. Comment 4 – correct the power density to 3mW/MHz
- 3.3.1.5. Comment 5 – the word “conforms” was added after high rate PHY. Correct article referral reference to Japanese standard.
- 3.3.1.6. Comment 6 – the comment for 13 channels was added.
- 3.3.1.7. Comment 7 – the name of the Japanese ministry was changed.
- 3.3.2. Motion – that the new draft 1.6 be sent for another 10 day IEEE sponsor recirculation ballot, after which it can be sent to the SEC for final incorporation into the standard (assuming no new comments requiring further voting).
  - 3.3.2.1. Moved Carl Andren
  - 3.3.2.2. On behalf of TG 802.11b-cor1
- 3.3.3. Discussion
  - 3.3.3.1. There was another comment by Johnny Zweig? Yes, it was in a previous round, and it has been confirmed and accepted in this round.
  - 3.3.3.2. The new version 1.6 has been reviewed by a regulatory expert in Japan, and he has approved it.
- 3.3.4. Vote on the motion: Passes 52:0:6

### **3.4. Errata Requirements**

- 3.4.1. John Rosdahl
- 3.4.2. How do we want to handle known existing errors, inconsistencies, or problems with the standard. We are in process of updating the MAC, so these issues may be dealt with in this process.
- 3.4.3. Is the group interested in a maintenance effort for the existing standard?
- 3.4.4. Discussion
  - 3.4.4.1. It seems that the work of TGe will affect most of the state machines. Isn't that the most effective way to handle this?
  - 3.4.4.2. Nothing related to the MAC is outside the scope of the PAR of TGe. The PAR allows “enhancements” which includes fixes.
  - 3.4.4.3. Would TGh have any bearing on this question? Unknown? Possibly, but there will be less sections affected by that TG.
- 3.4.5. This matter will be discussed with the TG chairs, and brought up again on Friday.

### **3.5. New Business**

- 3.5.1. 802.11 Operating Rules
  - 3.5.1.1. Document 315r0. Summary of 802.11 operating rules update. Rules are on the web site in 11-01-331r1.
  - 3.5.1.2. Updates to liaisons, naming conventions, Interim meetings, WG balloting.
  - 3.5.1.3. These rules will be voted upon at the opening meeting at the July Plenary meeting.
  - 3.5.1.4. Motion to adopt document 11-00-331r2 as the operating rules for IEEE 802.11
    - 3.5.1.4.1. Moved Vic Hayes
    - 3.5.1.4.2. Second Harry Worstell

- 3.5.1.4.3. Discussion
  - 3.5.1.4.3.1. Subsidiary motion to delay the vote until the Portland Meeting.
  - 3.5.1.4.3.2. Richard Paine
- 3.5.1.4.4. The main motion and the subsidiary motion are both ruled out of order since there is a requirement to have the document available on the server one meeting in advance of the vote.
- 3.5.1.5. The chair rules that the vote will take place at the July meeting in Portland.

### **3.6. At 4:05PM, recess for subgroups**

## **4. 802.11 Closing Plenary Session, May 18, 2001**

### **4.1. Opening**

- 4.1.1. The session was called to order at 8:10AM by the Chair, Stuart Kerry.

### **4.2. Review of Agenda**

- 4.2.1. Additions to new business
  - 4.2.1.1. Resolution from Ken Clements
  - 4.2.1.2. Hard Stop at 12:00 noon
- 4.2.2. Call for new items
  - 4.2.2.1. None
- 4.2.3. Discussion on the agenda
  - 4.2.3.1. None
- 4.2.4. Agenda Approved without objections

### **4.3. Announcements**

- 4.3.1. Chairs to send updates for web site to Tim Godfrey by May 25<sup>th</sup>.
- 4.3.2. Objectives and agenda to Stuart Kerry by June 1<sup>st</sup>.
- 4.3.3. Chairs pre-meeting teleconferences: June 4<sup>th</sup>, July 2<sup>nd</sup>
- 4.3.4. Web site posting of objectives and agenda will be on the web site 30 days before the next meeting, June 8<sup>th</sup>.
- 4.3.5. Order in meetings – we need to prevent disruptions of meetings.
  - 4.3.5.1. The chair notes that an increase in decorum would be appreciated.

### **4.4. Document Update**

- 4.4.1. Documents are up to 328.
- 4.4.2. Document list expected to be on web site by Monday.
- 4.4.3. At this rate, we will exceed 600 documents this year.

### **4.5. Closing Reposts**

- 4.5.1. TGb-cor1 – Carl Andren
  - 4.5.1.1. Processed comments and took a vote to send TGb-cor out for another recirculation ballot. Next agenda will hopefully close out TGb-cor1, unless comments are received.
- 4.5.2. TGe – John Fakatselis

- 4.5.2.1. TGe has an open Letter Ballot 27, which closes Sunday. We started comment resolution this week. We started a study group on AV Services over TGe
- 4.5.2.2. We decided to have teleconferences during the time before the next meeting. We have assigned Wednesdays, May 30<sup>th</sup>, Jun 6<sup>th</sup>, 13<sup>th</sup>, 20<sup>th</sup>, 27<sup>th</sup>, July 4<sup>th</sup>. The time is 1:00-4:00PM Eastern Time. The teleconference numbers and agenda will be announced on the reflector.
- 4.5.2.3. In Ad Hoc teleconferences before 30 days, the results will not be binding, and any decisions will have to be re-voted.
- 4.5.3. TGf – Dave Bagby
  - 4.5.3.1. Document 311. Goal for the meeting was to process comments for LB26. Comments were partially completed. There is no new draft. Final results 157 votes. 54:69:38. 30 valid voters did not respond.
  - 4.5.3.2. Decision on interlocking schedules with 802.11e ore 802.11i has been deferred.
  - 4.5.3.3. An Ad Hoc interim meeting may be held for comment resolution. Will be announced on the reflector.
  - 4.5.3.4. The 802.11 chair notes that future letter ballots will close a week before a meeting.
  - 4.5.3.5. The minutes are in document 260
  - 4.5.3.6. The letter ballot comments are in document 312.
  - 4.5.3.7. Goals – prepare for July meeting, finalize comments, prepare revised draft, submit for letter ballot
- 4.5.4. TGg – Matthew Shoemake
  - 4.5.4.1. Report in Document 331. Only one objective was completed, the regulatory discussion.
  - 4.5.4.2. The selection procedure was called into question, the session was adjourned before completing the selection procedure
  - 4.5.4.3. Objectives for July – complete selection procedure, select an editor, enable a draft
  - 4.5.4.4. Questions
    - 4.5.4.4.1. Are there any teleconferences planned? No
- 4.5.5. TGh – Mika Kasslin
  - 4.5.5.1. There were four proposal presentations and final statements. The Philips/Nokia/Aachen proposal merged with the Cisco proposal. The intention to merge this merged proposal with the Broadcomm proposal.
  - 4.5.5.2. The elimination vote was taken: Results in document 314.
  - 4.5.5.3. Teleconferences will be every second Thursday
  - 4.5.5.4. Objective in July – prepare a draft and submit for letter ballot.
- 4.5.6. TGi – Dave Halasz
  - 4.5.6.1. Report in Document 325.
  - 4.5.6.2. LB25 results: 62 yes : 56 no : 34 abstain.
  - 4.5.6.3. Comment resolution – there were 800 comments received. Small ad hoc groups categorized comments and processed the non-contentious ones. Multiple resolution documents have been generated to deal with groups of comments
  - 4.5.6.4. Minutes in document 321.
  - 4.5.6.5. Major Motions
    - 4.5.6.5.1. Remove Kerberos as mandatory – failed
    - 4.5.6.5.2. Call for new authentication proposal – passed
    - 4.5.6.5.3. Remove WEP2 – failed
  - 4.5.6.6. Comments are in document 326 – will be updated in subsequent revisions.

- 4.5.6.7. Ad Hoc meetings – June 19<sup>th</sup> in Portland.
- 4.5.6.8. Two Teleconferences are scheduled and will be announced on the reflector
- 4.5.6.9. Discussion
  - 4.5.6.9.1. Are the major changes just within TG<sub>i</sub> as the whole task group, or the sub groups? Yes, the whole TG<sub>i</sub> task group, with 75% approval required.
- 4.5.7. Announcement from the chair: Hyatt regency Queensland in Brisbane is the current leading choice for the September interim.
- 4.5.8. 5GSG – Bruce Kraemer
  - 4.5.8.1. Report in document 240r1
  - 4.5.8.2. Two tasks underway – TG<sub>j</sub> interworking, and coordination with ETSI BRAN. Information on HCF was presented to coordinate the Interworking methods.
  - 4.5.8.3. The second group of activities is regarding the single global standard process (5WING). Reviewed the schedules and procedures that will be used in 5WING. Considered the structures of the 3GPP group as an example.
  - 4.5.8.4. Objectives for July – TG<sub>j</sub> task group will be ratified in July. A different leadership group will be instated.
  - 4.5.8.5. Documents – Minutes in 316r0
  - 4.5.8.6. Questions
    - 4.5.8.6.1. From 802.16 TG<sub>4</sub> – who is the liaison for 802.16 to 802.11? Naftali Chayat, and John Kowalski. We need some more discussion and coordination between groups.
- 4.5.9. Radio Regulatory Ad Hoc – Vic Hayes
  - 4.5.9.1. Report in document 333
    - 4.5.9.1.1. One meeting session was held. Reviewed feedback on the 6<sup>th</sup> criteria for a PAR. The group was advised to keep 5 criteria.
    - 4.5.9.1.2. Review of process of initiating standards and purpose of PAR and 5 criteria.
    - 4.5.9.1.3. Two teleconferences are scheduled June 1 and June 22. Details in report.
    - 4.5.9.1.4. Send an email to Vic Hayes to be added to Radio Regulatory email reflector.
    - 4.5.9.1.5. Objectives for July meeting – continue work to establish group with permanent charter. Work on PAR, comment on FCC 99-231.
    - 4.5.9.1.6. Questions
      - 4.5.9.1.6.1. Is something going to be submitted to the FCC regarding 5GHz bands? It is regarding preparation for WRC2003.
      - 4.5.9.1.6.2. Have you sent emails to WG chairs requesting comments on 6<sup>th</sup> criterion? It will be done on the reflector.
- 4.5.10. Publicity report – Al Petrick
  - 4.5.10.1. Report in document 279
  - 4.5.10.2. Worked on WLAN forecast, Conference calendar, WECA coordination.
  - 4.5.10.3. Call for new chairs. The chair is up for nomination.
  - 4.5.10.4. Next steps – there will be another teleconference with WECA in June.

**4.6. Liaison Reports****4.6.1. Liaison Updates – Al Petrick**

4.6.1.1. Document 406r3. contains current lists of liaisons.

4.6.1.2. New liaisons are being considered between 802.11 and NIST. Simon Blake and Simon Black

**4.6.2. Report from 802.15.3 – Mary Duval**

4.6.2.1. Continuing work on MAC and PHY, Interim meeting will be held. A draft is expected after the July meeting.

**4.6.3. Report from 802.16 – John Kowalski**

4.6.3.1. The liaison with 802.16 spent most time in 802.11 TGe, and wishes for a new liaison.

**4.7. Old Business**

4.7.1. None

**4.8. New Business**

4.8.1. No motions from task groups

4.8.2. Resolution from Ken Clements

4.8.2.1. Motion to adopt this resolution:

**Resolution in Support of the Chair of 802.11TGg**

5/18/2001

**Whereas** TGg has advanced in its selection process to the point of elimination of three out of four initial candidate proposals, and the following events have occurred:

On the morning of May 17, 2001, upon request for clarification of part 19 of the selection rules, the Chair of TGg gave an opinion that the rule would result in the elimination of the final candidate proposal should that candidate fail to receive at least 75% approval in the selection process vote scheduled for that morning. Hearing this, a member of TGg called for the Chair to be overruled. At the time, this action was not declared out of order, and subsequently, a non-debatable vote was taken. This vote went against the Chair 75 to 65 with 12 abstentions. After the vote, TGg adjourned with no further actions.

**Further**, that the action stated above was unfair and out of order. At the time of the action no motion was before TGg, nor could any motion be made because the Orders of the Day called for the next selection vote. Therefore, it was not possible to amend part 19 prior to the vote without suspension of the rules. However, by portraying the Chair as if he had made a ruling on an action, the challenger sought to change the rules without due process. This had the side effect of calling into question the integrity of the Chair. Furthermore, the lack of debate in this matter may have prevented a full understanding in the minds of the members of TGg as to the true nature and outcome the vote they were taking.

***Therefore be it resolved***, that the Chair did nothing improper, and in accord with his long demonstrated integrity and evenhandedness stated the rules on this day just as he had on the day when TGg caused those rules to be made, that the vote against the Chair is brought under question and remanded back to TGg for fair debate and resolution, that full faith and confidence is restored in the fairness of the Chair, and that the members of TGg are reminded that the selection process is intended to promote consensus, not just endurance.

4.8.2.2. Discussion

4.8.2.2.1. Adopting this resolution is important to remind the group to follow form and procedure, and to restore faith in the chair of TGg.

- 4.8.2.2.2. There could be unintended consequences of the actions of TGg. We want to make it clear to the world that the chair of TGg acted in good faith.
- 4.8.2.2.3. Against the motion. The fairness of the chair was not called into question. The paragraph has numerous interpretations and the body was attempting to clarify. The chairs integrity is undisputed.
- 4.8.2.2.4. Has no issues with the chair with the leadership of TGg. In terms of passing this resolution, it is not clear what this is. This seems to be an attempt to reset the procedural objectives, which I would not be in favor of.
- 4.8.2.2.5. The mover of the resolution says the resolution remands the action back to TGg for full discussion. From a technical standpoint, the chair didn't make a ruling since there was no action to rule on. If the final vote had been taken, the chair could have taken an action, and it would be appropriate to object. Feels that the way to events transpired, debate was not allowed as desired.
- 4.8.2.2.6. Against the motion. It seems that this is trying to retroactively declare something that happened two days ago out of order. This motion is trying to act as a parliamentarian without actually have been there. Is this motion out of order?
- 4.8.2.2.6.1. The chair says the motion is in order
- 4.8.2.2.7. The chair did indeed issue a ruling and thus it was appropriate to appeal the ruling.
- 4.8.2.2.8. In favor of the motion – the whole situation was vastly blown out of proportion. Suggest that the text be amended if it is not acceptable. We need to have a basis to go forward and work together in harmony, in order to get things done.
- 4.8.2.2.9. Against the motion – the fundamental issue is that the agenda would have taken us to a vote. The interpretation of the paragraph has been questioned before, but it was always ambiguous. The objective was to discuss the intent of item 19. No one is calling the chair of TGg's into question, so there is no need to grant forgiveness.
- 4.8.2.2.10. Assuming there is no formal protest against any chairs at this point. Would ask to divide the question into a part regarding the integrity of the chair and the action of remanding.
- 4.8.2.2.11. It is the particular nature of the call for overruling the chair in the session had the effect of questioning the chairs integrity, and thus will not separate the resolution.
- 4.8.2.2.12. In favor of this resolution. The chairman of TGg has done an excellent job in a difficult situation. This says lets send this back to TGg to continue the discussion. Is concerned that there might be block voting going on, and warns against it.
- 4.8.2.2.13. Also confused. Doesn't like the wording. Would like to show support the chair, but the resolution as written puts in too many details, and would not serve to unite TGg. Cannot support the resolution as written. Recommends rewriting to emphasize support for the chair.
- 4.8.2.2.14. Also confused. Asks for a friendly amendment. Would like to defend the chair. We should not say "at this time this action was not declared out of order" . Friendly amendments are not allowed.
- 4.8.2.3. Motion to delete the text: "at this time this action was not declared out of order"
- 4.8.2.3.1. Moved Matt Sherman
- 4.8.2.3.2. Seconded Ken Clements.



- 4.8.2.3.3. Discussion
  - 4.8.2.3.3.1. Suggests we move on rapidly
  - 4.8.2.3.3.2. Motion to recess for 15 minutes (until 10:00)
    - 4.8.2.3.3.2.1. Moved Gary McGarr
    - 4.8.2.3.3.2.2. Second John K
    - 4.8.2.3.3.2.3. Question called without objections
    - 4.8.2.3.3.2.4. Vote on motion to recess :passes  
53:29:5
- 4.8.2.4. Recess until 10:30
- 4.8.2.5. Meeting is called to order at 10:30
- 4.8.2.6. Discussion
  - 4.8.2.6.1. A new and better amendment has been developed.  
Advise to vote against
  - 4.8.2.6.2. The question is called on the vote on the amend
    - 4.8.2.6.2.1. No Objections
- 4.8.2.7. Vote on the motion to amend: The amendment fails 2:46:13
- 4.8.2.8. Discussion on the main resolution
  - 4.8.2.8.1. Motion to amend the resolution to the contents of  
document 336r1: (shown here as displayed):

### Resolution in Support of the Chair of 802.11TGg

**Date:** May 18,2001

**Author:** Ken Clements  
Inovation on Demand, Inc

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**Whereas** TGg has advanced in its selection process to the point of elimination of three out of four initial candidate proposals, and the following events have occurred:

On the morning of May 17, 2001, upon request for clarification of part 19 of the selection rules, the Chair of TGg was asked to rule and gave an opinion that the rule would result in the elimination of the final candidate proposal should that candidate fail to receive at least 75% approval in the selection process vote scheduled for that morning. Hearing this, a member of TGg called for the Chair to be overruled. At the time, this action was not declared out of order, and s subsequently, a non-debatable vote was taken. This vote went against the Chair 75 to 65 with 12 abstentions. After the vote, TGg adjourned with no further actions.

**Further**, ~~that the action stated above was unfair and out of order.~~ At the time of the action no motion was before TGg, ~~nor could any motion be made because the Orders of the Day called for the next selection vote. Therefore,~~ it was not possible to amend or discuss part 19 prior to the vote without suspension of the rules. ~~However, by portraying the Chair as if he had made a ruling on an action, the challenger sought to change the rules without due process. This had the side effect of calling into question the integrity of the Chair.~~ Furthermore, the lack of debate in this matter may have prevented a full understanding in the minds of the members of TGg as to the true nature and outcome the vote they were taking.

**Therefore be it resolved**, that the Chair did nothing improper, and in accord with his long demonstrated integrity and evenhandedness stated the rules on this day just as he had on the day when TGg caused those rules to be made, that ~~the vote against the Chair is brought under question and the question regarding the interpretation of step 19 of the selection process be~~ remanded back to TGg for fair debate and resolution, that full faith and confidence is ~~restored-affirmed~~ in the fairness of the Chair, and that the members of TGg are reminded that the selection process is intended to promote consensus, not just endurance.

- 4.8.2.8.2. Moved John Fakatselis
- 4.8.2.8.3. Second Bob O'Hara
- 4.8.2.9. Discussion on the amendment
  - 4.8.2.9.1. In favor of adopting this motion. This will give us some leverage to the Chair of TGg and the officials of IEEE to counter any suggestions that question the integrity of the process of 802.11. This motion has the full support of those who worked on this.
  - 4.8.2.9.2. Urge everyone approve this amendment and the main resolution. We want to affirm the integrity of the chair of TGg in a way that is palatable to all concerned.
  - 4.8.2.9.3. Requesting a clarification that the chairs "stated the rules as he did the day the rules were made". There is a thought that the interpretation of the rules yesterday was different than originally.
  - 4.8.2.9.4. The mover of the resolution says that it means that there were no changes to the rules of the selection process. It is just saying the rules were read, and that they were unchanged.
  - 4.8.2.9.5. In favor of the motion because it sends the right message outside our body. However it doesn't say that the parliamentary procedure was correct or not. Would like parliamentary clarification on whether the action in question was a ruling or not.
    - 4.8.2.9.5.1. The parliamentarian opinion is inappropriate at this time since it was not raised during the session in question
- 4.8.2.10. Motion amend the amendment as follows: remove the following words: "and in accord with his long demonstrated integrity and evenhandedness stated the rules on this day just as he had on the day when TGg caused those rules to be made"
  - 4.8.2.10.1. Moved Jim Zyren
  - 4.8.2.10.2. Second Bruce Kraemer
    - 4.8.2.10.2.1. Discussion on the amendment to the amendment
      - 4.8.2.10.2.1.1. The original amendment would have been sufficient. This is not necessary.
      - 4.8.2.10.2.1.2. Feels that the first half of the phrase is factually accurate.
      - 4.8.2.10.2.1.3. This amendment goes to core of the material. Speaks against the amendment.
      - 4.8.2.10.2.1.4. Against the amendment – there has been a lot of bad blood between the sides. Call the question
        - 4.8.2.10.2.1.4.1. Question called John Kowalski
        - 4.8.2.10.2.1.4.2. second Mary DuVal
        - 4.8.2.10.2.1.4.3. Vote: 50:8:10. The question is called

- 4.8.2.10.2.2. Vote on the amendment of the amendment:  
Fails 22:38:11
- 4.8.2.11. Discussion on the amendment of the resolution
  - 4.8.2.11.1. Call the question
    - 4.8.2.11.1.1. Dave Bagby
    - 4.8.2.11.1.2. John Kowalski
    - 4.8.2.11.1.3. No Objection
- 4.8.2.12. Vote on amendment of the resolution: passes 64:4:5
- 4.8.2.13. Harry Worstell takes over as Secretary
- 4.8.2.14. The resolution as amended: (Document 336r1 with changes accepted):

**Whereas** TGg has advanced in its selection process to the point of elimination of three out of four initial candidate proposals, and the following events have occurred:

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**Further**, at the time of the action no motion was before TGg, it was not possible to amend or discuss part 19 prior to the vote without suspension of the rules. Furthermore, the lack of debate in this matter may have prevented a full understanding in the minds of the members of TGg as to the true nature and outcome the vote they were taking.

**Therefore be it resolved**, that the Chair did nothing improper, and in accord with his long demonstrated integrity and evenhandedness stated the rules on this day just as he had on the day when TGg caused those rules to be made, that the question regarding the interpretation of step 19 of the selection process be remanded back to TGg for fair debate and resolution, that full faith and confidence is affirmed in the fairness of the Chair, and that the members of TGg are reminded that the selection process is intended to promote consensus, not just endurance.

- 4.8.2.15. Moved Ken Clements
- 4.8.2.16. Seconded Bob O'Hara
- 4.8.3. Discussion on the amended resolution
  - 4.8.3.1. Call the question on the resolution
    - 4.8.3.1.1. Ivan Reede
- 4.8.4. Vote on the resolution : Motion passes: 58 for : 3 against : 8 abstain
- 4.9. Open Discussion**
  - 4.9.1. List has been made of voters who lost rights and they will be published after Friday May 18, 2001
  - 4.9.2. Discussion of the Barcode readers
    - 4.9.2.1. Successful trial - document 01/327 contains results
  - 4.9.3. Graphic for July 2001 meeting was shown (document 01/335) and presented
  - 4.9.4. The 802.15 Chair announces that one LAN Card missing
  - 4.9.5. Dave Bagby
    - 4.9.5.1. Will John Fakatselis respond to letter ballot
    - 4.9.5.2. John - will do as soon as it is finished
  - 4.9.6. Report any attendance discrepancies to Al Petrick.
  - 4.9.7. Restated - Free standards will be available 6 months after published
  - 4.9.8. Interim meeting in Sydney - Sunshine Coast
    - 4.9.8.1. \$300-350 meeting fee
    - 4.9.8.2. Airfares west coast to Sydney \$900 as of last night May 17, 2001
    - 4.9.8.3. Boston to Sydney \$1300
    - 4.9.8.4. Date of meeting Sept 10-14, 2001
    - 4.9.8.5. Hotel Rooms \$220 Australian \$110 US
    - 4.9.8.6. Should be under contract by Monday, May 21, 2001
- 4.10. Stuart Kerry, Chair IEEE802.11 ask if there was any objection to adjourn the meeting**
  - 4.10.1. Hearing none the meeting and session was adjourned at 11:35 AM.

## *Attendance list for the meeting held at* **Radisson Orlando, Orlando, FL**

<i>Full name</i>	<i>status</i>	<i>att. %</i>	<i>phone</i>	<i>company</i>	<i>e_mail</i>
Mr. George Lin ()	aspirant	85	408 326 6846	3COM Corporation	georgelin@3Com.com
Dr. Bernard Aboba (Bernard)	nearly voter	100	+1 425 936 6605	Microsoft	bernarda@microsoft.com
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Mr. Richard Allen (Dick)	voter	90	+1 408 974 5265	Apple Computer Inc.	rallen@apple.com
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Mr. Keith Amann (Keith)	voter	100	+1 303 440 5330	Spectralink	kamann@spectralink.com
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Mr. Carl F. Andren (Carl)	voter	100	+1 321 724 7535	Intersil Corporation	candren@intersil.com
Mr. David C. Andrus ()	nonvoter	45		3COM	david_andrus@3com.com
Dr. Butch Anton	voter	100	+1 408 551 0800	hereUare Communciations, Inc.	butch@hereuare.com
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Mr. David Bagby	voter	100	+1 408 326 3762	3Com Corporation	david_bagby@3com.com
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Mr. Gil Bar-Noy ()	voter	100	+972 9 743 9701 ext 200	hLAN	gilb@hlan.com
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Mr. Phil Belanger (Phil)	voter	30	+1 330 664 7953	Wayport	phil@wayport.net
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Mr. Mikael Brunell ()	aspirant	100	+46 8 733 76 00	Wireless Solutions	mikael.brunell@wireless.se

*Friday, June 29, 2001*

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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. Mitch Buchman ()	aspirant	100	+1 410 796 5461	US Dept of Defense	mitchb@ieee.org
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*Friday, June 29, 2001*

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**IEEE P802.11  
Wireless LANs**

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**Minutes of 802.11 Task Group E  
MAC Enhancements - QoS**

**Radisson at Universal, Orlando, FL**

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## **1. Monday Afternoon**

### **1.1. Secretary**

1.1.1. Tim Godfrey

### **1.2. Call to order**

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

### **1.3. Opening**

#### **1.3.1. Objectives of this session**

1.3.1.1. *Start resolving comments on the Letter Ballot.*

1.3.1.2. *The ballot has not closed. We cannot have formal resolutions yet.*

1.3.1.3. *At some point we will adjourn to an ad-hoc comment resolution group. They will generate recommended resolutions. In July, we will formally accept those recommendations as resolutions.*

1.3.1.4. *Chair notes that votes and comments are due by May 20<sup>th</sup>. Some votes that have been received will be void unless they are changed. They will be notified by email. "No" votes must have comments. The only valid abstention is due to lack of technical expertise.*

1.3.1.5. *Those who gain voting status this week cannot vote on the current letter ballot.*

#### **1.3.2. Review of process**

1.3.2.1. *Ballot has not closed yet. We cannot adopt resolutions on comments submitted so far.*

- 1.3.2.2. *However, resolving the comments now will save us time in July when we address the remaining comments, and make binding resolutions.*

### **1.3.3. Review of Study Group on AV transport**

- 1.3.3.1. *John Kowalski*
- 1.3.3.2. *A teleconference was held to discuss AV transport and 1394. Discussions of the transport and the required protocol.*

### **1.3.4. Review of 802.11 policies and rules**

- 1.3.4.1. *The chair has the right to recognize non-voters during discussion and debate.*
- 1.3.4.2. *There are about 10 new participants, and several new voting members.*
- 1.3.4.3. *Review of Robert's rules basics.*

### **1.3.5. Review of Agenda (per agenda document 206r5)**

- 1.3.5.1. *Current proposed agenda*
  - 1.3.5.1.1. *Review Minutes*
  - 1.3.5.1.2. *Matters arising for the minutes*
  - 1.3.5.1.3. *Call for papers / presentations*
  - 1.3.5.1.4. *Recess for Ad Hoc*
  - 1.3.5.1.5. *Continue at 6:30PM with comment resolution*
  - 1.3.5.1.6. *Tuesday AM – Comment resolution*
  - 1.3.5.1.7. *Tuesday Afternoon – John Kowalski AV Study Group*
  - 1.3.5.1.8. *Wednesday – Comment Resolution*
  - 1.3.5.1.9. *Thursday AM – Study Group*
  - 1.3.5.1.10. *Thursday AM – Comment resolution*
  - 1.3.5.1.11. *Thursday Aft – adjourn Ad Hoc comment resolution. One hour for Study Group conclusion.*
  - 1.3.5.1.12. *Thursday evening – Old Business, New Business, Resolutions from Ad Hoc, Plans for next meeting, any motions for the plenary. Adjourn at 9:30PM*
- 1.3.5.2. *Discussion of agenda*
  - 1.3.5.2.1. *Request for presentation. – ½ hour would be needed. Request for Tuesday, due to not being available today. Would like to present before the Study Group.*
- 1.3.5.3. *Adoption of agenda as shown*
  - 1.3.5.3.1. *Adopted without objection*

### **1.3.6. Approval of Minutes from Hilton Head**

- 1.3.6.1. *Minutes approved without objection*

### **1.3.7. Call for Papers**

- 1.3.7.1. *802.11e Isochronous supercycles. Doc 246.. Peter Johanssen*
- 1.3.7.2. *(untitled) Doc 247 Peter Johanssen*
- 1.3.7.3. *AV Multicast for 802.11e (DOC ???) John Kowalski.*

- 1.3.7.4. *AV User Requirements (DOC ???) John Kowalski*
- 1.3.7.5. *Packet Capture (Doc 232) Eric*
- 1.3.7.6. *Proposed changed to 802.11e Draft. Doc 243  
Mathilde*
- 1.3.7.7. *Problems with 802.11e NAV operation (doc ???)  
Sunghun*
- 1.3.7.8. *Quantification of capture effect (doc ) Amman Singla.*
- 1.3.7.9. *Signaling for stream registration (doc) Sri Kandala*
- 1.3.7.10. *Benefits of an expanded Traffic label (doc 123)  
Michael Fischer*
- 1.3.7.11. *Cleaning up MAC PHY timing ( doc 127) Michael  
Fischer*

## **1.4. Presentation of Papers**

### **1.4.1. Packet Capture UDP Experiments**

- 1.4.1.1. *Eryk Dutkiewicz – Motorola Australia*
- 1.4.1.2. *Document 232*
- 1.4.1.3. *Testing done with a flood of UDP packets over  
802.11b nodes. Trace with TCPdump.*
- 1.4.1.4. *Discussion*
  - 1.4.1.4.1. *Simulation models need to be improved with better  
PHY models.*
  - 1.4.1.4.2. *Different results are obtained for different access  
points.*
  - 1.4.1.4.3.
- 1.4.1.5. *Announcement from the chair of 802.11*
  - 1.4.1.5.1. *ExCom members have discussed voting rights. The  
new voting members as of this session do not have to vote  
according to 2.8.1, and so are not affected by any loss of  
voting rights for LB25, 26, and 27.*
  - 1.4.1.5.2. *The chair rules that members were in the 802.11  
WG balloting group (see 2.8.1) and are eligible for loss of  
voting rights due to failure of submitting two out of three  
consecutive letter ballots will maintain their voting rights  
until Noon Friday, at which time will they lose their voting  
rights.*
  - 1.4.1.5.3. *New voters at this meeting who are not part of the  
802.11 WG balloting group for LB 27, so they are not  
affected.*
  - 1.4.1.5.4. *The chair restates that the rules state that voting  
rights on a letter ballot are based on voting status as of the  
start of the letter ballot.*
  - 1.4.1.5.5. *Do comments then have to be in by Tuesday? Yes.  
Because they are part of your vote.*
  - 1.4.1.5.6. *Quotes from 802.11 rules:*
    - 1.4.1.5.6.1. *2.8.1 Draft Standard Balloting Group*
    - 1.4.1.5.6.2. *The 802.11 WG balloting group consists of  
all voting members of the 802.11 WG as of the*



close of the day the ballot package distribution was completed as determined by the WG chair.

1.4.1.5.6.3. 7.1.4 Working Group Ballot

1.4.1.5.6.4. ...

1.4.1.5.6.5. Voting members have an obligation to vote. Not returning two, valid, ballots in a sequence of 3 letter ballots will automatically terminate voting rights. Abstentions are only counted as valid if they are based on "lack of expertise"

1.4.1.6. *Discussion*

1.4.1.6.1. *Do we know why this effect is happening? Was RTS/CTS really being used? Yes, it could be see them on the air. Packets were dropped by MAC buffer overflows.*

## **1.5. Recess regular session for Ad Hoc Comment resolution**

### **1.5.1. No Objection**

## **1.6. Comment Resolution group**

### **1.6.1. Review of comment resolution process**

1.6.1.1. *We cannot make definite decisions on resolutions since the ballot is not closed. The output of this ad hoc*

1.6.1.2. *If there are papers related to comments, there will be time given to present them.*

1.6.1.3. *At the end of discussion, we will try to form a resolution, either accepting or rejecting the suggestion of the commenter.*

1.6.1.4. *We may accept an amended resolution, or sometimes reject the comment.*

1.6.1.5. *Comments will be read, and the group will be asked if there is any objection to accepting the comment and resolution as stated.*

1.6.1.6. *For each comment, we will document the vote on the comment acceptance with two votes – one for voters only, and another with all present voted.*

1.6.1.7. *We have probably 300 comments so far, but there are many duplicates. On clauses 7 and up, technical, there about 320 comments. There about 100 before clause 7.*

1.6.1.8. *At the end of the process, we will have a single document with all comments.*

1.6.1.9. *Currently, there are 7 separate documents broken down by clauses, and one for "general" (multi-clause) comments. Documents 261 to 270.*

1.6.1.10. *Note that there were some comments that were not identified as editorial or technical. They were considered editorial unless the comments were a part of a No vote.*

1.6.1.11. *Do not use bookmarks in the Name column.*

1.6.2. At 5:15PM, TGe recesses until 6:30PM

## 2. Monday Evening - TGe Ad Hoc Session

### 2.1. Opening

#### 2.1.1. Call to Order 6:30PM

#### 2.1.2. Review of comment resolution procedure

2.1.2.1. *We will address comments and offer to accept it.*

2.1.2.2. *If there is an objection, there will be discussion, leading to a resolution.*

2.1.2.3. *We will vote, and a 75% vote results in a recommended resolution.*

2.1.2.4. *If the vote fails, the comment remains unresolved.*

2.1.2.5. *If we get stuck on a comment, it will be skipped.*

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

### 2.2. Comment Resolution

#### 2.2.1. Comments on Clause 6 – doc 263r1

##### 2.2.1.1. Comment 1

2.2.1.1.1. *How can we deal with “reserved” comments? A null comment on a place where no text is in place. The rules states that you can comment on any text that changes, so this is not necessary to preserve the right to comment later.*

2.2.1.1.2. *Accepted – no change required.*

##### 2.2.1.2. Comment 2 on 6.1.1

2.2.1.2.1. *Is this comment making QoS mandatory, and thus eliminating backwards compatibility. The QoS bit indicates 802.11e conformance.*

2.2.1.2.2. *Desire that the QoS facility be mandatory for 802.11e.*

2.2.1.2.3. *Belief is that this is already the intent. It will be specified in the PICS, not here.*

2.2.1.2.4. *Suggested resolution – To remove the word “optional” in references to QoS functions in clauses 6 through 11 and to add a paragraph to sub-clause 5.2.2.2 which states what functions parts of the QoS facility are necessary for conformance to 802.11e..*

2.2.1.2.4.1. *This fixes an entire class of problems.*

2.2.1.2.4.2. *Acceptable to commenter*

2.2.1.2.4.3. *Is there any objections to accepting this resolution? None*

2.2.1.2.4.4. *Resolution accepted.*

##### 2.2.1.3. Comment 3 on 6.2.1.1

2.2.1.3.1. *8 priority values are not adequate. Expand the parameter priority values to 16.*

- 2.2.1.3.2. *This information shows up on the air interface, and at the MAC SAP.*
- 2.2.1.3.3. *Suggestion to go to 4 bits , 16 values, 8 for priority and 8 for parameterized. We need to disambiguate this.*
- 2.2.1.3.4. *Proposed resolution – allow 16 values for the priority parameter. Values 0-7 have their traditionally meaning, and Values 8-15 are for parameters.*
- 2.2.1.3.5. *The TCID changes also. In Clause 7.1.3.5.1.*
- 2.2.1.3.6. *In the draft, fig 14.5, the top two rows change by defining bit 15.*
- 2.2.1.3.7. *Deferred – see document 01/123*
- 2.2.1.4. *Comment 4 on 6.2.1.1*
  - 2.2.1.4.1. *Comment: Having a variable MSDU MTU depending on features seems to leak unnecessary MAC-layer knowledge into layers above the MAC*
  - 2.2.1.4.2. *Suggested: Define a constant MSDU MTU*
  - 2.2.1.4.3. *Discussion.*
    - 2.2.1.4.3.1. *Would this cause a backwards compatibility issue?*
    - 2.2.1.4.3.2. *There are 2 questions - backward compatibility is a non issue since 802.11-1999 has a maximum of 2304, but it doesn't have security, FEC, etc that make it longer. As long as we don't make 1999 devices non-conformant there is no problem.*
    - 2.2.1.4.3.3. *Can we fix the MTU at 2048?*
    - 2.2.1.4.3.4. *No we shouldn't make it smaller.*
    - 2.2.1.4.3.5. *What is the largest MTU that the PHYs will support? 802.11a can accept up to 4095. The FH PHY can support up to 4095 also.*
    - 2.2.1.4.3.6. *Small frames minimize the impact of a bit error.*
    - 2.2.1.4.3.7. *Regarding long MTUs there is a proposal for Ethernet for "jumbo" frames.*
  - 2.2.1.4.4. *Vote on the resolution*
    - 2.2.1.4.4.1. *Voting Members: Resolution is accepted 22:3:6.*
    - 2.2.1.4.4.2. *Non-voters: 0:1:8*
- 2.2.1.5. *Comment 5*
  - 2.2.1.5.1. *Already Resolved by resolution of comment 2 in this document (263)*
- 2.2.1.6. *Comment 6 on 6.2.1.1.2*
  - 2.2.1.6.1. *Comment: The semantics of the "Contention" and "Contention-Free" service parameters are not adequately defined. Do they express a preference or an absolute constraint? This parameter would also appear to be able to affect MSDU re-ordering over and above that implied in 6.1.3. Also these two cases and the priority classes are different. The priority class parameter can be transported*

- exactly, but the Contention/Contention-free cannot – it has to be inferred inexactly by the receiver.*
- 2.2.1.6.2. *Suggested: Remove the Contention & Contention-free priority classes.*
- 2.2.1.6.3. *Discussion*
- 2.2.1.6.3.1. The semantics are described subsequently in 6.2.1.1.2, in a portion not being modified in the draft, and 6.1.2.2. If we deleted these, we would render former implementations non-conformant.
- 2.2.1.6.3.2. The objective is to make it clear that the QoS facility depends on these.
- 2.2.1.6.4. *Vote on the resolution*
- 2.2.1.6.4.1. Voters: Comment rejected – 3:10:10
- 2.2.1.6.4.2. Non-voters: 3:0:10
- 2.2.1.7. *Comment 7 on 6.2.1.1.2*
- 2.2.1.7.1. *Comment: Why has the MTU been reduced when an option is used? Other standards, notably 802.3, have expanded their MTU when required to carry additional information, such as VLAN tags.*
- 2.2.1.7.2. *Suggested: Extend the allowable size of the MSDU rather than reducing it, when using the “optional facilities”.*
- 2.2.1.7.3. *Discussion*
- 2.2.1.7.3.1. Asking to extend the MPDU maximum to keep the current allowable size.
- 2.2.1.7.4. *We have already voted and accepted a comment in the opposite sense.*
- 2.2.1.7.5. *Suggestion to defer until the commenter is present.*
- 2.2.1.7.6. *No objection*
- 2.2.1.8. *Comment 8 – on 6.2.1.3.2*
- 2.2.1.8.1. *Comment: It is not clear why the dropping of a packet (due to failed delivery) is not reportable to the upper layers.*
- 2.2.1.8.2. *Suggested: Clarify*
- 2.2.1.8.3. *Discussion*
- 2.2.1.8.3.1. There was a misunderstanding of MAunitdata.status. It is not to report the result of deliver. It is an unacknowledged service. It is for problems with the transmitted data.
- 2.2.1.8.3.2. Proposed resolution – Rejected. State that packet delivery is not guaranteed. The definition of MAC service is connectionless and unacknowledged.
- 2.2.1.8.4. *Defer until the commenter is present.*
- 2.2.1.9. *Comment 9 – on 6.2.1.3.2*
- 2.2.1.9.1. *Comment : P 14, L 10 Missing information. Change is needed for completeness.*
- 2.2.1.9.2. *proposed: Insert text: Undeliverable (MSDUTimer reached aMaxMSDULifetime [TC] before successful delivery of an MSDU of traffic category TC)*

- 2.2.1.9.3. *Discussion*
  - 2.2.1.9.3.1. This would be incorrect – A traffic category is not used in this case. What happens is the MSDU lifetime counters are described in clause 9. MAunitdata.status is the result of the transmission request, not the transmission. There is no primitive to provide the eventual result of a transmission, since the MAC is considered connectionless. Do we need such a primitive? It is not unreasonable to have one.
- 2.2.1.9.4. *Disposition – comment was withdrawn*
- 2.2.1.10. *Comment 10 –*
  - 2.2.1.10.1. *Commenter not present: Comment deferred*
- 2.2.1.11. *Comment 11 – on 6.2.1.2.2*
  - 2.2.1.11.1. *Comment: Should we include a response for “uncorrectable error” and possibly “correctable error”*
  - 2.2.1.11.2. *Suggested: We should include as suggested.*
  - 2.2.1.11.3. *Discussion*
    - 2.2.1.11.3.1. Why include one and not the other? The transmitter never knows there is an error on the medium.
    - 2.2.1.11.3.2. Proposed resolution – add a case for “or success with correction” after “success”.
  - 2.2.1.11.4. *Vote on the resolution*
    - 2.2.1.11.4.1. Voting Members: Resolution accepted 24:2:5
    - 2.2.1.11.4.2. Non Voters: 9:0:2
- 2.2.1.12. *Comment 12*
  - 2.2.1.12.1. *Deferred due to commenter not present*
- 2.2.1.13. *Comment 13 – 6.1.3*
  - 2.2.1.13.1. *Comment: Does MSDU reordering make sense in the QoS environment? Is this on a per Queue or per traffic class basis? Strictly Ordered Service does not make sense, should not be on a packet-by-packet basis, but on a session wide basis.*
  - 2.2.1.13.2. *Suggested: Explain how this will work Make strictly ordered service definition on a session wide basis not on a packet by packet basis.*
  - 2.2.1.13.3. *Discussion*
    - 2.2.1.13.3.1. Does the strictly ordered class even work? Nobody implements it.
  - 2.2.1.13.4. *Comment withdrawn*
- 2.2.1.14. *Comment 14 – 6.1.3*
  - 2.2.1.14.1. *Comment: There is an “information gap” between the receiving station that knows it wants to receive strictly-ordered MSDUs or would like to save power and the transmitting station that specifies this parameter.*
  - 2.2.1.14.2. *Suggested: Remove this section and the strictly ordered traffic category elsewhere.*

**2.2.1.14.3. Discussion**

2.2.1.14.3.1. This was a useless facility when it was established, and no longer needed. It is not in the PICS, so taking it out would not cause non-conformance.

2.2.1.14.3.2. Proposed Resolution: remove all mention of strictly ordered service class, including all the errors about trying to use it, in the updated standard.

**2.2.1.14.4. Vote on accepting the resolution:**

2.2.1.14.4.1. Voting Members: 27:0:1

2.2.1.14.4.2. Non voters: 12:0:1

**2.2.1.15. Comment 15 – 6.2.1.1.4**

2.2.1.15.1. *Comment: We should consider passing back what is available if a request cannot be fulfilled. That way there can be negotiation rather than a game of 20 questions*

**2.2.1.15.2. Discussion**

2.2.1.15.2.1. We have an architecture where status information is at the MLME SAP, not the MAC SAP in this reference.

2.2.1.15.2.2. There is an open issue in clause 10 on this subject.

2.2.1.15.2.3. Straw Poll – should this information be available at an abstract interface? 13:1:8

2.2.1.15.2.4. Suggestion that a new SAP might be the best interface for this sort of information. Unitdata.status is not the place for this.

2.2.1.15.3. *Comment withdrawn pending further consideration*

**2.3. At 9:20PM, recess until tomorrow at 8:00AM****3. Tuesday - TGe Ad Hoc Session****3.1. Opening****3.1.1. Called to Order at 8:00AM****3.1.2. Review of the resolution process so far****3.1.3. Announcement**

3.1.3.1. *At the 3:30PM session today we will have 3 papers.*

3.1.3.2. *At 4:30 today we will have the AV study group for one hour.*

**3.2. Comment Resolution****3.2.1. Comments on Clause 7**

3.2.1.1. *Comment 45 – clause 7.1.3.2*

3.2.1.1.1. *Comment: Not convinced that the use of values less than 32768 during the CFP is the best thing to do. HCF Implementations in environments where its not*

*beneficial to have NAV set can stop the CFP by sending CF end and then use the virtual carrier sense mechanisms.*

3.2.1.1.2. *Suggested: Remove the recommendation to implementers.*

3.2.1.1.3. *Discussion*

3.2.1.1.3.1. The reason for this is to have a uniform set of frame exchange rules. If the existing requirement to use only 32768, then only cf-pollable stations as in the base standard are able to communicate during the CFP. We had a compromise that CF-pollable didn't require all the capabilities. If we require a fixed value, it reverses that previous decision.

3.2.1.1.3.2. The NAV rules haven't changed. A duration never reduces the NAV value. Any legacy station setting its NAV from a beacon or TBTT, and would not contend in the CFP.

3.2.1.1.4. *Comment Withdrawn*

3.2.1.2. *Comment 46 – clause 7.2.3.12*

3.2.1.2.1. *Comment: 1 Activation delay is present only in action request frames. 2 Non zero activation delays may be used with action codes that are specified to permit or to require such. 3 ESTAs that receive an action frame with recognized category code but an unrecognized request action code required to generate a response error*

3.2.1.2.2. *Suggested: 1) Remove this requirement there may be cases where activation delay is useful for response 2) This requirement be modified to say that non zero activation delays may be used except when such action codes specifically do not permit such use. (Or this requirement may be removed). 3) evaluate the suitability., ignore unrecognized action codes.*

3.2.1.2.3. *Discussion*

3.2.1.2.3.1. Commenter wants to add an additional byte. Activation delay in response frame.

3.2.1.2.3.2. Why is this needed? You might want a indicate a different effective time than what was requested.

3.2.1.2.3.3. Editor: The activation delay requires a state machine in all stations to process the management subheader to synchronize the action with TSF and beacons. The negotiation of when to commence an action shouldn't be part of the request to initiate the action. The intent of the command is imperative.

3.2.1.2.4. *Part 1 of the comment is withdrawn*

3.2.1.2.5. *Part 2 – Editor feels this will create additional complexity without any benefit. This would permit activation delay in all cases. There may be side effects.*

3.2.1.2.6. *Discussion*

3.2.1.2.6.1. We should explicitly say it is allowed

3.2.1.2.6.2. There is a general problem with action delays – How many such deferred actions must a

- conforming station support? How much memory is required?
- 3.2.1.2.6.3. The thinking behind the draft wording is to avoid having to set such a limit. The default is that activation delay is not there. An activation delay is optional.
- 3.2.1.2.7. *Vote on the resolution – part 2:*
- 3.2.1.2.7.1. Voters: fails 1:15:19
- 3.2.1.2.7.2. Non Voters: 1:0:15
- 3.2.1.2.8. *Part 3 – proposed modification: removing the error response to unrecognized action codes.*
- 3.2.1.2.9. *Discussion*
- 3.2.1.2.9.1. The way it is written, it allows for extension of the standard.
- 3.2.1.2.10. *Commenter Withdraws part 3*
- 3.2.1.3. *Comment 47 – clause 7*
- 3.2.1.3.1. *Comment: There should be a reference here to correctable frames as well as those received without error*
- 3.2.1.3.2. *Proposed: “frames without errors or with corrected errors”*
- 3.2.1.3.3. *Vote on resolution*
- 3.2.1.3.3.1. Voting Members: passes 27:0:7
- 3.2.1.3.3.2. Non Voters: 6:0:8
- 3.2.1.4. *Comment 48 – 7.1.1*
- 3.2.1.4.1. *Comment: There should be a reference here to correctable frames as well as those received without error. Reserved value in non reserved fields are not transmitted by conformant stations*
- 3.2.1.4.2. *Proposed: add “or with corrected errors”*
- 3.2.1.4.3. *Comment accepted without objection*
- 3.2.1.5. *Comment 49 – 7.2.1.1*
- 3.2.1.5.1. *Comment: 1) If it is the case that an RTS is not very useful in the case where there is a single BSS and it is assumed that all STAs can hear the AP, then it should be pointed out that the use of RTS/CTS is not required but is up to the discretion of the implementer 2) The duration of RTS should depend on frame exchange that it is part of as defined in clause 9*  
*3) Note seems to indicate that ESTAs do not set NAV to CFPmaxDuration at TBTT in CFP.*
- 3.2.1.5.2. *Discussion*
- 3.2.1.5.2.1. Under the existing rules, useRTS is defined in clause 9, based on a MIB attribute RTS threshold. RTS is stated to not be used in the CFP, but would be allowed under HCF.
- 3.2.1.5.2.2. There are benefits for RTS even in a single BSS.
- 3.2.1.5.3. *First part of comment withdrawn.*
- 3.2.1.5.4. *Proposed Resolution, part 2: “For all RTS frames sent under DCF Rules..... “For all other uses of RTS, the*



*duration field is calculated in the relevant section of clause 9"*

- 3.2.1.5.5. *Vote on proposed resolution*
  - 3.2.1.5.5.1. Voting members: 30:0:4
  - 3.2.1.5.5.2. Non Voters: 11:0:2
- 3.2.1.5.6. *Part 3 – Discussion*
  - 3.2.1.5.6.1. If you send an RTS to a legacy STA in the CFP, there will not be a response, since its NAV will be set.
- 3.2.1.6. *Comment 50 – 7.2.1.10*
  - 3.2.1.6.1. *Comment: Change to accommodate elimination of CC frame*
  - 3.2.1.6.2. *Suggested: The RR frame should be modified to include multiple QoS Control fields for different traffic classes that may be simultaneously put into one RR packet.*
  - 3.2.1.6.3. *Discussion*
    - 3.2.1.6.3.1. There are a number of comments that address this. We should address all of them at once.
  - 3.2.1.6.4. *Defer as part of CC/RR discussion*
- 3.2.1.7. *Comment 51 – 7.4*
  - 3.2.1.7.1. *Comment: Should we say something about just what QoS management actions are?*
  - 3.2.1.7.2. *Discussion*
    - 3.2.1.7.2.1. Some explanation before table 20.1
  - 3.2.1.7.3. *Comment withdrawn pending generation of some suggested text*
- 3.2.1.8. *Comment 52 – 7.2.1.2*
  - 3.2.1.8.1. *Comment: If it is optional to send an RTS, is it optional to respond to an RTS with a CTS? The duration of CTS should depend on frame exchange that it is part of as defined in clause 9*
  - 3.2.1.8.2. *Discussion*
    - 3.2.1.8.2.1. The CTS response is not optional. The duration is constant.
    - 3.2.1.8.2.2. It is an equivalent change to previous resolution
  - 3.2.1.8.3. *Accepted without objection*
- 3.2.1.9. *Comment 53 – 7.4.1*
  - 3.2.1.9.1. *Comment - QoS level 3 is referred to.*
  - 3.2.1.9.2. *Proposed resolution – editorial oversight. We propose an expanded resolution: to remove all references to QoS Levels 1, 2, and 3.*
  - 3.2.1.9.3. *Discussion*
    - 3.2.1.9.3.1. The original level scheme included 3 levels with specific exclusions. There are differential implementations. There is not a specification of a minimal set of parameters for parameterized.

- 3.2.1.9.3.2. Is it possible for a BSS to support simultaneous Parameterized and Prioritized. Yes – we now have 16 traffic categories.
- 3.2.1.9.3.3. Can we make this interoperable, with allocation of parameterized and prioritized TXOPS.
- 3.2.1.9.3.4. This comment is editorial – there is still another discussion on communication of capabilities and implementation, and what needs to be in the PICs.
- 3.2.1.9.4. *Vote on proposed resolution*
  - 3.2.1.9.4.1. Voting members: passes 27:1:3
  - 3.2.1.9.4.2. Non Voters: 13:0:3
- 3.2.1.10. *Comment 54 – 7.5*
  - 3.2.1.10.1. *Comment: Not true that FEC is only used in parameterized QoS; also reference to QoS level 3 no longer valid*
    - 1) *In the last MSDU block, it says that the last 4 octets is included as an FCS for the Frame body. If the last block is 208, then it will be (208+4 = 212 octets for the last MSDU. Is the FEC performed on this 212 octets in which case it will be termed as RS (228,212) or the last block should be 4 less octets. ??*
    - 2) *It is not possible for FCS to fail in the error corrected frame. then why do we need to compute the FCS for the frame body?? and determine whether to pass up the frame to the higher layers.*
    - 3) *Is the FCS for the MPDU should be checked for passing the error corrected MPDU's or the (FEC FCS ) for the Frame Body ?*
    - 4) *For non-FEC compatible STA's, do they use the FCS for the MPDU., or the FCS for the frame body or BOTH ?? They only know to drop the FEC parity bits. Will they pass FEC FCS & FCS back to back to the higher layers??*
    - 5) *If fragmentation is used, then larger MSDU sizes can be used ?? Does this mean block size for FEC encoding RS(255, 240) can be greater than 240 bytes?? It is not possible if the no .of correctable errors is  $t=8$ ., and parity bytes = 16.*
  - 3.2.1.10.2. *Discussion*
    - 3.2.1.10.2.1. It is the case that FEC is only available in parameterized as defined.
    - 3.2.1.10.2.2. First part of comment withdrawn.
  - 3.2.1.10.3. *Remaining comment parts will be considered editorial*
- 3.2.1.11. *Comment 55 – 7.2.3.1.10*
  - 3.2.1.11.1. *Comment: There seems to be a conflict in this note. By definition, a legacy packet transmitted as “contention” must have a priority value of either 0 or 7 depending on what the default bits represent, so how can this legacy packet not be strictly orderable?*
  - 3.2.1.11.2. *Discussion*

- 3.2.1.11.2.1. We have already dealt with this. We resolved strictly ordered in clause 6.
- 3.2.1.11.3. *Proposed Resolution: There is no conflict. StrictlyOrdered is not usable with the QoS facility. The reorderable has to do with power save*
- 3.2.1.11.4. *Comment withdrawn*
- 3.2.1.11.5.
- 3.2.1.12. *Comment 56 – 7.2.1.3*
- 3.2.1.12.1. *Comment: What are the rules if an ACK frame is sent during the CFP under the HCF? The duration of ACK should depend on frame exchange that it is part of as defined in clause 9.*
- 3.2.1.12.2. *Resolved in comment 52.*
- 3.2.1.12.3. *Commenter accepts, the same modification is accepted here without objection*
- 3.2.1.13. *Comment 57 – 7.2.3.1*
- 3.2.1.13.1. *Comment: Where are the definitions and discussion of BSS overlap mitigation and the use of the Proxy Beacon? Information is missing regarding 802.11d in the beacon table – ought not this information be available by this time. Comment reserved until information is available.*
- 3.2.1.13.2. *Defer to BSS Overlap Discussion*
- 3.2.1.14. *Comment 58 – done*
- 3.2.1.15. *Comment 59 – done*
- 3.2.1.16. *Comment 60 - 7.2.3.13*
- 3.2.1.16.1. *Comment:*
1. Are container frames optionally supported, or mandatory, and if optional how is capability indicated?
  2. Retry bit is interpreted for the container frame, clear retry bit need not mean that each MPDU is being transmitted for the first time
  3. When address 1 is Broadcast address all MPDUs should have only group address for MPDU, this restriction need not be placed except when there is WEP
  4. When address 1 is multicast, the MPDUs are restricted to the identical address1 – should this be the case?
  5. Are there any special rules required to apply FEC to a container? Example, if some of the MPDUs are correctable are the subset of correctable MPDUs delivered or is the entire container rejected?
  6. Even octet boundaries requirement introduces complexity of padding
  7. Container can generate an MPDU too large given that the max MPDU size is quite large compared to maxSDU size. Is this bounded by section 7.1.3.7?
- 3.2.1.16.2. *Discussion*
- 3.2.1.16.2.1. *Container frames should either be taken out, or made optional.*

- 3.2.1.16.2.2. If it is optional, there may be an interoperability issue?
- 3.2.1.16.2.3. If we delete container frames, we need to delete all other references to them elsewhere.
- 3.2.1.16.2.4. Container frames are for aggregation. The CF Bursting does the job almost as well.
- 3.2.1.16.2.5. Container frames were added for this reason: The PHY overhead goes up as the data rate goes up. Short frames have a higher and higher penalty.

3.2.1.16.3. *Proposed resolution: Delete Container frames and all references to them*

3.2.1.16.4. *Vote on resolution*

3.2.1.16.4.1. Voting members: accepted 37:0:4

3.2.1.16.4.2. Non Voters: 11:0:5

### 3.2.2. At 10:00AM, Recess until 10:30AM

### 3.2.3. At 10:30AM, reconvene

3.2.3.1. *Comment 9 – 7.4.4-9*

3.2.3.1.1. *Comment: These sections are incomplete. Remove these sections and reserve the codes.*

3.2.3.1.2. *Discussion*

3.2.3.1.2.1. Commenter would like to reserve the codes

3.2.3.1.2.2. There is a need for clause 9 text to describe these frames

3.2.3.1.2.3. The entire table is already reserved if not explicitly named.

3.2.3.1.3. *Proposed resolution: Remove these sections and reserve the codes:*

3.2.3.1.4. *Vote on resolution*

3.2.3.1.4.1. Voting members: passes 23:0:5

3.2.3.1.4.2. Non Voters: 8:0:4

3.2.3.2. *Comment 10: 7.2.1.10*

3.2.3.2.1. *Comment “The TA is the address of the STA transmitting the frame.” No TA is shown in the RR frame figure.*

3.2.3.2.2. *Suggested: Remove this sentence*

3.2.3.2.3. *Discussion*

3.2.3.2.3.1. This is an inconsistency between the text and the figure

3.2.3.2.3.2. *Resolution accepted without objection*

3.2.3.2.3.3. *Comment 11: 7.2.2*

3.2.3.2.3.4. *Comment: Table 4. Why use the 4-address format with duplication of address fields in the ESTA-ESTA case? The existing case, now marked as STA-STA in an IBSS copes perfectly well with this case.*

3.2.3.2.3.5. *Suggested : Remove this usage and add ESTA-ESTA to the STA-STA in IBSS case.*

- 3.2.3.2.3.6. *Discussion*
- 3.2.3.2.3.7. The three address format would work. It is not specified because of clause 5.5. ToDS and FromDS both 0 are a class 1 frame. Changing this would cause an inconsistency with 5.5.
- 3.2.3.2.3.8. Are we willing to have the 6 byte overhead in ESTA to ESTA?
- 3.2.3.2.3.9. We need a proposal for how to fix 5.6.
- 3.2.3.2.3.10. Could we reclassify data frames as type 1?
- 3.2.3.2.3.11. Can we add addressing problems in 5.6 as the resolution? The editor doesn't know exactly how to do that.
- 3.2.3.2.4. *Proposed change: Move the ESTA to ESTA line in table 4 to the fromDS and ToDS = 0 line, and make a modification to clause 5.5 to make frame with TODS and FROMDS both 0 to class 3 frames except when stations are part of an IBSS.*
- 3.2.3.2.5. *Discussion*
  - 3.2.3.2.5.1. What about IBSS that is supporting QoS? There is no explicit support of QoS in an IBSS.
- 3.2.3.2.6. *Vote on proposed resolution*
  - 3.2.3.2.6.1. Voting Members: accepted 24:0:6
  - 3.2.3.2.6.2. Non Voters: 9:0:5
- 3.2.3.3. *Comment 12: 7.4.1*
  - 3.2.3.3.1. *Comment: The process of negotiating a parameterized TS is much more than an "advisory".*
  - 3.2.3.3.2. *Suggested: It needs a response defined that can include various reasons to refuse a proposed traffic spec.*
  - 3.2.3.3.3. *Discussion*
    - 3.2.3.3.3.1. There needs to be a protocol for connection setup. Need a resolution that acknowledges that a connection setup can fail.
    - 3.2.3.3.3.2. The QoS action for defining a traffic spec should include a response for success or failure.
    - 3.2.3.3.3.3. There is a larger area of Signaling that needs to be addressed.
    - 3.2.3.3.3.4. We need to define a response, and a timeout for failure to respond.
    - 3.2.3.3.3.5. Can't we use existing timeouts for management response? Yes.
  - 3.2.3.3.4. *Proposed resolution: Add a new management action response for Define traffic specification.*
  - 3.2.3.3.5. *Vote on the resolution*
    - 3.2.3.3.5.1. Voting Members: 25:0:4
    - 3.2.3.3.5.2. Non Voters: 9:0:4
- 3.2.3.4. *Comment 13: 7.5*
  - 3.2.3.4.1. *Comment: "It is used in parameterized QoS". It is not clear whether this comment attempts to restrict the use of FEC only to these cases. It is my opinion that FEC can*

*usefully be used under other circumstances and not as part of a parameterized QoS TS.*

3.2.3.4.2. *Suggested: Clarify precisely under what circumstances FEC can be used. Consider widening its scope to permit its use by ESTAs that do not support QoS level 3 (parameterized). This would require signaling of FEC (with and without immediate ACK) in the capability field and finding a place to signal presence of FEC coding on a per-MPDU basis.*

3.2.3.4.3. *Discussion*

3.2.3.4.3.1. We need a way of turning FEC on and off.

3.2.3.4.3.2. The FEC corrects burst errors. We need a way of signaling this. On a per packet basis would be preferred.

3.2.3.4.3.3. The FEC belongs in the PHY. The MAC FEC cannot correct some errors.

3.2.3.4.3.4. Indicating FEC on a per packet basis would mean adding to MA.Unitdata.Request.

3.2.3.4.3.5. Since 802.11g is considering FEC, and can add PHY header bits, that is the place to do this.

3.2.3.4.3.6. The interpretation of a packet have to occur before the header is processed. The FEC doesn't protect the MAC header.

3.2.3.4.3.7. FEC belongs in the PHY.

3.2.3.4.3.8. You could use parameterized QoS with FEC to mimic prioritized QoS.

3.2.3.4.3.9. FEC needs to be represented in a capability, and stipulate that association not be denied for not supporting FEC.

3.2.3.4.4. *Proposed resolution: Make FEC optional in a way that allows negotiation. The ability to receive FEC to be indicated in a capability bit 11.*

3.2.3.4.5. *Vote*

3.2.3.4.5.1. Voters: passes 27:0:1

3.2.3.4.5.2. Non Voters: 15:0:1

3.2.3.5. *Comment 14: 7.5*

3.2.3.5.1. *"error correction is expected to take longer than a SIFS" – while this may be true today it will not remain so for long. Should we build in implementation dependencies of this type into the spec?*

3.2.3.5.2. *proposed: Permit negotiation for a TS of the use of FEC with and without immediate ACK.*

3.2.3.5.3. *Discussion*

3.2.3.5.3.1. Would like to increase data reliability for non-time bounded cases. Implementation should not limit this.

3.2.3.5.4. *Proposed resolution: In cases where FEC is longer than SIFS, an alternate acknowledgement policy must be used. Decouple acknowledgement policy and FEC.*

3.2.3.5.5. *Discussion*

- 3.2.3.5.5.1. The sender needs to know of the receiver can immediately acknowledge or not.
- 3.2.3.5.5.2. Does this decouple the no\_ack bit? There is another issue for signaling this.
- 3.2.3.5.6. Vote
  - 3.2.3.5.6.1. Voting Members: accepted 28:0:1
  - 3.2.3.5.6.2. Non Voters: 10:0:4
- 3.2.3.6. *Comment 15: 7.2.3.1*
  - 3.2.3.6.1. *This section (and others) reference a clause 9 section (BSS overlap mitigation) that does not exist. This section will need to contain normative text describing mandatory behavior of ESTAs and EAPs that supports BSS overlap mitigation. Without this text, this feature is incomplete.*
  - 3.2.3.6.2. *Defer to broader discussion of BSS overlap*
- 3.2.3.7. *Comment 16: 7.6*
  - 3.2.3.7.1. *Table 20.2 assumes that the EPC is the HC. But at the moment, this assumption is not correct.*
  - 3.2.3.7.2. *Suggested: Require the EPC to be the HC.*
  - 3.2.3.7.3. *Discussion*
    - 3.2.3.7.3.1. *There is no requirement that the EPC to be the HC. This is editorial*
  - 3.2.3.7.4. *Editorial – no objections.*
- 3.2.3.8. *Comment 17 ; 7.2.3.13*
  - 3.2.3.8.1. *The referenced section in clause 9 does not exist. Although it is fairly obvious how these frames should be used, there may be normative requirements of clause 9 that are not obvious.*
  - 3.2.3.8.2. *Container frames – already dealt with*
- 3.2.3.9. *Comment 18: 7.2.3.13*
  - 3.2.3.9.1. *Dealt with*
- 3.2.3.10. *Comment 19 – 7.2.3.17*
  - 3.2.3.10.1. *The second para implies broadcast traffic is sent after beacons or TBTTs, when it is sent only after DTIM TBTTs according to existing power-saving rules .Have the rules changed, or is this a false assumption?*
  - 3.2.3.10.2. *Discussion*
    - 3.2.3.10.2.1. *Should be “after beacons containing at DTIM element”*
  - 3.2.3.10.3. *Proposed resolution – modify references to TBTT to “the TBTT of beacons containing a DTIM”*
  - 3.2.3.10.4. *Vote*
    - 3.2.3.10.4.1. *Voting members: accepted 25:0:4*
    - 3.2.3.10.4.2. *Non Voters: 12:0:3*
- 3.2.3.11. *Comment 20 – 7.3.2.17*
  - 3.2.3.11.1. *I’m not sure I believe the support implied here for ESTA to PS ESTA will work. There’s a bit of a “chicken and egg” problem exchanging the directed probe request/response with the power-saving station.*

- 3.2.3.11.2. *Suggested: Provide guidance in the spec on how to reliably achieve the probe request/response exchange with the power-saving station.*
- 3.2.3.11.3. *Discussion*
  - 3.2.3.11.3.1. If a station is asleep, you can't discover when it is awake. How does this work
  - 3.2.3.11.3.2. There is no proposal known to address this issue. This is a known issue with power save in QoS.
  - 3.2.3.11.3.3. Is there any need for Power Save in a station using QoS facility to exist?
- 3.2.3.11.4. *Proposed Resolution: QoS ESTA to Power Saving ESTA traffic is not supported.*
- 3.2.3.11.5. *Vote*
  - 3.2.3.11.5.1. Voting Members: accepted 20:0:8
  - 3.2.3.11.5.2. Non Voters: 5:0:11
- 3.2.3.12. *Comment 21 – BSS overlap – defer*
- 3.2.3.13. *Comment 22 – “ – defer*
- 3.2.3.14. *Comment 23 – 7.1.3.5*
  - 3.2.3.14.1. *Knowing the queue size (TC queue size) without knowing the rate that will be used to send DATA doesn't allow the EAP/HC to allocate time, but does allow it to manage its internal storage.*
  - 3.2.3.14.2. *Suggested: Replace TC queue size with an equivalent time-based specification.*
  - 3.2.3.14.3. *Discussion*
    - 3.2.3.14.3.1. The place where this matters, it allows for it. The sending station can indicate using a duration of queue size.
    - 3.2.3.14.3.2. Are there any cases where the size is useful?
    - 3.2.3.14.3.3. It provides a means of modifying the objective of the scheduler.
    - 3.2.3.14.3.4. You need to know how many TXOPs are needed to transfer the queue. That is the best metric – TXOPs needed over the next beacon period.
    - 3.2.3.14.3.5. In favor of time-based QoS reporting.
    - 3.2.3.14.3.6. A Traffic contract is bytes per second, not time. Backlog should be in bytes.
    - 3.2.3.14.3.7. Transmit ops requested is already separate from queue size.
    - 3.2.3.14.3.8. While there is potential variability in data rate, TXOPs are not uniform in size either. A station cannot translate its load into TXOPs.
    - 3.2.3.14.3.9. Why can't the AP or HC infer the rate in use? It is the best information a station has as well.
  - 3.2.3.14.4. *Proposed Resolution: Replace TC Queue size to duration in microseconds.*



**3.2.4. At 12:00, recess until 1:00****3.2.5. Reconvene at 1:00PM****3.2.5.1. Comment 15 – 7.2.3.1**

3.2.5.1.1. *This section (and others) reference a clause 9 section (BSS overlap mitigation) that does not exist. This section will need to contain normative text describing mandatory behavior of ESTAs and EAPs that supports BSS overlap mitigation. Without this text, this feature is incomplete.*

3.2.5.1.2. *Suggested: Either remove all references to overlap mitigation (and mark fields as reserved) or supply the missing clause 9 text.*

**3.2.5.1.3. Discussion**

3.2.5.1.3.1. BSS overlap mitigation is a good idea, but difficult. We need signaling to make it usable.

3.2.5.1.3.2. BSS overlap may become a huge problem in dense populated areas. If we could develop a mechanism, could we graft it into the standard later? That shouldn't be an issue.

3.2.5.1.3.3. The suggested resolution is not to remove the concept, just the partial bits currently in the draft. That would be an advantage for potential new approaches that might be considered later in balloting.

3.2.5.1.4. *Proposed resolution: remove all references to overlap mitigation (and mark fields as reserved).*

**3.2.5.1.5. Discussion**

3.2.5.1.5.1. Suggests that we not remove overlap mitigation, but fill in the requested text.

3.2.5.1.5.2. However, we don't have any proposals.

3.2.5.1.5.3. The frame element formats and fields that are in the draft are from an earlier proposal. As such there is no great likelihood that it helps us by staying there.

3.2.5.1.5.4. If we ignore the subject, we might get more no votes. We would accept a proposal in July.

**3.2.5.1.6. Vote**

3.2.5.1.6.1. Voting members: passes 26:1:10

3.2.5.1.6.2. Non voters 5:0:4

**3.2.5.2. Comment 24 - 7.1.3.3.3.**

3.2.5.2.1. *“Even if the EAP... functions are transferred to an alternate station”. There is inadequate support for doing this in the spec. Would need the APs to signal some kind of AP capability and priority information in a standardized form so that the “most important” potential AP acted in this role.*

3.2.5.2.2. *Suggested: Remove the concept of EAP mobility or specify the necessary standardized mechanism for EAP election and transfer.*

**3.2.5.2.3. Discussion**

- 3.2.5.2.3.1. Need a mechanism to insure the “best” AP is active. Is a difficult problem, so would like to remove entirely.
- 3.2.5.2.3.2. Nothing in this resolution speaks to a static location rather than a fixed MAC address.
- 3.2.5.2.3.3. No change is needed in 7.1.3.3.3. It is not in conflict with a static location. Nor is it part of AP handoff. All it says that if at some point the AP is mobile, it could be supported.
- 3.2.5.2.3.4. This says a station can be implemented to assume the BSSID value cannot change, regardless of EAP mobility.
- 3.2.5.2.3.5. If we addressed EAP mobility in a future standard, would this statement needed? If you want to implement AP mobility, and you satisfy this, you wouldn't have to disassociate legacy stations. This assumption already exists.
- 3.2.5.2.4. *Proposed resolution – remove the concept and all references to EAP mobility from the draft.*
- 3.2.5.2.5. *Vote*
  - 3.2.5.2.5.1. Voters: accepted 17:3:18
  - 3.2.5.2.5.2. Non Voters 5:0:13
- 3.2.5.3. *Comment 25 – 7.2.1.7*
  - 3.2.5.3.1. *The CF-Multipoll TXOPs are not specific to any particular traffic class, but the CF-Poll ones are. This appears to be inconsistent*
  - 3.2.5.3.2. *Discussion*
    - 3.2.5.3.2.1. No TXOP is specific to any traffic category. TXOP disposition is at the discretion of the station
  - 3.2.5.3.3. *Comment withdrawn*
- 3.2.5.4. *Comment 26 – 7.1.3.5.3*
  - 3.2.5.4.1. *It is unclear why the behavior described in the last sentence: “The Non-final field is ignored in received MPDUs or MMPDUs with the More Fragments frame control field set to 1” should exist. This confuses fragmentation and medium access.*
  - 3.2.5.4.2. *Discussion*
    - 3.2.5.4.2.1. Suggest alternate resolution – the non-final field shall be set the same in all fragments.
    - 3.2.5.4.2.2. You can have a fragmented MSDU across multiple TXOPs.
    - 3.2.5.4.2.3. An interpretation is needed on the precedence of more fragments and non-final.
  - 3.2.5.4.3. *Proposed resolution – in the case where the non final field is 0 and the more fragments field is 1, it indicates this is the last fragment of a fragmented MSDU with the following fragments to be sent in a subsequent TXOP.*
  - 3.2.5.4.4. *Vote*
    - 3.2.5.4.4.1. Voting Members: accepted 37:0:7
    - 3.2.5.4.4.2. Non Voters: 16:0:2

- 3.2.5.5. *Comment 27 - 7.1.3.1.8*
  - 3.2.5.5.1. *The two red paras appear to contradict themselves. It is unclear on reading them both if the "more data" field is set in a QoS data type if there are frames of other traffic classes buffered.*
  - 3.2.5.5.2. *Suggested: Clarify which is the correct interpretation.*
  - 3.2.5.5.3. *Discussion*
    - 3.2.5.5.3.1. *The More Data field ought to indicate any queued traffic.*
    - 3.2.5.5.3.2. *Make the MoreData field independent of traffic class.*
  - 3.2.5.5.4. *Proposed resolution – delete entirely the second red paragraph. Make it explicit that the MoreData field is independent of traffic class.*
  - 3.2.5.5.5. *Vote*
    - 3.2.5.5.5.1. *Voting Members: accepted 26:0:9*
    - 3.2.5.5.5.2. *Non Voters: 6:0:10*
- 3.2.5.6. *Comment 28 – 7.1.3.5.4*
  - 3.2.5.6.1. *It is not clear why the following behavior exists: "The TXOP limit field is also ignored in received MPDUs or MMPDUs with the More Fragments frame control field set to 1."*
  - 3.2.5.6.2. *Discussion*
    - 3.2.5.6.2.1. *It should say "with the non-final field set to 1".*
  - 3.2.5.6.3. *Proposed Resolution – Change the "more fragments field being 1" to "the non-final field being 1"*
  - 3.2.5.6.4. *An extension of comment 26*
  - 3.2.5.6.5. *Vote*
    - 3.2.5.6.5.1. *Voters 22:0:9*
    - 3.2.5.6.5.2. *non voters 7:0:6.*
- 3.2.5.7. *Comment 61 –*
  - 3.2.5.7.1. *already addressed by removal of BSS overlap comment 15*
- 3.2.5.8. *Comment 62 - 7.3.2.19*
  - 3.2.5.8.1. *already addressed by removal of BSS overlap comment 15*
- 3.2.5.9. *Comment 63 -*
  - 3.2.5.9.1. *Need for CC frames has been eliminated due to ability to transmit RR anytime during CFP . CC is unnecessary and is too complicated just for sending reservation requests.*
  - 3.2.5.9.2. *Defer discussion to general comment section*
- 3.2.5.10. *Comment 64, 65*
  - 3.2.5.10.1. *already addressed by removal of BSS overlap comment 15*
- 3.2.5.11. *Comment 66 - 7.1.3.1.3*

- 3.2.5.11.1. *My current understand is that frames may also be directed from STA to STA and from ESTA to ESTA. How is this included in these definitions.*
- 3.2.5.11.2. *Discussion*
  - 3.2.5.11.2.1. The assertion is wrong – there is nothing that speaks to ESTA to ESTA communication. An editorial update to match the previous resolution
- 3.2.5.11.3. *Proposed resolution: Resolved by resolution of comment 11. STA to STA is in a QBSS not allowed, ESTA to ESTA has been changed to class 3.*
- 3.2.5.11.4. *Vote*
  - 3.2.5.11.4.1. Voting Members: accepted 24:0:7
  - 3.2.5.11.4.2. Non Voters: 7:0:6
- 3.2.5.12. *Comment 67*
  - 3.2.5.12.1. *No text*
  - 3.2.5.12.2. *Accepted without objection*
- 3.2.5.13. *Comment 68*
  - 3.2.5.13.1. *Same as comment 66*
- 3.2.5.14. *Comment 69 – 7.1.3.5*
  - 3.2.5.14.1. *Shouldn't the TXOP limit subfield also be used when the frame subtype include QoS CF Poll and CF Multipoll?*
  - 3.2.5.14.2. *Resolution – believe to be no longer applicable.*
- 3.2.5.15. *Comment 70, 71*
  - 3.2.5.15.1. *No Text*
  - 3.2.5.15.2. *Accepted without objection*
- 3.2.5.16. *Comment 72 - 7.1.3.5.2*
  - 3.2.5.16.1. *If No Ack is indicated, and a transmission cannot be made after a SIFS period, does that not create a gap in the Contention Free Burst than can be exploited? For MSDUs with ack policy delayed ack on ack field should be set to 1 (mandatory)*
  - 3.2.5.16.2. *Suggested: Change note to say that for MSDUs expecting delayed ack it is illegal to set no ack bit to 0. (change may be to should be for the dly ack clause).*
  - 3.2.5.16.3. *Discussion*
    - 3.2.5.16.3.1. The proposed change has not effect – not normative. If you get a data frame, you ack it. If a sending station wants to save the time of an ack, it can set the noack bit. Delayed ack is a separate issue.
    - 3.2.5.16.3.2. What is the signaling to set up a delayed ack?
    - 3.2.5.16.3.3. Recommend we reject this – it is unclear, and would have no normative impact. This issue should be dealt with in the acknowledgement policy.
  - 3.2.5.16.4. *Proposed resolution – Reject Comment*
  - 3.2.5.16.5. *Vote*

- 3.2.5.16.5.1. Voting Members: comment rejected 29:0:7
- 3.2.5.16.5.2. Non Voters: 2:2:12
- 3.2.5.17. *Comment 73*
  - 3.2.5.17.1. *Resolved by the decision on MTU size in clause 6.*
  - 3.2.5.17.2. *No Objection*
- 3.2.5.18. *Comment 74*
  - 3.2.5.18.1. *Accepted, no objection*
- 3.2.5.19. *Comment 75 – 7.1.3.1.7*
  - 3.2.5.19.1. *There is some notion of advanced power savings as evidenced by the existence of the Listen Epoch mechanism. How is this reflected in the power management field by using one bit?*
  - 3.2.5.19.2. *Discussion*
    - 3.2.5.19.2.1. *The bit in question is the non-QoS power management bit, which is from the existing standard. This bit retains it's existing function only.*
  - 3.2.5.19.3. *Proposed resolution – The listen epoch has nothing to do with power management frame control bit. Therefore no change to text is required.*
  - 3.2.5.19.4. *Vote*
    - 3.2.5.19.4.1. *Voting members: accepted 23:0:7*
    - 3.2.5.19.4.2. *Non Voters: 5:0:7*
- 3.2.5.20. *Comment 76*
  - 3.2.5.20.1. *Accepted, no objection*
- 3.2.5.21. *Comment 77 -*
  - 3.2.5.21.1. *What is the definition for the more data bit when used with QoS CF Multipoll and QoS CF Poll frames? Does more data field indicate additional buffered MPDU in same traffic category or just any traffic category (contradiction) ?*

### **3.2.6. At 3:00PM, recess until 3:30PM**

## **3.3. Presentation of Papers**

### **3.3.1. Document 246 “P802.11e Isochronous Supercycles”**

- 3.3.1.1. *Peter Johansson*
- 3.3.1.2. *Discussion*
  - 3.3.1.2.1. *Could retry be supported? Typically, Isoch traffic is not retried, although we could consider it.*
  - 3.3.1.2.2. *If we don't address reliability in the MAC, it has to be done somewhere else? We will look at FEC and other schemes for reliability.*
  - 3.3.1.2.3. *There might be a need to deny access to “slow” devices to the network to guarantee service. Needs assistance on technical details on the best way to do this.*
  - 3.3.1.2.4. *Need to define “isoc capable” stations, and define a “cycle coordinator” for them.*
  - 3.3.1.2.5.

### **3.3.2. Document 247 “P802.11e Network topologies and the Isochronous cycle coordinator”**

3.3.2.1. *Peter Johansson*

3.3.2.2. *Discussion*

3.3.2.2.1. *Support for HC/APs co-located with Cycle Coordinator, or separated as separated devices.*

3.3.2.2.2. *When you have HC election, what do you do to maintain current streams. This is a difficult problem.*

### **3.3.3. Document 271 “Quantification of Capture Effect in Near Far scenarios”**

3.3.3.1. *Aman Singla*

3.3.3.2. *Discussion*

3.3.3.2.1. *The far station loses a greater percent of bandwidth. There is less degradation of TCP traffic compared to UDP.*

3.3.3.2.2. *Why is there less impact in TCP? The hypothesis is that the amount of bandwidth at the transport layer, and hence their ACKs. The AP has to generate the ACKs.*

3.3.3.2.3. *Was there any study of hidden node topologies? Not yet*

3.3.3.2.4. *There is a surprisingly little difference in results. This is clearly not Ethernet capture effect. Has any more analysis been done. No, this is just a single test case. The simulation intends to isolate the near-far case. In practice it is not isolated and other effects are being seen as well.*

## **3.4. AV Study Group**

### **3.4.1. John Kowalski, SG Chair**

### **3.4.2. Document 273 “802.11e Issues for AV Transport”**

3.4.2.1. *1394 applications don't know about topology – they are just logically connected. So what topology management is needed? We need to explore this.*

3.4.2.2. *RFC1042 (SNAP) might be helpful*

3.4.2.3. *We are talking about encapsulating 1394 and carrying over an 802.11 MAC. A repeater or bridge functionality.*

3.4.2.4. *Other devices on the 802.11 network would not “see” the 1394 traffic. 802.11 and 1394 could be separate domains, except for sharing the bandwidth.*

3.4.2.5. *Would there be any filtering of 1394 traffic based on knowing it is going over an 802.11 network? No, the headers would be changed from 1394 specific to 802.11 specific. No traffic that doesn't have to go on the wireless medium that doesn't have to. The “bridging” devices will insure this.*

### **3.4.3. Document 274 “AV Multicast for 802.11e: Benefits/Challenges”**

3.4.3.1. *1 to N is needed for multiple displays. Home applications*

- 3.4.3.2. *Group Address definition is needed*
  - 3.4.3.2.1. *Have you considered multicast domains as conceptualized in 802.1? It involves bridges, and a mechanism that have been evaluated and would work in 802.11 if we wanted it.*
  - 3.4.3.2.2. *You don't have to do anything in 802.11. Multicasting does impact IAPP, though. It may be above the 802.11 MAC, though.*
- 3.4.3.3. *Requirements – FEC, Delayed ACK, retransmission.*
- 3.4.3.4. *Looking for a form of acknowledged multicast. Perhaps part of protocol adaptation layer. We might need an interface that would be non-conformant to 802.2. That probably isn't an issue.*
- 3.4.3.5. *802.14 had multiple SAPs. We could define an alternative SAP that supports additional primitives that are needed, without being non-conformant to 802.2.*
  - 3.4.3.5.1. *In that case you have to track what SAPs are in use, so the corresponding SAP is used at the other end.*
  - 3.4.3.5.2. *We could put LLC SNAP headers on AV traffic. MUX/DEMUX could be above the MAC.*
  - 3.4.3.5.3.

**3.4.4. At 5:30PM Recess until Wednesday at 3:30PM**

## **4. Wednesday - TGe Ad Hoc Session**

### **4.1. Opening**

**4.1.1. The session was called to order at 4:15PM**

**4.1.2. Discussion of procedure**

- 4.1.2.1. *We will present all these resolutions for a vote in the July meeting. If there is objection, we will subdivide the resolutions.*

### **4.2. Comment Resolution**

**4.2.1. Comments on Clause 7 – document 264r0**

4.2.1.1. *Comment 77 -*

- 4.2.1.1.1. *What is the definition for the more data bit when used with QoS CF Multipoll and QoS CF Poll frames? Does more data field indicate additional buffered MPDU in same traffic category or just any traffic category (contradiction) ?*

4.2.1.1.2. *Comment withdrawn*

4.2.1.2. *Comment 78*

- 4.2.1.2.1. *Where are the rules defined that determine how Probe Request/Response is used? How are these used in an environment that includes STA – STA communications?*
- 4.2.1.2.2. *Proposed resolution: the rules are in clause 11.*

- 4.2.1.2.3. *Comment accepted : deferred until there is text for clause 11*
- 4.2.1.3. *Comment 79, 80*
- 4.2.1.3.1. *Accepted: No text.*
- 4.2.1.4. *Comment 108*
- 4.2.1.4.1. *P 45, L 15 As written, class-specific limits on the time spent by MSDUs in the MAC layer are set only at the MIB, independently of all other class-differentiating parameters, which can be updated by the AP. The change is necessary in order to enable the AP to provide a consistent specification of all the class-differentiating parameters.*
- 4.2.1.4.2. *Suggested: Insert text The aMSDULifetime[TC] field is 2 octets in length and indicates the maximum number of time units (TUs) allowed to transmit an MSDU of traffic category TC. The timer is started when the MSDU enters the MAC. Modify Figure 42.6 accordingly*
- 4.2.1.4.3. *Discussion*
- 4.2.1.4.3.1. *MSDULifetime is being used for 2 purposes – not keeping buffer date too long, and it is in the traffic spec. It is a Per-TC value.*
- 4.2.1.4.3.2. *Is there confusion between TX MSDU and the time before it reaches the head of the buffer.*
- 4.2.1.4.3.3. *There is a per-traffic spec time, and a per station time (MSDULifetime).*
- 4.2.1.4.3.4. *Putting a strong timer on a sub-component of the total time is not worth the added complexity. Suggests not making this change.*
- 4.2.1.4.3.5. *Inserting this text would not address the problem at hand – This comment is unnecessary. This is not a field per TC. A single global limit for all TCs is not useful: the traffic differs. Adding a field that is 2 octets long is not enough to be per-TC.*
- 4.2.1.4.3.6. *If you are using only prioritized differentiation there is no need for this. In parameterized the TC limit in the traffic spec. The two needed cases are already covered.*
- 4.2.1.4.3.7. *There is value to specify packet lifetime, but they are more properties of a TSpec.*
- 4.2.1.4.3.8. *The commenter intends to add 16 octets to provide a value per traffic class.*
- 4.2.1.4.3.9. *The right place to put this is in a management action request., where the AP could give the data to the station. The values change infrequently. It would require a MLME SAP primitive to get it to be sent.*
- 4.2.1.4.3.10. *The AP doesn't know what the optimum value is for lifetime.*
- 4.2.1.4.3.11. *This should not be in the beacon because it would reduce efficiency.*



- 4.2.1.4.3.12. This is useful because it keeps useless packets (too old) from contending for the medium.
- 4.2.1.4.4. *Proposed Resolution: Insert text The aMSDULifetime[TC] field is 16 octets in length, treated as a 2 octet value for each TC, and indicates the maximum number of time units (TUs) allowed to transmit an MSDU of traffic category TC. The timer is started when the MSDU enters the MAC. Modify Figure 42.6 accordingly*
- 4.2.1.4.5. *Vote on proposed resolution:*
- 4.2.1.4.5.1. Voting Members: resolution fails 6:20:7
- 4.2.1.4.5.2. Non voters: 1:4:7
- 4.2.1.5. *Comment 109 –*
- 4.2.1.5.1. *Overlap management – withdrawn*
- 4.2.1.6. *Comment 110*
- 4.2.1.6.1. *Use otherwise unused flag combination to allow stations that cannot be polled, but which support EDCF.*
- 4.2.1.6.2. *7.3.1.4 Capability Information Field Change row 6, column 4 to "ESTA requesting association in QBSS, requesting not to be polled", and row 7 column 4 to "ESTA requesting association in a QBSS, requesting to be polled" in table 16*
- 4.2.1.6.3. *Discussion*
- 4.2.1.6.3.1. An extremely bad idea – it creates a return to the level scheme we were trying to simplify. There would be two different conformance models.
- 4.2.1.6.3.2. This breaks the valuable concept of having all stations being equivalent.
- 4.2.1.6.3.3. This comment contradicts a previous resolution, regarding FEC capability.
- 4.2.1.6.3.4. There is a similar distinction of CFpollable in the current MAC.
- 4.2.1.6.3.5. This regards a key compromise that enabled the current solution. The original objection was complexity. We intentionally modified the state machine sequence to simplify. Without this, a DCF station cannot respond under PCF control.
- 4.2.1.6.4. *Vote deferred until next session of comment resolution at 10:30*

#### 4.2.2. Recess

## 5. Thursday Morning – AV Study Group

### 5.1. Opening

#### 5.1.1. Call to Order at 8:00AM

#### 5.1.2. Discussion of process

- 5.1.2.1. *Other votes going on – discussion of the possibility of recessing.*

5.1.2.2. *At 9:30 it is mandatory to recess. Does anyone want to recess now? If we recess now, will the Study Group papers be presented later? Yes, this afternoon*

5.1.2.3. *The chair asks for anyone who wants to recess now. None..*

### **5.1.3. Review of Agenda**

5.1.3.1. *This first session is AV Study Group. Plans to present two papers, followed by discussion.*

## **5.2. Presentation of Papers**

### **5.2.1. Document 278 “Protocol Stack options for AV over 802.11e”**

5.2.1.1. *Toro Ueda*

5.2.1.1.1. *Calls for recommended practice development for protocol stack services for AV transmission*

5.2.1.2. *Discussion*

5.2.1.2.1. *None*

### **5.2.2. (No Doc Number) AV Timing**

5.2.2.1. *Georg Dickmann*

5.2.2.2. *Discussion*

5.2.2.2.1. *Need clarification on exactly what timing resolution is adequate. Statement that 1uS is not adequate needs support and verification.*

5.2.2.2.2. *It is not necessarily the case that the 1394 AV timing requirement apply directly to the wireless channel. There are alternatives that can be explored.*

5.2.2.2.3. *It would be nice to maintain the features of 1394 over the wireless medium.*

## **5.3. Brainstorming discussion**

### **5.3.1. Building blocks**

5.3.1.1. *Settle on clock distribution and synchronization that is adequate for AV data streams – MPEG2 transport. Handling that would probably meet the needs of other stream types also.*

5.3.1.2. *Creation of a class of traffic – express data. Characterized by stations wishing to reserve periodic transmit opportunities based on time. Acknowledged or non-acknowledged. Issue – how do you keep all traffic from wanting to be sent in this class. In 1394, Isoch traffic is not always appropriate since it is always unconfirmed.*

5.3.1.3. *The necessity to elect a single coordinator for association to the service set.*

### **5.3.2. What is needed to be added to 802.11 to support these requirements?**

5.3.2.1. *New signaling schemes for reservation and release of bandwidth.*

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**5.4. Recess SG until 4:30PM****6. Thursday Morning – TGe ad hoc****6.1. Opening****6.1.1. Called to order at 10:30AM****6.1.2. Announcements from the chair**

6.1.2.1. *TGg voting proceedings have pulled away a number of key people needed for comment resolution*

6.1.2.2. *There is no objection to recessing until TGg completes the voting or adjourns*

**6.2. Recess for TGg voting process****7. Thursday Morning – TGe ad hoc****7.1. Opening****7.2. Comment Resolution****7.2.1. Clause 7****7.2.1.1. Comment 110**

7.2.1.1.1. *Use otherwise unused flag combination to allow stations that cannot be polled, but which support EDCF.*

7.2.1.1.2. *Suggested: 7.3.1.4 Capability Information Field Change row 6, column 4 to "ESTA requesting association in QBSS, requesting not to be polled", and row 7 column 4 to "ESTA requesting association in a QBSS, requesting to be polled" in table 16*

**7.2.1.1.3. Discussion**

7.2.1.1.3.1. Context – commenter wants to make pollability at a station optional, because he feels EDCF stations will be shipping before HCF APs are available to test them.

7.2.1.1.3.2. This was the subject of a previous decision. We decided that all stations would be pollable.

7.2.1.1.3.3. The problem is that this is a short term issue, but the solution is permanent. We had a similar situation last fall with multiple levels. This comment would degrade interoperability, and render many comments un-processable. The best approach is to reject this comment and quickly move to implementation. This has issues with what the PICs would say about this.

7.2.1.1.3.4. This entire group worked on a compromise to get rid of the multilevel strategy, and decided on HCF as the solution.

- 7.2.1.1.3.5. Suggestion that this is analogous to the existing standard's CF-pollable option. In favor of the comment.
- 7.2.1.1.3.6. This has the potential to interfere with HCF's ability to schedule TXOPs. There are better uses for the capability information field.
- 7.2.1.1.3.7. The commenter feels that this doesn't interfere with the ability of the HC to schedule TXOPs. Also, we do have an extended capability field, so that is not an issue.
- 7.2.1.1.3.8. This comment undoes the compromise that causes all stations being equal. This will introduce confusion in the marketplace. Changing the standard because of near term implementation issues is wrong.
- 7.2.1.1.3.9. Feels that there will be no delay in availability of HCF equipment. Also it is not that difficult to test cf-pollability.
- 7.2.1.1.3.10. Is the HC allowed to poll any station? No, not legacy stations. However, there is no way for a QoS-capable station to say it cannot be polled.
- 7.2.1.1.3.11. Would it be reasonable for an HC to only poll a QoS station after it has sent at least one RR frame? That is an unnecessary restriction, since RR might not be necessary.
- 7.2.1.1.3.12. Against the comment – increased options are not a good thing.
- 7.2.1.1.3.13. Currently, CF-pollable stations are able to say they don't want to be polled, but they have to implement the ability. This comment allows stations to be built without the capability. That is different, and undesirable due to lack of interoperability.
- 7.2.1.1.3.14. We have envisioned that an EDCF station would be able to specify how frequently they should be polled.
- 7.2.1.1.3.15. The simplest way is to have a way to say "I have no data" when polled.
- 7.2.1.1.3.16. However, that reduces efficiency.
- 7.2.1.1.3.17. There are two basic views of QoS. The commenter is systematically trying to remove one of these approaches that have been put in through much compromise.
- 7.2.1.1.3.18. Commenter objects to the suggestion that the comments are inappropriate.
- 7.2.1.1.3.19. In the current draft, nothing states an ESTA has to respond to a poll with anything but a null. You cannot ignore it, but a null is OK.
- 7.2.1.1.4. *Proposed Resolution: add a clarification that an ESTA that receives a CFpoll shall respond with the remainder of a valid QoS frame exchange. IE Indicating not wanting to be polling does not mean not implementing the poll response.*

**7.2.1.1.5. Discussion**

- 7.2.1.1.5.1. The commenter feels this is an acceptable resolution
  - 7.2.1.1.5.2. You cannot ignore a poll. The HC or PC needs to be able to distinguish between a poll that was not received and a poll with no data response.
  - 7.2.1.1.5.3. So, a station can respond to a poll with a null, and then send the data with the EDCF mechanisms? Yes.
  - 7.2.1.1.5.4. In the current standard a non-cf-pollable station will respond with an ACK. A cfpollable station will respond with a null.
  - 7.2.1.1.5.5. Suggests that we leave the draft as is – this proposed resolution doesn't add anything.
  - 7.2.1.1.5.6. This is making it clear that we are not adopting something that returns to levels, but the code gives the HC a clue that the ESTA is a poor implementation.
  - 7.2.1.1.5.7. Are we allowing a non-null frame in response ? Yes.
  - 7.2.1.1.5.8. This proposal only allows a legal response to function as a hint to the HC.
  - 7.2.1.1.5.9. You cannot force a station to respond with data. A null is always in order.
  - 7.2.1.1.5.10. We shouldn't allow bad implementations. Against the resolution and the comment.
  - 7.2.1.1.5.11. The intention of the current draft is to insure an HC can properly service all stations. This comment would impede that ability.
  - 7.2.1.1.5.12. Commenter disagrees – you cannot reserve a large amount of time for the HCF. The HC cannot lock out the DCF.
- 7.2.1.1.6. *Vote on accepting the proposed resolution*
- 7.2.1.1.6.1. Voting Members: resolution rejected 13:22:3
  - 7.2.1.1.6.2. Non-voters: 2:5:5

**7.2.2. Recess until 1:00PM****8. Thursday Afternoon****8.1. Opening****8.1.1. Call to order at 1:00PM****8.1.2. Discussion**

- 8.1.2.1. *Debate limiting might help us make progress*
- 8.1.2.2. *Do we postpone problematic*
- 8.1.2.3. *The advantages of the resolutions to date is that they re non-contentious. We could approve them in large blocks to save time later. If we take all the contentious issues together, it might fail. Speaks to defer contentious issues.*

- 8.1.2.4. *There is a possibility of having an interim in one month. We will discussion in New Business.*
- 8.1.2.5. *We will process “easy” comments for now.*

## **8.2. Comment Resolution**

### **8.2.1. Clause 7**

#### **8.2.1.1. Comment 108**

8.2.1.1.1. *P 45, L 15As written, class-specific limits on the time spent by MSDUs in the MAC layer are set only at the MIB, independently of all other class-differentiating parameters, which can be updated by the AP. The change is necessary in order to enable the AP to provide a consistent specification of all the class-differentiating parameters.*

8.2.1.1.2. *Currently unresolved, No Vote comment, resolution rejected yesterday.*

8.2.1.1.3. *In the discussion yesterday, there was a larger issue. A new proposed resolution addresses this:*

8.2.1.1.4. *Proposed Resolution: Create a new element QoS Additional Parameters Element, allowable in the associate and reassociate response, and mgmt response. Move the AIFS[TC] values field. Clarify the MSDUlifetime. (current MIB attribute is the length of time from starting to attempt xmit to cease transmitting – IE only head-of-queue blocking, not total time in MAC). The QoSMSDUlifetime indicates the maximum lifetime after a MSDU is provided to the MAC. The other fields are moved out of the beacon since they are relatively static.*

#### **8.2.1.1.5. Discussion**

8.2.1.1.5.1. *Against the resolution because it was hastily introduced.*

8.2.1.1.5.2. *This is a good resolution that solves other problems. Some aspects should be incorporated. However, the AP cannot set these values directly. QoSMSDUlifetime should not be centrally managed.*

8.2.1.1.5.3. *We are not introducing a new lifetime limit. We are trying to make it more useful.*

8.2.1.1.5.4. *Should we defer until there has been more study?*

8.2.1.1.5.5. *Proposal to change: There is no need to send the information in every beacon. Since it is a element, it can be sent “as needed” at the discretion of the AP.*

8.2.1.1.5.6. *This modification is acceptable to the proposer.*

8.2.1.1.6. *Vote on whether we defer this discussion to a later time. 7: 7:24*

8.2.1.1.7. *The chair decides the vote – we will defer the discussion.*

- 8.2.1.1.8. *This will be added to the comments yet to be processed.*
- 8.2.1.2. *Comment 111*
  - 8.2.1.2.1. *Mention of HC handover process, not otherwise specified, should be deleted*
  - 8.2.1.2.2. *Discussion*
    - 8.2.1.2.2.1. *There is currently no HC handover process defined anywhere. We propose deleting the reason code, changing it to reserve*
  - 8.2.1.2.3. *Comment accepted with no objections by voters*
  - 8.2.1.2.4. *Comment accepted with no objections by non-voters.*
- 8.2.1.3. *Comment 112*
  - 8.2.1.3.1. *If a requesting station doesn't support QoS, it probably won't understand the new reason code either...*
  - 8.2.1.3.2. *Discussion*
    - 8.2.1.3.2.1. *When this standard is approved, legacy stations will not understand this code, however there might someday be a station type that doesn't support 802.11e, but are based on later versions of 802.11*
    - 8.2.1.3.2.2. *However, there is already an unspecified reason code.*
    - 8.2.1.3.2.3. *A station could also have QoS turned off, but still understand the message.*
  - 8.2.1.3.3. *Comment withdrawn*
- 8.2.1.4. *Comment 117*
  - 8.2.1.4.1. *Comment – clarification needed on clause 7.*
  - 8.2.1.4.2. *Reclassified as editorial*
- 8.2.1.5. *Comment 118*
  - 8.2.1.5.1. *Comment – clarification needed on clause 7.*
  - 8.2.1.5.2. *Suggested: Modify the text for item a of this clause as follows: a) A MAC header, which comprises frame control, duration, address, and sequence control information and Traffic Category Identifier*
  - 8.2.1.5.3. *Discussion*
    - 8.2.1.5.3.1. *Request to reclassify as editorial*
    - 8.2.1.5.3.2. *Editor agrees. – it is not normative.*
  - 8.2.1.5.4. *Reclassified as editorial*
- 8.2.1.6. *Comment 113*
  - 8.2.1.6.1. *Defer due to complexity*
- 8.2.1.7. *Comment 114*
  - 8.2.1.7.1. *Defer due to complexity, and other comments will deal with this*
- 8.2.1.8. *Comment 115*
  - 8.2.1.8.1. *Already Resolved in comment 9 resolution*
- 8.2.1.9. *(Temporary Recess for TGi Vote)*

- 8.2.1.10. *Note from the chair – we will not spend time looking up references for comments that are already resolved. This will be provided in the final comment resolution document on Friday.*
- 8.2.1.10.1. *No Objections*
- 8.2.1.11. *Note from the chair – we will no longer tally separate votes from non-voters in the interest of time.*
- 8.2.1.11.1. *No Objection*
- 8.2.1.11.2. *If anyone request such a vote, we will do it.*
- 8.2.1.12. *Comment 119*
- 8.2.1.12.1. *Comment: The existing text and figure is inconsistent with the frame descriptions in 7.2 – particularly CF-Multipoll, DlyAck, CC, and RR. The figure shows the TCID field as being 2 bytes, and makes no reference to the other fields that can exist, or the varying order involved. It is suggested that the title TCID should be changed to QoS Control, and it's size made variable. The existing section on QoS control sub-fields (7.1.3.5) could be extended to incorporate material from 7.2 on specific frame formats. The material in 7.2.1.7-7.2.1.10 will probably require adjustment. The QoS control field may want to be declared as separate from the MAC header. Other possibilities exist, and further consideration may be required.*
- 8.2.1.12.2. *Discussion*
- 8.2.1.12.2.1. *Making the QoS control field is not the optimum solution.*
- 8.2.1.12.3. *Proposed resolution: Modifying the other fields to create consistency*
- 8.2.1.12.4. *Accepted with no objections*
- 8.2.1.13. *Comment 120*
- 8.2.1.13.1. *Comment request for clarification in 7.1.3.1*
- 8.2.1.13.2. *Discussion*
- 8.2.1.13.2.1. *What fields can and can't move. Wants to spell out explicitly what will always be there.*
- 8.2.1.13.3. *Suggested Resolution: At the end of the existing paragraph add: "The Frame Control field shall always be taken as the 1st and 2nd octets of any received frame."*
- 8.2.1.13.4. *Resolution accepted without objection*
- 8.2.1.14. *Comment 121*
- 8.2.1.14.1. *Comment: Table 2 would indicate that the DS exists in all STA and ESTA since to / from DS is set for ESTA to ESTA communications in the presence of an AP. This is contrary to the current definition of the DS.*
- 8.2.1.14.2. *Discussion*
- 8.2.1.14.2.1. *This is a name for a bit – we are defining encoding, not*



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**8.2.2. Recess for votes in 802.11i****9. Thursday Afternoon – AV Study Group****9.1. Opening****9.1.1. Called to order at 3:30PM****9.1.2. Review of progress, papers presented****9.2. Discussion, continued****9.2.1. What is needed to be added to 802.11 to support these requirements?**

9.2.1.1. *How does HC election interact with AV topology? What are the ramifications?*

9.2.1.2. *What are the protocol stack options, and the best way to realize them?*

9.2.1.3. *Is a multicast acknowledged class possible? Can it be relayed if some participants are not in range?*

9.2.1.4. *How are ESTA to ESTA multicasts handled? (Sidestream)*

9.2.1.5. *H323 Gatekeeper / traffic cop controls available bandwidth.*

9.2.1.6. *An abstract service interface can be used to provide inter-layer communication. .*

9.2.1.7. *Need to define the bandwidth scheduling entity – MAC or L3?*

9.2.1.8. *Existing internet streams have very slow start-up. Do we need to provide fast set up service? The lengthy part is outside of the MAC anyway.*

9.2.1.9. *How well can we allocate TXOPs – How many streams can be supported? Depends on PHY capacity. We already have a QBSS load element.*

9.2.1.10. *How do we account for overhead for re-transmission? Is it relatively small? < 10% approx, but it varies considerably.*

9.2.1.11. *A very basic set of primitives are needed in the coordinator. The burden of complexity should be on applications that have special requirements.*

9.2.1.12. *Joining and leaving multicast group – what protocol is used? There is something in 802.1d – GMRP.*

9.2.1.12.1. *The multicast facilities of the MAC are much lower than this....*

9.2.1.12.2. *We're trying to layer 1394 CSR architecture on top of 802.11. The destination address field will be analogous to "channel". Not a broadcast or group address for the MAC, but something set outside.*

9.2.1.13. *Does GMRP really deal with the question?*

9.2.1.14. *A local multicast administrator may have a block of addresses from GMRP. We have to avoid conflicts of addresses. A local address manager might already be using GMRP for some other purpose.*

### **9.2.2. Need feedback from 802.11 experts on electing a single coordinator.**

9.2.2.1. *There are two systems that do this – HiperLAN home extensions, and HomeRF. Signaling is explicitly for the candidate controllers, and to decide their relative merit.*

9.2.2.2. *Relative merit is harder to define.*

9.2.2.3. *The same problem has been found in 1394. Most capable nodes need to take on more roles. Hierarchical capabilities are written into the standard.*

9.2.2.4. *802 must restrict to the MAC layer. We will build the hierarchy inside the MAC.*

9.2.2.5. *We need to perform this HC assignment while maintaining streams. This is like a dynamic handoff – a difficult task.*

9.2.2.6. *One other aspect of HC handover – what is the preferred operating practice to take place while the handover is in process? We don't want to stop everything while it is happening.*

9.2.2.7. *What happens to 1394 when the cycle master disappears? Hopefully a robust recovery. There are methods outside the MAC that work in seconds, but not milliseconds.*

### **9.2.3. Conclusion**

9.2.3.1. *Need to figure out what 802.11e needs to do to address these issues.*

9.2.3.2. *How many are members of IEEE 1394 TA? About 14 people.*

9.2.3.3. *Need to send a notice to the 802.11 reflector.*

## **9.3. Recess Study Group**

# **10. Thursday Afternoon – Task Group E**

## **10.1. Presentation**

**10.1.1. Errata Changes in 8802-11-1999 Standard.**

**10.1.2. John Rosdahl**

10.1.2.1. *Process of getting changes done for interpretation*

10.1.2.2. *Implementers come to committee members for interpretation, but that is incorrect. There is an official process for interpretation. If the standard is wrong, the interpretation group must start a corrigendum to correct the error.*

- 10.1.2.3. *Because this group is already working in the areas of the errors, we may already be correcting some of the errors. There are other errors that are not within the scope of the 802.11e PAR.*
- 10.1.2.4. *Members are free to make comments on things that need to go into the next letter ballot, as long as they are in the scope of the PAR.*
- 10.1.2.5. *Those matters outside the scope of the 802.11e PAR will have to be dealt with by starting a new study group.*
- 10.1.2.6. *If the WG is willing to approve a new PAR, and forward it directly to SEC? It would be better to start with a study group with a PAR.*
- 10.1.2.7. *We are not required to form a study group before approving a PAR.*
- 10.1.2.8. *How many would be willing to supply text for correcting these other problems in the existing spec? An errata fixes only known errors and discrepancies?*
- 10.1.2.9. *The SDL in the existing standard was never intended to be compilable. Who could help make it so?*
- 10.1.2.10. *Would starting with a commercial version help? No, it is not fully correct.*
- 10.1.2.11. *The 1999 standard says the SDL takes precedence. There are a much smaller number of real errors that require our attention.*
- 10.1.2.12. *The SDL checks for editorial consistency. That level of analysis is appropriate for an errata.*
- 10.1.2.13. *The existing SDL was not added until the Sponsor Ballot phase of the current standard.*
- 10.1.2.14. *Is there any rule that says state machines have to be SDL? Could we switch to something else for TGe?*
- 10.1.2.15. *Discussion to be continued later...*

## **10.2. Old Business**

### **10.2.1. Agenda Review**

- 10.2.1.1. *We were planning to have ad hoc comment resolution review. Since we didn't have small breakout groups, we don't need to review.*
- 10.2.1.2. *We would like to use the remaining time for comment resolution.*
- 10.2.1.3.

## **10.3. New Business**

### **10.3.1. Additional Interim**

- 10.3.1.1. *To continue comment resolution, at least 30 days from now.*
- 10.3.1.2. *Discussion*

- 10.3.1.2.1. *Is there an interest?*
- 10.3.1.2.2. *Is this the only way? How about an ongoing teleconference every week?*
- 10.3.1.2.3. *Would this be an interim of TGe or 802.11? Just a TGe Ad Hoc., non binding conclusions.*
- 10.3.1.2.4. *Would more off-line work be more helpful in the meantime? Could some of these issues be done by email on the reflector?*
- 10.3.1.2.5. *In favor of a meeting – to best use our time, identify and only process non-controversial topics.*
- 10.3.1.2.6. *Face to face meetings are better to gather consensus. Those from other time zones would be at a disadvantage for teleconferences.*
- 10.3.1.2.7. *The editor would be crucial to the process – what is his schedule like?*
- 10.3.1.2.8. *It might be helpful to have teleconferences for specific subjects rather than chapters and subchapters.*
- 10.3.1.2.9. *If we have a meeting we can't resolve comments unless the commenter is there.*
- 10.3.1.2.10. *We could pre-announce commenters for the scheduled topics.*
- 10.3.1.2.11. *There is one alternative – there are numerous comments on missing sections. It might be worth looking for volunteers to provide the missing sections. Signaling is high on the list.*
- 10.3.1.2.12. *There have been documents submitted as ballot comments, but they haven't been presented. Then they should be associated with comments so the editor can evaluate them.*
- 10.3.1.3. *Straw Poll*
  - 10.3.1.3.1. *11 people would participate in a meeting*
  - 10.3.1.3.2. *12 people would not participate no matter what.*
  - 10.3.1.3.3. *Who would participate in teleconferences? 19 favor, 3 object*
  - 10.3.1.3.4. *How many favor having the editor assign groups of people to develop text for specific areas offline on the reflector. 16 favor, 1 against.*
- 10.3.1.4. *Motion – for the chair to initiate a series of teleconferences for comment resolution.*
  - 10.3.1.4.1. *Moved Matt*
  - 10.3.1.4.2. *Second Khaled*
  - 10.3.1.4.3. *Discussion*
    - 10.3.1.4.3.1. *The meetings should avoid the upcoming WECA meetings.*
    - 10.3.1.4.3.2. *Will the agenda and comments to be resolved be published in advance? Yes.*
    - 10.3.1.4.3.3. *We will set up areas for comment resolution on the web site.*
  - 10.3.1.4.4. *Vote on the motion: passes 25:3:7*
  - 10.3.1.4.5. *Discussion*

- 10.3.1.4.5.1. Is there any reason to restrict access?  
Because it contains draft ballot text.
- 10.3.1.4.5.2. Proposals are not draft text until we release a draft text.
- 10.3.1.4.5.3. But the comment resolution texts also contain portions of the draft texts.

10.3.1.5. *The editor will solicit individuals to derive candidate text for signaling and management either as ad hoc input for the Portland meeting or as ad hoc input for teleconferences.*

10.3.1.5.1. *Anyone interested in working in this area should contact Michael Fischer.*

### **10.3.2. Errata Changes in 8802-11-1999 Standard (continued)**

- 10.3.2.1. *Review of Sample PAR for errata for corrigenda*
- 10.3.2.2. *Next submission to RevCom for PAR approval would have to be ready by August 3<sup>rd</sup>. We would have to approve PAR in ExCom in July Meeting.*
- 10.3.2.3. *The PAR would have to be approved in 802.11 WG by June 6<sup>th</sup> for ExCom.*
- 10.3.2.4. *Scope of project – (to correct errors)*
- 10.3.2.5. *Looking for volunteers to co-champion this effort in the Portland meeting, and continue progress.*
- 10.3.2.6. *The TGe Chair will leave this as a placeholder in the July agenda. If someone can take this.*

### **10.4. At 5:30PM, Recess until 6:30PM**

## **11. Thursday Evening – TGe**

### **11.1. Opening**

#### **11.1.1. Call to order at 6:30PM**

#### **11.1.2. Agenda Review**

- 11.1.2.1. *Ad Hoc Comment Resolution Results overview*
- 11.1.2.2. *At 8:45, we continue with plans for next meeting.*
- 11.1.2.3. *Any motions for plenary (none so far)*
- 11.1.2.4. *Between now and 8:45, continue with comment resolution (as an ad-hoc)*
- 11.1.2.5. *Is there any objection to recess for Ad Hoc Comment resolution? None*

## 11.1.3. Recess for comment resolution ad-hoc

## 12. Thursday Evening – Ad Hoc

### 12.1. Presentation of Papers

#### 12.1.1. Document 301 “Signaling for Streaming in IEEE 802.11e”

#### 12.1.2. Discussion

- 12.1.2.1. *If a stream doesn't reserve bandwidth at all, how do you identify it as a QoS Stream. If the DSBM knows it is a wireless link, the path setup will reach the end station, why can't the end RSVP agent set up the call? Have the station itself generate the signaling – beginning at the end station.*
- 12.1.2.2. *You don't have to use RSVP exclusively. An API can optionally be QoS aware, but doesn't have to be.*
- 12.1.2.3. *Is there a case where endpoint initiated signaling is not sufficient? If not, ESTA inbound cases are all that are necessary. What about sidestream?*
- 12.1.2.4. *There needs to be rate negotiation because the probe response is sent at a basic rate, but higher supported rates might not work because of range issues.*
- 12.1.2.5. *Usable rates may dynamically change due to interference variables.*
- 12.1.2.6. *Directed probe requests are the current mechanism in the draft that provides this rate testing function.*
- 12.1.2.7. *What is the process for setting up a sidestream vs. an upstream? Some application will know about the other nodes on the network.*
- 12.1.2.8. *If a STA sends a probe to an STA and doesn't get a response, what happens? What is the fallback?*
- 12.1.2.9. *From the station's point of view, it should be connecting to a MAC address – in the DS, local via AP, and local via STA-STA. The connection should be automatic via a discovery process.*

### 12.2. Comment Resolution

#### 12.2.1. General (Signaling)

##### 12.2.1.1. Comment 2

12.2.1.1.1. *Comment: A “Filter Specification” element is needed to provide an AP with the information necessary to identify frames that are associated with a downlink flow.*

##### 12.2.1.1.2. Discussion

12.2.1.1.2.1. *This was addressed in document 120 last year. There are many scenarios where a classifier is needed. There is a lot of opposition to describe this in the MAC because it belongs above the MAC.*

- 12.2.1.2. *Comment 3*
  - 12.2.1.2.1. *Comment: A general management interface is needed to establish persistent opaque "context elements" that are forwarded to the "new AP" each time that a station roams to re-establish the operational context at the new AP. In particular, such context elements are needed to transfer QoS state information (traffic and filter specifications) when a station roams.*
  - 12.2.1.2.2. *Proposed Resolution*
    - 12.2.1.2.2.1. *Rejected – The exchange of context information is within the scope of the TGF PAR. It cannot be solved within the BSS or QBSS and thus is not a TGe problem.*
  - 12.2.1.2.3. *Resolution accepted without objection.*
- 12.2.1.3. *Comment 4*
  - 12.2.1.3.1. *Comment: A mechanism is needed for an AP to advertise QoS capability and availability, in beacon and probe response frames, so that a station can better select a parent AP. (Currently, a station must associate with an AP and send a TSpec to determine if QoS is available for a parameterized flow.)*
  - 12.2.1.3.2. *Proposed Resolution*
    - 12.2.1.3.2.1. *Rejected – too broad, impossible to support, and not identifying a sufficient mechanism*
  - 12.2.1.3.3. *Resolution accepted without objection.*
- 12.2.1.4. *Comment 5*
  - 12.2.1.4.1. *Comment: A signaling mechanism is required to establish the HCF channel access method for parameterized synchronous uplink flows. For example, channel access can be reduce if HCF polling (i.e. rather than contention-based access) is used for a synchronous uplink flow.*
  - 12.2.1.4.2. *Proposed Resolution: Use the uplink signaling described in document 301r0, slides 4 – 6.*
  - 12.2.1.4.3. *Resolution accepted without objection.*
- 12.2.1.5. *Comment 6*
  - 12.2.1.5.1. *Comment: A signaling mechanism is required to establish "active multicast groups". The mechanism would enable an AP to require a station to operate in active mode to participate in a layer 2 multicast group. Multicast frames that are directed to an "active multicast group" can be delivered immediately (i.e. in BSSes with power-save stations).*
  - 12.2.1.5.2. *Discussion*
    - 12.2.1.5.2.1. *Is active multicast group in the scope of this PAR? Yes, the PAR calls out "improvements in efficiency", and this is in that category.*
    - 12.2.1.5.2.2. *Another alternative is GARP.*
  - 12.2.1.5.3. *Defer resolution – we don't have enough information to resolve*
- 12.2.1.6. *Comment 7*

- 12.2.1.6.1. *Comment: A station should be responsible for re-establishing QoS state for both uplink and downlink flows when it roams (i.e. to eliminate the dependency on an IAPP or RSVP). RSVP does not support roaming well because a mechanism is not defined to trigger the “local repair” mechanism (i.e. in a router or switch).*
- 12.2.1.6.2. *Discussion*
- 12.2.1.6.2.1. *We can’t assume RSVP or IAPP are present. We can make the end stations responsible for establishing flow and links as described in document 301*
- 12.2.1.6.3. *Proposed Resolution: Accepted – in addition, the station is responsible for establishing the initial links upstream and downstream. The mechanism in document 301 provides a basis.*
- 12.2.1.6.4. *Discussion*
- 12.2.1.6.4.1. *Has anyone considered RSVP for mobile hosts? What do they want layer 2 to do? There is objection to requiring RSVP as part of the QoS solution. If it is not necessary, it is not a good option.*
- 12.2.1.6.4.2. *The issue is what reserves the bandwidth in the new BSS when you roam? Suggestion that IAPP should do that. What are the alternatives?*
- 12.2.1.6.5. *Proposed Resolution: Accepted – in addition, the station is responsible for establishing the initial links upstream and downstream. The mechanism in document 301 provides a basis. The efficiency is improved if IAPP is used for the purpose of having the new AP communicate with the old AP regarding a context update and release of allocated WLAN bandwidth in the old BSS.*
- 12.2.1.6.6. *Resolution accepted without objection.*
- 12.2.1.7. *Comment 8*
- 12.2.1.7.1. *Comment: Appendix F not present.*
- 12.2.1.7.2. *Defer until July to see if there is any need to add Annex F . No text is currently available, but may be generated.*
- 12.2.1.8. *Comment 9*
- 12.2.1.8.1. *Comment: As a general comment, the enhancements to the 802.11 MAC that are covered by 802.11e do not make significant improvements in the QoS that can be achieved. The requirement that all TGe enhancements be backward compatible with legacy 802.11 systems completely undermines any ability to improve the QoS. Because of this, 802.11e will not meet QoS requirements for audio/video applications for consumer electronics industry.*
- 12.2.1.8.2. *Suggested: Remove requirement to be backward compatible with legacy systems or start a new PAR within IEEE for wireless devices designed to serve the consumer electronic space.*



- 12.2.1.8.3. *Proposed Resolution: Rejected – it is not germane to this task group. We cannot enact the requests. There is a study group addressing AV and consumer issues within the context of the TGe work.*
- 12.2.1.8.4. *Resolution accepted without objection.*
- 12.2.1.9. *Comment 10*
  - 12.2.1.9.1. *Comment: BSS Overlap mitigation needs a lot of work.*
  - 12.2.1.9.2. *Accepted*
- 12.2.1.10. *Comment 11*
  - 12.2.1.10.1. *Clause 19 not present*
  - 12.2.1.10.2. *Proposed Resolution – Clause 19 is no longer relevant, material is being included in clauses 9 and 11, and references have been removed in other comments.*
  - 12.2.1.10.3. *Resolution accepted without objection.*
- 12.2.1.11. *Comment 12*
  - 12.2.1.11.1. *Comment accepted*
- 12.2.1.12. *Comment 13*
  - 12.2.1.12.1. *Comment accepted*
- 12.2.1.13. *Comment 14,15*
  - 12.2.1.13.1. *Comment accepted*
- 12.2.1.14. *Comment 16*
  - 12.2.1.14.1. *Comment accepted*
- 12.2.1.15. *Comment 17*
  - 12.2.1.15.1. *Comment: Levels 1 and 2 were supposed to merge under HCF into a single level. The text does not reflect this. What happened?*
  - 12.2.1.15.2. *This has already been addressed, reclassified as editorial*
- 12.2.1.16. *Comment 18*
  - 12.2.1.16.1. *Comment: Many places where only +CF poll is mentioned must be certain that these references include all forms of polling including multipoll and QoS cf poll*
  - 12.2.1.16.2. *Reclassified as Editorial*
- 12.2.1.17. *Comment 19*
  - 12.2.1.17.1. *Comment: Need to add TX Suppression (ERTS/ECTS) mechanisms. Some rev of IEEE 802.11-01/130 must be adopted into the draft.*
  - 12.2.1.17.2. *Discussion*
    - 12.2.1.17.2.1. *This is a reference to normative text that was rejected at the March Plenary.*
    - 12.2.1.17.2.2. *There is a presentation on this. But due to the small number of people present, any decision would have to be re-addressed. We need to stick to non-controversial issues.*
    - 12.2.1.17.2.3. *The commenter has updated document 130 to a new revision. The negative votes have been addressed. The commenter would like to propose*

- again for vote in July. The document is 01-130r5 and 01-157r1.
- 12.2.1.17.3. *Comment resolution group deferred to cited document. To be addressed in a future comment resolution meeting.*
- 12.2.1.18. *Comment 20*
- 12.2.1.18.1. *Comment accepted*
- 12.2.1.19. *Comment 21*
- 12.2.1.19.1. *Comment: The draft proposes a number of concepts and functions that are well beyond the scope of the PAR to enhance the MAC for QoS. These unnecessary and complex extensions do not provide QoS, but provide a definition of a particular system solution to a perceived market.*
- 12.2.1.19.2. *Suggested: Delete additional functions in STA that provide RHC, BP and other mechanisms that "extend" the BSS.*
- 12.2.1.19.3. *Defer until July*
- 12.2.1.20. *Comment 22*
- 12.2.1.20.1. *Rejected: Identical to comment #9.*
- 12.2.1.21. *Comment 23*
- 12.2.1.21.1. *Comment: The new sections introduce a number of new mechanisms. Some guidance about under what conditions it is better for an ESTA to use contention-free or contention-based TXOPs would be helpful. Ditto question for TXOP reservation using CC or QoS Null.*
- 12.2.1.21.2. *Defer until text available.*
- 12.2.1.22. *Comment 24*
- 12.2.1.22.1. *Comment: The PAR states that the MAC will be enhanced to support QoS. To a reasonable person, this would indicate that a single mechanism would be added to the MAC after all trade-offs had been considered. It does not seem to indicate that many different and incompatible (though interoperable) mechanisms would be added to the MAC. The task group should be producing a standard, not a shopping list.*
- 12.2.1.22.2. *Suggested: Delete all but one of the described QoS mechanisms or combine the existing mechanisms in such a way that the result is a single mechanism without options.*
- 12.2.1.22.3. *Defer*
- 12.2.1.23. *Comment 25*
- 12.2.1.23.1. *Comment: The parameterized QoS is a form of connection with a setup and tear-down phase. The spec should describe how the setup can be refused or re-negotiated by the HC. It should also define a timeout mechanism that allows each end of a parameterized TC to discard it when it has been inactive for a period of time.*
- 12.2.1.23.2. *Proposed Resolution: First part of comment is addressed by generation of a procedure based on from document 301, which will be considered at the July*

- meeting. Second part is addressed by existing timeout attribute in MAC MIB*
- 12.2.1.23.3. *Resolution accepted without objection.*
- 12.2.1.24. *Comment 26*
- 12.2.1.24.1. *Comment: There are no modifications to the state machine to support the changes in the text.*
- 12.2.1.24.2. *Suggested: Update the state machine to reflect the changes to the MAC.*
- 12.2.1.24.3. *Defer the comment on the basis that there are ongoing discussion on resolving the issue with state machines.*
- 12.2.1.25. *Comment 27*
- 12.2.1.26. *Comment: There has been nothing added to the MIB. Certainly, a few of the changes made to the MAC require that the outside world be able to identify their presence and manage their operation?*
- 12.2.1.27. *Comment accepted without objection*
- 12.2.1.28. *Comment 28*
- 12.2.1.29. *Accepted*
- 12.2.1.30. *Comment 29*
- 12.2.1.31. *Comment: Throughout the text terms and expressions often contain text in {} or (). It appears that this practice is used to indicate multiple allowed options or interpretations. Such practice should be called out in the text and employed consistently. Either {} or () should be used. Also, this practice is over-employed. For instance, the terms (E)STA and (E)AP is used. Both an ESTA and an STA are a form of an STA. The use of (E) is superfluous, confusing, and should be dropped. At times it seems AP and STA have two meanings. For example an AP could mean any AP (Enhanced or non-Enhanced). At other times it seems to specifically mean non-enhanced. This may not always be clear from context.*
- 12.2.1.32. *Discussion*
- 12.2.1.32.1.1. *We do need to make a clearer consistent notation for enhanced only, legacy only, and either.*
- 12.2.1.32.2. *Reclassify as editorial*
- 12.2.1.33. *Comment 30*
- 12.2.1.33.1. *Comment: An RHC sounds nearly identical to an EAP with HC and a wireless DS. Why is it described as a completely novel entity?*
- 12.2.1.33.2. *Suggested: Delete the definition and use of RHC from the entire document.*
- 12.2.1.33.3. *Defer*
- 12.2.1.34. *Comment 31*
- 12.2.1.34.1. *Comment: The bridge portal is an 802.11 abomination. Consider the simple case where the BP is a member of an ESS that includes 2 EAPs. When channel conditions are such that the BP must move its association from one EAP to another, how many addresses must it reassociate? Surely the answer is every address that is in*

*its forwarding table. For the simple cases described in the definition, this does not seem like much of a problem. But, it is the general case where the BP has many stations "behind" it on a LAN that must govern the usefulness of this function. This function is not necessary to meet the PAR requirements of enhancing the MAC for QoS.*

12.2.1.34.2. *Suggested: Remove the BP and all of its functionality from the draft.*

12.2.1.34.3. *Discussion*

12.2.1.34.3.1. *Portions of the comment are incorrect, and there are alternate solutions.*

12.2.1.34.3.2. *This comment indicates the draft doesn't describe BP well enough.*

12.2.1.34.4. *Defer*

**12.2.2. Adjourn Ad Hoc at 8:45PM**

## **13. Thursday Evening – TGe closing session**

### **13.1. Opening**

**13.1.1. Called to order at 8:45PM**

### **13.2. Plans for next meeting**

#### **13.2.1. Teleconferences**

13.2.1.1. *Discussion*

13.2.1.1.1. *We could have Ad Hoc for the first 30 days, and formal TGe teleconferences after that, since we have a Quorum.*

13.2.1.2. *Proposed Dates: May 30, June 6, June 13, June 20<sup>th</sup>, June 27<sup>th</sup>, July 4<sup>th</sup>. on Wednesday.*

13.2.1.3. *1:00PM eastern time on Wednesdays, 3 hours maximum duration. .*

13.2.1.4. *Michael and Duncan will continue to be coordinators*

#### **13.2.2. Offline comment processing**

13.2.2.1. *Comments will be grouped in reasonable sections, and distributed to volunteer groups to formulate recommended resolutions.*

13.2.2.2. *Discussion*

13.2.2.2.1. *Documents 261 to 268 should be updated by adding new comments at the end, and posted on the web site and announced by the reflector. They will all be numbered as r2.*

13.2.2.2.2. *The resolved comments will be in there.*

13.2.2.2.3. *When will they be available? At the latest, a week from Monday (May 28<sup>th</sup>).*

13.2.2.2.4. *Volunteers should coordinate with Michael and Duncan to work on sections.*

**13.3. Motions to Plenary**

13.3.1.1. *None*

**13.4. Announcements**

13.4.1. Any presentations in support of comments should be distributed at least 24 hours before agenda presentation time.

**13.5. Adjourn at 9:10PM**

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**IEEE P802.11  
Wireless LANs**

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**Tentative Minutes of the IEEE P802.11f**

**Date:** May 14-17, 2001

**Author:** Jon Rosdahl  
Micro Linear  
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**Minutes 802.11 TGf Orlando, Florida, May 14-17, 2001**

Called to Order 10:35 am.

Motion:  
Move to approve previous minutes: Jon R/Jessie W  
Vote: 11\0-0

Review Goals for this week:  
Process Letter ballots  
Create revised draft  
Schedule fork issue decision – MAY 2001  
Hold for 11e & 11i progress or start external ballot?

Agenda reviewed.

Because letter ballot is 42 days, we may not have all comments before the meeting is over.  
Concern expressed that we need to have as much done by Wed as possible.

Motion: Moved to adopt agenda as proposed  
Moved: Jessie W. 2<sup>nd</sup>: Jon R.  
Vote: 13-0-0

Comments were located on venus/submissions/working group/802.11f temp docs.

Currently 185 voters in our letter ballot, 87 this is not quite enough to close the ballot.

Suggested that all editorial comments be supplied to editor and left to him to handle.  
Editor reported that all/most of the editorial comments have already been incorporated into v1.2 of the draft.  
Probably at 90%+ are incorporated.  
Editor will place a version for all to see on Venus.

Technical comments are what we will focus on this session.

Request to find if there are large submissions from anyone.  
Bernard has one that covers the Security Blob and a MIB definition.

The process of reviewing the comments:  
The group must take a position on every comment submitted.  
We can take all comments on a particular sub-clause and provide a group response to all comments on that sub-clause  
Then after we have the comments ready, updated to the draft, then either a re-circulation ballot or a new ballot. If a re-circulation ballot occurs, then comments can only be done on the sections that have a change. With a new ballot, the entire draft is open to comment.

Decide to break up the group up into subgroups to process comments  
1,2,3 (Jon R): 5 helping hands identified.

4 service primitives: 3 helping hands identified.

5 & 6 Operation: O'Hara: 8 helping hands identified.

6 Frame Formats: 3 helping hands identified.

Unable to get a lot of response to why the room was filled with over 30 folks, but only 19 responded to help with comments.

Room was then divided into 2 groups:       Group1: Sec 1-3 and General Comments,  
  Group 2: Sec 4-6  
large group of folks then choose to leave the room.

Smaller Ad-Hoc Groups worked on comment resolution until 3 pm

Tuesday 7pm

Meeting called to order, and message from Stuart Kerry was explained:

<MEETING MSG>

Voting stats were reviewed. 75.3% votes have been turned in.  
The group was broke back up into two groups 1-3/Gen and 4-6.

Mtg recessed 9:30 pm

Wednesday, 8:00 am

Meeting called to order.

Review Voting status for letter ballot 26:

Num Voters: 186

Num Responding: 157 (84%)

Valid response rate (>50%)

Result:

For: 50

Against: 69

Abstain 38 (24%)

Valid abstention rate (<30%)

Discuss agenda change: Recess today at 10:00 for break, then reconvine after the TGg vote is done at 10:30.

Would like to have presentation from Bernard, but is not present this morning.

The item to Discuss is whether or not to include .11i or .11e in our schedule/support of our new draft.

Motion: Set time to adjourn to 10:00 am.

Moved: Gary Spies 2<sup>nd</sup>:Bob O.

Vote: 11-0-0

Discuss Schedule moving forward.

Discuss whether or not to include .11i or .11e in our schedule/support of our new draft.

Motion: to decide this at July instead of May

Moved: Jon R 2<sup>nd</sup>: Jessie W.

Vote: 9,0,3

Discussed Ad-Hoc interim Mtg possibilities: Maybe in CA, or Cambridge. As it would be Ad-Hoc, we would not be required to attend, and the results would be brought back to July Meeting for discussion.

Request for creating proposed resolutions had the following volunteers:

Albert, Frank, Gary, Kevin

Goals for July:

- Decide re 11e, 11i Schedule dependencies.

- Finalize/adopt LB 26 comment resolution

- Adopt revised draft reflecting comment resolutions

- Start new LB for revised draft

More questions on how the dependencies affect our schedule.

Break into smaller groups to resume comment resolution.

Adjourned 12:03 pm



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**IEEE P802.11  
Wireless LANs  
Orlando, Florida**

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**Minutes of TGg Meeting, May 14-18, 2001 (Doc. 11-01-318)**

**Date:** May 14-18, 2001

**Author:** Ron Provencio – TGg Acting Secretary  
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**May 14, Monday 10:40am-12noon**

Meeting called to order by Matthew Shoemake at 10:30pm

Matthew S. made announcements

- No logos or copyrighted information on submissions
- Please turn off mobile phones

Chairs Status Update and Review of objectives for the session  
Covered results and status of proposals

Reviewed and approved minutes of Hilton Head meeting Doc. 214 “TGg Minutes Hilton Head”  
Rob Roy makes motion to adopt minutes  
Minutes are adopted by unanimous consent

Reviewed agenda for the week  
Key items on agenda for the week:  
First vote at 10:30am on Wednesday, May 16, 2001  
Second vote at 9:30am on Thursday, May 17,2001

Old Business

- Presentation of modifications to proposal
- Explanation of voting procedure
- Selection procedure

Chair asked if anyone would like to present. The following individuals requested time to present under the following topics

I. Related to Regulatory issues

- Jim Zyren – Doc. 11-01-249r0 “FCC Further Notice”
- Chris Heegard Doc. 11-01-254r0 “Great News for the FCC”

II. Related to Selection Procedure Non-authors of proposals

- Chris Hansen – Broadcom, Doc 11-01-228r0
- Jim Lansford, Ephi Zehavi – Mobilian, Doc. 11-01-061
- John Terry – Nokia “ Error Rate of OFDM Interference” Doc. 11-01-226

Unfinished business presentations from authors of CCK-OFDM and PBCC proposals

- o Chris Heegard
- o Mark Webster

**Motion I:** Accept agenda for the week. Doc. 216r3

Bill Carney

2<sup>nd</sup> Anuj Batra

For: 71

Against: 0

Abstained: 1

Motion I Passed

Recessed at 11:20am by Matthew Shoemake

### May 14, 2001, Monday 1-3pm

Meeting called to order by Matthew Shoemake at 1:00pm

A coin was tossed to determine the order of the presentations and voting order on the ballot. Order is as follows:

Regulatory presentations

1. Jim Zyren Doc. 11-01-249r0 "FCC Further Notice"
2. Chris Heegard Doc. 11-01-254r0 "Great News for the FCC"

Final proposal presentations

1. Bill Carney\Mike Wilhoyte, Doc. 11-01-256 "Enhanced PBCC Proposal with Optional, Forward-Compatible OFDM"
2. Mark Webster - OFDM

Closing Statements

1. PBCC
2. OFDM

Order placement of proposals on the Ballot

1. OFDM
2. PBCC

The following presentations were given under the topic of "Regulatory Issues"

I. Jim Zyren presented Doc. 11-01-249r0 "FCC Further Notice"

- Both proposals will meet FCC waiver requirements

II. Chris Heegard presented Doc. 11-01-254r0 "Great News for the FCC"

- PBCC could be certified under existing rules
- The FCC clearly anticipates a PBCC-22 submission – Paragraph 6 of FCC document

Recessed at 3:00pm by Matthew Shoemake

### May 15, 2001, Tuesday 8:00am-10:00am

Meeting called to order by Matthew Shoemake at 8:15am

The following quotes from 802.11 rules were read to the group:

#### 2.8.1 Draft Standard Balloting Group

The 802.11 WG balloting group consists of all voting members of the 802.11 WG as of the close of day the ballot package distribution was completed as determined by the WG Chair.

#### 7.1.4 Working Group Ballot

Voting members have an obligation to vote. Not returning two, valid, ballots in a sequence of 3 letter ballots will automatically terminate voting rights. Abstentions are only counted as valid if they are based on "lack of expertise".

The following announcement from the chair of 802.11 was read to the group:

**1.1.1.2 Announcement from the chair of 802.11**

- 1.1.1.2.1 ExCom members have discussed voting rights. The new voting members as of this session do not have vote according to 2.8.1 and so are not affected by any loss of voting rights for LB 25,26 and 27.
- 1.1.1.2.2 The chair rules that those members that were in the 802.11 WG balloting group (see 2.8.1) and are eligible for loss of voting rights due to failure of submitting two out of 3 consecutive Letter Ballots will maintain their voting rights until noon Friday, at which time they will lose their voting rights.
- 1.1.1.2.3 New voters at this meeting are not part of the 802.11 WG balloting group for LB 27, so they are not effected.
- 1.1.1.2.4 The Chair restates that the rules state that voting on a letter ballot are based on voting status as of the start of the letter ballot.
- 1.1.1.2.5 Do comments then have to be in by Tuesday? Yes, because they are part of your vote

The following presentations given under the topic of "Selection Procedure non-authors of proposals":

- Chris Hansen – Broadcom presented "A Comparison of Feedforward 256-state Trellis Codes" Doc. 11-01-228
  - o Claimed that current PBCC proposal does meet the coding gains stated in proposal
- Ephi Zehavi – Mobilian presented " " Doc. 11-01-061
  - o Reviewed Bluetooth impact on OFDM and PBCC
- John Terry – Nokia presented "Error Rate of OFDM Interference" Doc. 11-01-226
  - o Highlighted interference of Bluetooth on OFDM

Recessed at 9:30am by Matthew Shoemake

**May 15, 2001, Tuesday 10:30am-12:00noon**

Meeting called to order by Matthew Shoemake at 10:30am

Bill Carney \ Mike Wilhoyte presented, Doc. 11-01-256 "Enhanced PBCC-22 Proposal with Optional, Forward-Compatible OFDM"

Recessed at 12:00noon by Matthew Shoemake

**May 15, 2001, Tuesday 6:30-9:30pm**

Meeting called to order by Matthew Shoemake at 6:30pm

Bill Carney \ Anuj Batra presented Doc. 11-01-286r1 "Range vs. Rate Comparison of Remaining IEEE 802.11g Proposals: PBCC and CCK-OFDM"

Sean Coffey presented Doc. 11-01-257r1 "Multipath Comparison of OFDM (.11a) vs. CCK-OFDM"

Steve Halford presented Doc. 11-01-285r0 "Why OFDM for the High Rate?"

Jim Zyren, Mark Webster, Steve Halford presented Doc: 11-01-282 "OFDM High Rate Extension"

Chair reviewed agenda\schedule for May 16, 2001, Wednesday:

- o Meeting will start at 9:00am
- o Closing Remarks at 9:30am
- o Voting is at 10:30am

Recessed at 9:40pm by Matthew Shoemake

### **May 16, 2001, Wednesday 9:00am-10:00am**

Meeting called to order by Matthew Shoemake at 9:14am

Chair Matthew Shoemake reviewed the agenda for the morning.

The agenda was set as follows:

- 9:00am Procedure
- 9:30am Final Statements (15minutes each)
- 10:00am Recess
- 10:30am Down Selection Vote

A request was made by Chris Heegard to change the letter ballot as follows:

- Change OFDM to read CCK-OFDM on the letter ballot

It was noted that 2<sup>nd</sup> Vote is May 17, 2001, Thursday at 9:30am

Chris Heegard – PBCC Final Statement

- Technical superior technology
- Best technology: Backward compatibility and provides 22 Mbps
- Time to market is an advantages, since FCC will have a waiver process to allow new technology into the band
  - o Stated OFDM is uncertain on when is will be in the market: Q3 '02,Q4 '02, Not clear when it will be available
- PBCC roadmap is not to have a lock on market, intent is to have a market that is large and with several sources
- TI has a commitment to offer a Royalty free license
- Can and will license TI core

In Conclusion:

- Technology is superior with forward and backward compatibility
- Fastest time to market
- Intent is to create a large market

Steve Halford – Doc. 11-01-349 “CCK-OFDM Final Statement”

- Direct step to OFDM: CCK-OFDM to OFDM
- CCK-OFDM natural way to provide higher rates and backwards compatibility
- OFDM has an advantage over Bluetooth (Submitted new results)
- CCK-OFDM has lower complexity
- CCK-OFDM offers a natural route to OFDM at 2.4GHz
- CCK-OFDM meets the PAR requirements
- CCK-OFDM is a multi-company solution

Recessed at 10:00am by Matthew Shoemake

### **May 16, 2001, Wednesday 10:30am – 12:00noon**

Meeting called to order by Matthew Shoemake at 10:35am

Chair explained this will be a down selection vote based on Step 19 of “Selection Criteria”

Chair gave instructions to the group on how to fill out the ballot. Noted that there were a total of 227 ballots created.

Require fields on ballot for voting:

- Name
- Signature
- Affiliation (Optional)

Chair asked Stuart Kerry and Al Petrick to assist with the voter eligibility and vote counting. Every voter was required to have a voting token, before they could receive a ballot.

Vote was conducted:

- Doors were closed and no one was allowed to enter or leave the room until all ballots were submitted
- Total number of votes recorded: 177
- Ballots 178 – 227 were destroyed

Chair stated of the down selection voting results would be available in Doc: 11-01-310 “Voting Results”

Voting results will be announced at the Joint 802.11/15 WG meeting May 16, 2001 Wednesday at 1:00pm

Matthew Shoemake, Stuart Kerry, Al Petrick, and Ron Provencio counted the votes

### **May 17, 2001, Thursday 8:00-10:00am**

Meeting called to order by Matthew Shoemake at 8:15am

Chair began the agenda for May 17, 2001, Thursday 8:00am-10:00am

Chair reviewed the results with the group as follows:

- I. Voting Results of the down selection related to Step 19 of the “Selection Procedure”
  - Total number of votes recorded: 177
  - Votes for CCK-OFDM: 96 (58%)
  - Votes for PBCC: 70 (42%)
  - Votes Abstained: 11

Point of Information I: Request for clarification of voting and eliminations process

Chair Matthew Shoemake stated that there are two scenarios, which could take place:

- Scenario I: The remaining proposal must receive 75% or greater to move forward in the selection process
  - Move to select an editor for the proposal
  - Move to Letter Ballot
- Scenario II: Remaining proposal does not reach 75% or greater
  - Eliminates remaining candidate
  - In this case, the body must vote to select the procedure moving forward. The body must achieve 50% to adopt the procedure.

Point of Information II – Jim Zyren: Request to review Step 19 of Selection Criteria” Stated that the chair’s clarification to Step 19 was a misinterpretation.

Chair Matthew Shoemake stated that he had already reviewed Step 19 and that he must proceed with the agenda, as it was within the orders of the day.

Chair asked for presenters of CCK-OFDM proposal to present as they were next on the agenda

The following presentations were given:

Steve Halford presented Doc. 11-01-317

Jim Zyren presented Doc. 11-01-284 “ Intersil IP Statement”

Jim Zyren requested a formal ruling from the chair, so that it could be placed into the minutes

- o Requested chair to make a ruling on Step 19 of Selection Criteria
- o Then requested that TGg be allowed to appeal the chair's ruling

Chair Matthew Shoemake made the following ruling on Step 19 of "Selection Criteria":

- o Scenario I: The remaining proposal must receive 75% or greater to move forward
  - Move to select an editor for the proposal
  - Move to Letter Ballot
- o Scenario II: Remaining proposal does not reach 75% or greater
  - Eliminates remaining candidate
  - In this case the body must vote to select the procedure moving forward. The body must achieve 50% to adopt the procedure.

**Motion I:** Appeal Ruling of the Chair on Step 19

Jim Zyren

2<sup>nd</sup> John Frakasalis

For: 65

Against: 75

Abstained: 12

Motion I Passed

Jim Zyren request for discussion/debate on the motion

Chair rules this is not a debatable Motion: Vote is taken

**Motion II:** Move to set aside for the rules for the purpose of making motions and to modify the agenda to delay the explanation of voting procedure and vote under selection procedure Step 19 to 1:00pm and 1:15pm respectively and to immediately discuss the interpretation of selection procedure Step 19.

Chris Heegard

2<sup>nd</sup> Stuart B.

- o Several friendly amendments were made to Motion II.
- o Meeting was recessed prior to vote on Motion II.

A request for order of the day, as it was 10:00am

Recessed at 10:00am by Matthew Shoemake

**May 17, 2001, Thursday 10:30am-12:00noon**

Meeting called to order by Matthew Shoemake at 10:30am

Chair stated that allowing the amendments to the motion was out of order. A vote must be taken on the original motion

**Motion II:** Move to set aside for the rules for the purpose of making motions and to modify the agenda to delay the explanation of voting procedure and vote under selection procedure Step 19 to 1:00pm and 1:15pm respectively and to immediately discuss the interpretation of selection procedure Step 19.

Chris Heegard

2<sup>nd</sup> Stuart B.

For: 60

Against: 34

Abstained: 6

Motion I: Fails (2/3 of the vote required to Pass)

**Motion III:** Adjourn session, based on delays in TGg are delaying progress in other meetings

Greg Chessen

2<sup>nd</sup> Jan Boer

For: 51

Against: 35

Abstained: 8

Motion III: Passed

Motion passed to Adjourn TGg Session

**Adjourned Session at 11:04am by Matthew Shoemake**

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**IEEE P802.11  
Wireless LANs**

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**Meeting Minutes TGh May 2001, Orlando, FL**

**Date:** May 14-17, 2001

**Author:** Evan Green  
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Monday 3:30pm session, Mika Kasslin, Chairman opened meeting and reviewed IEEE rules.

The agenda for the week was reviewed and the document presentation schedule was discussed and modified. Motion to approve agenda as written in document 231r1.

Moved – Vik Hayes

Seconded – Evan Green

Vote 14, 0, 0 (yes, no, abstain)

Review and approval of Hilton head minutes postponed to Thursday. Mika will write them and post to server tomorrow.

Mika asked for permanent secretary – no volunteers. Evan volunteered for this week. The editor (Evan) notified that he will not be able to attend July meeting and is looking for a substitute.

A discussion regarding the concern that TGh selection process is not working out. Mika proposed that we put on the agenda for this week to discuss and possibly to revise the selection process. It was put on the agenda for further discussion at 6:30pm.

Mika, Peter and Vic Hayes contributed to a discussion on the plans for letter ballot. The consensus is that, given the proposal activity this week, our earliest intention would be to begin circulation as part of the July meeting.

Regulatory update. Mika mentioned that 802.11 regulatory web page has links to latest from ETSI, ERC. Andy McGowan gave an update on ETSI activity on DFS compliance. A Liaison letter (doc BRAN23dzz) has been written to get feedback from SE36 group regarding details on range etc for the listed RADAR applications. The intent is to develop a regulatory compliance test for RLAN units. One concern is the worst case where an 802.11a device would not be able to detect the RADAR yet would interfere with it.

Stuart Kerry made an announcement regarding voting rights for 802.11 members in regards to letter ballots 25, 26 and 27. He read sections 2.8.1 and 7.1.4 from 802.11 rules. He then made the following announcement from the chair of 802.11:

- *ExCom members have discussed voting rights. The new voting members as of this session do not have [to] vote according to 2.8.1 and so are not affected by any loss of voting rights for LB 25, 26 and 27.*
- *The chair rules that those members that were in the 802.11 WG balloting group (see 2.8.1) and are eligible for loss of voting rights due to failure of submitting two out of 3 consecutive Letter Ballots will maintain rights until noon Friday, at which time they will loose their rights.*
- *New voters at this meeting are not part of the 802.11 WG balloting group for LB 27, so they are not affected.*
- *The Chair restates that the rules state that voting on a letter ballot are based on voting status as of the start of the letter ballot.*
- *Do comments then have to be in by Tuesday? Yes, because they are part of your vote.*



Recess for dinner

Monday 6:30pm session opened by Mika

A long discussion about the selection process was held. Mika's advice to the group was to hear all the proposals even though a strict interpretation of the selection process (069r1) would rule out the "incomplete proposals". A consensus of the group was reached to hear and discuss all four proposals (169, 215, 217, 219) prior to any elimination via the selection process. Regarding the missing components of some of the proposals it is hoped that as a result of these discussions features will be included into the complete proposals which can then be processed according to the selection process.

Presentation of proposals:

Andrew Miles of Cisco presented ITPC (Independent TPC) (doc 219a).

Chris Hanson and Joonsuk Kim of Broadcom presented doc 217 an overview of their DFS/TPC proposal and doc 229 an example of DFS operation.

Adjourn for the day

Tuesday 1pm session opened by Mika

Presentation on Tiered TPC (doc 215r2a) by Peter Larsson, Ericsson Research

Presentation on DFS TPC (doc 169r1a) by A. Soomro, Philips Research

Break 3-3:30pm

Presentation doc 227 Steve Gray Nokia Throughput and Loss Packet Performance of DCF with Variable Transmit Power

Mika led a discussion on how to move forward. We have heard the presentation now do we proceed with the selection procedure or modify it? Peter suggested that before we create the comparison matrix lets see which are the complete proposals. Andrew Myles suggested that the four proposers get together and write the comparison matrix. This process may trigger a merging since the proposals are quite similar.

Meeting continued to the next agenda item: Mika presented the comparison criteria matrix (doc 287r0). Consensus was the next time we meet we will address the results of the comparison matrix. (see doc 244 for Peter Larsson's comparison criteria)

Wednesday 4pm session, Mika opened meeting 4:15pm (large crowd)

Final arguments:

Doc 245r0 final arguments for Tiered TPC (doc 215r1), presented by Peter Larsson.

Doc ### final arguments for DFS/TPC proposal (doc 217r1), presented by Chris Hansen. Merged with Choi (doc 169r2).

Doc 313r0 final arguments for DFS and TPC proposal (doc 169r2), presented by Steve Gray. Merged with Hansen (doc 217r1). Merged version is doc 169r2.

Proposal selection voting:

Peter clarified to the group that for step 13 (step we are in now), proposals that are eliminated can be merged with those that survived. Proposals that are eliminated cannot be merged together.

81 ballots were handed out. Unused ballots destroyed. 2 spoiled (mistake) ballots were reissued.

Results will be in doc 314r0 TGh voting results step 13.

Thursday session, Mika opened at 8:10am.

Announcement of vote results by Mika.

1. Announcement of Results doc 314
2. Joint philips Nokia – 97%
3. Broadcom Proposal 34%
4. Ericsson Proposal 19%

Note this announcement was based on best recollection [some errors see later], refer to doc 314 for correct counts. Ericsson proposal eliminated. Broadcom & Philips/Nokia proposal remain. 2 votes casted were not valid. Both had only one valid votes.

Questions: Ericsson indicated their desire to merge

Mika Kasslin: Important for proposers to get together to get together and merge . Best thing a single proposal in the format of normative text as a draft. Encourage proposers to discuss and merge.

Peter Ecclsine: Test procedures

Mika Kasslin: Ongoing BRAN meetings on test procedures and conformance tests with results expected before the last week of June. Might contain something on DFS

Peter Ecclsine: French regulators are discussing sharing in the 5GHz band. He would like to see a public place to access these documents on regulatory authority.

Mika Kasslin will put on website pointers to these documents

Peter Ecclsine: Is there a sentiment that conformance tests would be performed country by country or a part of ETSI?

Mika Kasslin. ETSI BRAN receives comments, modifies , approves and sends to final round. All regulatory bodies to discuss and approve. Based on this procedure regulatory bodies are commenting already. Comments available to TGh.

Other issues. None

Agenda item 6.9 Presentations of merged proposals. Since remaining proposals have intention to merge, presentations will not be made at this time. Peter Larsson indicated their problems have been resolved, however, details need to be worked.

Mika suggested that since there are no proposals to present now there is no way to proceed in the selection process and we should Recess or Adjourn.

Motion: To move work items 6.9 thru 6.13 to July mtg. By Peter Ecclsine, 2nd: Peter Larsson

Discussion: None

Favor: 5

Opposed: 0

Abstain: 0

Motion passes unanimously 5-0-0

Motion: by Peter Ecclsine to move agenda items 7 to 10:30 AM.

Second: Chris Hanson

A friendly amendment: Recess for break. Peter Ecclsine 2nd Chris Hanson

Discussion: None

Results 6-0-0

Motion passes

Recessed till 10:30 AM

Meeting 10:30am Thursday, Mika opened

Mika reported the final step 13 vote tally:

There were a total of 77 valid ballots

70 of 77 votes or 91% for doc 169r2 Nokia/Philips/Aachen

15 of 77 votes or 19% for doc 215r1 Ericsson

26 of 77 votes or 34% for doc 217r0 Broadcom

Discussion about teleconferences  
Draft normative text

Agenda item 7.2 New Business – none  
Agenda item 7.3 Preparations for July meeting

Two hour teleconferences will be held every second Thursday at 9am PDT starting May 31. Following dates are June 14 & 28. Mika will organize the calls, others are invited to host the calls if they notify Mika one week in advance.

Evan and Mika will generate and submit a document with the basic structure of the draft normative text. Proposers are encouraged to provide draft normative text in this format prior to the July meeting.

Peter & Mika will request Stuart Kerry to setup a web page for TGh to share draft normative text documents.

Mika will request 8 meeting slots with a minimum of 6 for the July meeting.

Plan for July meeting is to complete draft normative text and submit for letter ballot with comment resolution beginning in September.

Motion to adjourn by Chris Hanson seconded by Andrew Myles  
Approved my unanimous consent



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**IEEE P802.11  
Wireless LANs**

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**Tentative Minutes of Task Group i for the may 2001 Session**

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**Date:** 5/14-18

**Author:** Jesse Walker  
Intel

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## 1 Call to Order

Monday, May 14, 2001, 3:37 PM.

## 2 Agenda Discussion

Major work item is comment resolution. Plan to have presentation of papers on Wednesday.  
Agenda adopted without comment.

## 3 Comment Resolution Discussion

Chairs have been instructed to make clear whether times are hard or soft. We will use soft time for Wednesday papers.

So far we have drafted text, in letter ballot comment on draft 1 of security enhancements. Please include whether you are voting no.

Comment: If your comments has one technical comment listed as counting toward a no vote, then it is a no?

Chair: there are some comments without any indication of whether any of their comments count toward a no.

Comment: Tool can't calculate whether you are abstaining.

How did people view using the tool?

One voter found it easy to use. People with non-Windows system couldn't use it. It wouldn't run on some machines.

Chair: Its intent is to make back end easier to compile.

Straw poll: Good to use tool: 5 No one thinks it's a bad idea.

Comment: Tool instructions didn't make sense.

Chair: No one owns this tool.

Chair: What is process to resolve comments? Need a motion to change the draft text. About 700 comments so far.

Tool groups comments according to section. Could make single motion for each section. Typically TG tries to characterize comment and tries to formulate motions to address comments. We won't get this done at this meeting.

Q: How do new members get access to materials being discussed? A: Venus:\\submissions\wg.

Q: Have editor consolidate the comments? Not practical.

Comment: Have ad hoc groups to address each of the sections. Present some order, and have regular conference calls or interims, to formulate motions to consider by Portland meeting.

Comment: Use way tool has comments, split by section.

Comment: Give all editorial comments to editor.

Chair: to give a flavor of comments.

Comment: clone database to each ad hoc group to organize comments related to their assigned area.

Q: What is database? A: access database

Comment: Export it, so ad hoc groups can make comments regarding it.

Comment breakdown

Clause 5 – 175 comments

Clause 7 – 75 comments

Clause 8 – 415 comments

Clause 11 – 30 comments

This is with about half the ballots still outstanding. 4 ad hoc groups to address each of the different major sections.

Comment: don't want new comments to unsettle the organization.

Group 8 has 2/3 of the work.

Can't use resources effectively if we

Ad hoc Groups/Leaders:

Dave – 7

Jesse – 8.2 and 8.3

Alan – 11

Bob Beach – 5

Dorothy – 8.1

Give editorial comments to Jesse

Ad hoc groups prepare papers surveying landscape to prepare comment resolution planning.

Call for motion to enter ad hoc committees

### **3.1 Motion: To break TGi into ad hoc committees until Wednesday presentation of papers**

Moved: Leo

Second: Denis

Discussion: Comment: Wednesday is too long.

Q: When does ballot close? A: Tuesday tomorrow night.

Q: Can't we reconvene tomorrow to begin resolving comments? A: We could make ad hoc time shorter to meet until 9 tomorrow to find out our status.

### **3.2 Motion: To amend the motion to break until 9 PM this evening**

Moved: Bob Beach

Second: Denis

Discussion: None

Vote: 13-0-0, Motion passes

Vote on main motion: 11-0-0

## **4 Recess for ad hoc operation**

## **5 Announcement on Question of Voting Rights**

Stuart Kerry made the following announcement during the work of the ad hoc subgroups:

ExCom members have discussed voting rights. The new voting members as of this session do not have vote according to 2.8.1 and so are not effected by any loss of voting rights for LB 25, 26, and 27.

The chair rules that those members that were in the 802.11 WG balloting group (see 2.8.1) and are eligible for loss of voting rights due to failure of submitting two out of 3 consecutive Letter Ballots will maintain their voting rights until noon Friday, at which time they will lose their voting rights.

New voters at this meeting are not part of the 802.11 WG balloting group for LB 27, so they are not effected

The chair restates that the rules state that voting on a letter ballot are based on voting status as of the start of the letter ballot.

Do comments then have to be in by Tuesday? Yes, because they are part of your vote.

Q: If I abstain, do I need to put the reason in a comment document? A: No, you can use the Subject line of the e-mail ballot.

## **6 Call to order in PM Session**

Clause 7 Status: went farther than categorize; started discussion on how to fix real problems, and thought there would be a few. Need about 3 hours to complete discussion of clause 7.

Clause 5 Status: 175 Comments, most editorial. 6 areas of technical concern. Can't determine answers to all these 6 areas in 3 hours. Suggest to OR the different lists together and look for common themes.

Clause 8.1. 90 comments, most editorial, 8 areas needing significant work. 4 can be dealt with by ad hoc, but 4 need full TG. Numerous comments that Kerberos should not be mandatory, but there is no agreement what to replace it with.

Clause 8.2 sub-group 1: out of 67 comments, 2 substantive, 2 other minor ones. Need 2-3 hours to make recommendations on the bulk of comments. 2 comments need clarification.

Clause 8.2 sub-group 2: About 8 categories where need direction from TG. Need a few hours to make recommendation

Clause 8.2. sub-group 3: 12 categories needed direction. Probably need 4 or 5 hours to make recommendations for comments we can resolve

Clause 10-11. Almost all editorial. Not a lot needed

Comment: If issue bogs down in ad hoc group, then it should be taken to the whole TG.

Discussion on whether to work any more tonight, set details of work tomorrow.

Q: When will more comments be available? A: We could get more comments tomorrow.

## **7 Recess until Tuesday AM at 8**

## **8 Call to Order**

## **9 Recess until 2:30 PM to meet in ad hoc**

## **10 Call to Order**

Discussion of whether to begin meeting in plenary again at 3:30. Consensus this is not enough time to close issues, but we need to have conversation to synch ad hoc groups. Need to understand where all the groups are, find where the overlaps are.

## **11 Recess until 3:30**

## **12 Call to Order at 3:32 PM**

### **12.1 Clause 5 discussion**

Bob Beach present findings for ad hoc group for clause 5. Over 200 comments, mostly editorial. 9 major areas. State diagram, replay protection, Kerberos, etc.

- State diagram. Response: fix state diagram and add additional explanation
- Replay protection. Wanted for multicast, but no one proposed an algorithm
- IBSS authentication not specified. Need to clarify what is intended.
- Kerberos applicability: should it be mandatory, is it applicable in SoHo. Response tbd
- AS/AP trust issue: people raised issue of whether AP and Auth server can trust each other
- Legacy compatibility.
- What is ESN compliance?
- Security Impact on QoS: authentication delay on roaming
- Mixed encrypte/non-encyrpted traffic. Not allowed
- Dissociation timeouts. Need a MIB variable.
- Deauthentication frame usage.

### **12.2 Clause 7 Discussion**

Tim Moore presents.

- Unspecified authentication to allow 802.1X to decide. TG discussed and decided on this. Should reject comment.
- Kerberos optimization: authentication elements must run w/o information element.
- Which messages do info elements go into?
- Selection of UCSE and MCSE
- ESN w/o ULA?

## 12.3 Clause 8.1 Discussion

Dorothy Stanley presents. Bulk of comments editorial

- Comment 320: Document focus not home or SoHo. Want IT free solution with mandatory to implement scheme. Solution: need username/password for any solution.
- Comment 321 – No IBSS solution. Commenter proposed solution: pre-shared keys without authentication.
- Comment 322 – Station to Station traffic. Investigate how to support this in a BSS.
- Comment 327 – forbid non-ESN stations? Necessary for migrating deployed equipment.
- Comment 330 – Multiple cipher and multicast support?
- Comment 33? – Does it have to support multiple encryption suites simultaneously.
- Comment 337 – Should authentication algorithm be mandated. Is Kerberos a good solution?
- Comment 342 – What about Association frame and denial of service attacks? Association message authenticated? Not feasible.
- Comment 356 – Split descriptive and normative information.
- Comment 360 – support mechanism to support fast hand-off. Want details.

## 12.4 Clause 8.2 – 8.2.2

Mitch Buchman presents.

- Categories: editorial, minor technical, major technical
- Minor technical issues philosophical.
- Major: technical issues
- Data encapsulation or cipher suite?
- Strength of WEP
- Language to recommend not to use Basic WEP
- Use of Vernam cipher not applicable?
- WEP2 useless without MIC
- Use and confusion of Pad in IV?
- Problem with bit ordering.
- Remote station timing in establishing key.
- Inconsistency on minimum packet length

## 12.5 Clause 8.2.2-8.2.3.3.3

Nance Cam-Winget presents.

- IP Issues. Remove IP statements. Some want licensing issues resolved.
- Comments regarding to details of OCB. An improved version of OCB. Adopt new algorithm and update text.
- 77 We should treat multicast like unicast. Need multicast sequence number.
- TGe has adopted maximum size of 2048 bytes. We should
- Choosing a mandatory/default ESN encryption mode: WEP2 and AES.
- Remove WEP2
- Add replay protection into WEP2
- Protect Addr3 in AES mode of MIC.
- KeyID need to stay in 4<sup>th</sup> byte for WEP2 and AES.

## 12.6 Clause 8.2.3.3.1-8.5

Jesse Walker presented main issues

## 12.7 Clause 11

Alan Chinsky presented main issues

## 13 Discussion of process

Motions will eliminate 50% of comments. What is process to dispose of remaining comments?

We need to set up structure to resolve the 20 or so major categories of comments, as well as begin work to specify the work that hasn't been done. Would like to set up structure to begin to address this on Thursday.

Chair: let's address this in last session before adjourning.

Q: Where do docs go after they go into ToDockeep? A: Harry moves them into correct directly



## 14 Recess until Wednesday

## 15 Call to Order at 4:05 PM

### 15.1 Call for papers

Bill Arbaugh - 230  
Bernard Aboba – 252  
Bernard Aboba – 253  
Nancy Cam-Winget – 223 – crypto  
Simon Blake-Wilson – 303  
Jon Edney – 306 – authentication  
Alan Chickinsky – 258

### 15.2 Paper 230 – Bill Arbaugh

Title: An inductive chosen plaintext attack against WEP and WEP2.

Discussion:

Q: How is replay window implemented? Bill: Pick a random IV and increment it thereafter. However, this requires a cryptographically secure random number generator, and these are hard to build.

Comment: sequential IV is more dangerous without replay window.

Source code implementing attack won't be released except to research community.

Q: How often do you have to change the keys with this? A: At least every hour.

Q: Does WEP2 not buy anything? A: WEP2 only delays attack, in that it makes it more difficult for attacker. WEP2 more difficult, sliding window even more difficult.

Q: Can't you limit access by MAC address? A: No; they are forgable.

Q: If packet size a multiple of 8 bytes, still possible? A: It makes it harder, but won't make it impossible. Probably another good idea.

### 15.3 Papers 252, 253, Bernard Aboba

#### 15.3.1 253 WEP2 Security Analysis

Discussion:

Q: Is SRP mature? SRP has been around a three year. Stanford not only IP issue for SRP? Need IP statement.

Comment: Password checkers usually don't do their job, and poor passwords are selected

Comment: Should worry about cost of public key operations on AP. A: This is not a problem in enterprise; low number of operations minimize problem in small environment.

Q: Use alternative cipher in AES: how much do you think this will slow down attack?

Comment: UMAC based on Carter-Wegman paradigm, and if you can forge one MIC you can forge an infinite number

A: SRP Burden? It can be considerable, because you have to do a Diffie-Hellman modular exponentiation.

#### 15.3.2 252 Secure Roaming

Discussion:

Comment: Cost of back-end security. A: Discussed what is going in TGF.

Comment: Let's examine details of encrypting the keys, to make sure this is a secure transfer. A: Agreed

Comment: Use of Kerberos does not preclude other authentication mechanism from defining their roaming.

Comment: Deployment important, since everyone is using RADIUS. Cost of back-end is not that hand. A: Agreed; reuse AP code.

Comment: Return trip to Auth server for authorization, not part of Kerberos. A: Agreed

## 16 Recess

## 17 Call to Order, 8:07 AM

## 18 Announcements

Comments in text form now; on Venus.  
We will recess for TGg vote.

## 19 Papers, Continued

### 19.1 Paper 223, Nancy Cam-Winget

Discussion:  
Question about CBC mode and selection of IV.

## 20 Recess for TGg vote

## 21 Call to Order after TGg non-vote

### 21.1 Paper 303 – Simon Blake-Wilson

TLS-EAP for authentication

Discussion:

Q: Questions asking for clarifications

Q: Code/space implications? A: TLS will be in phones in a couple of weeks.

Q: Why password in home? A: Public key only would work too, but people want passwords

Q: Who ships TLS-AEP? Microsoft in XP.

Q: Can you share the document with performance numbers? A: Yes

Comment: Anonymous Diffie-Hellman worse than dictionary attack. Man-in-the-middle a threat in this environment.

Q: How do we move forward?

Q: We need discussion to remove Kerberos? A: This should be taken care of in comment resolution.

Long discussion on how to operate during the rest of the session.

### 21.2 Paper 306 – Jon Edney

EAP Authentication Suite Advertising

Discussion:

Comments: Kerberos is mandatory to implement, not to use.

Q: Who are you trying to protect? A: Trying to stop clients that can't do it from associating. It is an optimization

### 21.3 Paper 258 – Alan Chickinsky

Security Threats

No Discussion

## 22 Announcements

We will discuss Kerberos, Encapsulation.  
Subgroups give Dave doc numbers for papers.

## 23 Recess until PM

## 24 Call to Order, 1:13 PM, Thursday, May 17, 2001

## 25 Comment Resolution Discussion

Chair explains the two paths available to TGi. Straw pole: tackle big issues first. Unanimous consent to move forward on big issues.

Goal: Establish interim meetings first.

### ***25.1 Move to authorize an interim meeting of TGi on Tuesday, June 19, 2001, in either Portland or the San Jose area, for the presentation of proposals to resolve comments.***

Moved: Jesse Walker

Second: Glen Zorn

Discussion: WECA meeting may collide? A: No.

Vote: 17-0-3, Motion passes

Jesse Walker volunteers to host meeting in Portland.

### ***25.2 Move to authorize TGi teleconferences on Monday, June 25, 2001, and Monday, July 9, 2001, for presentation of proposals and comment resolution.***

Moved: Jesse Walker

Second: Bob Beach

Discussion: None

Vote: 17-0-2, Motion Passes

### ***25.3 Proposal for the task group to request submissions for a new authentication method.***

Moved: Tim Moore

Second: Albert Young

Discussion: Question about procedure.

Comment: order of motions seems wrong.

### ***25.4 Move to postpone consideration of the main motion until after consideration of a motion to remove Kerberos as the mandatory to implementation authentication protocol***

Moved: Glen Zorn

Second: Jesse Walker

No Discussion

Vote: 19-3-3, Motion Passes.

### ***25.5 Proposal for Kerberos authentication to be non-mandatory in the security draft. The sections that are to be changed to remove the word mandatory are: 5.4.3.4 (page 9, line 33), 5.10 (page 16, line 22), 8.1.3.2 (page 33, line 44; page 34, line 22)***

Moved: Tim Moore

Second: Albert Young

Discussion: Concern that if we take it out, we will never get back to a mandatory algorithm

A: The motion does not say there won't be a mandatory algorithm.

A: The draft itself says in other places (e.g., 5.2.2.3, 5.10) that there is a mandatory-to-implement algorithm, so the doc can't pass without one.

Comment: This motion is an over-reaction to presentations given in this meeting. We agreed to Kerberos unanimously in November. In this meeting criticism have been aimed at one area. We should investigate whether solutions can be found to weaknesses before setting aside baseline. Only if we find there are no solutions should we remove Kerberos

Comment: Several weaknesses have been pointed out, to fix Kerberos requires going through IETF. This motion makes psychology more explicit, allowing people to present solutions with a more open mind.

Comment: The weaknesses pointed out are not insurmountable, and might not exist. Open-mindedness not a good characteristic in standard.

Comment in favor of the motion. Vendors want solutions in environments that may not be Kerberos friendly

Comment in favor of motion. Motion is not about mandatory or no mandatory method. Not about eliminating Kerberos entirely. It has become apparent that field needs to be reopened.

Comment: Among possible solutions are PKINIT solving these, but these have not been mandated in the Draft. We still need to go through the process

Comment in support of motion. RADIUS most widely deployed mechanism. We are forcing IT to deploy new authentication system. Proposals for enhancement of Kerberos not yet final. It increases cost.

Comment: This group has never acted like it is constrained to offer proposal; silly idea. Kerberos does not preclude other mechanisms; rather there are other algorithms more suited to other spaces; however Kerberos was chosen as compromise to have an interoperable standard. There are things we can do in TG1 to fix some of the weaknesses. Finally, there were 4 or 5 authentication proposals last year, and we selected Kerberos after this process. Need to address these before rushing into other proposals.

Comment: speak in favor of motion. What we are asking for is to initiate process to come to agreement on an acceptable authentication mechanism, which may be Kerberos. Purpose of this motion is to level playing field and to encourage proposals. Without leveling playing field, potential submissions may be inhibited.

Request from TG1 to know when we will vote on this. Comment: we are in the process of discussing the motion, and the vote can happen any time someone calls the question. Chair agrees.

Comment: Not worried over uniformed vote.

Comment: In matters of security, level playing security not right. Having someone fight is good. We've been through several months making the decision in the first place, and no insurmountable problem has been shown.

Comment: Some of the changes needed can only be done in the IETF. Before, the discussion was not against the formal requirements.

Call the Question: Jon Edney

Second: Bob O'Hara

Vote to call the question: 47-1-2, Motion to call the question passes

Vote on Main Motion: 37-15-3

Parliamentary rules this is a technical vote, so motion fails since it changes requirements for conforming implementation.

Comment: It was stated that this motion would not remove requirement for mandatory authentication method, and 5.2.2.3 says the standard defines a mandatory authentication.

### ***25.6 Proposal for the task group to request submissions for a new authentication method (already made).***

Moved: Tim Moore

Second: Albert Young

Discussion: Is there an completion time?

Vote: 28-0-0, Motion Passes

### **26 3. Move for TG1 to issue a call for new proposals for data encapsulation not based on OCB mode, concluding at the beginning of the Plenary meeting July 2001, to provide a backup plan in case the Intellectual Property issues with OCB mode cannot be properly resolved.**

Moved: Jesse Walker

Second: Glen Zorn

Discussion: Does not preclude members from introducing own motions later.

Vote: 24-0-0

## 27 Move to instruct editor to remove WEP2 from draft

Moved: Jesse Walker

Second: Tim Moore

Discussion: Jesse Walker has asked for a roll call ballot

Comment: IEEE cannot afford to put out a standard that is easily broken.

Comment: Observation of the mover that WEP2 is irretrievably broken, and wonder if this is true. If we can fix WEP2, this could be fixed by firmware upgrade.

Comment: Speak in favor of motion. Reason for WEP2 is to have an upgrade path for existing equipment. 802.11 has been severely criticized in press, and will come down doubly hard if it is still broken. Presentations have shown WEP2 no better than WEP1. Proposed fixes in conflict with original goal of easy upgrade. Go straight to AES.

Comment: Ambivalent on motion. Appreciate need for upgrade path. Throwing away is not most helpful thing to do. Would like to see another attempt to fix WEP. Want WEP3, not just tossing out everything we have.

Comment. Speak against motion. Current implementation broken, WEP2 just an attempt to remedy most severe problems. Still have the opportunity to address problems. Yesterday we heard some alternate solutions that could be used to take this path. Will do customers a disservice to drop this complete.

Comment. Speak against motion. Says throw away WEP2. Saying everything is insecure and nothing can be done. This can severely impact equipment we are shipping now. Modification of WEP2 would be a better service.

Comment. Agree and speak against motion. This is second motion today to start over. Rather leave WEP2 there to fix.

Comment. Speak in favor of motion. WEP2 is more than badly flawed, and negative press already. Adding additional facilities? But it's already a band-aid. If adding additional features, breaking original justification. There is no text describing how to fix WEP2. WEP2 can be reintroduced. Call the question by Duncan.

Second: Shawn Coffey

Vote to Call the Question: 52-11-2, Question Called.

Vote: 30-36-1, Motion Fails

## 28 Recess

## 29 Call to Order at 3:29pm

## 30 Agenda Discussion

Heads up to possibly adjourning early (5:30pm).

Go through some other motions to move forward with some comment resolutions.

From 4:30-5pm discuss how to move forward towards draft 2; setting goal to have a new draft for Sept. meeting.

Comments: they have a document with their ad hoc comment resolution posted to the doc keeper folder.

Comments: will all editorial comments be taken from our documents or do we need to make motions?

A: no need for motions

## 31 Motion discussions

**31.1 Liason contact for NIST**

Volunteer: Simon Blake-Wilson

**31.2 Liason contact for Tge**

Volunteer: Simon Black

**31.3 Volunteers for proposals to resolve**

- Key synchronization specification: Aaron Friedman
- 5.1 state diagram : Bob Beach
- What does ESN compliance mean? Dave Halasz
- multi-cipher operation: Dave Halasz
- packet expansion rules and interaction with MIB: Tim Moore/Jesse Walker
- how to split normative and description parts of 8.1 : Jon Edney
- key disassociation specification: Tim Moore
- Legacy compatibility: Jon Edney
- Rekeying: Jesse Walker
- IBSS operation : Bob Beach
- IT Free operation (Configureless operation): white paper why this is not feasible?
- Need agreement on what is minimal configuration necessary: Dave Halasz
- how are we supporting fast hand-off: Albert Young
- who will work with TGf: Bernard Aboba

Comment: do as much of the work by June 18 to get ready for July meeting

Comment: the intent to assign volunteers is to make sure we have a champion for each topic and lead the group towards resolution. The volunteer may not necessarily write all of the text.

Comment: by default we will place Jesse's name on ones that are not clear to us until we get further clarification.

**32 Motions****32.1 Move to instruct editor to clean up Clause 7 message element definitions as per Tim Moore's proposal doc 200.**

Moved: Jon Edney

Second: Tim Moore

Discussion: none

Vote: 14-0-2

**32.2 Move that TGi accept recommended resolution of comments 76, 79, 393, 395, 396, 583, 768, 769, 771, 773, 775, 1175, 1176, 1178, 1179, 1220, 1221, 1222, 1374, 1307, 1308, 1310, 1377, 1414, 1418, 1453, 1454, 1456, 1465, 1466, 1507, 1511 as proposed in Slides 5-8 of Document 802.11-01/298r1.**

Moved: Jon Edney

Second: none

Comment: it's a bit of a mistake to read someone else's motions. We should table this for now until we can get further

**32.3 Move to address comment 405: the word “not” was dropped.**

Discussion: after closer look at the text. The text is correct.

Motion was removed

**32.4 Move to instruct editor to update draft to support the final OCB mode definition and to deprecate the primary OCB definition in the existing draft, in support of resolving comments 583, 1175, 1176, 1221, 1418, and 1465.**

Moved: Jon Edney

Second: Bob O’Hara

Comment: this will actually close a lot more comments than the ones cited here.

Vote: 17-0-0 passes

**32.5 Move to instruct editor to update AES key derivation as per Jesse Walker’s comment on this issue:**

**KeyMaterial ::= InitMAC // InitNonce // InitASE // InitUCSE  
 // RespMAC // RespNonce // RespASE // RespUCSE //  
 RespMCSE**

**responder to initiator key ::= PMAC(AssociationKey, KeyMaterial  
 // 0x00)**

**initiator to responder key ::= PMAC(AssociationKey, KeyMaterial  
 // 0x01)**

Moved: Jon Edney

Second: Bob O’Hara

Discussion: none

Vote: 15-0-3 passes

**32.6 Move to instruct the editor to create a PICS prior to issuing draft 2.**

Moved: Jon Edney

Second: Butch Anton

Comment: adding a PICS is nontrivial.

Comment: motion is to create one not necessarily to put one in the draft 2.

Comment: will the draft of this text be released to the whole group?

Answer: yes, but someone would have to make a motion to put it in draft2.

Vote: 19-0-1 passes

**32.7 Move to add an authentication suite selector by instructing the editor to incorporate the text of document 306 into draft 2.**

Moved: Jon Edney

Second: Albert Young

Comment: what is the point of this? Is it an optimization?

Answer: it's a helper function. An efficiency improvement. It's in the beacon. It avoids having to associate to find out if authentication mechanism is supported by AP.

Comment: there are issues with the suite values RFC 2284 states EAP values takes only 1 octet.

Comment: some of the table values need to be fixed. There is no reference to Table 1c in the 802.1X/EAP (value 4) in table 1b

Move to table this motion.

Second: Butch Anton

Discussion: none

Vote: 7-3-7 passes

**32.8 Motion to amend 32.7 with specific editorial changes:**

Table 1b: in value 4, change value in "octets in suite parameter" from 2 to 1

Table 1b: make reference to Table 1c

Table 1c: heading should refer to value 2 to 4

Move: Jon Edney

**33 Discussion for upcoming July meeting**

We have conference calls and a one day ad hoc meeting in Portland scheduled. We can have a list of motions to bring up to these meetings.

Chair: Moves to adjourn Tgi for this session for the rest of the week

Comment: Alan makes his hackers code available to anyone who can use it discreetly.

Comment: someone needs to help make the motions for some of the comment resolution for Mitch at the ad hoc meetings

Comment: work through the motions ahead of time to avoid crafting the motions realtime during presentations.

Adjourned for the week (4:50pm)





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**Rlwf80949033  
IEEE P802.11  
Wireless LANs**

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**Minutes of Joint 5GHz Globalisation Study Group (5GSG) Meetings**

**Date:** May 14-18, 2001

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**Abstract**

Minutes of the 5GHz Globalisation Study Group meetings held during the IEEE 802.11/15 Ad-hoc meetings in Orlando from May 14 through 18, 2001.

**Executive Summary**

1. Richard Kennedy resigned as Chairman and Bruce Kraemer accepted chairmanship.
2. Framework alternatives for 5WING were discussed:
  - a. Relationship diagram
  - b. Voting Procedure
  - c. Additional features
3. Michael Fischer gave an overview of HCF so that it could be considered when defining Inter-Working proposals. Initial indications were that HCF would facilitate Inter-Working (in particular the 2 ms fixed frame format of H2) and not further complicate inter-working.
4. If any amendments to the existing standards become necessary to support Inter-Working (IW) the goal will be to make them optional.
5. Richard Kennedy's presentation compared and contrasted where 5GSG is today with its original intent. While the IW step was not originally comprehended it was the consensus that it was necessary.
6. The consensus is that a new study group will need to be formed within IEEE to launch the 5WING project thereby bifurcating the original Study Group into the TGj task group and a second study group.

**Monday 5-14-01, 3:30-5:30**

Officers Present – Bruce Kraemer, Vice Chairman; Garth Hillman, Secretary

Attendance – 48

Roll was called.

Name	Affiliation	Email Address
Dick Allen	Allen	<a href="mailto:rallen@apple.com">rallen@apple.com</a>
Baruch Altman	Commprize	<a href="mailto:baruch@commprize.com">baruch@commprize.com</a>
Song An	CommAccess Technologies	<a href="mailto:songan@commaccess.com">songan@commaccess.com</a>
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Vafa Ghazi	Cadence Design	<a href="mailto:vafa@cadence.com">vafa@cadence.com</a>
Kerry L Greer	ShyCross	<a href="mailto:greerk@skycross.com">greerk@skycross.com</a>
Daging Gu	Mitsubishi Electric	<a href="mailto:dgu@merl.com">dgu@merl.com</a>
Amer Hassan	Microsoft	<a href="mailto:amerh@microsoft.com">amerh@microsoft.com</a>
Garth Hillman	AMD	<a href="mailto:Garth.Hillman@amd.com">Garth.Hillman@amd.com</a>
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Peter Murray	Intersil	<a href="mailto:pmurray99@home.com">pmurray99@home.com</a>
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Leon Zegers	Philips Components	<a href="mailto:leon.zegers@Philips.com">leon.zegers@Philips.com</a>

Roberts Rules of Order apply.

Voting Status – since this is a study group and not a task group anyone present can vote. However in plenary sessions only voting members can vote.

Interim Vice-Chair - Jamshid Khun-Jush (Ericsson) in attendance.

Meeting Agenda:

1. Approval of agenda (doc 240)
2. Review Objectives
3. Approve minutes of the last meeting
4. Review of history of 5GSG
5. Overview 3GPP

Agenda was approved.

Bruce reviewed history of 5GSG especially as it is a joint development with ETSI (Doc.11-00- 240):

1. 5GHz Partnership Project now named 5WING
2. 5GHz Standardization Roadmap
3. 5GHz harmonization is more than just spectrum harmonization i.e., MAC and PHY; yes it is possible that the MAC and PHY get harmonized but the spectrum may not get harmonized however that is beyond the control of this study group.
4. Julius Knapp at the HH meeting did state that the FCC was not planning to change the characteristics of the operative bands

5. Status of MMAC (CSMA and HiSWANa standards) – they will observe IEEE and ETSI standards body activities and consider making changes accordingly; (what about listen before talk 4 ms?)
6. Overview of previous usage scenarios
7. Convergence progression was reviewed
8. Proposed that we extend 5GSG to next plenary
9. Pursue creation of 5GPP
10. PAR purpose
11. 5 Criteria Purpose
12. New business – Inter-working options
  - a. Mandatory
  - b. Optional
  - c. Recommended practice
13. Richard Kennedy – make it recommended practice since optional effectively is yet a new standard
14. **Action** – expand on text to clarify the definition of the IW Options
15. BRAN#23 –
  - a. Scope of 5GHz Alignment Rapporteur Group (5GARG)
  - b. Tentative schedule for 5GARG
  - c. Scope of 5WING
  - d. Tentative schedule for 5WING
  - e. Highlights of Expected Desired Features of this new standard
  - f. Decision process between 5GARG and TGj
  - g. Schedule of standards meetings
16. Review of 3GPP (formed December 1998, Japan, Korea, Europe, ...)

**Monday 5-14-01 6:30PM – 9:30 PM**

Officers Present – Bruce Kraemer, Vice Chairman; Garth Hillman, Secretary

Attendance – 25

Bruce introduced the agenda for this evening – start developing a framework for 5WING:

1. Four additions to features were suggested:
  - a. Coexistence with other radio types
  - b. Smart (as in beam steering) antennae
  - c. System performance for radio cell

- d. Security
2. Discussion of Voting Characteristics of Interested Bodies
  - a. IEEE –
    - i. voting rights based on attendance, voting behaviour and paid up meeting fees (but within IEEE rules there is an option for entity voting (i.e. by company)
    - ii. one vote per person
    - iii. 75% majority
    - iv. Takes place on completed specification
    - v. no limit on votes per company
    - vi. block voting by company is illegal
    - vii. No proxies
  - b. ETSI –
    - i. Membership fees based on company revenue
    - ii. Only paid up member companies can send representatives
    - iii. Consensus (unanimous) based but if necessary voting is based on 71%. (details worked out in discussion item by item)
    - iv. One weighted (i.e., based on revenue) vote per company
    - v. Regulatory Administrations also have weighted voting (?)
    - vi. No proxies
    - vii. Voting rules differ based on topic
  - c. MMAC –
    - i. One vote per company or subsidiary (provided it pays dues)
    - ii. Simple majority
    - iii. No weighted voting
    - iv. Can attend even if not a paid up member
    - v. No proxies ?
  - d. 3GPP
    - i. One vote per company
    - ii. Consensus (unanimous) based but if necessary voting is based on 71%
    - iii. Only members can attend
    - iv. Proxies are allowed
    - v. Voting rules differ based on topic?
3. Given the above what are the options for 5WING voting – discussion of ideas
  - a. Use entity voting (acceptable under IEEE rules, equivalent to MMAC, minor deviation from ETSI rules, equivalent to 3PP voting) [does one vote per company imply each division gets a vote or .....? What about subsidiaries, Groups, ...?]

- i. **Action** – retrieve IEEE regulations regarding ‘entity voting’ before the end of this ad hoc 802.11 session
  - b. Are proxies to be allowed?
  - c. Membership fees? Per company, per meeting
- 4. 5WING straw man relationship diagram (ref 11-01-240r0) contrasted with that of 3GPP
- 5. What process should be used within IEEE to launch the 5WING project? E.G., form a new study group, commission a committee, .....
- 6. Stuart Kerry reviewed **“Questions on Voting Rights for 802.11 Members on LB 25,26,27”**
  - 1.1.1.1 Quotes from 802.11 rules

### **2.8.1 Draft Standard Balloting Group**

The 802.11 WG balloting group consists of all voting members of the 802.11 WG as of the close of day the ballot package was completed as determined by the WG Chair

### **7.1.4 Working Group Ballot**

.....

Voting members have an obligation to vote. Not turning in two, valid, ballots in a sequence of 3 letter ballots will automatically terminate voting rights. Abstentions are only counted as valid if they are based on “lack of experience”.

....

#### 1.1.1.2 Announcement from the Chair of 802.11

- 1.1.1.2.1 ExCom members have discussed voting rights. The new voting members as of this session do not have a vote according to 2.8.1 and so are not affected by any loss of voting rights for LB 25, 26, 27.
- 1.1.1.2.2 The Chair rules that those members that were in the 802.11 WG balloting group (see 2.8.1) and are eligible for loss of voting rights due to failure of submitting two out of 3 consecutive Letter Ballots will maintain their voting rights until noon Friday, at which time they will lose their voting rights.
- 1.1.1.2.3 New voters at this meeting are not part of the 802.11 WG balloting group for LB 27, so they are not effected.
- 1.1.1.2.4 The Chair restates that the rules state that voting on a letter ballot are based on voting status as of the start of the letter ballot.
- 1.1.1.2.5 Do comments then have to be in by Tuesday? Yes, because they are part of your vote.

### **Tuesday 5-15-01 6:30PM – 9:30 PM**

Officers Present – Bruce Kraemer, Vice Chairman; Garth Hillman, Secretary

Attendance – 36

Bruce introduced the agenda for this evening – Michael Fischer presented a tutorial on HCF; doc’s 00/453r3 and 01/109r2 to ascertain its potential impact on the Inter-working proposals.

Key Points to Emerge:

1. Michael agreed that the Inter-Working phase was politically necessary and that the longer a global standard takes to write the more critical this phase becomes.
2. The fact that H2 is based on fixed 2msec frames and HCF is based on frame exchanges of varying lengths can in principal be accommodated and becomes less problematic as the data rates increase.

**Wednesday 5-16-01; 8:00 AM – 12:00 noon**

Officers Present – Bruce Kraemer, Vice Chairman; Garth Hillman, Secretary

Attendance – 37

Bruce introduced the agenda:

1. 5Wing Framework
2. Proposals - none
3. Presentations – Richard Kennedy

Bruce discussed some of his research on IEEE policies and procedures relative to voting

IEEE definition of consensus – more than a majority but not unanimity

Entity voting – allowed but the type of voting to be used in the TG must be indicated on the PAR

Entity – can be defined arbitrarily in the PAR; i.e., company, institution, person

Richard Kennedy gave a presentation on direction of 5GSG (doc 01/283)

H2a defined as H2 with inter-working amendments in his presentation

Changed his ‘motion’ to ‘point of discussion’

Bruce went through the composite timeline for initiating Inter-working and 5WING

Bruce gave his definition of Change Classifications to Standards to Facilitate Inter-working as follows:



- Mandatory – amendments to 11a, H2 and MMAC standards will be required; retrofit (update or replace) existing equipment; all new equipment must use the new standard
- Optional – amendments to 11a, H2 and MMAC standards will be required; the amendments will be options and implementation will be optional however thus some new equipment will employ ‘j’ but not all new equipment
- Recommended practice – rules to be applied when and if compatibility is desired however standards are adequate as written but can be used in a novel way

**Action** – research other definitions of mandatory, optional and recommended practice

**Action** – topics/request for contributions at BRAN#24 and July IEEE plenary

- Report on research of the impact of having 11e in an AP to facilitate IW mechanism
- Request for proposals for changes to 11e to facilitate IW mechanisms
- Solicit opinions from Michael Fischer and Menzo Wentink on the impact of 11e amendments on Inter-Working

**Motion – eliminate the mandatory alternative as defined by Bruce from future consideration**

Result – (23, 2, 1) [for, against, abstain]

- Revisit Optional and Recommended Practice definitions at July Plenary and BRAN#24

Therefore the *Working Assumption* going forward – focus on the Optional alternative but reassess/reconfirm at each meeting.

Hypothetical question to audience – what would the audience rather work (i.e., value) on over the next 12 months?

Result – TGj=9; 5WING=9. Needless to say the vote would have been different had it not been held in Florida!

Audience felt strongly to keep the IW and 5WING activities separate especially in view of the 5WING goal of evolving the standards into a new standard not amending the existing standards. The question becomes what if any compatibility will be specified

It was noted by Andy Gowen that the ITU has a Joint Task Group - JTG-1-6-8 – focused on spectrum requirements for future multimedia.

**Action** – make government/regulatory links more explicit on the relationship diagram

Stuart Kerry has requested that another study group be created to officially launch the 5WING project at the July IEEE Plenary.