IEEE P802.11
Wireless LANs

Approved Minutes of the IEEE P802.11 Full Working Group

Nov 15 - 19, 2004

Hyatt Regency, San Antonio, Texas, USA

Opening Plenary: Nov 15, 2004

1.1. Introduction

1.1.1. Meeting called to order by Stuart J. Kerry at 1:45PM The starting was delayed due to the long distance walk from the hotel.

1.1.2. The agenda of the 88th session of 802.11 is in doc: IEEE 11-04-993r1.

1.1.3. Secretary – Tim Godfrey

1.1.4. Officers and Chairs of 802.11:

IEEE 802.11 WORKING GROUP OFFICERS			
Name	Position	Work Phone	eMail
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Dorothy Stanley	APF AHC Chair	+1 (630) 979-1572	dstanley@agere.com

1.1.5. Stuart Kerry reviews the roles and responsibilities of the Working Group officers.

1.1.6. Brian Mathews has resigned for another job outside the industry. The WG chair thanks him, and ask for volunteers for replacements.

1.1.7. People attending for the first time at this meeting: 32

1.1.8. There are 243 people in the room.

1.2. Review of Policies and Procedures

1.2.1. Al Petrick presents document 04/424r3 to the body.

1.2.2. Review of working group officers and duties for all wireless working groups.

1.2.3. Review of voting rights, participation requirements, and voting token procedures. There is a new system for indicating voting rights – instead of tokens, there is a printed indication on the badge.

1.2.4. Review of operating policies and procedures, registration, payment of fees. Our P&P is in 04/510r0, which is posted on the web site.

1.2.5. Review of rules against photographs, tape recording, and media briefing.

1.2.6. Review of attendance recording process, and contact information updating procedures.

1.2.7. Review of process and requirements for gaining and keeping voting rights.

1.2.8. Membership representation and anti-trust laws are reviewed.

1.2.9. Stuart Kerry reads an additional Anti Trust Statement contained in 11-04-0993r2.

ANTI-TRUST STATEMENT

Each Member acknowledges that the Members are committed to fostering competition in the development of new products and services. The Members further acknowledge that they may compete with one another in various lines of business and that it is therefore imperative that they and their representatives act in a manner which does not violate any applicable antitrust laws and regulations. Without limiting the generality of the foregoing, the Members acknowledge that the Members will not discuss issues relating to product pricing, methods or channels of product distribution, any division of markets, or allocation of customers or any other topic which should not be discussed among competitors. Accordingly, each Member hereby assumes responsibility to provide appropriate legal counsel to its representatives acting under the Member Agreement regarding the importance of limiting their discussions to subjects that relate to the purposes of the Member Agreement, whether or not such discussions take place during formal meetings, informal gatherings, or otherwise.

1.2.10. Al Petrick reads the following text to the body regarding IEEE patent policy:

November 04 doc.: IEEE 802.11-04/424r3

IEEE-SA Standards Board Bylaws on Patents in Standards

6. Patents

IEEE standards may include the known use of essential patents, and patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard. This assurance shall be provided without coercion and prior to approval of the standard (or reaffirmation when a patent becomes known after initial approval of the standard). This assurance shall be a letter that is in the form of either

a) A general disclaimer to the effect that the patentee will not enforce any of its present or future patent(s) whose use would be required to implement the proposed IEEE standard against any person or entity using the patent(s) to comply with the standard or

b) A statement that a license will be made available without compensation or under reasonable rates, with reasonable terms and conditions that are demonstrably free of any unfair discrimination

This assurance shall apply, at a minimum, from the date of the standard's approval to the date of the standard's withdrawal and is irrevocable during that period.

Approved by IEEE-SA Standards Board –, March 2003, July 2004

General Agenda Information Slide 12 Stuart J. Kerry - Philips Semiconductors, Inc.

November 04 doc.: IEEE 802.11-04/424r3

Inappropriate Topics for IEEE WG Meetings

- **Don't** discuss licensing terms or conditions
- **Don't** discuss product pricing, territorial restrictions or market share
- **Don't** discuss ongoing litigation or threatened litigation
- **Don't** be silent if inappropriate topics are discussed… do formally object.

If you have questions,
contact the IEEE Patent Committee Administrator
at patcom@ieee.org

Approved by IEEE-SA Standards Board – December 2002

General Agenda Information Slide 13 Stuart J. Kerry - Philips Semiconductors, Inc.

1.2.11. Stuart Kerry asks if there are any questions on patent policy.

1.2.11.1. No questions

1.2.12. Review of IEEE copyright policy.

1.2.13. Review of IEEE meeting etiquette.

1.3. IP Statements (Letters of Assurance)

1.3.1. Stuart Kerry asks if there are any new LOA?

1.3.1.1. A member states that a document has been uploaded (11-04-1434r0) detailing possible patents impacting TGn

1.3.1.2. Stuart Kerry notes that There was a previous issue with TI and Mesh Networking. We are still waiting for a response from TI after three letters to them.

1.4. Announcements

1.4.1. We have just published 802.11i, and there are awards for the Task Group participants.

1.4.1.1. Award for Dave Halasz, 802.11i Chair, received by Peter Ecclesine.

1.4.1.2. Additional awards are given for Tim Moore, Franck Ciotti, Tony Jeffree, Terry Cole, Jesse Walker.

1.4.1.3. Certificates are given to Bernard Aboba, Nancy Cam-Winget, Clint Chaplin, Dan Harkins, Russ Housley, Paul Lambert, Mike Moreton, Dave Nelson, Henry Patinski, Dorothy Stanley, Doug Whiting, Glen Zorn.

1.4.2. Awards for 802.11j

1.4.2.1. Sheung Li, chair of 802.11j. receives a plaque.

1.4.2.2. Additional plaques are given to Peter Ecclesine, and Inoe-san,

1.4.2.3. Certificates are given to Tomoko Atachi, Terry Cole, Darwin Engwer, Albert Garrett, Chris Hansen, Uriel Limberger, William McFarland, Andrew Myles, Gunner Nitsche, Steven Pope, Masahiro Takagi.

1.5. Network and Software

1.5.1. There were improvements asked for at the last meeting.

1.5.2. Update for attendance and documentation and software.

1.5.3. There are new templates for use for submissions. We now have a template and cover page for Excel spreadsheets.

1.5.4. At the end of this week, all documents must use the new templates with disclaimer.

1.5.5. Harry Worstell thanks Darwin Engwer for his work in making these templates.

1.5.6. Harry reviews the process of attendance recording and voting, and reminds members to sign in for sessions. Any corrections to attendance must be made during the session this week.

1.5.7. Stuart re-affirms that the templates are mandatory for all submissions after the close of this session.

1.5.8. Harry notes that voting membership and reflector participation must be requested by emails. There will be email templates for requesting voting rights, reflector membership, etc.

1.6. Voting Membership Review

1.6.1. Al Petrick presents document 04/511r2

1.6.2. There are 417 voters at the start of the meeting, and 95 nearly voters.

1.6.3. If all nearly voters are registered and have requested rights, we would have 522 voting members.

1.7. Approval of the Agenda

1.7.1. Any change to the agenda? None.

1.7.2. The agenda is adopted and approved by Unanimous consent.

1.8. Interim Meetings

1.8.1. January – Monterey CA

1.8.2. May 2005. Cannot be Sydney, Australia, since the hotel will not be completed. Considering Beijing, China.

1.8.3. September 2005. We have outgrown Boston. We are holding a booking for Garden Grove CA.

1.8.4. January 2006. Considering Hawaii, Big Island or Maui.

1.9. EC Report

1.9.1. Stuart Kerry reads the Executive Committee report in Document 04/1132r0

1.9.2. Reports for working groups to Tim Godfrey by Monday following meetings.

1.9.3. 802.19 Coexistence changes to P&P will be discussed Friday.

1.9.4. There was discussion of the actions of China at the ISO JCT6 meeting last week.

1.9.5. There was an 802.1 Architecture meeting, but 802.11 members were not invited.

1.9.6. There will be an RFP for network services.

1.10. Financial Summary

1.10.1. Will be done Wednesday

1.11. Review of the minutes from September

1.11.1. Any other matters from the minutes? None

1.11.2. The minutes are approved with Unanimous consent

1.12. Policies and Procedures

1.12.1. Al Petrick states that the current P&P is document 04/510r0.

1.13. Objectives for this Session

1.13.1. TGe – John Fakatselis

1.13.1.1. Completed two sponsor recirculations.

1.13.1.2. Plan to submit to RevCom at this week.

1.13.1.3. The Executive Committee have been notified

1.13.1.4. We do not have the official result of the 3rd recirculation.

1.13.2. TGj – Sheung Li

1.13.2.1. Project 802.11j was approved by Revcom on September 24th, and published.

1.13.2.2. The group is formally dissolved.

1.13.3. TGk – Richard Paine

1.13.3.1. resolving comments from LB71. Have done some editorial resolution on teleconferences.

1.13.3.2. All technical comments have been categorized. Document 04/1327.

1.13.4. TGm – Bob O'Hara

1.13.4.1. Will have several slots this week.

1.13.4.2. There will be resolution of an interpretation request in document 1198.

1.13.4.3. The WG chair thanks Inoue-san for his research.

1.13.5. TGn – Bruce Kraemer

1.13.5.1. Will continue presentation on partial and complete proposals. Expanding on Q&A.

1.13.5.2. After Q&A, will conduct first low-hurdle vote.

1.13.6. TGp – Lee Armstrong

1.13.6.1. Ready to prepare a draft. By the end of this session, it could be ready.

1.13.7. TGr – Clint Chaplin

1.13.7.1. Agenda in 04/1414. Currently having presentations of proposals this week. There are eight proposals today and tomorrow.

1.13.8. TGs – Donald Eastlake

1.13.8.1. Agenda is in 04/1149r2. Working on scope and comparison criteria document.

1.13.8.2. Call for Proposals in January

1.13.9. TGT – Charles Wright

1.13.9.1. Will have 6-7 presentations and proposals.

1.13.9.2. Need to appoint editor and secretary for group.

1.13.10. WNG SC – TK Tan

1.13.10.1. There will be two presentations.

1.13.10.2. Update to 802.21, and software define radios.

1.13.11. ADS SG – Jesse Walker

1.13.11.1. Will meet twice. Goal to develop PAR and 5C. Draft PAR in document 04.1214

1.13.12. WIEN SG – Stephen McCann

1.13.12.1. Will have presentations on AP discovery,

1.13.13. WNM SG – Harry Worstell

1.13.13.1. Stuart Kerry reads the Official result of LB72 to approve TGv PAR and 5C passes 254: 42 : 25.

1.13.13.2. WNM will respond to PAR and 5C questions.

1.13.13.3. There will be presentations and discussions

1.13.13.4. Discussion

1.13.13.4.1. Will the comments on the vote be passed to ExCom? Stuart says no, this was a procedural motion. The comments will be reviewed by WNM.

1.13.14. APF Ad Hoc – Dorothy Stanley

1.13.14.1. Will have 2 meetings this week

1.13.14.2. Agenda in 04.1428.

1.13.14.3. Thursday meeting joint with 802.1.

1.13.14.4. The reason for being an AdHoc was to make it possible to deliver text through the TGm process.

1.13.15. Editor – Terry Cole

1.13.15.1. Will meet with each TG editor this week.

1.13.16. Publicity and Plenary tutorial – are moved to Wednesday

1.13.16.1. Change to agenda is approved with Unanimous consent

1.14. Review of other 802 WG PARS

1.14.1. 802.1ah - AMENDMENT: PROVIDER BACKBONE BRIDGES

1.14.1.1. Comments

1.14.1.1.1. A member states that the format of the PAR documents is not clear. Certain fields are not visible or are hidden.

1.14.1.1.2. Stuart Kerry has reviewed the PAR had has the same issue. 802.11 will take the position that this problem needs to be addressed.

1.14.2. 802.1ai - AMENDMENT: MULTIPLE REGISTRATION PROTOCOL

1.14.2.1. No Comments, No position

1.14.3. 802.1aj - AMENDMENT: TWO-PORT MAC RELAY

1.14.3.1. No Comments, No position

1.14.4. 802.3ar - AMENDMENT: ENHANCEMENTS FOR

1.14.4.1. No Comments, No position

1.14.5. CONGESTION MANAGEMENT

1.14.5.1. No Comments, No position

1.14.6. 802.3as - AMENDMENT: FRAME FORMAT EXTENSIONS

1.14.6.1. No Comments, No position

1.14.7. 802.16h - AMENDMENT: IMPROVED COEXISTENCE MECHANISMS FOR LICENSE-EXEMPT OPERATION

1.14.7.1. No Comments, No position

1.14.8. 802.17b - AMENDMENT: SPATIALLY AWARE SUBLAYER

1.14.8.1. No Comments, No position

1.15. IEEE Patent Policy and PatCom processes

1.15.1. Karen Kinney speaks to the group.

1.15.2. Things the PatCom is considering for future changes.

1.15.3. Steve Mills, former member of PatCom is also here.

1.15.4. PatCom is meeting in 2 weeks in New York.

1.15.5. This same discussion will take place on Wednesday in 802.15

1.15.6. Letter of Assurance Form. Considering adding a URL on the form. Today URLs are not allowed.

1.15.7. Check-boxes. May consider an options for a royalty free license.

1.15.8. Fourth checkbox will be added. The patent holder states it will not enforce any patents.

1.15.9. Questions from the floor.

1.15.9.1. Stuart Kerry requests clarification on RAND and RAND-Z. Is it allowed to discuss the difference?

1.15.9.2. Karen believes that RAND and RAND-Z should not be discussed. It is related to terms and conditions.

1.15.9.3. In Berlin the guidance was any statement consistent with the LOA form was acceptable. That form includes RAND or RAND-Z.

1.15.9.4. Karen states these are small nuances. Would like to defer this to the Patent Committee.

1.15.9.5. One of the things we struggle with is that the rules are always in a state of flux. For example LOAs submitted for 802.11g are no longer acceptable. Most members don't understand the Patent Policy.

1.15.9.6. Members don't know that there is no requirement for disclosure. Requiring a form letter for LOA could be considered coercive behavior, which is forbidden by the bylaws.

1.15.9.7. Karen states that our P&P and is in compliance with ANSI.

1.15.9.8. However ANSI allows companies to submit licensing terms in written form.

1.15.9.9. Stuart Kerry asks Karen to come back with a position on "legacy" LOAs. Karen says any forms that are already submitted are grandfathered in.

1.15.9.10. Do the LOA's that have been submitted against earlier parts of the standard apply to future amendments?

1.15.9.11. Karen states that every new project requires new LOAs.

1.15.9.12. So any new PAR would require every LOA be resubmitted?

1.15.9.13. In the evaluation of proposal for a new standard, often patents are claimed to be applicable. What if any weight should the members evaluating proposals give to these assertions, without having LOAs from the patent owners.

1.15.9.14. Karen says no discussion is allowed, so there is no way.

1.15.9.15. If a member makes an assertion of a patent, the Chair is responsible to send a letter to the party holding the patent asking for an LOA.

1.15.9.16. What if the assertion is made against a proposal that has yet to be selected?

1.15.9.17. Karen says no immediate action is required, and members should not place any weight on the assertion.

1.15.9.18. Suggestion that the submission of LOAs be moved to much earlier than submission of finished standard to RevCom. Members don't know how to vote because they don't have all the information.

1.15.9.19. Karen's opinion is that the technology should be evaluated on the technical merits only, without consideration of IP.

1.15.9.20. If somebody stands up and says a patent is applicable to the proposal under discussion, is that a violation of policy?

1.15.9.21. No, that is disclosure, and is OK.

1.15.9.22. So you are allowed to say it is applicable, but you are not allowed to say it is not applicable?

1.15.9.23. Karen hopes Dave Ringle can take this up in December.

1.15.9.24. Stuart Kerry notes that a patent number was given during a session. The group will pursue an LOA from the company owning the patent. TG chairs have to pass along to the WG chair.

1.15.9.25. Even though a group can submit a RAND or RAND-Z to the IEEE on a form letter, it cannot be discussed here? In Berlin it was acceptable to make statements consistent with the LOA form letter. Now it is not?

1.15.9.26. Karen states that if it is on the form in the current format, it is acceptable. However a free-form letter must be reviewed, and may not be accepted until review.

1.15.9.27. The IEEE does not review the contents of letters, but does reject letters with too much information – simply because they contain terms and conditions. This makes it difficult for some companies to submit LOAs. If a company wants to be forthcoming that is not acceptable.

1.15.9.28. Karen – the IEEE will not take a position on whether terms are reasonable.

1.15.9.29. There is no requirement for disclosure, and LOAs are not submitted until long after decisions are made.

1.15.9.30. 802 suffered problem with Token Ring. TGf had IPR disclosed after the last sponsor ballot. There is no way to force anyone to disclose IPR before work is done.

1.15.9.31. Is it acceptable to present the LOA as part of the presentation (only the official form)?

1.15.9.32. Paul Nicolich says it is acceptable if the IEEE PatCom has accepted the LOA.

1.15.9.33. But comparing to any other LOA would be out of order?

1.15.9.34. Paul doesn't know. Stuart asks Paul and Karen to come back with an answer on Wednesday.

1.15.9.35. What if a company wants to offer both RAND and RAND-Z, depending on who the licensing company is? Can the form handle that?

1.15.9.36. We don't want to swing the other way and use LOAs as a bargaining chip for considering different proposals.

1.15.9.37. Are inter-company patent swapping agreements discriminatory?

1.15.9.38. Karen says IEEE can't get involved in determining T&Cs.

1.15.9.39. Stuart Kerry notes that the LOA letters go directly to Dave Ringle. The WG chair doesn't receive a copy. Requests that a copy to the WG chair becomes mandatory.

1.16. Recess at 3:34pm

2. Wednesday, November 17, 2004

2.1. Opening

2.1.1. The meeting was called to order at 10:50AM by Stuart J. Kerry. The opening was delayed because of the long distance walk from the hotel.

2.1.2. There are 268 people in the room.

2.2. Review of the agenda

2.2.1. The agenda in 04-11-09930r3 is presented.

2.2.2. Added the financial review and other items deferred from Monday.

2.2.3. 802.21 update from A.J., WNM motions on PAR comments, ISO JC6, new document process.

2.3. Announcements

2.3.1. Correction to the agenda. It was the WIEN study group comments from 802.21 that will be reviewed.

2.3.2. Under new business, add a liaison report to/from 802.22

2.3.3. Under new business, add a discussion of SEC new position. (Emeritus)

2.3.4. Add an item for WG Technical Editor Report.

2.3.5. Social will be moved indoors

2.4. IP Policy

2.4.1. Stuart J. Kerry asks the group if they are aware of the IEEE patent policy.

2.4.2. There are no new LOAs from any members.

2.5. Approval of the Agenda

2.5.1. The agenda is approved with Unanimous consent

2.6. Liaisons

2.6.1. 802.18 – Denis Kuahara

2.6.1.1. Report in document 04/1480r1

2.6.1.2. Involved in 802.22 on TV band sharing NPRM.

2.6.1.3. Preparing comments on TV band sharing NPRM, and proposed rules changes.

2.6.1.4. Discussion

2.6.1.4.1. Stuart Kerry asks Denis for the procedure for when the comments go to ExCom for a vote.

2.6.1.4.2. Stuart Kerry notes that that if the motion doesn't come up in ExCom, there is a procedure in 802.18, where the motion can be done by email. If there is no reply or discussion, the motion is approved.

2.6.1.4.3. Request to appoint an ad-hoc group to review comments.

2.6.1.4.4. Peter Ecclesine will coordinate an ad-hoc group to bring back an official position for 802.11 on Friday.

2.6.1.5.

2.6.2. 802.19 –

2.6.2.1. Calling for volunteers – none.

2.6.3. General Announcements

2.6.3.1. Call for members receiving awards

2.6.3.1.1.1. Russ Housley – not present

2.6.3.1.1.2. Dave Nelson – not present

2.6.3.1.1.3. Doug Whiting – not present

2.6.3.1.1.4. William McFarland – present. Receives certificate for help in completing the 802.11j standard.

2.6.3.1.1.4.1. Discussion from the floor

2.6.3.1.1.4.1.1. When the awards were given for 802.11i, one person was omitted. Neils Ferguson designed the Michael Algorithm, and should be given an award.

2.6.3.1.1.4.1.2. Stuart Kerry has notified the IEEE that we missed him, and the award will be given.

2.6.3.1.1.5. Christopher Hansen – present. Receives certificate.

2.6.3.2. Stuart Kerry notes that the rogue network has been switched off

2.6.4. 802.11 to WiFi Alliance – report by Al Petrick

2.6.4.1. Document 04/1483r0

2.6.4.2. Review of active task groups, future meeting schedule,

2.6.5. 802.11 to JEDEC JC61 – Tim Wakeley

2.6.5.1. Document –

2.6.5.2. BBRF interface has been published.

2.6.5.3. Completed requirements for interoperability MRD

2.6.5.4. Working on clock extension

2.6.5.5. Working on FCC NPRM on Partitioned modules.

2.6.6. 802.11 from IETF – Dorothy Stanley

2.6.6.1. Document 04/1464

2.6.6.2. One EAP document we have been requested to review. We are reviewing at this meeting.

2.6.6.3. A new request for 802.11 to review 802.11 EAP Keying requirements. Will be discussed in TGr.

2.6.6.4. CAPWAP has been rechartered. Taxonomy is near complete. Next steps are protocol evaluation/selection document.

2.6.6.5. An internet draft has been created on the topic of benchmarking 802.11 LANs. The 802.11 position is this work should be done in 802.11. There will be ongoing dialog.

2.6.6.6. There has been an IETF submission on Mobile IPv6 regarding fast handoff.

2.6.6.7. Discussion

2.6.6.7.1. The network selection draft from the IETF has been reviewed by the WIEN study group. The WIEN group has prepared a liaison document, which will be brought forward Friday.

2.6.6.7.2. The report is authorized by the group.

2.6.7. 802.11 to MMAC – Inoue-san

2.6.7.1. Document – 1453r0

2.6.7.2. MMAC has continuing maintenance of ARIB STD-T71 to keep it aligned with 802.11, and new 5GHz spectrum allocations in Japan.

2.7. Old Business

2.7.1. 802.11 and 802.15 Joint Treasury

2.7.1.1. Al Petrick presents Document 1481r2

2.7.1.2. May Meeting report. $82K income

2.7.1.3. September meeting – projected $71K Aus Surplus.

2.7.1.4. Treasury had $45K balance in August 2004.

2.7.1.5. November balance is $82K

2.7.2. Publicity Activity Review

2.7.2.1. Stuart Kerry calls for volunteers for Publicly Committee?

2.7.2.1.1. Nanci Vogtli volunteers. Nancy is appointed as the Publicity Chair by acclamation.

2.7.2.2. Report in 04/1482r2.

2.7.2.3. Had updates from industry alliances, press coverage.

2.7.2.4. Discussed event calendar. Greg Rasor (802.15 joint treasurer) will create event tracking spreadsheet.

2.7.2.5. Will work to maintain web site updates and keep them current. We will have updates per the scheduled dates of the CAC.

2.7.2.6. Press release for 802.11j is being prepared. Will vote on Friday.

2.7.2.7. Discussed pre-standard device announcements. IEEE will develop guidelines. 04/1461 is a work in progress, open for comments and review.

2.7.3. Tutorial Slots

2.7.3.1. Stuart asks the group's opinion about running 802.11 sessions at the same time as tutorials.

2.7.3.2. The IEEE 802 position is to discourage having official WG sessions during tutorials.

2.7.3.3. Harry Worstell believes that Tutorials are important, and some may want to attend them. But we have business we have to conduct, and we don't have as much time in plenary sessions anyway. Suggests we add one or two interim meetings per year.

2.7.3.4. Al Petrick agrees with Harry

2.7.3.5. Discussion from the Floor:

2.7.3.5.1. Suggest that we suggest that the Tutorials scheduled so the ones of interest for wireless are all on Monday, so we don't have to give up two nights.

2.7.3.5.2. Stuart Kerry agrees that that could be done.

2.7.3.5.3. Understand that we have work to done, but rather than another interim, we could get rid of the social.

2.7.3.5.4. Recognizes the need for setting aside Thursday. Because 802 is so large, the validity of having a social should be reconsidered. Suggests that we should still attend the 802 plenary to keep appraised of other WG activities. Approves of not having a joint wireless session at plenary meetings. Supports having one evening for Tutorials.

2.7.3.5.5. Do you mean removing Plenary social, or Interim social? Just the Plenary social. Many do not show up, and many leave quickly for private dinners.

2.7.3.5.6. There are 1600 registered at this meeting.

2.7.3.5.7. Agree to eliminate the Wednesday social. Also suggest that the Tutorials be held Monday AM, since most people don't go to ExCom.

2.7.3.5.8. Supports clearing one night for tutorials. Suggests moving ExCom to Sunday. Suggests "meet and greet" time could be during the new members orientation.

2.7.3.5.9. Stuart notes that the leadership and membership need some rest time during the week to think and consider.

2.7.3.6. Straw Poll: That the IEEE 802 limit the Tutorials of interest to 802.11 to one evening meeting on Monday, noting that 802.11 will keep that evening slot open.

2.7.3.6.1. YES: 171 NO: 47

2.7.3.6.2. Discussion

2.7.3.6.2.1. This would mean we lose working on Monday? Yes.

2.7.3.7. Straw Poll: That the IEEE 802 remove the 802 plenary session "social event" on Wednesday evening.

2.7.3.7.1. YES: 109 NO: 92

2.7.3.7.1.1. Suggests straw poll on whether we want more interim meetings. Stuart suggest that be done on the reflector.

2.7.3.7.1.2. Suggests that tutorials be moved to Thursday evenings.

2.7.3.8. Straw Poll: That the IEEE 802 create a Thursday evening Tutorial meeting in lieu of a Monday or Tuesday evening event.

2.7.3.8.1. YES: 125 NO: 25

2.7.4. CAC Secretaries focus

2.7.4.1. Document has been created and is being reviewed by the CAC. Harry will provide to CAC members.

2.7.4.2. We will make them available to all secretaries when reviewed.

2.7.5. Bonneville Tiger Team

2.7.5.1. Al Petrick reports that this will be moved to the Thursday evening CAC meeting, and reported on Friday

2.7.6. 802.11v Chair Volunteers (Network Management SG)

2.7.6.1. None.

2.7.7. WIEN SG Motions on PAR

2.7.7.1. Stephen McCann presents the 802.11u PAR Title. The change is proposed to change the title to “802.11 Interworking with external networks”.

2.7.7.2. Only removing the word “wireless” – an editorial change.

2.7.7.3. Update wording regarding overlap with 802.21 scope, to include “ongoing formal coordination”.

2.7.7.4. Coordination will have to be documented formally.

2.7.7.5. Discussion

2.7.7.5.1. Stuart asks Stephen if he believes this is editorial? Yes.

2.7.7.5.2. How long will the WIEN SG exist? Only until Friday.

2.7.7.5.3. Suggest that the wording include the TG following the SG.

2.7.7.5.4. Stuart suggests changes to wording to include subsequent Task Group.

2.7.7.5.5. Stephen agrees to the change

2.7.7.5.6. There is no objection to the change from anyone present

2.7.7.6. Motion: Move to approve the PAR document IEEE 802.11-04/506r11, and 5 Criteria document IEEE 802.11-04/507r4 for the WIEN Study Group, and forward to ExCom for approval

2.7.7.6.1. Moved Stephen McCann

2.7.7.6.2. Second Sheung Li

2.7.7.6.3. Discussion

2.7.7.6.3.1. Amend document number to r11 due to changes. No objection.

2.7.7.6.4. Motion ID 504

2.7.7.6.5. Vote: 106 : 1 : 5

2.7.8. WG Editor Update

2.7.8.1.1. Update on ISO documents. 2003 has not been approved

2.7.9. ISO JTC1/SC6 Overview

2.7.9.1. Document -

2.7.9.2. There was an ISO meeting in Orlando last week.

2.7.9.3. IEEE 802 standards are submitted for international accreditation to ISO.

2.7.9.4. China has submitted an alternative security mechanism (WAPI) they want to have added to the ISO version of 802.11i.

2.7.9.5. Normally IEEE 802 standards are submitted through the UK National Body and submitted to WG1.

2.7.9.6. Issue is how to move a work item from ISO WG1 back into 802.11 for collaboration. There is no existing process.

2.7.9.7. Discussion

2.7.9.7.1. Could we create a chairs ad-hoc committee to draft a response to SC6?

2.7.9.7.2. Stuart notes that Al Petrick, Bruce Kraemer, Dorothy Stanley, and Jesse Walker have been working on this. Stuart will form Chairs Ad Hoc group. Jesse Walker will be the chair and coordinate. Al Petrick is officially appointed to the team. Volunteers should see Jesse Walker.

2.7.9.7.3. Ho-In Jeon has officially appointed as the liaison form JTC6 to 802.11. He is appointed to the Ad Hoc as well.

2.7.10. Document Templates – Darwin Engwer

2.7.10.1. Harry Worstell and Darwin have worked together to develop new templates.

2.7.10.2. There are detailed instructions in the templates.

2.7.10.3. There is a patent notice on the title page of all documents

2.7.10.4. The format supports multiple authors, abstract, and references.

2.7.10.5. These templates will be required as of the end of this session. Even for revisions of document that have been presented before, they will have to be re-formatted.

2.7.10.6. Task Group chairs will have to enforce this.

2.7.10.7. Darwin explains how to use the templates to the members.

2.7.10.8. These templates will be on the website be tonight. See Darwin and Harry Worstell with any questions.

2.7.10.9. The group thanks Harry and Darwin for their hard work

2.7.11. Remaining agenda items are moved to Friday

2.7.12. Announcements

2.7.12.1. The social will be in the Hyatt tonight

2.8. Recess at 12:40

3. Friday, November 19, 2004

3.1. Opening

3.1.1. The meeting is called to order at 8:00AM by Stuart J. Kerry

3.2. Agenda Review

3.2.1. Stuart reads the agenda for this session from document 04/993r3.

3.2.2. There are 143 people in the room.

3.2.3. A motion from Peter Ecclesine is deleted.

3.2.4. Any further agenda changes? None

3.2.5. The agenda is approved with Unanimous consent.

3.3. Announcements

3.3.1. The CAC schedule is in the agenda. Minutes and reports are due November 22nd. Next session Graphic will be Nov 24th.

3.4. IEEE SA LOA

3.4.1. Is everyone aware of the patent policy? Yes

3.4.2. Any objections or dissent? None

3.5. Reports from TG, SG, SC

3.5.1. TGe – John Fakatselis

3.5.1.1. Document 04-1216
3.5.1.2. Resolved 52 comments, will move to sponsor recirculation.
3.5.1.3. Next meeting, finalize the draft, and submit to RevCom.

3.5.2. TGk – Richard Paine

3.5.2.1. Report in document 04-1520
3.5.2.2. Continued comment resolution on LB71
3.5.2.3. Had 26 presentations, 3 new presentations, approved 180 comments from teleconferences, 204 comments from ad-hoc, and 71 here.
3.5.2.4. Will conduct next LB in January.
3.5.2.5. Teleconferences will continue on Wednesday
3.5.2.6. Discussion
3.5.2.6.1. Do you expect LB after January? At the Monterey meeting.

3.5.3. TGm – Bob O'Hara

3.5.3.1. Report in document 04-1435
3.5.3.2. Processed interpretation request, response in 04-1454r0, which was approved by TGm.
3.5.3.3. 73% of work items were completed.
3.5.3.4. 802.11ma-d0.4 is current working draft of revision standard.
3.5.3.5. In January, will continue with work items, working toward 802.11 revision for LB in March.

3.5.4. TGn – Bruce Kraemer

3.5.4.1. Report in document in 04-1512
3.5.4.2. Had presentations and low hurdle vote.
3.5.4.3. MitMot 47.4%. TGnsync 73.7%, WWise 64.7%, Qualcomm 58.6%.
3.5.4.4. There were 266 votes, with one invalid ballot. The invalid ballot was not counted.
3.5.4.5. Will continue Q&A on proposals, and conduct down-select vote in January.
3.5.4.6. The Task Group will conduct an election for vice-chair.
3.5.4.7. Discussion
3.5.4.7.1. The low hurdle vote was a roll call? Yes, it was paper ballot, but members names were recorded and will be published.
3.5.4.7.2. The results will be in the members private area? Yes? The LMSC P&P require that roll call votes are part of the minutes and public.
3.5.4.7.3. There were problems with the PDF of results. Stuart notes it was tested to open with all standard and professional versions.
3.5.4.7.4. Stuart calls for volunteers for TGn vice chair to see Stuart Kerry or Bruce Kraemer

3.5.5. TGr – Clint Chaplin

3.5.5.1. Presentation in 04/1518
3.5.5.2. Had 8 proposals, modified down-select process
3.5.5.3. Will have motion to forward letter to IETF

3.5.6. TGs – Donald Eastlake

3.5.6.1. Report in 04/1504r2
3.5.6.2. Working on CFP,
3.5.6.3. In January will complete CFP

3.5.7. TGT – Charles Wright

3.5.7.1. Document 04/1389

3.5.7.2. Heard presentations, and discussed framework, measures, methodologies.

3.5.7.3. Will continue weekly teleconferences, starting December 2nd on Thursdays.

3.5.8. ADS SG – Jesse Walker

3.5.8.1. Report in document 04/1515

3.5.8.2. Appointed Jon Edney as editor for PAR and 5C.

3.5.8.3. Worked on PAR at this meeting in document 04/1214r2

3.5.8.4. Will continue in January working on PAR and 5C, and will have presentations.

3.5.8.5. Stuart notes that the WG reflectors should be used for discussion of the SG PAR and 5C.

3.5.9. APF SG – Dorothy Stanley

3.5.9.1. Document 04/1516

3.5.9.2. Continued definition of AP functions in document 04/1225.

3.5.9.3. 802.1d may have a new work item to extend 802.1d port types.

3.5.9.4. In January, will continue to work on text for submission to TGm.

3.5.9.5. Thanks to Sandy Turner for serving as Secretary

3.5.10. WNG SC – report by Harry Worstell

3.5.10.1. Document 04/1424

3.5.10.2. Had presentations in one session this week.

3.5.10.3. Objectives for January: updates from MMAC and other regulatory

3.5.11. TGp – Lee Armstrong

3.5.11.1. document 04/1519

3.5.11.2. Reviewed 802.11p draft, restructured.

3.5.11.3. Had proposal for managing packet queuing, to be reviewed ongoing before next meeting.

3.5.11.4. An Ad Hoc SG will investigate and report back in January.

3.5.11.5. Stuart notes that the next meeting objectives are not in the report. Lee will release a revised report by Monday.

3.5.12. Side Discussions

3.5.12.1. Jon Rosdahl notes that his problem with Acrobat was the use of version 4.0. The versions 5.0 or 6.0 will work OK.

3.5.12.2. The awards for Doug Whiting, Russ Housley are given to Jesse Walker.

3.5.13. WIEN SG – Stephen McCann

3.5.13.1. Document 04/1514

3.5.13.2. Had presentations from SSCAN forum and 3GPP2, and other technical presentations.

3.5.13.3. Processed comments on PAR and 5C from 802.21.

3.5.13.4. Produced liaison letter to IETF on “netsel-problem” document.

3.5.13.5. In January, will discuss open issues, and working on initial requirements and selection criteria documents.

3.5.13.6. The minutes will be 04/1523

3.5.14. WNM SG – Harry Worstell

3.5.14.1. Document

3.5.14.2. Had 4 hours of SG meeting, reviewed LB72, that passed with approval of 86%. Considered about 50 “no” comments.

3.5.14.3. WNM will liaison with ADS SG to have ADS SG extend their PAR to cover security requirements of WNM.

3.5.14.4. Discussion

3.5.14.4.1. Move to withdraw WNM PAR and 5C

3.5.14.4.2. Stuart notes that motion is out of order.

3.5.14.4.3. What was the WNM SG reception to the presentations asking for changes to the PAR? The PAR has passed the WG LB, and moved to ExCom . The WG no longer owns the PAR.

3.5.15. ANA Report – Duncan Kitchin

3.5.15.1. Not Present at the meeting.

3.5.16. WG Editor – Terry Cole

3.5.16.1. Was done Wednesday

3.5.17. CAC Bonneville Team – Al Petrick

3.5.17.1. This is not the final report.

3.5.17.2. There was discussion of the 4 hour rule.

3.5.17.3. The chair directs Al Petrick to have the final closing resolution at the January meeting.

3.6. Liaisons

3.6.1. Looking for volunteers to liaison to 802.22

3.6.2. Nominating Peter Ecclesine

3.6.3. No other nominations.

3.6.4. Peter Ecclesine is accepted as the liaison by acclamation.

3.7. ExCom New Positions

3.7.1. Jon Rosdahl states his concern regarding the new position on the ExCom for “member emeritus”. Feels that at some point members should retire and allow new members to come in. Without regard to who would be considered for such a position, would like to direct the WG chair to vote no on that position.

3.7.2. The motion will be brought in new business.

3.7.3. Discussion

3.7.3.1. Stuart notes that it is unclear what the period of time is for this position.

3.8. 802 Architecture Group

3.8.1. Stuart requests volunteers to assist the WG by attending the 802.1 meeting chaired by Tony Jeffree.

3.8.1.1. Roger Durand

3.8.1.2. Andrew Myles is tentative

3.9. Documentation Update

3.9.1. There were concerns over templates presented in Wednesday plenary session.

3.9.2. The text on the cover page has been in use by 802.15 and 802.16 for several years. It states our policy, and gives the IEEE a license to use the material in the IEEE process. It does not transfer any IP rights.

3.9.3. Stuart Kerry encourages any member to have their IP counsel review it.

3.9.4. These templates will not be mandatory until January 1, 2005. Members are encouraged to start using the new templates as soon as possible.

3.9.5. If anyone does have questions, there is no opportunity to discuss before the next meeting. Stuart notes that any issues should be addressed directly to the chair, or use the reflector.

3.9.6. The templates will be posted shortly after this meeting out our server.

3.9.7. Stuart notes that the only difference from 802.15 or 802.16 is the URL reference on our is directly to the IEEE.

3.9.8. We had requests to enlarge the document number. This requires a minor P&P change, but will increase the point size to about 18.

3.9.9. We are changing the dates to the international standard YYYY-MM-DD

3.9.10. Stuart notes that we are adhering to the international policy of IEEE.

3.9.11. Discussion

3.9.11.1. Do we really need the addresses of the authors? Stuart suggests we try it.

3.9.11.2. The author area is actually a table. It is expandable. You can add rows. Keying TAB at the end of the table will create a new row.

3.9.12. We were directed to add a search engine to the software for documents. We are looking at how to adopt or incorporate two packages into our software.

3.9.12.1. Stuart Kerry notes that we are not in the timeframe of the motion that was passed, but we will work as fast as possible.

3.9.12.2. Stuart cannot provide a revised schedule. It is a financial constraint based on the joint treasury.

3.9.13. Our document template has been reviewed by 802.15 and 802.16.

3.10. WG Updates

3.10.1. 802.18

3.10.1.1. On the 802.18 SG1 in response to the NPRM for using unlicensed devices in the TV bands. There was a motion to remove discriminatory language against personal portable devices.

3.10.1.2. Documents will be on the 802.18 SNAP server.

3.10.1.3. Stuart notes that 802.18 has a 5 day email ballot by exception (default passes).

3.10.1.4. Stuart notes that the document must be posted to the 802.11 Email reflector for our members comments.

3.10.2. 802.19 – Steve Shellhammer

3.10.2.1. Working on coexistence methodology for coexistence assurance document.

3.10.2.2. IEEE 1073/1074 Wireless Applications for Medical devices. There will be an email to our reflector.

3.10.2.3. Liaison to from 802.11 and 802.19. Volunteers? None.

3.11. Old Business

3.11.1. TGe Motions – John Fakatselis

3.11.1.1. Believing that sponsor ballot comment responses in 11-04/1394R4 and the document mentioned below satisfy IEEE-SA rules for sponsor ballot recirculation, Authorize a SB recirculation of 802.11e draft 12.0 to conclude no later than 01/01/2005.

3.11.1.1.1. Moved John Fakatselis on behalf of TGe

3.11.1.1.2. Discussion

3.11.1.1.2.1. In the CAC john has said the documents will be available by the 3rd of December. Srini says this is achievable.

3.11.1.1.2.2. Can we update the draft template? Since we haven't actually produced the draft yet? Stuart suggests attending the CAC meeting on Sunday in January to help re-word.

3.11.1.1.2.3. Believes TGe has compromised the quality of the document. There were technical comments received that were rejected because they are not on text that was changed. Requests TGe fix the problems before recirculating. Against the motion.

3.11.1.1.2.4. The task group reviewed the comments, and they were not on changed portions of the draft. They changes did nothing to improve the interoperability or readability. The group reviewed in detail, and has agreement from the WG chair on how to resolve this issue.

3.11.1.1.2.5. Has document 04/1394r4 been produced? Yes, the comments resolutions have been on the server.

3.11.1.1.2.6. Srini Kandala states that 1394r4 was on the server yesterday. The draft is not ready.

3.11.1.1.2.7. Anyone who is not happy with having a draft ready can vote against it in the motion or sponsor ballot.

3.11.1.1.2.8. There are several comments that were outside the rules of acceptance because they don't comply with the rules for sponsor recirculation ballots. We are following the rules. However, we will re-examine them at a future time. The TG desires to address them at the proper time.

3.11.1.1.3. Call the question – John Fakatselis / John K

3.11.1.1.3.1. Vote on calling the question: passes 68 : 15 :17

3.11.1.1.4. Motion ID 505

3.11.1.1.5. Vote on the main motion: Passes 74: 11 : 19

3.11.2. TGm Motions – Bob O'Hara

3.11.2.1. Moved: to adopt document 11-04/1454r0 as the response to the interpretation request.

3.11.2.1.1. Moved Bob O'Hara on behalf of TGm

3.11.2.1.2. Approved with Unanimous consent

3.11.3. TGr Motions

3.11.3.1. Move to request Stuart J. Kerry, Chair of IEEE 802.11 to send the letter in 04/160r7 to Harald Alvestrand IETF Chair, with a copy to the IESG, Requesting publication of the EAP Method Requirements for Wireless LANs as an IETF Informational RFC, including the one sentence change indicated in r7

3.11.3.1.1. Moved Clint Chaplin on behalf of TGr

3.11.3.1.2. The motion is approved by Unanimous consent

3.11.4. Publicity Motions

3.11.4.1. Move that the 802.11WG forward IEEE 802.11j press release document 04-1487-01-0000 to ExCom for approval and forward to IEEE for media publication.

3.11.4.1.1. Moved Al Petrick

3.11.4.1.2. Second Inoue-san

3.11.4.1.3. Motion approved by Unanimous consent

3.11.5. ADS SG Motions

3.11.5.1. Move to request the IEEE 802.11 Working Group to extend the ADS Study Group through the March 2005 meeting and forward to the Executive Committee for Approval..

3.11.5.1.1. Moved Jesse Walker on behalf of ADS SG

3.11.5.1.2. Motion approved by Unanimous consent

3.11.6. WIEN SG Motions

3.11.6.1. Move to request the IEEE 802.11 Working Group to extend the WIEN Study Group through the March 2005 meeting and forward to the Executive Committee for Approval.

3.11.6.1.1. Moved Stephen McCann on behalf of WIEN SG

3.11.6.1.2. Motion approved by Unanimous consent

3.11.6.2. Move to request the IEEE 802.11 Working Group to approve document 11-04-1501r0 and request the IEEE 802.11 Working Group chair to forward it to the IETF.

3.11.6.2.1. Moved Stephen McCann on behalf of WIEN SG

3.11.6.2.2. Motion approved by Unanimous consent

3.11.7. WNM Motions

3.11.7.1. Move to request the IEEE 802.11 Working Group to extend the WNM Study Group through the March 2005 meeting and forward to the Executive Committee for Approval.

3.11.7.1.1. Moved Harry Worstell

3.11.7.1.2. Second Al Petrick

3.11.7.1.3. Motion approved by Unanimous consent

3.11.8. Motions from the Floor

3.11.8.1. Move to withdraw the network management PAR document 04-0537-08 and 5 Criteria document 04-0684-01 from the Executive Committee's consideration and agenda

3.11.8.1.1. Moved Roger Durand

3.11.8.1.2. Second Chris Hansen

3.11.8.1.3. Discussion

3.11.8.1.3.1. Speaks against the motion – the body has already decided to approve this PAR.

3.11.8.1.3.2. Concern that this PAR too vague. It could be hijacked for a different purpose. The purpose is to create a MIB, but the AP functions are just being defined now. The SG is working on fixing the PAR. It has not yet been received by ExCom. Suggest now is the time to withdraw before ExCom approval.

3.11.8.1.3.3. This PAR and 5C have received overwhelming support in the letter ballot. It has been before all of 802 for more than 30 days. The ExCom is will known for requiring that scope and purpose are well defined.

3.11.8.1.3.4. A narrow PAR is important to keep the progress of the TG on track. Supports the motion. The PAR should be correct before proceeding to as Task Group.

3.11.8.1.3.5. Against the motion – this PAR is representative of what is needed to treat 802.11 as a system. This PAR was approved

by a duly constituted letter ballot. This work will allow technologies from outside 802.11 to help it.

3.11.8.1.3.6. For the motion. This is a serious concern, and wants to see the PAR tightened.

3.11.8.1.4. Call the question (Ed Reuss, Bob O'Hara)

3.11.8.1.4.1. Point of Order: What is the percent? Calling the question is 2/3. Revoking the PAR is 75%.

3.11.8.1.4.2. The question is called with Unanimous consent

3.11.8.1.5. Motion ID 506

3.11.8.1.6. Vote on the main motion: Fails 36 : 36 : 40

3.11.8.1.7. Stuart notes that it is the duty of members to read the documents before voting on them, and admonishes any members that don't.

3.11.8.1.8. Discussion

3.11.8.1.8.1. Will this vote information be presented to ExCom? Yes.

3.11.8.1.8.2. Is it true that members can abstain from a ballot and maintain rights? Yes, the chair notes that members can abstain from a ballot due to lack of technical expertise and maintain their voting rights.

3.11.8.1.8.3. LB72 was not clear on whether comments were acceptable.

3.11.8.1.8.4. Stuart states that comment processing depends on the motion in the letter ballot.

3.11.8.1.8.5. Please clarify the rule for abstaining. Are there limits on number of consecutive abstains? Stuart advises against it, but it is up to the members conscience.

3.11.8.2. Move to direct the 802.11 WG Chair to vote NO on the question of creating an Emeritus Position in the 802 SEC

3.11.8.2.1. Moved Jon Rosdahl

3.11.8.2.2. Second Srini Kandala

3.11.8.2.3. Discussion

3.11.8.2.3.1. This is to remove Stuart from the pressures of the case at hand, but representing the group in his position.

3.11.8.2.3.2. Is this a voting position on ExCom? No. There are currently members of ExCom that are not accountable to anyone in 802.

3.11.8.2.3.3. Against the motion. Was at the ExCom. They have not actually defined the title and duties of this position yet. Stuart will not be able to act if our motion is too constrained.

3.11.8.2.3.4. In favor – calling this emeritus will cause endless confusion. Paul said this would be a non-voting position. We should direct Stuart to vote against it as long as the name has emeritus in it.

3.11.8.2.3.5. Hoping the chair will see the sentiment of the group. Concern is that SEC wants to put more people on the board. It is created as an advisor, and not accountable to the rest of 802. Needs to have a clear and distinct definition. It is clear that the plan is to get it through without clear definition. Against that approach, and supports this motion.

3.11.8.2.3.6. Suggests changing the motion to say "additional SEC positions until specifically directed by the WG.

3.11.8.2.3.7. Straw Poll on the suggested change:

3.11.8.2.4. Motion to amend as stated, approved with Unanimous consent.

3.11.8.2.5. Motion as amended: Move to direct the 802.11 WG Chair to vote NO on the question of creating any new position at the 802 SEC until directed otherwise by the WG.

3.11.8.2.6. Discussion

3.11.8.2.6.1. This could be too restrictive as it includes new WG or TAG positions, and doesn't fulfill the intent.

3.11.8.2.6.2. The work of 802 is broadening at a rapid pace. The current 802.SEC cannot meet the requirements. The objective is to help the SEC deal with the Chinese issues at ISO.

3.11.8.2.6.3. Stuart notes that there could be an acclamation of the 802.22 chair. He will interpret this motion as not including new WG chairs such as 802.22.

3.11.8.2.6.4. This would be a non-voting position, and only one previous ExCom member would be allowed to hold the position.

3.11.8.2.6.5. Recalled that the addition of an SEC vice chair was done without notification of 802 members. Wanted to create simple motion to give Stuart simple direction. Cannot move to amend or revert., but preferred the original motion.

3.11.8.2.6.6. The issue is on the specific name of the position. Suggests we vote against any position that isn't even clearly named. Doesn't feel any emeritus position would have he best interests of 802 in mind.

3.11.8.2.6.7. Would prefer to see any new positions for SEC be voted upon in the 802 plenary sessions. In favor

3.11.8.2.6.8. The motivation of this is due to the lack of accountability in the SEC. The WG doesn't understand why there are ISO standards in addition to IEEE. This motion is designed to increase the accountability of SEC to the WG members.

3.11.8.2.7. Move to amend to: Move to direct the 802.11 WG Chair to vote according to the majority opinion expressed during the WG discussion of the creation of the "emeritus" position.

3.11.8.2.7.1. Moved Dave Bagby

3.11.8.2.7.2. Second Bruce Kraemer

3.11.8.2.7.3. Discussion

3.11.8.2.7.3.1. In favor – this does not tie Stuarts hands. This is a good compromise.

3.11.8.2.7.3.2. This makes the motion meaningless. What is the majority opinion? We don't know.

3.11.8.2.7.3.3. The intent is clear.

3.11.8.2.7.3.4. Against – we need to be clear what our position is. Can't vote for this until we know the position is.

3.11.8.2.7.3.5. The LMSC rules set the membership of the SEC. The membership cannot be changed by a vote within the SEC. So this debate is moot.

3.11.8.2.7.3.6. Wants to point out that the purpose is to alleviate the chair from being in a difficult circumstance due to personal relationships on the SEC. This motion doesn't give him the strength of the WG membership.

3.11.8.2.7.4. Call the question (Mike M / Jim Z) No objections.

3.11.8.2.7.5. Vote on the motion to amend: fails 1 : 58 : 38

3.11.8.2.8. Motion on the floor: Move to direct the 802.11 WG Chair to vote NO on the question of creating any new position at the 802 SEC until directed otherwise by the WG.

3.11.8.2.8.1. Discussion

3.11.8.2.8.1.1. Email from Paul Nicolich for the actual motion to be brought this afternoon: To approve the creation of EC member emeritus position with the following conditions. Years of experience, non voting, single position, expires at ExCom election. Planning to nominate Geoff Thomson.

3.11.8.2.8.1.2. When will the ExCom elections be? In March 2006.

3.11.8.2.8.1.3. Could that motion be amended in ExCom? Yes.

3.11.8.2.8.1.4. In favor – we need to have this group affirm new positions.

3.11.8.2.8.1.5. Against the intent. The ExCom is trying to do the right thing. This doesn't change the power. Designed to help 802 on the international stage. ISO is the only international standards organization. In the international community, titles are more important.

3.11.8.2.8.2. Call the question (Donald E/ Jim Z) no objection

3.11.8.2.8.3. Motion ID 507

3.11.8.2.8.4. Vote on the motion: Passes 49 : 21 : 24 (50% required).

3.11.8.2.8.5. Discussion

3.11.8.2.8.5.1. Does this motion conform for 802 P&P for a WG chair taking a WG directed position? Or is the result of this simply asking the chair to vote no?

3.11.8.2.8.5.2. Al Petrick takes the chair

3.11.8.2.8.5.3. The chairs believe that it is true that the WG can direct the WG chair to vote on this per our P&P.

3.11.8.2.8.5.4. Is the result sufficient for Stuart to state this as a WG directed position. Requests seeing the 802 P&P regarding directed positions.

3.11.8.2.8.5.5. Stuart Kerry reads from LMSC rules section 9.3:

PROCEDURE FOR ESTABLISHING A DIRECTED POSITION (Formerly "Procedure 9") Members of the LMSC Executive Committee have a responsibility to act in the best interest of the LMSC as a whole. Working Group Chairs have a responsibility to represent their Working Group on the Executive Committee. At times these responsibilities are in conflict with each other.

Decisions of a Working Group may be of such a nature that the Working Group members deem it necessary to "Direct" the Working Group Chair to vote a specific way on Executive Committee motions related to a Working Group decision. When directed, through the process described below, the Working Group Chair shall vote as mandated by the Working Group resolution for the specified subject on any formal vote(s) in the Executive Committee. It would be anticipated that the use of a directed (i.e., instructed) vote is an exceptional situation and hence used infrequently, e.g., critical PAR votes, formation of new Working Groups and Study Groups. Working Group developed positions are not to be considered as automatic "Directed Positions." After a Working Group motion has been passed that establishes the Working Group's position, a separate Directed Position (75% required to pass per subclause 7.2.4.2 Voting) motion is required to make that Working Group Position a Directed Position. A Directed Position motion applies only to a specific, bounded, Working Group issue that is to be brought before the Executive Committee. Directed Position motions may not be combined, nor may any procedure be adopted that diminishes the extraordinary nature of establishing a "Directed Position." The Working Group Chair, however, has the freedom to express other views in an attempt to persuade members of the Executive Committee to consider them, however, such views shall be identified as distinct from and not the formal Working Group Directed Position. The Working

Group Chair is required to disclose to the Working Group his/her intent to offer a position contrary to a Directed Position. When presenting a Directed Position to the Executive Committee, the Working Group Chair is obligated to present and support the Working Group's Directed Position Motion with voting results, along with pros and cons behind the motion.

3.11.8.2.8.5.5.1. Source: LMSC POLICIES AND PROCEDURES REVISED JULY 16, 2004 PAGE 30 OF 41 FILE: LMSC_P&P_JULY_2004_R1.DOC

3.11.8.2.8.5.6. The question is did the vote meet the requirement for a directed position? It was not 75%. The motion did pass, but it was not a working group directed position.

3.11.8.2.8.5.7. Stuart Kerry takes the chair

3.11.8.2.9. Announcements

3.11.8.2.9.1. 802.18 letter will be on the 802.11 reflector this afternoon.

3.11.8.3. Stuart asks if the generic motions can be brought forward on the agenda?

3.11.8.3.1. No Objections.

3.11.9. Discussion

3.11.9.1. How do members get on the reflectors? Stuart states that Harry will send out an email to the WG with instructions for reflectors, voting status, etc. You have to request to be added.

3.11.9.2. Harry asks the membership to ask him to be on reflectors, and which reflectors they are interested. It used to be automatic, but there were problems.

3.11.9.3. Stuart notes that the default will be membership on the WG generic reflector

3.11.9.4. How can TG chairs help those who are not on the reflector? Contact Harry Worstell or Stuart Kerry directly.

3.11.9.5. Once members are on one reflector can they add others? No, only remove others.

3.11.9.6. Requests that when a new member request being put on the reflector be put on all reflectors then they can remove themselves.

3.11.9.7. Al Petrick takes the chair

3.11.10. Generic Motions

3.11.10.1. Move to empower the IEEE 802.11 Working Group, Task Groups, Study Groups, Ad Hoc's and Standing Committees to hold an interim meeting beginning January 16-21, 2005 to conduct business as required.

3.11.10.1.1. Moved Harry Worstell

3.11.10.1.2. Second Clint Chaplin

3.11.10.1.3. Approved by Unanimous consent

3.11.10.2. Move to empower the following TGs/SGs/Ad Hoc to hold teleconference calls beginning no sooner than November 20, 2004 through 15 days past the end of the January 2005 Interim Session.

Group	Start Date	Duration	Time
AP Functional Description Ad Hoc	Dec 15-2004, Jan 12-2005,	1 Hour	12:00 Noon EST
ISO Ad Hoc	Dec 16, 04, Jan 13, 05	1 Hour	12:00 Noon EST
Task Group K	Nov 24, 2004 - Weekly	2 Hour	11:30 am EST
Task Group T	Dec 2, 04 - Weekly	1 Hour	12:00 Noon EST
Task Group S	Dec 1, 15-04, Jan 5, 12- 05	2 Hours	4:00 pm EST
Task Group P	Nov 30, 2004 Tuesday Bi-weekly	2 Hours	4:00 pm EST
Task Group E	Jan 4, 05 Tuesday Bi-Weekly	2 Hours	12:00 Noon EST

3.11.10.2.1. Moved Mike M
3.11.10.2.2. Second Guido Hiertz
3.11.10.2.3. Approved by Unanimous consent

3.11.10.3. Move to empower the following TGs/SGs/Ad Hoc to hold Ad Hoc meetings:

Group	Start Date	Duration	Location
Task Group K	Feb 8-11, 2005	4 Days	Seattle, Wa
Task Group E	Feb 21, 2005	5 Days	Florham Park, NJ

3.11.10.3.1. Moved Richard Paine
3.11.10.3.2. Second Lee Armstrong
3.11.10.3.3. Vote: passes 68 : 4 : 2
3.11.10.3.4. Stuart Kerry takes the chair

3.12. New Business

3.12.1. None

3.13. Next Meeting

3.13.1. Jan 16-21, 2005, Monterey, California.

3.13.1.1. Registration will be open next week.

3.14. Closing

3.14.1. Discussion

3.14.1.1. Request the chair review subscriptions that are cancelled. Some addresses have been bouncing. We are trying to work with the IEEE.

3.14.1.2. Need to have notification if the email address is cancelled. Any bounce should go to Harry.

3.14.1.3. Would it be possible to have a straw poll on locations?

3.14.1.4. Straw Poll – who likes San Antonio and wants to come back? About 70% like it, 30% dislike it.

3.14.1.5. General agreement that San Antonio is better than DFW airport. Should have all meetings in Convention Center, and not walking between.

3.14.1.6. USA today lists WiFi as #2 to be thankful for.

3.14.1.7. The chair doesn't have the right to limit debate.

3.15. The meeting is adjourned at 11:10am

Attendance for the November 2004 Plenary

Last Name	First Name	Middle Initial
Aboba	Bernard	D
Aboul-Magd	Osama	S
Abraham	Santosh	P
Adachi	Tomoko	
Adams	Jon	
Agre	Jonathan	R
Ahn	Joo Hyun	
Aldana	Carlos	H
Alevy	Adam	
Alexander	Thomas	
Alimian	Areg	
Allen	James	D.
An	Kyu Hwan	
Anandakumar	Anand	
Anantha	Veera	
Ananthaswamy	Ganesh	
Andrade	Merwyn	B
Aoki	Hidenori	
Aoki	Tsuguhide	
Aramaki	Michimasa	
Aramaki	Takashi	
Ariyavisitakul	Sirikiat Lek	
Armstrong	Lee	R
Arnett	Larry	
Arunachalam	Vaidhyanathan	
Asai	Yusuke	
Astrin	Arthur	W.
Audeh	Malik	
Awtrey	Anthony	L
Bagby	David	
Bahr	Michael	
Bain	Jay	
Baker	Dennis	J
Bao	feng	
Barel	Avi	
Barnwell	Richard	N
Bartel	Charles	R.
Baysal	Burak	H
Beach	Bob	
Benko	John	L
Benveniste	Mathilde	
Berger	Robert	J
Bersani	Florent	

Bhandaru	Nehru	
Bhardwaj	Manish	
Bhatt	yogesh	B
Bjerke	Bjorn	A
Black	Simon	
Blue	Scott	
Bonneville	Herve	
Bowles	Mark	V
Brasier	William	M
Brownlee	Phillip	L
Brunel	Lo?c	
Buttar	Alistair	G
Calhoun	Pat	R
Cam-Winget	Nancy	
Carney	Bill	
Carson	Pat	
Cash	Broady	B
Chang	Jin-Bong	
Chang	Woojin	
Chaplin	Clint	F
Chari	Amalavoyal	
Chen	James	
Chen	Jeng-Hong	
Chen	Kwang-Cheng	
Chen	Shiuh	
Chen	Ye	
Chen	Yi-Ming	
Cheng	Alexander	L
Cheng	Hong	
Chesson	Greg	L
Chimitt	William	
Chindapol	Aik	
Chinitz	Leigh	M
Choi	Won-Joon	
Chong	Jo Woon	
Choudhary	Manoj	
Choudhury	Abhijit	K
Chu	Liwen	
Chuang	Dong-Ming	
Chung	Byungho	
Chung	Simon	
Coffey	Sean	
Cole	Terry	L
Coleman	Doug	
Conner	W. Steven	
Cook	Charles	I

Cook	Kenneth	
Crowley	Steven	
Dang	Meimei	
Das	Subir	
De Vegt	Rolf	J
Decuir	Joe	
Del Prado Pavon	Javier	
Demel	Sabine	
Devlin	Paul	EG
Dick	Kevin	
Doi	Yoshiharu	
Durand	Chris	
Durand	Roger	P
Dure	Sebastien	
Eastlake	Donald	E.
Ecclesine	Peter	
Edney	Jonathan	P
Edwards	Bruce	
Egan	John	V
Ellis	Jason	
Emeott	Stephen	P
Engwer	Darwin	
Eriksson	Patrik	
Estrada	Andrew	X
Euscher	Christoph	null
Evensen	Knut	
Faccin	Stefano	M
Fakatselis	John	C.
Falk	Lars	P
Famolari	David	
Fantaske	Steve	W
Feinberg	Paul	H.
Finn	Ed	
Fischer	Matthew	J
Fischer	Michael	A
Fisher	Wayne	K
Flygare	Helena	
Foegelle	Michael	D.
Ford	Brian	
Formoso	Ruben	R
Frederiks	Guido	
Freiman	Amit	
Frye	Robin	M
Fukagawa	Takashi	
Fukuoka	Shinya	
Funk	Paul	

Geipel	Mike	
Gercekci	Anil	M
Gerson	Eran	
Ghazi	Vafa	
Gifford	Ian	
Gilb	James	P K
Gilbert	Jeffrey	M
Godfrey	Tim	
Goh	Sung-Wook	
Gohda	Wataru	
Golmie	Nada	
Gowans	Andrew	J
Grandhi	Sudheer	
Gray	Gordon	P
Gray	Paul	K
Green	Evan	R
Gu	Daqing	
Gummadi	Srikanth	
Gummalla	Ajay	
Gupta	Vivek	G
Haisch	Herman	F
Hall	Robert	J
Han	Younhee	
Hansen	Christopher	J
Harford	James	J
Harriman	Adam	
Hartman	Chris	
Haslestad	Thomas	
Hassan	Amer	A
Hasty	Vann	
Hauser	James	P.
Hayakawa	Yutaka	null
Hayes	Kevin	N.
He	Haixiang	
He	Xiaoning	
Heberling	Allen	D
Hedberg	David	J
Henderson	Gregory (Scott)	S
Hepworth	Eleanor	
Hermodsson	Frans	M
Heubaum	Karl	F
Hiertz	Guido	R.
Hillman	Garth	D
Hinsz	Christopher	S
Ho	Chin Keong	
Ho	Jin-Meng	

Honary	Hooman	
Horne	William	D
Horng	Jyhchau (Henry)	
Housley	Russell	D
Howley	Frank	P.
Hsu	Yungping	A
Huang	Robert	Y
Hudak	David	E.
Hunter	David	
Imamura	Daichi	
Inoue	Yasuhiko	
Ishida	Kazuhito	
Ishidoshiro	Takashi	
Jacobsen	Eric	A
Jalfon	Marc	
Jang	KyungHun	
Jang	Yeong Min	
Jechoux	Bruno	
Jeon	Ho-In	J
Jeon	Taehyun	
Jetcheva	Jorjeta	G
Ji	Baowei	
Jian	Yung-Yih	
Jiang	Yimin	
Jones	Ben	
Jones	VK	
Jose	Bobby	
Joung	Jinoo	
Jung	Young-Ho	
Kain	Carl	W
Kakani	Naveen	K
Kandala	Srinivas	
Kang	You Sung	
Kasher	Assaf	Y
Kato	Masato	
Kato	Toyoyuki	
Kavner	Douglas	
Kelly	Michael	F.
Kelly	Patrick	
Kennedy	Richard	
Kent	Jeremy	
Kerry	Stuart	J
Ketchum	John	W.
Khansari	Masoud	
Kido	Ryoji	
Kikuma	Tomohiro	

Kim	Chong-kwon	
Kim	Dongho	
Kim	Haksun	
Kim	Jae Young	
Kim	JinKyeong (Joseph)	
Kim	Joonoo	
Kim	Joonsuk	
Kim	Kyeongpyo	
Kim	KyungTae	
Kim	Myung-Soon	
Kim	Taekon	
Kim	Yongbum	
Kim	Yongsuk	
Kim	Young Hwan	
Kim	Youngsoo	
Kimhi	Ziv	
Kindler	Matthias	
Kinney	Patrick	
Klein	John	R
Kleindl	Guenter	
Kneckt	Jarkko	
Kobayashi	Kaoru	
Kobayashi	Kiyotaka	
Kobayashi	Mark	M
Koga	Keiichiro	
Koh	Benjamin	
Kolze	Thomas	
Koomullil	George	P
Kopikar	Rahul	
Kopikare	Milind	
Kopikare	Milind	
Kotecha	Lalit	R
Kowalski	John	M
Kraemer	Bruce	P
Kruys	Jan	
Kuhfahl	Matthew	J
Kuijsten	Dirk	
Kumar	Rajneesh	
Kunihiro	Takushi	
Kupershmidt	Haim	
Kurihara	Thomas	M
Kuroda	Masahiro	
Kuun	Ed	
Kuwahara	Denis	
Kuze	Toshiyuki	
Kvarnstrom	Bo	

Kwak	Joe	
Kwon	Edwin	
LU	MINGHO	
Laihonen	Kari	A
Lakkis	Ismail	
Lambert	Paul	
Landeta	David	S
Landt	Jeremy	A
Lauer	Joseph	P
Leach	David	J.
Lee	Dongjun	
Lee	Hyun	
Lee	Jeong Taek	
Lee	Myung	J
Lee	Sok-kyu	
Lee	Tae-Jin	
Lefkowitz	Martin	
Lemberger	Uriel	
Leyonhjelm	Scott	
Li	Jia-Ru	
Li	Liang	
Li	Pen	
Li	Sheung	
Li	Yuan	
Liang	Haixiang	
Liang	Jie	
Lim	Wei Lih	
Lin	Huashih	A
Lin	Victor	
Lindsay	Scott	
Liu	Albert	
Liu	Changwen	
Liu	Der-Zheng	
Liu	Ed	W
Liu	Hsuan-Yu	
Liu	I-Ru	
Liu	Xiaoyu	
Liu	Yong	
Lojko	Peter	M
Lou	Hui-Ling	
Luther	Jason	
Ma	Steve	
Madrigal	Elsa	
Makishima	Doug	
Malek	Majid	M
Malinen	Jouni	K

Mani	Mahalingam	
Mankin	Kevin	M
Marshall	Bill	
Martin	Art	
Matsumaru	Makoto	
Matsumoto	Yoichi	
Matta	Sudheer	
McCann	Stephen	
McClellan	Kelly	P
McFarland	William	J
McIntosh	Bill	J
McNamara	Darren	P
McNew	Justin	P
Medvedev	Irina	
Meempat	Gopalakrishnan	
Mehta	Pratik	
Merrill	Mark	G.
Meyer	Klaus	
Meylan	Arnaud	
Miki	Morgan	H
Miller	Robert	R.
Mittelsteadt	Cimarron	
Mlinarsky	Fanny	
Mohindra	Rishi	
Molisch	Andreas	F
Montemurro	Michael	
Moore	Rondal	J
Moorti	Rajendra	T
Moreton	Mike	
Morley	Steven	A.
Moskowitz	Robert	G
Mourot	patrick	
Muck	Markus	D
Mueller	Joseph	
Mueller	William	
Mujtaba	Syed	Aon
Murakami	Keishi	
Murphy	Peter	A
Murray	Peter	
Myers	Andrew	D
Myles	Andrew	
Nagai	Yukimasa	
Nakamura	Michiharu	
Nakamura	Tetsuya	
Nakao	Seigo	
Nakase	Hiroyuki	

Nam	Seung Hoon	
Nanda	Sanjiv	
Narasimhan	Partha	
Nedic	Slobodan	
Ngo	Chiu	
Nguyen	Tuan	P
Ni	Qiang	
Nitsche	Gunnar	
Niu	Huaning	
Noda	Masaki	
Noens	Richard	H
O'Conor	John (Jay)	C.
O'Hara	Bob	
O'Nan	Jon	
Oakes	Ivan	F
Ogawa	Masakatsu	
Oguma	Hiroshi	
Ohtani	Yoshihiro	
Ojard	Eric	J
Olson	Timothy	S
Oostveen	Job	
Ota	Atsushi	
Ouyang	Feng	
Oyama	Satoshi	
Ozer	Sebnem	Z
Paine	Richard	H
Paljug	Michael	J
Palm	Stephen	
Panish	Paul	W
Pare	Thomas	
Park	Jong Ae	
Park	Yongseok	
Parker	Steve	C.J.
Parsons	Glenn	
Patel	Vijay	
Peleg	Yaron	
Peng	Wei-Chung	null
Pennington	William	C
Perahia	Eldad	
Perrot	Sebastien	
Petranovich	James	E
Petrick	Al	
Pilla	Anselmo	
Pirzada	Fahd	
Pitarresi	Joe	
Pong	Dennis	Y

Pope	Stephen	P
Ptasinski	Henry	
Purkovic	Aleksandar	
Qi	Emily	H
Qian	Luke	
Quinn	Liam	B.
Raab	Jim	E
Raissinia	Ali	
Rajkumar	Ajay	
Rangwala	Noman	
Rappaport	Ted	
Rappaport	Ted	
Rasor	Gregg	
Rayment	Stephen	G
Reible	Stanley	A
Reuss	Edward	
Ribeiro Dias	Alexandre	
Ribner	David	
Riegel	Maximilian	
Riess	Eilon	
Rios	Carlos	A
Robar	Terry	M
Roberts	Harold	
Robinson	Andrew	
Roebuck	Randy	
Rollet	Romain	
Rosca	Justinian	
Rosdahl	Jon	W
Rudolf	Marian	X
Rusnak	RJ	
Ryu	Jiwon	
Sadeghi	Bahareh	
Sadowsky	John	S
Saed	Aryan	
Saifullah	Yousuf	
Salhotra	Atul	
Sampath	Hemanth	
Samprakou	Ioanna	F
Sanchez	Maria	
Sandhu	Sumeet	
Santhoff	John	H
Sanwalka	Anil	K
Sarca	Octavian	V
Sarrigeorgidis	Konstantinos	
Sashihara	Toshiyuki	
Sastry	Ambatipudi	R

Sawamura	Mariko	
Saxena	Monica	
Scarpa	Vincenzo	
Schiffer	Jeffrey	L
Schylander	Erik	
Seth	Vikram	
Sfikas	Georgios	
Sharma	Sanjeev	K
Shellhammer	Stephen	J
Sherlock	Ian	
Sherman	Matthew	J
Shimada	Shusaku	
Shimoni	Yigal	
Shirakata	Naganori	
Shoemake	Matthew	B
Shvodian	William	M
Shyy	D. J.	
Siep	Thomas	M
Simpson	Floyd	
Singh	Ajoy	K
Sinha	Vishal	
Siti	Massimiliano	
Siwiak	Kazimierz	
Sjoberg	Sten	
Smith	Matt	
Sood	Kapil	
Soranno	Robert	T
Spalla	Filippo	
Spiess	Gary	N
Srinivasan	Ranga	
Stacey	Robert	
Stanley	Dorothy	
Steck	William	K
Stephens	Adrian	P
Stevens	William	M
Stolpman	Victor	J
Strutt	Guenael	T
Sun	Feng-Wen	
Sun	Sumei	
Surineni	Shravan	K
Takagi	Masahiro	
Takahashi	Kazuaki	
Takahashi	Seiichiro	
Takizawa	Kenichi	
Tambe	Sonal	
Tan	Teik-Kheong	

Tanahashi	Mike	
Tanaka	Hideki	
Tanaka	Yasuhiro	
Taneja	Mukesh	
Tang	Kevin	
Tao	Jeffrey	
Tee	Lai-King Anna	
Terry	John	D
Thrasher	Jerry	
Ting	Pangan	
Tolpin	Alexander	
Tomcik	James	D.
Towell	Timothy	N
Trachewsky	Jason	A.
Trainin	Solomon	B.
Trerotola	Ron	
Tseng	Rodger	
Tsoulogiannis	Tom	
Tung	David	
Turner	Sandra	L
Tzamaloukas	Mike	E
Uchida	Yusuke	
Van Erven	Niels	
Van Nee	Richard	D.J.
Van Poucke	Bart	
Vandenameele	Patrick	
Varas	Fabian	
Varsanofiev	Dmitri	
Victor	Dalton	T
Vlantis	George	A
Vogtli	Nanci	
Volpano	Dennis	
Wakeley	Timothy	P
Walker	Jesse	R
Wallace	Brad	A
Walter	John	R
Wang	Huaiyuan	
Ward	Lisa	
Ward	Robert	
Ware	Christopher	G
Warren	Craig	D
Watanabe	Fujio	
Wax	Mati	
Wells	Bryan	
Wendt	Jim	
Weytjens	Filip	

Whitesell	Stephen	R
Wilhoyte	Michael	E
Williams	Michael Glenn	
Williams	Richard	
Williams	Tim	
Wilson	James	M
Wineinger	Gerald	
Winters	Jack	H
Wojtiuk	Jeffrey	J
Wong	Jin Kue	
Wong	Timothy	G
Worstell	Harry	R
Wright	Charles	R
Wu	Gang	
Xhafa	Ariton	
Xia	Bo	
Yagi	Akiyoshi	
Yamada	Katsuhiko	
Yamamoto	Takeshi	
Yamaura	Tomoya	
Yang	Lily	
Ye	Huanchun	
Yee	James	
Yin	Jijun	
Young	Chris	
Yu	Heejung	
Yu	Mao	
Zaks	Artur	
Zeira	Eldad	
Zeng	Cheng	
Zhang	Jinyun	
Zhu	Chenxi	
Zhu	Chunhui	
Zhu	Jeffrey	C.
Zilber	Anat	
Zuniga	Juan-Carlos	
Zyren	James	
chen	michael	
chung	jaehak	
de Courville	Marc	
fremont	benoit	
han	jaesong	
hwangbo	yong	
li	wei	
liu	chuanwei	
ten Brink	Stephan	

tsao	jean	
van Waes	Nico	J
van Zelst	Allert	
xie	wei	

IEEE P802.11
Wireless LANs

Minutes of 802.11 Task Group E
MAC Enhancements - QoS

San Antonio, TX

Date: November 15-19, 2004

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1. Monday Afternoon Session, November 15, 2004

1.1. Opening

1.1.1. Call to order

1.1.1.1. JohnF (John Fakatselis): I call the meeting to order.

1.1.1.2. Meeting convened at 4:06 pm.

1.2. Process

1.2.1. Review of Meeting Times

1.2.1.1. JohnF: Are there any opening comments from anyone? None. We have 4:00-6:00 pm and 7:30-9:30 pm sessions today. We begin with a sync-up, call for papers, then technical presentations, comment resolutions and potentially another draft. On Thursday we will act on the work we have completed. I have fixed the meetings to allow people to plan their attendance for items of interest.

1.2.2. Approval of the agenda

1.2.2.1. JohnF: Are there any comments on the agenda? None. Is there any objection to accepting the agenda? None. The agenda is approved unanimously.

1.2.3. Review Objectives for the Session

1.2.3.1. We shall now review the objectives of the session. We have had two recirculations and one ad-hoc meeting in Portland. Today we have the results of the 2nd recirculation ballot. We must determine how to approach the comments. We can: 1) reject all comments, send for final recirculation and submit to Revcom to complete the standard or 2) prepare another recirculation addressing the comments submitted, and have the recirculation ballot. The objective would be to address the comments in that case. I do not know the statistics at this time. Are there any comments or questions? None.

1.2.4. Rules Review for New Members

1.2.4.1. JohnF: How many new participants are in the group? Several. We follow Robert's rules of order to run the meeting, and to make decisions there must be a motion by a voting member. The mover brings the motion, there is a discussion period, and then finally there is a vote and the motion either passes or fails. The last step is for voting members only, however for discussion the chair exercises the right to allow non-voters to participate. Raise your hand, and I will recognize you. Are there any questions on procedure or anything else regarding the rules? None. I ask new members, nearly voters or older members. Hearing none, we proceed.

1.2.5. Review Objectives for the Session

1.2.5.1. JohnF: Last meeting, we decided to hold a recirculation ballot. I ask the editor to summarize the two last recirculation ballots, and to estimate the volume of anticipated work to be done this week.

1.2.5.2. Srini: There were a total of 56 comments. There was a meeting in Portland, in preparation for a 2nd recirculation ballot. There are now 53, however a balloter made a mistake. Depending on the status of mistake allowance, either 50 or 53 comments will have to be handled.

1.2.5.3. JohnF: Are there any new "no" votes?

1.2.5.4. Srinii: There are comments on sub-clauses where there had been no changes. It seems we have pretty much closed everything.

1.2.5.5. JohnF: Are there any valid new comments?

1.2.5.6. Srini: There may be one, but in general, no.

1.2.5.7. JohnF: Do you have everything listed?

1.2.5.8. Srini: All the comments made by the balloters are listed on document 1394r0 which is on the server.

1.2.5.9. JohnF: Can you give us some history on the votes?

1.2.5.10. Srini: Right now my numbers are approximate. I believe there were 11 no voters, now there are 5, so the number is down substantially. Most abstainers have changed to "yes" votes. By my calculations, we have about 111 approve/disapprove votes with 106 approving. That is about 95.45%

1.2.5.11. JohnF: Are there any questions for Srini or myself?

1.2.5.12. Mathilde: What happened in Portland?

1.2.5.13. JohnF: The Portland meeting was conducted, and we went to recirculation. We are now at that point. Now we review and approve the Portland minutes as well as the minutes from Berlin.

1.2.5.14. Srini: Usually before the meeting I write starting points, and then we go forward with the resolutions from there. This time I did not have time to do that.

1.2.5.15. JohnF: Historically, ad-hoc groups have been formed to address the comments. This should not be alarming to anyone, since the resolutions go to re-circ. The voting members have an opportunity to address the appropriateness of the comments.

1.2.6. Approval of the agenda

1.2.6.1. JohnF: Are there any objections to accept the minutes for Portland and the last meeting in Berlin? None. Hearing no objections, the minutes are approved unanimously. Let us discuss how to move forward.

1.2.7. Call for Papers

1.2.7.1. JohnF: Are there any papers someone would like to present? These papers, however, must pertain to the comment resolution process. Please ensure that you can correlate your presentation with particular comments. Are there any papers? Mathilde has one regarding Multiple NAVs, which is related to comments. Anyone else on multiple NAVs? Hearing none. Any other

presentations? No. Mathilde, the paper is on the server? Yes. Last call on papers. None.

1.2.8. Discussion of Comment Resolution Process

1.2.8.1. JohnF: Now, we move to planning the comment resolution process. Historically, we have split into ad-hoc groups that work the comments and then prepare some proposed resolutions. After that, we discontinue the ad-hoc activity, and enter formal session as a full group to make decisions on the comment resolutions proposed. This seems to work better since working on each comment with the whole group in formal session takes a longer time, since we must work a more deliberate procedure to reach closure. I would recommend that we stay with the ad-hoc process to retain efficiency. Srini, would you like to comment on that?

1.2.8.2. Srini: There are only 27 technical comments, maybe less. I would suggest that one ad-hoc group should be sufficient.

1.2.8.3. JohnF: I would like to have some text on the editorial comments as well, OK?

1.2.8.4. Srini: Yes.

1.2.8.5. Johnf: Out of the 27, if we exclude the uncertain ones, how many "no"s do we have? Srini, you were not sure before.

1.2.8.6. Srini: There are 16 technical "no" comments, with at least 5 or 6 as "old ones" Another 6 or 7 are comments on text that didn't change.

1.2.8.7. JohnF: So about a dozen left?.

1.2.8.8. Sirini: Yes.

1.2.8.9. JohnF: We will do it as in the past. We shall recess to allow for ad-hoc work. Every new session, we shall open formally as TGe, then recess until the ad-hoc completes its work. By Thursday, we should be all done. Some side activities will be taking place. We shall have to investigate the O'Hara comments by bringing Bob here so he can explain his ballot so we can determine the validity of his comments. Another activity is that we shall check with the Excom members to see if they will allow us to go to Revcom by rejecting the remaining dozen-or-so technical comments. They will have to make an exception in this case, as they like to see all comments resolved. Then, based on the results, I will bring the information to the group, and we shall make a determination about how to proceed. Srini will chair the ad-hoc, and I shall work the O'Hara comment and approach Excom on proceeding directly. Any suggestions to do something different? Seeing none, we shall proceed with the plan in the minutes. Has the secretary captured these?

1.2.8.10. BobM: Yes.

1.2.8.11. JohnF: Are there any other questions on anything?

1.2.8.12. Questioner: How long will the ad-hoc meet?

1.2.8.13. JohnF: The next agenda item is a break. I'd like to start on the comment resolution process by starting with the presentation. So after Mathilde speaks, I shall recess for the ad-hoc group to start work. There will be no formal resolutions, just proposals. At 7:30 pm I shall reconvene TGe and ask "Is the ad-hoc group's work done?"

1.2.8.14. GregC: Will there be voting only after the 7:30 pm meeting convenes?

1.2.8.15. JohnF: It is sort of unpredictable. It depends on the progress of the ad-hoc group.

1.2.8.16. GregC: If we go into recess now, there will be no vote until 7:30, right?

1.2.8.17. JohnF: Right.

1.2.8.18. TomS: There is a tutorial tonight on the process of standards. I would like to attend. Is there a compelling reason to take a vote tonight?

1.2.8.19. JohnF: I cannot stop votes, but there is a high likelihood we will open the meeting and we will recess right away. I suggest you come to the meeting at 7:30 pm just to see what work is being conducted.

1.2.8.20. TomS: The tutorial begins at 6:30 pm, though.

1.2.8.21. JohnF: So there is a procedural meeting by which a vote could happen.

1.2.8.22. Mathilde: When we had a lot of comments, we had lots of ad-hocs. Now, with one group, why should we recess into ad-hocs?

1.2.8.23. JohnF: Doing the process with the formal approach could take a long time, even with a smaller number of comments. We need to use the ad-hoc to have qualified people bring us proposed solutions to speed the process, based on my 5 years of experience with this. Are there any other questions? None.

1.2.9. Presentation of Document 04/1093r1

1.2.9.1. JohnF: I'd like to invite Mathilde to give us some recommendations on certain comments. You may also move with resolutions if you like.

1.2.9.2. Mathilde: Presentation "Multiple NAV Protection – Revisited", document 802.11-04/1093r1. Normative text in document 802.11-04/1070r2. Those implementing EDCA do not have to worry about multiple NAVs. Those who plan to implement HCCA in dense environments would use this option. I had a balloted comment on this.

1.2.9.3. JohnF: Are there any questions for Mathilde? None. Keep this in mind for the appropriate resolutions. Are there any more papers? None. Before we recess for the ad-hoc group, is there any individual who would like to propose a resolution to a comment? No. Tom, I assume you want to move to pick up tomorrow instead?

1.2.9.4. TomS: Yes.

1.2.9.5. JohnF: Is there any objection to recess until 10:30 am tomorrow morning?

1.2.9.6. Discussion

1.3. Closing

1.3.1. Recess

1.3.1.1. JohnF: Is there any objection to recess? Hearing none, we are recessed until 10:30 am tomorrow morning.

1.3.1.2. Recess at 5:06 pm

2. Tuesday Morning Session, November 16, 2004

2.1. Opening

2.1.1. Call to order

2.1.1.1. JohnF (John Fakatselis): I call the meeting to order.

2.1.1.2. Meeting convened at 10:35 am.

2.1.1.3. We have meetings 10:30 am to 3:30 pm today.

2.2. Process

2.2.1. Comment Resolution

2.2.1.1. JohnF: I have done some research about our options. It is my suggestion that we go for another recirculation ballot rather than pushing through Revcom, so as not to create questions or friction. Let's take our time and not create controversy. I suggest that we continue to resolve the comments. In March we should be very solid for final approval. This delay, according to my experience, should not affect the industry. This is my recommendation: I suggest we go for another recirculation ballot. Any questions? None. Srini, can you report on comment resolution progress. After the report I have no objection to recessing

to complete the comments. I should like to have our work complete by tomorrow, so we can proceed toward the recirculation.

2.2.1.2. Srini: We have resolved 20 comments, either 31 or 33 remain, depending on the chair's ruling on the submission of the wrong set of comments. The correct set of comments were sent directly to the editor later, rather than going through the regular process. However, I believe the comments are worthwhile. The chair promised to let me know sometime today. I have requested the TGe chair on how to handle comments referring to text which has not been changed.

2.2.1.3. JohnF: I believe that these comments are not valid. I rule that we reject them on procedural grounds. However, if there is enough time, we may also consider them if we can develop improvements based on them. For the meantime, we'll proceed as if they are valid comments. Any other questions? None. Is there anyone who would like to propose a resolution to outstanding comments? None. Can you minute that, Bob?

2.2.1.4. BobM: Yes.

2.2.1.5. JohnF: Then I recommend that we recess into ad-hoc group.

2.3. Closing

2.3.1. Recess

2.3.1.1. JohnF: Is there any objection to recessing for the rest of the day so the ad-hoc group can address the comments? Hearing none, we are recessed until tomorrow.

2.3.1.2. Recess at 10:43 am

3. Wednesday Afternoon Session, November 17, 2004

3.1. Opening

3.1.1. Call to order

3.1.1.1. JohnF: I call the meeting to order.

3.1.1.2. Meeting convened at 1:35 pm.

3.2. Process

3.2.1. Comment Resolution

3.2.1.1. JohnF: I shall go back to the agenda for today. We shall discuss technical resolutions to the comments submitted from the last recirculation. We have been engaged in resolving these comments. I would like Srini to give a status report.

3.2.1.2. Srini: The ad-hoc produced 47 comments out of a total of 51. The remaining 4 we wish to bring to the floor because we could not arrive at proposed resolutions. There is activity required to produce normative text to respond to comment #31. Sometime later I shall present that document.

3.2.1.3. JohnF: Has the document been available on the server for 4 hours? The document 1489r3 has been on the server about 1-1/2 hours. At 4:00 we can vote on it. Please review the proposed resolutions and take exceptions to specific comments. We shall act on the bulk of the items, then we shall address the exceptions. Is this process clear to everyone?

3.2.1.4. StephenP: Could you clarify what's in that document?

3.2.1.5. Srini: 1394r2 is without the normative text and has been on server since yesterday.

3.2.1.6. JohnF: Then we can act on most of the comments now. I propose that we recess for ½ hour until 2:15 to allow the members to examine the proposed resolutions by the ad-hoc group. The comments in question because of procedural issues will be pulled out. Is there any objection to recess until 2:15 to review the proposed resolutions by the ad-hoc group? After we reconvene, we shall work on accepting or rejecting them.

3.3. Closing

3.3.1. Recess

3.3.1.1. JohnF: Is there any objection to recess? Hearing none, we are recessed until 2:15.

3.3.1.2. Recessed at 1:44 pm.

3.4. Opening

3.4.1. Call to order

3.4.1.1. JohnF (John Fakatselis): I call the meeting to order.

3.4.1.2. Meeting convened at 2:15 pm.

3.5. Process

3.5.1. Comment Resolution

3.5.1.1. JohnF: I would like to ask for people to identify exceptions in the highlighted rows of the document.

3.5.1.2. Srini: I which to except Comment 1, as well as 9 more comments not on changes. 6,23,27,28,29,31,32,33, and 51. All of these from 6-51 are under the category from 4 different commenters based on non-changed text.

3.5.1.3. JohnF: Do I have anything else to be pulled aside for consideration. Have you pulled out the normative text one?

3.5.1.4. Srini: Yes, #31.

3.5.1.5. JohnF: Any other exceptions? Hearing none. Srini, please put the motion on the screen.

3.5.1.6. Srini: I wish to move:

3.5.1.7. Move to accept the responses as written in 04/1394r2 with the exception of comments 1,6,23,27,28,29,31,32,33 and 51.

3.5.1.8. Moved by Srini.

3.5.1.9. JohnF: Are there any more additions to the exception list. None. Is there a second?

3.5.1.10. Seconded by Bob M.

3.5.1.11. JohnF: Is there any discussion on the motion? None. Hearing no discussion, is there any objection to accepting the motion as shown on the screen. None. The motion passes unanimously. Every comment except comment 1 reference text that did not change. Therefore they are disqualified. I suggest that they may have merit, however. I suggest that they be passed to the maintenance committee.

3.5.1.12. TomS: This is under the rules of SA, not 802.11, so we may wish to reconsider on not accepting them.

3.5.1.13. JohnF: Since we do not want to jeopardize progress on the standard, I shall check tomorrow to see if there is any flexibility on the rules, or my

understanding of the rules. That said, Srini are there any other recommendations for action.

3.5.1.14. Srini: I have a recommendation for comment 1. I have encouraged others to come forward with specific resolutions on items which they are interested in.

3.5.1.15. JohnF: Proceed with your comments.

3.5.1.16. Srini: This is comment 1, addressed yesterday. The ad-hoc participants discussed this, and have decided to accept the comment. "Accepted. Incorporate the second alternative." I would like to move that this be accepted.

3.5.1.17. Is there a second? StephenP

3.5.1.18. Discussion? None. Is there any objection to accepting the resolution as shown? Seeing none, the change is accepted.

3.5.1.19. Srini: Next, comment #49. We introduced the term "BCCA". The commenter objected.

3.5.1.20. Discussion on the motion.

3.5.1.21. BobM: May I have a straw poll? Voting members only, vote for rolling back or retaining BCCA. Vote: Roll back, 7. Retain BCCA 6.

3.5.1.22. Moved by BobM to accept the comment. Second by MathildeB.

3.5.1.23. Discussion

3.5.1.24. MathildeB: Call the question. Second Harry.

3.5.1.25. JohnF: Is there any objection to call question? None. We shall vote. Is there any objection to accept the motion as shown. Yes. We shall take a formal vote. The vote is technical and requires 75%. The vote is For 9, 5 against, 4 abstain. The motion fails, therefore the comment is not accepted.

3.5.1.26. Is there any request for an alternative motion? None. Are there any other comment proposals?

3.5.1.27. Srini: So #49 is still open?

3.5.1.28. JohnF: Yes.

3.5.1.29. MathildeB: I shall now address #22 and #42. This has to do with a change in NAV operation, restoring the use of multiple NAVs. Make the multiple NAV optional.

3.5.1.30. MathildeB: I wish to move:

3.5.1.31. Move to accept the normative text changes in document 04/1070r3. Comments addressed by this motion: #22 and #42

3.5.1.32. Point of Order: 1070r3 is not on server.

3.5.1.33. HarryW: I have confirmed that r3 is not on the server.

3.5.1.34. BobM: Are we going to recess (3:31)?

3.6. Closing

3.6.1. Recess

3.6.1.1. JohnF: Is there any objection to recessing for the break until 4:00 pm? Hearing none, we are recessed.

3.6.1.2. Recess at 3:32

3.7. Opening

3.7.1. Call to order

3.7.1.1. JohnF (John Fakatselis): I call the meeting to order.

3.7.1.2. Meeting convened at 4:00 pm.

3.8. Process

3.8.1. Comment Resolution

3.8.1.1. JohnF: With what I know (regarding document version on server), I cannot accept the motion as constructed. When Mathilde returns she can determine how she would like to proceed. Recapping, we are trying to see if we can accept comments that did not refer to changes in the document. Tom Seip checked, and advised that my original ruling to void them was correct. What other comments remain to be addressed? While we are waiting for Srini. Mathilde, do you want to stay with r2?

3.8.1.2. MathildeB: Yes. I want to use r2 with rewording of r3 in the motion.

3.8.1.3. JohnF: Please put the motion on the screen.

3.8.1.4. MathildeB: I wish to move:

3.8.1.5. Move to accept the normative text changes in document 04/1070r2 with the following changes:

3.8.1.6. When a QSTA retains a new NAV value, that QSTA shall also save the source address BSSID from the frame that is setting the NAV value, which is the MAC address from the Address2 field of the frame.

3.8.1.7. saved source address BSSID that matches the AP's MAC address

3.8.1.8. Comments addressed by this motion: 22 and 42 (in 1394r0)

3.8.1.9. Secretarial note: 42 is 40 in 1394r1 (from Srini).

3.8.1.10. Question: I am having trouble parsing the text.

3.8.1.11. Mathilde change motion to:

3.8.1.12. *When a QSTA retains a new NAV value, that QSTA shall also save the source address **BSSID** from the frame that is setting the NAV value, which is the MAC address from the Address2 field of the frame…*

3.8.1.13. *saved source address **BSSID** that matches the AP's MAC address*

3.8.1.14. *The underlined text in blue is deleted, the red text in italics is inserted.*

3.8.1.15. Comments addressed by this motion: 22 and 40

3.8.1.16. May I have a second?

3.8.1.17. Second by Guido Hiertz

3.8.1.18. JohnF: Is there discussion? None. We shall vote. The motion fails 9-5-5. Are there any other comments?

3.8.1.19. Srini: 36, Palm/3 Let's bring in the commenter. This is a repeat of comment Palm/20 in the previous ballot. Submitted in 1st recirc, 2nd recirc, and now. The comment is currently declined.

3.8.1.20. JohnF: Is there any opinion to change the comment from the group. Yes.

3.8.1.21. StephenPalm (commenter): Discussion.

3.8.1.22. JohnF: Is there any other discussion? Hearing none, Is there any objection to retaining the "decline" resolution? None. Comment declined for 2nd time. Now, let us revisit #49.

3.8.1.23. Discussion resulting in proposal to replace BCCA with "Mixed Mode", evolving to "HCCA, EDCA Mixed Mode". Stephen Palm offers text for motion.

3.8.1.24. Srini: I have typed:

3.8.1.25. "Counter – Replace all occurrences of "Both Controlled and Contention Channel Access" with "HCCA, EDCA Mixed Mode" and replace all occurrences of "BCCA" with "HEMM"

3.8.1.26. JohnF: Are there any further questions or comments? None. Srini seconds. Any discussion? None. Is there any objection to accepting this resolution as shown? None. Hearing none, the motion for comment #49 passes unanimously. Mathilde do you want to return to #22 and #40 (1394r1). Yes

3.8.1.27. JohnF: Mathilde would like to move to "accept" Comment #40. Is there a second? BobM seconds. Is there any discussion? Yes.

3.8.1.28. Discussion

3.8.1.29. MathildeB: I call the question. BobM Seconds.

3.8.1.30. JohnF: The question has been called. The vote for calling the question is 8-3-3. The motion requires 2/3. The motion passes. We now vote on the motion itself. The motion is technical, requiring 75%. The vote is 6-5-1. The motion fails.

3.8.1.31. JohnF: I am going to ask, by default, to entertain a motion to decline the comment.

3.8.1.32. StephenP: I move to decline. Srini seconds.

3.8.1.33. JohnF: This is my problem as a chair: We have to move to a new recirculation ballot. Mathilde thinks we can come up with an alternate resolution. Same goes for comment #22. If we cannot come up with a resolution, I would like the body to consider declining, not necessarily because you agree to decline, but because we want to recirculate. I would like to recess. That will give us time to discuss a possible alternate resolution and act when we return.

3.9. Closing

3.9.1. Recess

3.9.1.1. JohnF: Is there any objection to recessing until 5:30 pm? Hearing none, we are recessed.

3.9.1.2. Recess at 4:37 pm.

3.10. Opening

3.10.1. Call to order

3.10.1.1. JohnF (John Fakatselis): I call the meeting to order.

3.10.1.2. Meeting convened at 5:30 pm.

3.11. Process

3.11.1. Comment Resolution

3.11.1.1. JohnF: I am going to ask, “Is there a resolution for 22 or 40 or both?” Hearing none, I am going to ask the same question for Mathilde’s benefit. Has the hour allowed an alternate resolution?

3.11.1.2. Mathilde: There is no compromise.

3.11.1.3. JohnF: If anyone would like to decline the comment with the same text as previously provided, they could do so now. JohnK so moves on comment #22. Srini seconds.

3.11.1.4. JohnF: The motion is to accept the following text: “Comment declined The commenter has not provided adequate information to include in the draft. The committee also feels that the suggestion by the commenter will lead to other corner cases which have not been studied (either by the commenter or the group). Finally, the group feels that when there is a collision the best course of action is to do a backoff which is still the action taken by a station in cases of collisions.”

3.11.1.5. Ron Moore: I suggest a friendly amendment, to respond directly to the comment, rather than addressing other issues.

3.11.1.6. Srini: I wish to amend the text to “comment declined” without the other text.

3.11.1.7. AndrewM: I call the question. JohnK seconds.

3.11.1.8. JohnF: Is there any objection to accept the motion as shown?

3.11.1.9. HarryW: Point of Order: We didn’t vote on calling the question.

3.11.1.10. JohnF: I didn't follow procedure on the vote to call the question. Therefore, is there any objection to calling the question? None. The vote to call the question passes unanimously.

3.11.1.11. TomS: Another point of order: This could be an invalid motion. Tom Seip is researching the question. TomS: I think a reason to decline must be provided.

3.11.1.12. JohnF: On the previous motion "comment declined", I rule that this motion is out of order, based on the point brought by Tom Seip. Is there any objection to the ruling that this is out of order. None. One more time: Is there any objection that the motion as shown is out of order? I see no objection. (25 witnesses).

3.11.1.13. JohnK: The original motion is still on the floor. I move to amend it to replace the text after comment declined with the following text:

3.11.1.14. "The group believes that described behavior does not affect over the air or SAP interfaces"

3.11.1.15. JohnF: Is there any discussion on modifying or clarifying the suggested text?

3.11.1.16. RonM: The motion says that we reject it because there were not enough votes to accept it.

3.11.1.17. JohnF: There has to be a balance. Are there any modifications suggested?

3.11.1.18. MathildeB: We just had a vote on accepting this comment 9 for 5 against.

3.11.1.19. JohnF: I am just giving you some consequences of whether you bring this to closure. You can do anything you want. You can leave the comment open. You do not have to close on this. The consequence is that we cannot go to recirculation. These are the outcomes that can happen.

3.11.1.20. AndrewM: Call the question. Second JohnK.

3.11.1.21. JohnF: Is there any objection to calling the question? Yes one. We shall take a vote on calling the question. The vote to call the question requires 2/3, passes 24-2-2. There has been a motion to amend: Everyone in favor of accepting the motion as shown please raise your tokens. The motion to amend passes 17-4-5. JohnF: Now this becomes main motion:

3.11.1.22. "Comment declined. The group believes that described behavior does not affect over the air or SAP interfaces."

3.11.1.23. AndrewM: I call the question. Second JohnK.

3.11.1.24. JohnF: We shall vote on calling the question. The vote to call the question passes 22-2-1. We shall now vote on the motion, voting members please. The motion (technical) passes 18-4-5.

3.11.1.25. JohnF: Now, let us re-address comment #40. Does anyone want to decline the comment as shown for #40?

3.11.1.26. Srini: I wish to move that the proposed text "Comment declined. The group believes that described behavior does not affect over the air or SAP interfaces." be accepted.

3.11.1.27. JohnF: Are there any suggested modifications for this text?

3.11.1.28. Orders of the day.

3.12.Closing

3.12.1. Recess

3.12.1.1. JohnF: We are recessed.

3.12.1.2. Recess at 6:00 pm.

4. Thursday Morning Session, November 18, 2004

4.1. Opening

4.1.1. Call to order

4.1.1.1. JohnF (John Fakatselis): I call the meeting to order.

4.1.1.2. Meeting convened at 8:02 am.

4.2. Process

4.2.1. Comment Resolution

4.2.1.1. JohnF: We have about 4 floor voters who submitted comments which did not address changes or unresolved negatives. The rules are shown in IEEE-SA Standard Board Operations Manual, January 2004. The document shows that consideration can only be given comments on new text changes or areas indirectly addressed by changes made. We need to make a determination whether to respond to these comments. I have not commented on the merits of these comments, this is a procedural issue.

4.2.1.2. Srini: Referring to highlighted documents in 1394r3, The comments affected by this decision are 6,23,27,28,29,31,32,33 and 51.

4.2.1.3. JohnF: We are still working on comment #40. We failed to pass an alternative yesterday, and were unable to develop another resolution. Do I have an alternate proposal?

4.2.1.4. JohnK: I offer the following proposed text: “Comment declined. There are several cases where using the originally optional multiple NAVs actually hurts the QSTAs that use it and perform worse than the QSTAs that no not maintain multiple NAVs. Furthermore it also results in an inefficient use of the channel. Finally, even if it is assumed that the problems with the mechanism are not severe (which it is not), it is a partial solution and does not overcome the overlap BSS effectively. See also Kandala/36, Kandala/6 and Hansen/8 comments of the first sponsor ballot.

4.2.1.5. Bob M: Suggestion that the text uses the same argument (unproven observations) used previously to dismiss the comment.

4.2.1.6. JohnK: I wish to change the text to: “Comment declined. The benefits of the mechanisms are not clear and it is not clear if the overall performance of the network is superior. Furthermore, when there are collisions there is an efficient backoff mechanism which can be used.

4.2.1.7. JohnF: Is there any discussion? Yes.

4.2.1.8. Discussion.

4.2.1.9. JohnF: Let us vote. Voting members only. The motion requires 75%. The vote passes unanimously 33-0-2. We have special orders coming up at 9:00. I would like to recess for 10 minutes to review the comments 6, 23, 27, 28, 29, 31, 32, 33,and 51 based on the rules.

4.2.1.10. Discussion on interpretation of the red highlighted text in manual excerpted below.

Standard Board Operations Manual, January 2004.

5.4.3.2 Resolution of comments, objections, and negative votes

The Sponsor shall make every attempt to resolve comments, objections, and negative votes that are accompanied by comments. Comments that advocate changes in the document, whether technical or editorial, may be accepted, revised, or rejected. It should be borne in mind that documents are professionally edited prior to publication.

Comments received before the close of ballot from persons who are not in the balloting group require acknowledgement sent to the commentor and shall be presented to the comment resolution group for consideration. Comments received after the close of ballot will be forwarded to the Sponsor for consideration at the next update of the standard. If a comment is received as a result of a public review process, that comment will be addressed by the Sponsor and a disposition returned to the commentor, along with information concerning their right of appeal.

In order for a negative vote to be changed to an affirmative vote, the Sponsor shall obtain written confirmation from each voter (by letter, fax, or electronic mail) that indicates concurrence with any change of his or her vote. If the negative vote is not satisfied, either entirely or in part, the negative voter shall be informed of the reasons for the rejection and be given an opportunity either to change his or her vote to "approve" or to retain his or her negative vote during a recirculation ballot.

Changes may be made in the document to resolve negative votes that are accompanied by comments or for other reasons. All substantive changes made since the last balloted draft shall be recirculated to the Sponsor balloting group. All unresolved negative votes with comments shall be recirculated to the Sponsor balloting group. The verbatim text of each comment, the name of the negative voter, and a rebuttal by the members conducting the resolution of ballots shall be included in the recirculation ballot package.

During a recirculation ballot, balloting group members shall have an opportunity to change their previously cast ballots. A change to "do not approve," which is submitted with comments, shall be based only on the changed portions of the balloted document, clauses affected by the changes, or portions of the balloted document that are the subject of the unresolved negative votes. If a change to "do not approve" is based solely on comments concerning previously approved portions of the balloted document, the balloter shall be informed that the comments are not based on the changed portion of the balloted document and, therefore, those comments may not be addressed in the current ballot and may be considered for a future revision of the standard. If the balloter does not agree to change the negative ballot, the ballot shall be recorded as an unresolved negative without comment.

Further resolution efforts, including additional recirculation ballots, may be required if additional negative votes (with new technical comments) result. However, once 75% approval has been achieved, the IEEE has an obligation to the majority to review and publish the standard quickly. Therefore, once 75% approval has been achieved, the IEEE requirements for consensus have been met. Efforts to resolve negative votes may continue for a brief period; however, should such resolution not be possible in a timely manner, the Sponsor should forward the submittal to RevCom.

Copies of all unresolved negative votes, together with the reasons given by the negative voters and the rebuttals by the Sponsor, shall be included with the ballot results submitted to RevCom. Copies of the written confirmations from voters that indicate concurrence with the change of their votes from negative to affirmative shall be included in the submittal to RevCom.

4.2.1.11. JohnF: Is there any objection to having a 10 minute recess until 8:50 am? Hearing none, we are recessed.

4.3. Closing

4.3.1. Recess

4.3.1.1. JohnF: We are recessed.

4.3.1.2. Recess at 8:40 am.

4.4. Opening

4.4.1. Call to order

4.4.1.1. JohnF: I call the meeting to order.

4.4.1.2. Meeting convened at 8:52 am.

4.5. Process

4.5.1. Comment Resolution

4.5.1.1. JohnF: I wish to bring the following motion, based on procedural interpretation only. The motion does not address the merit of the comments.

4.5.1.2. Based on the IEEE SA STANDARDS BOARD OPERATIONS MANUAL Section 5.4.3.2

4.5.1.3. Comments 6,23,27,28,29,31,32,33,and 51 will not be considered for resolution at the current recirculation sponsor LB resolution process since they "are not based on changed portions of the balloted document, clauses affected by the changes, or portions of document that are subject to the unresolved negative votes."

4.5.1.4. GregC seconds.

4.5.1.5. JohnF: Is there any discussion? Hearing none, we shall vote on this motion. Voting members only, please. The motion passes unanimously.

4.5.1.6. JohnF: We have about 2 minutes of special orders. We shall restart the regular items now. I shall give the floor to Srini to prepare the process to incorporate the resolutions into the draft.

4.5.1.7. Srini: For the record, as a result of the previous vote I have changed the resolutions for the affected comments to:

4.5.1.8. "Comment not considered. Since these comments "are not based on changed portions of the balloted document, clauses affected by the changes, or portions of document that are subject to the unresolved negative votes." Otherwise, the document incorporates all of the comments (of 1394r4). The draft does not address the "j" standard, but its provisions do not apply anyway.

4.5.1.9. JohnF: I am asking Srini to prepare a motion so that we can forward the modified draft for recirculation ballot.

4.5.1.10. Srini: I have placed a suggested motion on the screen, would anyone like to place it on the floor? Yes (BobM).

4.5.1.11. Move to authorize the TGe editor to incorporate the resolutions in 04/1394r4 and create a new version of the draft (which will be D12.0)

4.5.1.12. Moved BobM, Seconded Anil

4.5.1.13. JohnF: Is there any discussion on this motion? None We shall vote. Those in favor raise your voting tokens. The motion passes 36-0-0 unanimously with no abstentions.

4.5.1.14. I now show a motion for SB Recirculation:

4.5.1.15. Believing that sponsor ballot comment responses in 11-04/1394r4 and the document mentioned below satisfy IEEE-SA rules for sponsor ballot recirculation.

4.5.1.16. Authorize a SB recirculation of 802.11e draft 12.0 to conclude no later than 01/01/2005

4.5.1.17. Moved BobM Seconded MatS

4.5.1.18. JohnF: We shall vote. Motion passes 37-0-0 unanimously with no abstentions. That said, we have concluded special orders. Is there any other topic anyone would like to discuss. Anything else? None.

4.6. Closing

4.6.1. Recess

4.6.1.1. JohnF: Is there any objection to adjourn for the week? Seeing none, we are adjourned.

4.6.1.2. Adjourn at 9:15 am.

IEEE P802.11
Wireless LANs

Minutes for the TGk November 2004 Session

Date:

November 16, 2004

Author:

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Monday, November 16, 2004
1:30 PM – 3:30 PM

1. Chair calls the conference to order at 1:30 PM
2. Attendance
3. Review IEEE 802 & 802.11 Policies and Rules
   a. Patent Policy
   b. Inappropriate Topics
   c. Documentation – 4 hour rule for changes that are normative
   d. Voting
   e. Roberts Rules
4. Objectives for Meeting 04-739r1
   a. Validate Seattle Ad hoc work
   b. LB71
   c. Prepare for Letter Ballot
5. Proposed Agenda
   a. Comment Incorporation into new draft (D2.0)
   b. Technical Comment Resolution
   c. Next major milestone: Pass Letter Ballot
6. Comments are in 04/0964r22 and documented in 04/1429r1 submitted on 11/15/04.
7. There are potential differences between 1219r1 and 964r22.
8. Assignments
   a. Security – Paine
   b. Neighbor Report, Capability Bits, Channel Report, and PowerSave – O'Hara
   c. Parallel Bit, Randomization Interval - Black
   d. Periodic - Kwak
   e. RCPI (11g) - Kwak
   f. Noise Histogram – Amjad Soomro
   g. TPC - Klein
   h. STA – Myles and O'Hara
   i. MIB - Gray
   j. PICS - Black
   k. Hidden Node – Black
   l. Beacon - Emeott
   m. ANA - Paine
   n. Parallel (Black)
   o. Request/Report - Emeott
   p. Miscellaneous - Emeott
9. Presentations
   a. 04/1439r0 Joe Kwak
   b. 04/1440r0 Joe Kwak
   c. 04/1390r0 Joe Kwak
   d. 04/1213r0 Stephen Wang
   e. 04/1409r0 Floyd Simpson
   f. 04/1410r0 Floyd Simpson
   g. 04/1403r0 Stephen Wang
   h. 04/1379r0 Stephen Wang
   i. 04/1425r0 Steve Emeott

j. 04/1204r2 Emily Qi
k. 04/1206r0 Simon Black
l. 04/1207r0 Simon Black
m. 04/1208r0 Simon Black
n. 04/120r2 Emily Qi
o. 04/1436r0 Mike Moreton
p. 04/1387r0 Dirk Kuijsten (Thursday Afternoon)

10. Motion to approve agenda passes unopposed
11. Motion to postpone our 7:30 to 8:00, because people want to attend WNM presentation – motion passes unopposed.
12. Technical Presentation – RCPI Comment Resolution – Kwak – 04/1440r0
    a. Address comment 1831 and 1843
    b. Comment – It needs to match the resolution to comment #935.
    c. Joe will make corrections and present a 1440r1 tonight.
13. Technical Presentation – Periodic Comment Resolutions – 04/1390r0 - Kwak
    a. Ignore auto figure numbering.
    b. Question – Can I have only a single request? What happens if I have 3 serial requests and 2 parallel requests? Answer - You're supposed to handle 3 serials and then 2 parallels.
    c. Comment – it seems like the scheduling is very complicated. Answer – it is like a beacon schedule time. Not really - with a beacon requests you are only dealing with a single beacon.
    d. Comment – the STA can reject the request if it becomes overloaded.
    e. Comment – the hard part is writing the code to handle all of these scenarios.
    f. Question – What is a "set of measurements"? Answer - All periodic measurements within an interval comprise the set of measurements.
    g. Comment – "set" is confusing. If you have a hundred messages you only have to worry about the previous message if it was parallel. A periodic measurement may consist of 5 individual requests. This is the "set" that the text is referring to.
    h. The parallel bit only applies to the Start Time of the first measurement.
    i. Change "set" to "series" in all places.
    j. We used sequence for elements in a frame.
14. Meeting in recess until 4:00 PM

Monday, November 16, 2004
4:00 PM – 6:00 PM

1. Chair calls meeting back into session at 4:00 PM
2. Request for a Straw Poll request by Simon Barber

Straw Poll
Should we remove periodic measurements from the draft?

Comments on Straw Poll
Make it voting members only

Joe requests to cancel the request for Straw Poll.
Periodic Group (Joe, Tim, John, Simon) will meet Wednesday in Rio Grande West at 10:30 to address this issue.

3. Technical Presentation – Adding Neighbor Report to Associate Response – Kwak – 04/1439r0
   a. Addresses comments #167 and #743
   b. Comment – The AP automatically sends this upon association without an option to override. There needs to be a method to disable, a new element. This might actually slow down association, because of influx of data.
   c. Comment – Change the text to be Capability Bit and not dot11RadioMeasurementEnabled.
   d. Comment – A station can obtain this information from other means.
4. Technical Presentation – A proposed Resolution to TGK LB71 comment on Neighbor Report in Association Response – Floyd Simpson - 04/1410r0
   a. Comment – are there security concerns putting this information in probe response.
   b. Comment – TGi relies on channel maps without association.
   c. Comment – Will bring a motion at 8:30 tonight.
   d. Request for Straw Poll

Straw Poll
Do you support the proposal in document 04/1410r0 to enable Neighbor Report to be returned in Association Response?

Yes: 14 No: 0

5. Technical Presentation – A Proposed Resolution to TGk LB71 comment on Neighbor Report in Probe Response - Floyd Simpson - 1409r0
   a. Comment – This could help you when you're doing a site survey.
   b. Comment – You can get this information from existing mechanisms.
   c. Comment – This is no longer a class 3 frame.
   d. Request for Straw

Straw Poll
Do you support the proposal in document 04/1409r0 to enable Neighbor Report to be returned in Probe Response?

Yes: 6 No: 6

6. Technical Presentation - Proposed Simplifications to TBTT Offset Format & Calculation – Stephen Wang – 04/1213r0, normative text in 04/1403r0

a. Address LB71 comments 662, 664, 671, 672, 673, 698, 699, 701, 702, 704, 707, 708, 714, 722, 734, 742, 744, 749, 754, 799, 1025, 1026
b. Comment – you don't answer when you don't have accuracy
c. Question – Why do need such strict accuracy? Answer – we picked this number for illustration. The more accurate you get for the prediction, the more power you can save.
d. Comment – The Beacon might be late, but never early.
e. Comment – It looks like your assuming that Beacon intervals will all be the same. Answer – no.
f. Comment – The offset is in TUs.
g. Comment - Proposed an amendment "to just provide the offset"
h. Request for Straw Poll

Straw Poll

Do you support the proposal in document 04/1403r0 for Simplifications to TBTT Offset Format & Calculation?

Yes: 14 No: 0

i. Request for a Motion

Motion

Move to instruct the editor to incorporate text from 04/1403r0 into next version of the IEEE802.11k draft with the following amendment change "Neighbor Report Response Frame" to "Neighbor List Entry" in second paragraph of clause 11.8.2.

For: 15 Against: 0 Abstain: 2

Motion Passes @ 100%

7. Technical Presentation – Normative Text for the Proposed Beacon Report Simplification – Wang - 04/1379r0
   a. Comment – Serves two purposes (1) cut data transmission and (2) reduce the load on the serving AP.
   b. Comment – You might still need the Beacon information that is deleted from this text.
   c. Request for Straw Poll

Straw Poll

Do you support the proposal in document 04/1379r0 for Beacon Report Simplification?

Yes: 4 No: 8

8. Meeting in recess until 8:30 PM tonight.

a

Monday, November 16, 2004
8:30 PM – 09:30 PM

1. Chair calls the meeting to order at 8:00 PM.
2. Motion to accept Ad Hoc and Teleconference Minutes

   Motion

   Move to accept the minutes of the Seattle Ad Hoc 2 in document 04/1200r4 and minutes of Berlin to San Antonio Teleconferences in document 04/1433r0.

   Moved: Kwak
   Seconded: O'Hara

   Discussion on Motion

   Question – What is the difference between 04/1200r3 and 04/1200r4? Answer – 1200r3 had wrong date in header.

   For: 8 Against: 0 Abstain: 1
   Motion Passes @ 100%
3. Motion to approved comment resolution from Seattle Ad Hoc Meeting

   Motion

   Move to accept the "Accepted" and "Declined" Editorial Comments of the Berlin-San Antonio teleconferences as documented in the approved minutes in 04/1187r0, 04/1188r0, 04/1189r0, 04/1398r0, 04/1399r0, and 04/1401r0.

   Discussion on Motion

   Question – are you leaving out defers? Answer – no.
   Comment – Comment #64 in 964r22 states "accepted" with clarity.
   Comment – We should update 04/964 with pointers to documents which addressed individual comments.

   Motion is withdrawn
4. Work on comments discrepancies in 964r22.
   a. Compile a list of all comments that have potential problems.

   21,64,84,86,120,121,122,167,168,171,180,183,197,203,207,215,216,231,243,254,375,376,400,441,442,447,448,450,451,452,453,467,470,474,475,477,479,492,555,563,627,636,670,682,743,773,783,812,820,830,848,922,935,945,994,997

5. Meeting in recess until 1:30 PM tomorrow.

Wednesday, November 17, 2004
1:30 PM – 3:30 PM

1. Chair brings the meeting back into session at 1:30 PM
2. Review agenda
3. Motion to approved agenda passes unopposed
4. Technical Presentation – TGk PICS Category Resolution - Simon Black – 04/1207r0
   a. Comments conditional on Radio Measurement IUT configuration #834, #835, #838, #840, #851, #855
   b. Comments relating to RCPI 11g (clause 19) in RRM
   c. Comments relating to Beacon Item optional (Decline #837)
   d. Comments relating to conditional reporting #841, #836, #841
   e. Comments relating to power constraints
   f. Comments relating to missing PICs items
5. Technical Presentation – TGk LB71 Hidden Category Comment Resolution - Simon Black – 04/1208r0
   a. Comment #153 was deferred in Seattle
   b. Simon would like to take a straw poll on comment #153 either now or a later time
   c. Comment – Perhaps we should rename it to "No ACK Detection" putting in a disclaimer.
   d. Discussion on Comment #604 from 04/964r25 as addressed in Seattle Ad Hoc.
6. Technical Presentation – TGk LB71 Parallel Category Comment Resolution - Simon Black – 04/1206r0
   a. Move for a motion

   Motion

   Move to instruct the editor to incorporate text from 04/1206r0 into next version of the IEEE802.11k draft.

   Moved: Black
   Seconded: Qi

   Discussion on Motion

   Comment – we should create a spreadsheet and vote from it.
   Question – will it be clear to the editor what to do. Answer from Editor – as long as it is included in 964.
   Simon Black will update 964 with 1206r0 information.

   For: 13 Against: 0 Abstain: 10
   Motion Passes @ 100%

7. Motion to amend agenda passes unopposed.
8. Technical Presentation – QoS Metrics for Traffic - Qi – 120r42 – Normative Text in 04/1395r0
   a. Comment – What are you trying to accomplish with this report? Based on the Frame/Loss count this does not tell you anything. You can have a High Loss Rate when the AP is very minimally loaded. Answer - It is not relevant to load, but for a roaming trigger.
   b. Comment – Power Saving Mode could delay report.
   c. Comment – your measurement does not take into account rate change which can introduce jitter.
   d. Comment – Change frame to MSDU.
   e. Comment – The delay measurement is a very useful measurement.

f. Comment – The fastest way to measure jitter – add Min/Max
g. Comment – This is useful to measure the MAC work embodied in 11e
h. Question – How do you determine quality without measuring other streams?

9. Technical Presentation – TGk LB71 comment on Neighbor Report – Simpson -1410r0
   a. Address Comment #167 and #743
   b. Move for a motion

Motion

Move to instruct the editor to incorporate text from 04/1410r0 into next version of the IEEE802.11k draft.

Moved: Simpson
Seconded: Emeott

For:12 Against:1 Abstain:8
Motion passes @ 92%

10. We must ensure that we update 964 with the two motion approved
11. Motion to amend agenda passes unopposed
12. Meeting is in recess until 3:55 PM.

Wednesday, November 17, 2004
3:55 PM – 6:00 PM

1. Chairperson calls meeting back in session at 3:55
2. Motion to approve the Seattle Ad Hoc 2 comment resolutions.

Motion

Move to accept the Seattle Ad Hoc 2 "accept" and "decline" comments in document 04/0964r24 (with restating the note to be "Note in your submission that comments 167 and 743 are covered by Floyd Simpson in document 1410r0").

Moved: Emeott
Seconded: Simpson

For:10 Against: 0 Abstain: 5

Motion Passes @ 100%

3. Technical Presentation – 802.11k Measurement Frame Proposal – Emeott – 04/1425r0
   a. Question – What do you mean by noise floor? The white noise floor does not match what is in the atmosphere.
   b. Question – Do you expect the noise floor to be absolute in dBm?
   c. Comment – It is probably the perceived noise at the antenna.
   d. Comments – These are mini beacons.
   e. Question – Why are you defining another method of passive scanning? Answer – devices coming from external networks (cell) where our existing services are not available. This is a belt and suspender approach.
   f. Question – Why can't you use passive scanning? Answer – It requires staying on a channel much longer than a Beacon period.
   g. Question – Is the mini beacon enough to accomplish fast roaming? Answer – TGr proposal are proving that these mini beacons will provide the ability to accomplish fast roaming.
   h. Comment – concerned with the frequency of these mini beacons. How will this impact a loaded network?
   i. Comment – This will solve a great deal of problems.
   j. Comment – If you are sending these measurement frames out every 20 milliseconds, you increasing contention on the channel. This could impact the number of voice calls. 802.11 voice calls is determine by contention on the medium instead of capacity.
   k. Question – Is it enabled dynamically? Yes, these are unsolicited.
   l. Question – Do you always need to send them? SNR alone is not all you need in the real world. What are the other fields used for? Answer – to determine when probe request is coming.
   m. Comment – If you are sending in burst, then you would not be increasing contention for the channel.
   n. Question – Is there other advantages over a "Cold Start" and "Blind Scan". Answer – the station does not have to wake up as often and stay awake.
   o. Request for Straw Polls

Straw Poll

Should 802.11k include a means to reduce the amount of time and effort required by a station to detect the presence of active AP, measure signal quality and estimate link margin.

Yes: 16 No: 0

Straw Poll

Should 802.11k include a means to permit AP to provide stations with passive measurement opportunities in addition to those afforded by beacon frames and probe responses since the length of the beacon interval may be too large to provide adequate measurement opportunities?

Yes: 8 No: 3

4. Move to amend agenda motion passes unopposed.
5. Technical Presentation – L2 Domain Indication - Moreton – 04/1436r0
   a. Comment – If you are running multiple SSIDs there might be multiple "root" nodes or multi subnets. Answer – multiple SSIDs are not supported in the 802.11 draft.
   b. Comment – APs on the same subnet could be configured with multiple VLANs.
   c. Question – Doesn't the Neighbor Report contain information about "is this AP reachable"? Answer – this requires active scanning. This proposal happens automatically.
   d. Comment – We should incorporate this into the Neighbor Report.
   e. Comment – We have a number of comments regarding reach ability.
   f. Comment – How is this applicable to Radio Resource Measurement?
   g. Comment – This solution suffers all of the same issues as the Neighbor Report. Answer – most APs deployed today are not using VLANs.
   h. Comment – This could provide the ability to talk with APs over the DS.
   i. Comment – STP has problems.
   j. Comment – There are other people trying to solve this problem with tunneling between switches or Mobile IP.
   k. Straw Poll

Straw Poll

Are you interested in hearing more about L2 Domain Indicator?

Yes: 11 No:2

6. Technical Presentation – Periodic Comment Resolution - 04/1390r1 – Kwak
   a. Remove comment #86, because it is very contentious.
   b. Remove comment #466, because it does not belong in the Periodic category.
   c. Move for a motion

Motion

Move to instruct the editor to incorporate text from 04/1390r1 into next version of the IEEE802.11k draft.

Moved: Kwak
Seconded: Durand

For:9 Against:1 Abstain:0

Motion passes @ 90%

7. Technical Presentation – The Network Beacon Announcement Scanning Method – Dirk Kuijsten - 04/1387r0
    a. Comment – Compare your presentation with Motorola and see if there are things missing from those proposals.
8. Meeting in recess until tomorrow at 1:30 PM

Thursday, November 18, 2004
1:30 PM – 3:30 PM

1. Chair calls the meeting to order at 1:30 PM
2. Review Agenda
   a. John Klein presentation 04/1508r0
   b. Fix 1194r0 beacon report comments in 1422r0
   c. Joe Kwak
   d. Deferred Seattle Ad Hoc 2 Tech Comment Resolution
   e. Process comments (04/1422r0)
   f. Motion on marking "Accepted" comments as Editor-to-do
   g. Motions for Working Group
3. Most of the TGk group is attending TGn today for a vote.
4. Technical Presentation – TPC Comment Status – Klein – 04/1508r0
   a. Update the deferred comments document with blue comments (7)
      - 951, 968, 969, 929, 740, 276, 93, 102
   b. Update red comments in 964r25 as miscategorized (3)
      - 185, 379, 985
   c. New editorial comments in orange
      - 274, 275, 636, 824, 828, 939
5. Deferred comment review

Comment #35 – Clause 11.2 – Amann
Problem - The draft does not currently indicate that any updates are required in clause 11.2, however I would disagree. The draft clearly indicates that a STA may be requested, by an AP or other STAs, to perform various measurements. This would imply that these measurements could also be requested during power-saving operation of a station. The question is, what should the station (and possibly AP), do in this situation?
Remedy - Provide appropriate updates to account for power-saving behaviors of a station.
Comment – time asleep
Comment – coordinate when it is sleeping and when it is making measurements
Comment – If you take it literally – STA must maintain data path with currently serving AP while taking measurements. This would mean the STA would send a null data frame to the AP.
Comment – there are 2 choices (1) Clearly state the power-save clients will remain asleep and not answer request (2) buffer the 11k request frame until station returns from sleep-mode (management frame do not get buffered) – this would require converting the request to a data frame and flagging data waiting in TIM.
Resolution – defer – address when more people are in the room

Comment #38 – Clause 11.5 – Thrasher
Problem - First sentence in second paragraph (line 39,40).. Need to remove the reference of "future regulatory requirements in Europe" I'd assume the TPC procedures could be used to satisfy future regulatory requirements in other places besides Europe…:)
Remedy - should read ….This clause describes TPC procedures that may be used to satisfy this particular European regulatory requirement. The procedures may also satisfy comparable needs ….
New Remedy- drop words "in Europe" in

Resolution – accept – instruct editor to make change as described in New Remedy above.

Comment #39 – Clause 11.5 - Ecclesine
Problem - As only one sentence is being modified, only one sentence needs to be present.
Remedy - Remove the other sentences from what of 11.5 is present
Resolution – differed there are changing coming 04/1120

Comment #81 – Clause 11.7.6 – Lefkowitz
Problem – Be explicit about who is sending the request in infrastructure. If STA's can not send requests to each other in infrastructure then stat that the AP sends a request to the STA in infrastructure and that STA's can send requests to each other in Ad-Hoc. If there can not be two AP's in infrastructure mode then the wording in the beginning of the clause is not clear about a STA sending to other STA's since the table states that a STA can send a request to an AP.
Remedy – See Comment
New Remedy – remove the words “infrastructure BSS or”.
Resolution – accept – instruct the editor to make change as described in New Remedy above.

Comment #91 – 11.7.6 – Wright
Problem - pg 48, line 22 - Need to look up the definition of "solicited" and "autonomous" meas. Reports
Remedy – none
Comment – We should add a definition section.
Comment – Charles should have added definitions.
Resolution – decline – meaning is obvious and unique to 11k.

Comment #153 – Clause 11.7.8.5 – Adachi
Problem - The hidden node report is questionable whether it is really meaningful compared with the load of implementing it.
Remedy - Delete the hidden node report and those related.
Resolution – defer – Simon Black will present “No ACK Detection” Report/Counter

Comment #154 – Clause11.7.8.5 – Matta
Problem - In paragraph 2, it seems like the method to detect hidden nodes, as described here is highly inconvenient (yet practical) for most 802.11 stations and/or APs. Typically APs and Stations have filters that allow only frames destined for this station or multicast and broadcast packets. Now just for this statistic, these stations/APs, should listen in promiscuous mode. Which is not clean. So this begs the question, is this hidden node stuff really necessary and/or useful ? If so what purpose is this serving ? It will be helpful if there is even an informative description in this section as to how this hidden node info can be used.
Remedy - see comment.
Comment – If you have 2 stations connected to the same AP, but can’t hear each other what would you do? Enable RTS/CTS and reduce the number of voice calls that can connect to the AP.
Comment – We need a one paragraph per measurement descriptive Annex. This will describe why we need the measurement and who and how they would be used.
Resolution – accept – create an Informative Annex (Paine) for each measurement

6. Meeting in recess until 4:00 PM today.

Thursday, November 18, 2004
4:00 PM – 6:00 PM

1. Chairperson calls meeting to order at 4:00 PM
2. Review the Agenda
3. Technical Presentation – 04/1440r1 - Kwak
   a. Address #831, #843
   b. Move to motion

Motion

Instruct the editor to incorporate text from 11-04/1440r1 into the next version of the IEEE802.11k draft.

Moved: Kwak
Seconded: Simpson

For: 10 Against:0 Abstain:0
Motion Passes @ 100%

4. Technical Presentation – 1409r0 – Simpson
   a. Addresses comment #773

Motion

Move to instruct the editor to incorporate text from 04/1409r0 into next version of the IEEE802.11k draft.

Moved: Simpson
Seconded: Emeott

Discussion on Comment

Comment Against - Probe Responses will never be protected.
Question – When would you use this? When you initially power up or when come from an external network, it provides a method of reducing power consumption
Question – How is this better than AP Channel List? Answer – You do not get TBTT in AP, so you don't know when to listen.
Comment – can we modify the AP Channel List and add TBTT.
Comment – it seems better to send a probe request and wait 15 milliseconds.

For: 6 Against:3 Abstain:1
Motion fails @ 67%

5. Technical Presentation – Beacon Comment Resolution from LB71– Emeott – 04/1511r0

Comment #124 - Clause 11.7.8.1 – Lefkowitz
Problem - The way I am reading this clause it appears that you can not send a beacon measurment request if the channel is the same as the serving channel.
Remedy - If this is the case change it such that you can measure beacons on the serving channel. Be explicit about what to do if the request is on the serving channel, or do not be explicit about what to do if it is not on the serving channel.

New Remedy – Change the first paragraph to read “If a station accepts a Beacon Request it may respond with a Radio Measurement frame containing one Measurement (Beacon) Report element for each BSS matching the BSSID in the request.”
Resolution – accept – instruct editor to make change as described in New Remedy above.

Comment #131 – Clause 11.7.8.1 – Balachander
Problem – Line 9 - Reference to probe request is not correct
Remedy – Replace probe request with probe response
Resolution – accept – see comment #127

Comment #132 – Clause 11.7.8.1 – Johnson
Problem - This clause appear out of sync with clause 7.3.2.21.6. Clause 7.3.2.21.6 states "A Response to a Beacon Request is one or more Beacon Reports" whereas this clause states "may respond with a Radio Measurement Report frame". Also this clause states "When more than one Beacon, or Probe Response from a BSS is received in the measurement duration, the contents of the Beacon Report shall be based on the latest received." and Clause 7.3.2.21.6 talks about averaging the most recent 19 values. Need to clarify whether this measurement request is for a periodic or single measurement in the text to make tings clearer.
Remedy - Clarify or explain.
Resolution – partially accepted – Since a beacon report is one type of measurement report (see table 20c), the text in clause 11 is correct and clear. Clarified in another comment 470.

Comment #133 – Clause 11.7.8.1 – Emeott
Problem – Step e) of the Active measurement mode procedure is unnecessary. There is no reason why a measuring station should return to the serving channel if the measurment channel is not the serving channel.
Remedy – Delete step e)
Resolution – accept – instruct editor to make change as described above.

Comment #135 – Clause 11.7.8.1 - Balachander
Problem - Line 9 - Reference to probe request is not correct
Remedy - Replace probe request with probe response
Resolution – accept – see comment #127

Comment #141 – Clause 11.7.8.1 - Durand
Problem - this paragraph is unclear relative to operation on the serving channel
Remedy – Please clarify operation on the serving channel
Resolution – accept – alternate resolution - see comment #124

Comment #432 – Clause 7.3.2.21.6 – Oakes
Problem - Table k4: Way too many combinations. If we know how these are going to be used, surely we know which one to choose, don’t have them all! If we don't know which one will be used, then this is not the solution!
Remedy - Reduce the table to one row!
Comment – RSSI is not defined in the standard and is already used for thresholds today. We can put up with RCPI (which has actual value) – some MFG use RSSI in some other way than power. They use it as a quality measurement.
Comment – RCPI is now a requirement in PHY measurement on the received frame.
Resolution – defer

Comment #434 – Clause 7.3.2.21.6 - Oakes
Problem – Page 14, line 18: "are averaged over at least 20 measurements to reduce the sampling error to several dB." is meaningless.
Remedy – change to something like "should be averaged over at least 20 measurements to reduce the sampling error to less than 10 dB"
Resolution – defer

Comment #436 – Clause 7.3.2.21.6 - Edney
Problem – Paragraph under Fig k5. What does "iteratively" mean. It implies an algorithm for choosing sequential channels but that algorithm doesn't seem to be defined.
Remedy – It is sufficient to say "the receiving STA shall conduct measurements for all channels." Otherwise you need to define the "iterative" algorithm.
Resolution – accept – see comment #996

6. Motion to approve editorial comments

Motion

Move to accept the "Accepted" and "Declined" Editorial Comments of the Berlin-San Antonio teleconferences as documented in the approved minutes in 04/1187r0, 04/1188r0, 04/1189r0, 04/1398r0, 04/1399r0, and 04/1401r0.

Moved: Kwak
Seconded: Jalfon

For:11 Against:0 Abstain:0
Motion Passes @ 100%

7. Motion to hold weekly teleconferences

Motion

Move to request the Working Group to empower TGk to hold weekly teleconferences (Wednesdays at 11:30am Eastern time) through 2 weeks after the Atlanta plenary as required to conduct business necessary to progress the Letter Ballot process, including creating and issuing drafts for Letter Ballots and handling other business necessary to progress through the IEEE standards process.

Moved: Black
Seconded: Klein

For:12 Against:0 Abstain:0
Motion Passes @ 100%

8. Meeting adjourned until Monterey.

Report of TGm – November 2004

DATE: November, 2004				
Author(s)				
Name	**Company**	**Address**	**Phone**	**email**
Bob O'Hara	Airespace	110 Nortech Pkwy, San Jose, CA 95134	408 635 2025	bob@airespace.com

Abstract

Report of the meeting of TGm at the November 2004 session.

Goals for November 2004

- **Address interpretation request**
  - Errors in Annex G
    - Analysis performed by Inoue-san and colleagues
- **Develop updates to standard**
  - Address submissions received
    - None
  - Continue work from spreadsheet of work items (04/801)

Submissions

- **Submissions**
  - None

Proposed Agenda

- **Review IEEE Patent Policy**
- **Review interpretation request procedure**
- **New business**
  - Interpretation Request
  - Submissions
  - Continue with items from 04/801
- **Adjourn**

Motion #1 to adopt Agenda

- **Moved: to adopt the agenda**
- **Mover: Richard Paine/Harry Worstell**
- **Passes: unanimous**

IEEE-SA Standards Board Bylaws on Patents in Standards

- http://standards.ieee.org/board/pat/pat-slideset.ppt

Interpretation Procedure

- **http://standards.ieee.org/reading/ieee/interp/**
- **Send email to Linda Gargiulo (l.gargiulo@ieee.org)**
- **IEEE forwards requests to the WG**
- **WG responds**

Interpretation Request

- **Request asks for clarification of Table G.17 in Annex G**
- **Request indicates that FCS value may be calculated incorrectly**

Interpretation Response

- **The analysis by Inoue-san, et al, indicates that the problem with Table G.17 is the value of two bits in the trailer**
  - Bits 818 and 820 are shown as zeroes
  - The correct value of both of these bits is one
- **Correcting the value of these bits makes the value of the FCS in the table correct**
- **The complete description of this analysis is in document 11-04/1198**
- **The proposed interpretation response is in document 11-04/1454**

Motion #2

- **Moved: to adopt document 11-04/1454r0 as the response to the interpretation request and forward it to the 802.11 working group for approval**
- **Moved: Inoue-san/Paine**
- **Passes: Unanimous**

Motion #3

- **Motion: to adopt the following changes to the "Value" column of Table 82 in 15.4.4.2 of 802.11ma-d0.4 as the resolution to item 106 in 04/801:**
  - TXPWR_LVL: Level1, Level2, Level3, Level4
  - TX_ANTENNA: 1-256
  - RSSI: 0-255
  - SQ: 0-255
  - RX_ANTENNA: 1-256
- **Moved: Charles Wright/Harry Worstell**
- **Passes: Unanimous**

Motion #4

- **Motion: Resolve item 18 in 04/801 with the following:**
  - The EIFS is not to be used on noise events. Clarify 9.2.3.3 by replacing everything from "A STA using DCF shall not transmit…" to the end of the paragraph with "A correctly received frame is one where the PHY-RXEND.indication does not indicate an error and the FCS indicates the frame is error free." Clarify 9.2.3.4 by replacing the first sentence with "A STA shall use EIFS before transmission when it determines that the medium is idle following reception of a frame for which the PHY-RXEND.indication primitive contained an error or a frame for which the MAC FCS value was not correct.", inserting "The STA shall not begin a transmission until the expiration of the later of the NAV and EIFS." after "without regard to the virtual CS mechanism.", and adding to the end of the paragraph "At the expiration or termination of the EIFS the station reverts to the NAV to control access to the medium.“
- **Moved: Srini/Darwin**
- **Passes: Unanimous**

Motion #5

- **Motion: Resolve item #19 in 04/801 with the following:**
  - In the paragraph of 9.2.4 that begins "The contention window (CW) parameter shall take an…", replace all occurrences of MSDU with “MPDU of type Data”. Also, in the paragraph of 9.2.5.3 that begins "After transmitting a frame…" and the following paragraph, replace MSDU with “MPDU of type Data” in all but the very last occurrence.
- **Moved: Srini/Richard Paine**
- **Passes: unanimous**

Motion #6

- **Motion: Resolve item #20 with the following:**
  - Add a new parameter to the PHY Characteristic tables for each PHY (Tables 78, 80, 97, 115, 146) named aPHY-RX-START-Delay. The value for this parameter is zero for all tables except 115 and 146. The value in table 115 is 24 microseconds. The value in table 146 is 24 microseconds for OFDM and zero for CCK-OFDM. In 9.2.5.4 in the paragraph below figure 128, insert "+aPHY-RX-START-Delay" before "+ (2 × aSlotTime) ".
- **Moved: Srini/Darwin**
- **Passes: Unanimous**

Motion #7

- **Motion: Resolve item 22 in 04/801 with the following:**
  - In the sentence beginning "After transmitting and RTS frame" in 9.2.5.7, insert "with a value of aSIFSTime + aSlotTime + aPHY-RX-START-Delay," after "CTSTimeout interval,".
- **Moved: Darwin/Srini**
- **Passes: unanimous**

Motion #8

- **Motion: Resolve item 23 of 04/801 with the following:**
  - In 9.2.8, delete the paragraph containing the sentence "The source STA shall wait ACKTimeout amount of time without receiving an ACK frame before concluding that the MPDU failed.“ In the paragraph below figure 132, insert “with a value of aSIFSTime + aSlotTime + aPHY-RX-START-Delay,” after “shall wait for an ACKTimeout interval,”.
- **Moved: Srini/Darwin**
- **Passes: unanimous**

Work completed

- **Adopted resolutions to 6 work items**

Summary

Work Items at start	**37**
Work Items added	**2**
Work Items closed	**8**
Work Items to Editor	**6**
Work Items remaining	**31**
Percentage completion	**73%**

Output Documents

- **1454r0: Interpretation response**
- **1435r0: This report**
- **801r2: Tracking list of work items**
- **802.11ma-d0.4: current working draft**

Goals for January

- **Joint meeting with AP Functional Descriptions chair's ad hoc committee**
- **Continue work on items in 04/801**
- **Prepare for issuance of draft to working group letter ballot after the March session**

Adjourn

- **Meeting adjourned at 5:53pm on November 18, 2004**

IEEE P802.11
Wireless LANs

Minutes of High Throughput Task Group .11n Meeting

Date: Nov 15-19, 2004

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Abstract

Cumulative minutes of the High Throughput Task Group sessions held during the IEEE 802.11 Plenary meeting in San Antonio from November 15 through 19, 2004. The meeting was chaired by Bruce Kraemer from Conexant.

Executive Summary (also see closing report doc. 11-04-1512r0):

1. **TGn was only granted 18 hours of meeting time.**
2. **21 Partial proposals were each given 2 minutes to review the key points of their proposal followed by a general Q&A and then a panel format Q&A session.**
3. **A comparison presentation, doc 11-04-1400r4, was given.**
4. **The 4 complete proposals were updated for 1 hour each and each proposal was given a dedicated 1 hour period for Q&A. This was followed by a panel session Q&A and 5 minute summary.**
5. **A Low Hurdle Vote (LHV) was held for the complete proposals where proposals not receiving 25% of the vote would be eliminated. The results of the LHV were MITMOT=47.37%; TGnSync=73.68%; WWiSE=64.66% and Qualcomm=56.77% so none of the proposals were eliminated. The detailed voting results have been appended to these minutes.**
6. **The key agenda items for the January meeting were discussed. It will follow a similar format however the vote taken in January will be an Elimination vote.**
7. **Time permiting, a Vice-Chair election will be held at the January meeting.**

Note: these minutes are intended to offer a brief (even though the comments averaged about 2 pages per presentation) summary (including document number) of each of the presentations to facilitate review and recall of the session without having to read each of the presentations. Most of these minutes are built directly from selected slides of the various presentations and therefore are not subjective. An effort was made to note obscure acronyms.

The Q&A was particularly hard to capture. Aryan Saed assisted in capturing the minutes of the Q&A on Wednesday.

Detailed minutes follow:

Tuesday November 16, 2004; 8:00 AM – 9:30 PM [~ 142+ attendees]

:

1. Meeting was called to order by Task Group chairperson elect Bruce Kraemer at 8:01 AM
2. Chairs' Meeting Doc 11-04-1218
3. Room too small; at break we will move to the convention center
4. Chair read IEEE Patent Policy
5. Chair reviewed topics not to be discussed during the meeting – licensing, pricing, litigation, market share
6. New participants in .11n ~= 5
7. Status update since Berlin Sept meeting
    a. There were no partial proposals which merged to form completes so the tally stands at 4 completes and 28 partials
8. **Motion by Adrian Stephens to approve Sept minutes was seconded by Richard Kennedy passed without comment**
9. Weeks' Agenda for .11n
    a. 18 hours available
    b. Interest in box lunch - ~10
    c. Overview:
        i. Partial Proposals Summaries – Q&A, panel session
        ii. Comparison Presentations
        iii. Complete Proposals Update – Q&A, panel session
        iv. Conduct low hurdle vote Thursday in 1:30 PM session
    d. Chair asked if any partial proposal summaries were not listed in slide. Chair updated the slide real time according to:
        i. #27 -> 1447
        ii. #6 ->1405
        iii. #11 -> 1385/1444
        iv. #18 -> 1386
        v. #19 ->899r5
        vi. #10 ->1381

vii. #22 -> 1374
viii. #23 – merged with Mit-mot
ix. Hughes will present
x. Kowalski -> 1360
xi. Heath -> not present
xii. Mock -> withdrawn
xiii. Itri -> present
xiv. Ukiwi-san -> withdrawn
xv. Inprocomm -> ?

e. Partial Proposals Q&A – Joseph Levy and Pratik Metha had written questions (included in 11-04-1218r4)
f. Comparison Presentations – 1400r2, Infineon
g. Complete Proposals Q&A – separate into 2 separate 1 hour sessions for each complete proposal; suggested first hour for presentation update and the second hour for Q&A
h. Complete Proposals – Joseph Levy, Pratik Mehta, Chris Hansen, Paul Feinberg had written Questions (included in 11-04-1218r4)
i. Final 5 minute wrap-up preceeding low hurdle voting
j. Low hurdle vote will be via written ballot
k. Low Hurdle vote SPECIAL ORDER at 2 PM on Thursday?
l. Comment from floor – wait until 2:15?
m. Motion from Jon Rosdahl and seconded by John Egan to hold the low hurdle vote at 2:15 on Thursday was approved unanimously
n. Chair showed a sample written ballot
o. Chair indicated that a row call vote is an option but does not recommend this as being valuable
p. Chair indicated that 25% of voting members would be required to approve a roll call vote
q. Comment from the floor – the precedent is roll call voting
r. Chair noted that the issue is how to present the voting results – just a tally or per person basis. In any case the voting members will be recorded.
s. Straw Poll – in favour of simple tally vote or recorded vote?
t. Straw poll Result – simple tally vote (62); fully recorded vote (50)
u. Therefore a roll call vote will be prepared for by the chair and secretary
v. Motion to approve the agenda by Richard Kenedy and seconded by Aryon Saed
w. Discussion
i. Reviewed order of presentations of complete proposals
ii. Which room for .19 liaisons?
iii. Question from John Benko on reflector?
iv. John rescinded his questions

v. There is no abstain line on the ballot; is that correct?
vi. Clarification – member MUST vote "to continue or not to continue" on all presentations or the ballot is invalid
vii. Should one hour time slots be made special orders?

10. **Motion to amend agenda to have one hour presentations as special orders was made by Adrian Stephens and was agreed to unanimously**
11. **Motion to approve the agenda passed (99,0,0)**
12. Chair requested partial proposal presenters prepare for making their summaries
13. 9:34- #1455, SUN;
14. 9:36 - #1364, Nokia;
15. 9:38 - #1223r0, WaveBreaker;
16. 9:40 - #1360, Sharp; add time stamps
17. 9:42 - #1405r2, Infocomm; fixed beam forming, long preamble design, unequal error protection, 2-D linear transform
18. 9:46 - #1363r3, Winbond; circular transmission and open loop
19. 9:48 - #1383r0, Hamilton Institute; AFR MAC aggregation
20. 9:50 - #1381, French Telecom; Turbo codes with as few as 4 iterations
21. 9:53 - #1444r0, STMicro; LDPCC codes structured versus random
22. Session adjourned at 10:00AM and will reconvene in Hall C at the convention center as close to 10:30 as possible.

23. Session reconvened at 10:40 AM due to the relocation to Convention center
24. 10 44 - #1375, Mitsubishi
25. 10:46 - #1378, Philips;
26. 10:50 - #1386,WWiSE; Turbo codes similar to Mit-Mot
27. 10:54 - #899r5, ST Micro; MAC; endorse TGe features, piggyback scheme
28. 10:58 #1361, SciCom; F-LDPC Codes suitable for any of the complete proposal
29. 11:01 #1368r1, Samsung; two level frame aggregation (MMRA), Partial MAC
30. 11:03 #1374, InterDigital; MAC and PHY
31. 11:06 #1365,ETRI; STM and STBC PHY
32. 11:10 #1447r1, Panasonic; Varying Interleave Pattern MIMO
33. 11:13 #1373, IceFyer; promote beam steering to optimize channel SNR; need Channel State Info (CSI) at TX
34. 11:15 #1367, Nortel; LDPC codes comparable to Turbo codes and efficient using structured codes instead of random codes
35. 11:17 #1459, ITRI;
36. Note: ALL (partials and completes) WRITTEN Questions will be appended to the Chairs meeting doc – 11-04-1218
37. Questions from Joseph Levy:
    a. For ETRI; A = ?
    b. For IceFyer; A = yes as must be the case if the streams are to be separated
    c. For Infocomm, A= no

d. For Motorola; A = freq will be considered in the future
e. For Panasonic; A1 = yes; A2= 6 symbol interleaver since 3 dB gain
f. For Samsung; A1 = scheduler not needed; A2 = only for downlink period
g. For Sharp; A1 = audio markets; A2 = takes too long
h. For STMicro; A1= idea is using block ack; A2 = PA settling time

38. Pratik Mehta Questions were addressed by volunteers from the partial proposal Presenters
    a. Scalability – addressed by IceFyer who wants to see hooks in the CSI algorithms for the vendors to use for their optimization
    b. Backward Compatibility – addressed by STMicro who said LDPC is optional and therefore compatible
    c. Impact on Complete proposals – addressed by STMicro who said LDPC will increase die size
    d. Impact on Complete proposals – addressed by WaveBreaker (Scott Leyonhjelm) who said WWiSE would benefit from fast rate adaptation; also, moving the training sequence to later in the frame would benefit all the proposals that depended on obtaining CSI
    e. Heterogeneous Networks – addressed by Interdigital who said that yes it will be an issue but with time the networks will be come much more homogeneous
39. Questiuons from the floor:
40. for Infocomm research; how is legacy operation supported by STBC
41. for Mitsubishi; for what applications is Statistical Rate Allocation effective for applications using CSI
42. for Philips; 1 over 4 coding rate, how does it compare with 1 over 2 coding rate? A = see 1st presentation
43. for Interdigital; advantages of STBC over SFA; A = by Eldad Zeira - we don't have results
44. for Hughes Network Systems; did you do comparisons of LDPC iterations for MIMO
45. for Sharp; why time stamps and not buffers for removing jitter? A = switching buffers takes time?
46. No further questions for partial proposal presenters.
47. Session recessed at 12:24 until 1:30 today

Tuesday 1:30

1. Session reconvened at 1:34 PM in the convention center
2. Chair – addressed cell phone ringers
3. John Egan,Roger Tseng, Albert Liu; Infineon;11-04- 1400 r4; Comparison of nSync and WWiSE proposals
    a. John Egan re: Applications and Use Cases
        1. PDA
        2. Wireless PAD
        3. Session Mobility while in session (Pedestrian = 1 m per sec)
    b. Roger Tseng – nSync vs WWiSE re: Phy

Features	TnSync	WWiSE
Preamble format	Neat	More Efficient (shorter)
MIMO Channel estimation	Simple	Needs more adders for interpolations
Spectrum	Fewer null sub-carriers around DC @ 40MHz mode	Wider @ 20MHz mode
Throughput (for long packets under identical MAC efficiency)	Higher, if "R=7/8 & ½ GI" is employed.	Higher, at "R=3/4 & 2 Tx"
claimed Performance for reference (@ 2X2, 64QAM, R=3/4, 20MHz)	0.3dB Better @ ch-D (full GI, CC67)	0.3dB Better @ AWGN (CC59) 0.8dB Better @ ch-B (T: 1/2GI , CC67)
Gate count (Mandatory mode)	Slightly lower due to simpler channel estimation	Slightly higher
Optional features	Many	Few
Proposal stability & Completeness	Sensitivity & EVM proposals are still missing	Better

c. Comparison nSync vs WWiSE re: MAC by Albert Liu

1. Suggestions:

(1) To TGn Sync:

- Topic : Remove HID in MHDR MPDU and CHDATA MPDU.
- Reason: For implementation feasibility, one MHDR MPDU should be often followed by same a1/a2/a3's CHDATA MPDU.
- Benefit: save one byte HID may possibly save 4 bytes of padding in each MPDU.
- Drawback: continuous MHDR MPDU with different HID are forbidden.

(2) To WWiSE:

- Topic1 :Enlarge A-MSDU size to 256KB.
- Reason: save more PLCP headers in A-PSDU
- Benefit : save more PLCP headers mean more air time is saved.
- Drawback: different address set (a1/a2/a3) should be separated by another A-PSDU.
- Topic2: Sub frame header should have CRC and develop one mechanism can find next correct sub frame header when current one is broken if topic 1 is applied.
- Reason: make sure this header is right. One sub frame header is fail, all the A-MSDU is fail.
- Benefit: One sub-frame header is fail, but the rest of sub-frame can still help.
- Drawback: Implementation overload.

d. Overall Summary
   1. More Use and Application cases need to be considered for a full analysis of proposals. This analysis needs to be scheduled.
   2. Both TGn Sync and WWiSE proposals have strengths and weaknesses. We recommend an effort to resolve these through some form of merger.
   3. The market should get as strong and technologically advanced a standard as possible to promote the next wave of consumer and in-premise distribution beyond traditional LAN devices

4. Chair recessed at 2:07 until 2:30 per agenda special orders
5. Chair reconvened the session at 2:30
6. Review of Complete Presentations commensed

7. Bruce Kraemer, TGn chair had a conflict from 2:30 to 4:30; Secretary, Garth Hillman, became chair and Aryan Saed volunteered as secretary for the two hour period.
8. Mit-Mot; Bruno Jechoux, 11-04-1369R3; MAC and MIMO Techniques for MORE Throughput
    a. Overall Goal and Positioning
        i. Preserve compatibility with legacy IEEE802.11 system
        ii. Evolution: expand current WLAN application domain, offer a consistent solution to
            1. *Provide required QoS* to support consumer electronics (multimedia home environment and VoIP enterprise)
            2. *Grant range extension* for limited outdoor operation (hotspot) as well as full home coverage
            3. *Support heterogeneous traffic*: increase overall peak data rate without jeopardizing lower data rates modes
            4. *Manage diversity* (laptop/PDA/VoIP Phone) and *evolution* (independent STA/AP antenna configuration upgrade) *of devices* through asymmetric antenna configurations
        iii. Proven and simple solution: combine a highly efficient contention-free based MAC with robust yet low complexity open-loop MIMO PHY techniques
    b. PHY Outline by Markus Muck
        - The MitMot PHY layer proposal consists in an extension of IEEE802.11a PHY including several key new features:
            i. 20MHz (mandatory), 40MHz (optional) bandwidth
            ii. Optional second OFDM modulation using 104 data subcarriers among 128 in 20MHz or 40MHz bandwidth
            iii. Multiple TX/RX antenna modes handling asymmetric antenna configuration (2, 3 or 4 transmit antennas, 2 or more receiving antennas); STBC and SDM; simple transmitter; # of RX antennas determines max number of streams (4 streams undesireable from a robustness perspective)
            iv. Frequency and spatial interleaving
                - Plus a space time interleaver to avoid neighboring bits on the same antenna
            v. Advanced optional forward error correction scheme relying on turbo-codes
            vi. Improved preamble design for multi-antenna channel estimation and synchronization purposes
            vii. Link quality metric feedback for efficient link adaptation
            viii. Simulation Results & Conclusion

        Note: STS = Short Training Sequence
        Note: LTS = Long Training Sequence
        Some notes captured from presentation
            i. From 2x2 to 4x4 gain improvement is 4.3 to 7 dB
            ii. Max throughput at 20 MHz is 176 Mbps and at 40 MHz 468 Mbps
            iii. FEC: legacy 11a BCC plus 5/6 puncturing, plus optional Turbo Code rate ½ to 5/6.

iv. Main advantages in implementation: scrambling prior to padding, 2048 bit segments (no new interleaver for each block size). Avoids memory contention access for interlever. 2dB gain
v. Preamble: STS in time domain based on code overlay sequence. Ensures cross correlators are very simple. LTS defined by limited alphabet. STS has good spectral and crosscorrelation properties, high peaks with overlay, good for time synchronization. Detection probability from -6 to 6dB SNR equals nearly one in 2x2 and 4x4.
vi. Preamble: LTS
vii. Link quality metric feedback for channel capacity and estimate for PER. Accurately estimate PER based on capacity.
viii. Performance: 120Mbps at 35dB in 2x2.
ix. Channel D: 2x2 35dB, 3x3 25.5dB 4x4 23dB SNR required for PER=10%.
x. 32 sample GI important for very large delay spread in channel F, error floor from 16 sample disappears.
xi. Negligible drawback in performance from drawback modes

c. MAC Presentation by Bruno Jechoux
   i. Why New Access Method
   - ***802.11n scope:***
     - Enhance performance, properly serve QoS application and increase efficiency.

   - ***Identified weaknesses in legacy MAC:***
     - Collisions and contention overhead (EDCA)
     - Fixed Inter Frame Spaces (All)
     - Polling efficiency and latency (HCCA)
     - MAC-PDU overhead (All)
     - PLCP overhead (All)
     - Block ACK limitations (All)

   Bottom line :Numerous new patches to legacy required
     - Minimum set of modifications
       - Adaptive resource allocation mechanism
         - Polling enhancement
       - New frame format
         - MAC PDUs and PLCP overhead reduction
         - Flexible and error-resistant frame aggregation
       - Enhanced ACK scheme
         - More powerful and more flexible than Block ACK

- In-band, resource thrifty signaling
  - Latency reduction and efficiency increase
- Collision and contention suppression

Conclusion - A new access mode is preferable

- ECCF - Extended Centralized Coordination Function – Introduced
- Max Delay < 20 ms for QoS; good for VoIP which is the most difficult application

ii. Notes captured from the MAC presentation:

1. ECCF
   a. Functions are distributed over 4 sublayers
      i. LLCF
         - Packet Sequence Number Assignments
         - MAC Header Compression
      ii. SAR
         - Segment Sequence Number Assignments
         - Segmentation/Re-Assembly
      iii. MIS
         i. Error and flow control
      iv. MLS
         - Encryption
         - MPDU Header
         - Signaling Insertion
2. 802.11 Frame and beacon maintained. CFP, CP maintained. MTF is period at which resources are allocated, dynamic allocation of resources. Flexible enough for legacy and 11n stations. Multiple ECCF in superframe.
3. Frame structure. In one MTF multiple MPDU, each TI (time interval) contains one MPDU only, only one header. MPDU can be aggregated, multiple destination, long PHY bursts up to 1ms. PGPM defines time intervals for multiple stations. MPDU describes length and phy mode.
4. Aggregation: multiple phy modes, multiple flows, multiple destinations. E.g. VoIP, TCP, MPEG flows. Packet sequence numbers. Each segment has header and CRC. Segment sequence number. MPDU up to 1ms.
5. Resource allocation scheme: ECCF period within CAP or CFP, allocation is within MTF. PGPM for resource allocation messaging , polling. TI (time interval) used for data transmission and RR (resource request).
6. Enhanced ACK and flow control: on a flow basis (one source, one destination, one priority). ACK is cumulative ACK for sequence. For missed packets: selective ACK in case of errored packet, ACK with SDU number, indicating which segment. ACK is for segment not MSDU.

7. Homogeneous BSS – new .11n beacon only is transmitted
8. Heterogeneous BSS – both legacy and .11n beacons are transmitted and in that order
9. Overlapping BSS avoided by using DFS from .11h
10. ECCF robustness: MAC efficiency versus PER for scenario 1,4,6: >60% for all PER 0..10%, high performance even in bad radio conditions.
11. ECCF scalability: MAC efficiency is constant versus PHY rate 50Mbps to 250Mbps.
12. Mixed traffic handling: increased number of stations for TCP flow keeps MAC efficiency at <60%. With 30x VoIP still 65Mbps available.
13. Delay performance: max delay is 20ms for QoS. VoIP is most stringent application. Simple round robin scheduling.
14. Simulations. Scenario 1: 106Mbps at MAC-SAP from 139Mbps at PHY. Scenario 4: 130Mbps available from 178Mbps PHY. Scenario 6: 103Mbps from 155Mbps PHY.

e. Results Conclusion:
   - QoS requirements supported (throughput and delay)
     - In all scenarios
   - High level MAC efficiency
     - Above 65 % in all scenarios
     - Efficient with QoS flows as non QoS flows
   - Very good scalability
     - Constant efficiency versus PHY rate
     - Backward compatibility
     - Flexibility ensured, without context-dependent tuning

f. Overall Conclusion - Full support of all mandatory 11n simulations scenarios with a 120 Mbps PHY layer

g. Differentiators:
   1. Resource allocation mechanism is highly dynamic
      - QoS provided without use of traffic profiles (TSPECS)
   2. Enhanced transparency and predictability through broadcast grouped resource announcement
      - yields clean low power implementation and low overhead
   3. Inherent clean split between legacy and .11n devices at MAC level
      - no need for mixed-modes transmission mode definition
   4. High Efficiency independent of application packet size through segmentation
   5. Robustness to error through retransmission mechanism on segmented packets
   6. .11n specific beacon enables materialization of new PHY mode range prediction
   7. Build in support for asymmetric TX/RX antenna configurations to accommodate various terminal sizes (PDA/Phone) offering a scalable and evolutionary solution

8. New preamble definition: allowing easier tradeoff between quality/complexity for CSI estimation avoiding the important noise enhancement using ZF approaches
9. Open-loop link quality feedback for easier and better link adaptation

9. Reccessed at 3:24 until 4 PM

Tuesday 11-16-04; 4PM

1. Chair reconvened the meeting at 4 PM
2. TGnSync Presentation by Jon Rosdahl, Aon Mujtaba and Adrian Stephens; 11-04-888r4
    a. Introduction by Jon Rosdahl
        i. Mission
            a. Develop a scalable architecture to support present and emerging applications
            b. Foster a broad industry representation across market segments
    b. Phy by Aon Mujtaba
        i. Mandatory Features:
            a. 1 or 2 Spatial Streams
            b. 20MHz and 40MHz* channelization
            c. 1/2, 2/3, 3/4, and 7/8 channel coding rates
            d. 400ns & 800ns Guard Interval
            e. Full & seamless interoperability with a/b/g
        ii. Optional Features:
            a. Transmit Beamforming
            b. Low Density Parity Check (LDPC) Coding
            c. SDM with 3 or 4 spatial streams using existing preamble
        iii. Changes since Berlin
            a. Removed Options
                i. Reed Solomon coding
        iv. Changed to mandatory in 20MHz:
                i. 7/8 code rate
                ii. 400ns (in addition to 800ns GI)
                iii. Highest Rate = 140Mbps in 20 MHz or 243Mbps in 40MHz
        v. Bottom Line – 140 Mbps in 20 MHz; or, 243 Mbps in 40 MHz
        vi. STF = Short Training Field
        vii. BF = Beam Forming
        viii. Is 40 MHz Mandatory?
            a. Yes - Both 20 MHz & 40 MHz capabilities are mandatory

i. With exceptions due to regulatory requirements
b. Capability depends on regulatory domain (just like channelization plans):
i. 20/40 MHz capable devices
ii. 20 MHz only capable devices
c. Both types of devices are fully interoperable

ix. Overall PHY Summary
a. Mandatory Rate of 140Mbps in 20MHz:
i. 2 Spatial Streams
ii. 7/8th rate coding
iii. 400ns Guard Interval
b. Low Cost & Robust Throughput Enhancement:
i. Scalable to 243 Mbps in 40MHz
c. Optional Robustness/Throughput Enhancements:
i. LDPC Coding
ii. Transmit Beamforming
iii. Scalable to 630Mbps with 4 spatial streams in 40MHz

x. Notes captured during the presentation:
a. Receiver assisted rate feedback
b. Unequal rates on spatial streams, with CSI at TX, closed loop
c. Orthogonal spatial spreading
d. Receiver does not need to distinguish between open loop or closed loop transmission, which is key to scalability.
e. SDM: coding is for joint streams, interleaving is over separated streams.
f. 20MHz tone spacing is identical to 11a. 40MHz with 128pt FFT, with filled guard band, thus 2.25x increase.
g. HT-Preamble is legacy compatible, with tone interleaved HT-STF and HT-LTF. Auto-detection: legacy data or HT-Signal field determines receiver mode, based on Q-BPSK (BPSK with 90deg rotation). The ‘reserved’ bit is undefined, cannot rely on the setting
h. MIMO AGC: Legacy STF used for power measurement. HT-Data is possibly with multiple streams. Tone interleaving not allowed for LTF. Cyclic delay gives nearly decorrelated STF, but there are interoperability problems, and has more variation w.r.t to the data power, requiring more dynamic range in ADC. Prefer tone interleaving. Power fluctuation problem persists with LTF as well.
i. Preamble seemlessly supports closed loop.
j. 20/40 operation: in Japan 40MHz is disabled, in US 20MHz supported. Mandatory: 2x2x40 for 100Mbps.
k. Tx beamforming: 10dB gain for 4x2-ABF over 2x2 (both cases receiver has 2 antennas)

l. Optional LDPC: 2..4dB over BCC (over 15 .. 30dB SNR)

c. MAC by Adrian Stephens
   i. Mandatory Features:
      a. MAC level frame aggregation
      b. RX assisted link adaptation
      c. QoS support (802.11e)
      d. MAC header compression
      e. Block ACK compression
      f. Legacy compatible protection
      g. 20/40 MHz channel management
   ii. Optional Features:
      a. Bi-directional data flow
      b. MIMO RX Power management
   iii. Changes since Berlin
      a. Removed
         i. TSPEC negotiation
         ii. Packet loss priority
      b. Added
         i. Enhanced Block ACK

      Note: 20 MHz and 40 MHz channels never operate at the same time
   iv. Overall MAC Summary:
      a. Baseline Features
         i. MAC Level Frame Aggregation
         ii. QoS Support (802.11e)
         iii. Receiver assisted link adaptation
      b. Additional MAC Efficiency
         i. Header Compression
         ii. Multi-Receiver Aggregation
         iii. Bi-Directional Data Flow
         iv. Enhanced Block ACK
      c. Legacy Compatible Protection Mechanisms
         i. Long NAV
         ii. Pairwise Spoofing
         iii. Single Ended Spoofing
      d. Scalable Channel Management
         i. 20/40 MHz Operating Mode

ii. Notes Captured during the presentation
    1. Removed TSPEC and packet loss
    2. Aggregation: chunk can be lost without loosing structure. MPDU with CRC, MPDU aggregation. Exchange groups of frames “aggregate exchange sequences”. Initiator holds TXOP, responder is under control.
    3. Rx assisted rate adaptation: control MPDU IAC (initiator) and RAC (responder).
    4. Multiple receiver aggregation: no need to aggregate small packets e.g. VoIP for one receiver. Multiple responses from multiple receivers.
    5. Protection mechanisms: MAC level and PHY level: LongNAV and spoofing.
    6. Operating mode selection: control two 20MHz channels with beacons, never contention between 20MHz and a 40MHz client.
    7. MAC simulation results documented and submitted.

3. WWiSE (Worldwide Spectrum Efficiency); Sean Coffey, TI; 11-04-0935r4
    a. Approach:
        i. The partnership was formed to develop a specification for next generation WLAN technology suitable for worldwide deployment
        ii. Mandatory modes of the WWiSE proposal comply with current requirements in all major regulatory domains: Europe, Asia, Americas
        iii. Proposal design emphasizes compatibility with existing installed base, building on experience with interoperability in 802.11g and previous 802.11 amendments
        iv. All modes are compatible with QoS and 802.11e
        v. Maximal spectral efficiency translates to highest performance and throughput in all modes
    b. Recap:
        i. WWiSE proposes 2 transmitters in 20 MHz mandatory
            1. Rates 54, 81, 108, 121.5, 135 Mbps
        ii. Optional extensions to 3 and 4 transmit antennas
        iii. Optional space-time block codes for longer range
        iv. Optional 40 MHz counterparts of all 20 MHz modes
        v. Optional LDPC code
        vi. MAC: HTP burst, aggregation, extended Block Ack
        vii. *See 11-04-0935r3 for a full description*
    c. Changes since Berlin:
        i. 20/40 MHz coexistence language strengthened
            1. Devices must perform CCA on secondary channel
        ii. All space-time block codes are now optional
        iii. Modifications to rate tables for 2x1-20 MHz, 1x1-40 MHz, and 2x1-40 MHz
        iv. *See 11-04-0886r5*

d. Suggest that the common configuration for comparison is 2x2, 64 QAM at rate=3/4
e. For STBC – block size is always 2 symbols; entirely open loop
    i. MAC Presentation by Mathew Fischer Broadcom
        1. Features
            a. The WWiSE proposal builds on 802.11e functionality as much as possible, in particular EDCA, HCCA, and Block Ack
                i. Block Ack mandatory
            b. WWiSE proposal ensures backwards compatibility
            c. Targeted effectiveness - ROI
                i. Eliminate the big bottlenecks
                ii. Avoid schemes which yield relatively small improvement in performance in return for large complexity changes
            d. Benefits of simplicity
                i. Shorter time to standardization
                ii. Shorter time to productization
                iii. Shorter time to interoperability
        2. WWiSE proposal introduces:
            a. ***Only ONE*** new frame subtype
                i. not actually a new subtype – uses QOS field reserved bit
            b. No new MAC access control functions
                i. Re-uses existing DCF/EDCA/HCCA
                ii. TGE => QOS + *Efficiency enhancements*
                iii. EDCA: reduce DCF overhead with continuation TXOP
                iv. HCCA: reduce EDCA overhead with controlled access
            c. WWiSE brings forth three simple efficiency enhancements
                i. These achieve high performance, even compared to other proposed enhancements
            d. Efficiency enhancements:
                i. MSDU (MAC Layer) Aggregation
                    1. Removes significant MAC overhead
                ii. HTP Burst
                    1. Eliminates major remaining components of MAC / PHY overhead
                iii. Enhanced Block Ack
                    1. Allow No-ACK policy
                    2. Removes significant ACK overhead
                    3. Block Ack eliminates MAC transmitter turnaround overhead
                iv. MAC Frame Aggregation

e. MSDU (MAC Layer) Aggregation
    i. "New frame subtype"
        1. Uses reserved bit of QOS subfield
    ii. Increased maximum PSDU length, to 8191 octets
    iii. Impressive improvements in MAC throughput
        1. WWiSE simulations use n=8 (with overriding max MPDU size limitation of 8191 Bytes)

Note: HTP = high throughout preamble

f. Legacy Interaction
    i. Legacy remediation
        1. N-STA detection/advertisement
            a. Uses proven 802.11g signaling and rules
            b. Extends ERP information element
            c. Identification of TGn and non-TGn devices and BSSs
        2. Legacy Protection mechanisms
            a. Existing protection mechanisms (extended to N/G case)
                i. Set NAV to protect new modulation types
                ii. E.g. RTS/CTS, CTS2SELF, etc.
            b. WWiSE adds PLCP length spoofing as additional tool

g. Conclusion:
    i. One unified format
    ii. Used for 2, 3, 4, transmit antennas
    iii. 20 MHz and 40 MHz channels
    iv. Used with open-loop space-time block codes

h. Summary:
    i. WWiSE proposes 2 transmitters in 20 MHz mandatory
        1. Rates 54, 81, 108, 121.5, 135 Mbps
        2. High performance, maximum robustness for given data rate
    ii. Optional extensions to 3 and 4 transmit antennas
    iii. Optional space-time block codes for longer range
    iv. Optional 40 MHz counterparts of all 20 MHz modes
    v. Optional LDPC code
    vi. MAC: HTP burst, aggregation, extended Block Ack

4. Chair recessed the session at 5:59 PM and will be reconvened at 7:30 PM

Tuesday Evening 11-21-04; 7:30 – 9:30 PM

1. Chair called the session to order at 7:30
2. Qualcomm Presentation; doc 11-04-1404r3; John Ketchum
    a. Introduction and PHY discussion by John Ketchum
    b. Goals:
        i. Maximize Throughput, QoS, and Spectral Efficiency
        ii. Minimize complexity and assure backward compatibility
        iii. Provide balance between TTM needs and 11n design longevity economics
    c. Only 20 MHz
    d. Closed Loop rate control
    e. SS-STBC – Spatial Spreading – Space Time Block Code
    f. PHY Summary
        i. Builds on 802.11a waveform
            1. 20 MHz bandwidth with 802.11a/b/g spectral mask
            2. 802.11a modulation, coding, interleaving with expanded rate set
        ii. Backward compatibility through legacy STF, LTF and SIG
        iii. Supports a maximum of 4 wideband spatial streams
        iv. Two forms of spatial processing
            1. Spatial Spreading (SS): modulation and coding per wideband spatial channel
                a. No calibration required
                b. SNR per wideband spatial stream known at Tx
            2. Eigenvector Steering (ES): via wideband spatial modes/SVD per subcarrier
                a. Tx and Rx steering
                b. Over the air calibration procedure required
        v. Rate adaptation enables sustained high rate operation
        vi. PHY techniques proven in FPGA-based prototype
        vii. Spatial Spreading: Mandatory & Optional Features
            1. Mandatory
                a. Hadamard matrix-vector multiply at transmitter
                b. Cyclic transmit diversity at transmitter
                c. Receiver must be capable of handling spatially spread signals (zero-forcing, MMSE, etc.)
                d. Support for rate feedback in PLCP/MAC header
            2. Optional
                a. Rate feedback functionality
        viii. Support for Eigenvector Steering
            1. Base standard mandatory features are required to support optional ES mode

a. Independent rates per stream for up to four streams
    i. Modulation/coding/interleaving must support independent rates per stream
b. Rate feedback
    i. Fields in PLCP header extension or MAC header
c. MIMO training waveform design
    i. Must support steered reference
    ii. Allows implicit channel state feedback in all PPDUs
    iii. Tone interleaving (TGnSync) or Walsh cover (Qualcomm)
d. Related elements such as signaling for mode control

ix. Notes from Presentation:
1. Consider STBC on top of SS
2. Do not propose a particular advanced coding but require that advanced coding be on a per stream basis

g. Sanjiv Nanda presented the MAC
i. Objectives
1. Enhanced efficiency built on 802.11e
    a. Ensure high QoS and high throughput
2. Support MIMO operation with limited overhead
3. Limit introduction of new features
4. Minimize burden on transmit and receive processing

ii. MAC Summary
1. Mandatory Enhancements to 802.11e
    a. Aggregation
        i. Frame Aggregation to a single RA.
        ii. PPDU Aggregation: Reduced or zero IFS
    b. Adaptive Coordination Function (ACF)
        i. Multi-poll enhancement to HCCA
        ii. Low latency
    c. Data rate feedback from Rx to Tx
        i. Enhanced rate adaptation
        ii. Very low overhead
    d. Eliminate Immediate ACK
    e. Data Rate Feedback

iii. Recap
1. Maximize Throughput, QoS, and Spectral Efficiency
    a. Eigenvector Steering (ES) and rate feedback provide the highest throughput and QoS performance.

b. ES should be an Optional Feature that can provide significant longevity to the 11n standard.
c. Provision for optional ES in 802.11n requires a few mandatory and some specified optional features

2. Provide balance between TTM needs and 11n design longevity economics
   a. Both Spatial Spreading and Spatial Spreading with Space Time Block Coding are good mandatory alternatives that meet TTM objectives
   b. ES should be an Optional Feature that can provide significant longevity to the 11n standard.

h. Summary
   i. Qualcomm proposal builds on existing 802.11a,g,e design
   ii. 802.11n can enable new markets & applications:
      1. Multimedia distribution in the home
      2. Enhanced enterprise applications (e.g. VoD, Video Conf.)
   iii. These applications require:
      1. High throughput → SS/ES, ACF, rate feedback
      2. High QoS → SS/ES, ACF, rate feedback
      3. Maximized range → ES
      4. Maximum spectral efficiency → ES
   iv. SS/ES + rate feedback + ACF meet the requirements associated with these new markets & applications:
      1. Highest network capacity: greater than 100 mbps above the MAC inside 30 m (20 MHz, 2x2, 5 GHz)
      2. Reliable coverage
      3. QoS: Less than 50 ms latency with "ZERO packet loss"

i. Questions:
   i. Scalability? A – Water filling, not much to be gained
   ii. 1 or 2 spatial streams in SS – STBC? A – 1 to 4 spatial streams
   iii. Which loss model? A – used TGn loss models

3. Mit-Mot Q&A Session
   a. Pratik's general questions:
      i. Backward compatibility
         1. Propose a super frame composed of legacy device frame and a .11n frame
      ii. Heterogeneous Networks – interference from surrounding APs
         1. use CTS to self
      iii. Mandatory – CC, 2 TX antennas, 20 MHz
      iv. Optional – 40 MHz, enhanced FEC based on advanced codes,
      v. Scalability
         1. PHY – power scales, can be parallelized
         2. MAC – scales with any PHY rate

   b. From the Floor
      i. Lesson from TGe – overlapping BSSs and QoS compatibility with legacy (state behavior); will your new access mechanism really be compatible with TGe? A1 – issue is CTI (contention time interval) but we can use CTS to self. A2 – this new mechanism is more predictable than TGe
      ii. What is position on closed loop MIMO? A – for VoIP open loop is best but certainly closed loop should be considered; hooks are in our proposal
      iii. How does MAC deal with bursty traffic? A – sta must request transmission; even VoIP traffic is not very bursty
      iv. What is the justification for the 3rd and 4th antenna since only 2 streams? A – true, can be done without the complex conjugate but from a mathematical viewpoint it is elegant
      v. Long training, why 4 training signals? A - true only 3 symbols could be used
      vi. Why did you use channel D? A – gave the best results
      vii. Short training signal design, why introduce phase factors? A – time synchronization
4. Chair reminded group of .19 liaison meeting in Mesquite room tomorrow at 9 AM
5. Any Presentations for Thursday PM? Nothing from the floor
6. Timing for tomorrows Q&A sessions:
   a. TGnSync 1:30-2:30
   b. WWiSE 2:30-3:30
   c. Qualcomm 4:00-5:00
   d. Panel Discussion 5:00 – 6:00
7. Session recessed at 9:15 until 1:30 Wednesday.

Wednesday PM 1:30 – 6:00 PM

1. Chair called the session to order at 1:35 PM
2. Chair reviewed the agenda for today and tomorrow
3. TGnSync Q&A; 11-04-1496r0; Responses to Written Questions; Aon Mujtaba and Adrian Stephens
   a. WWiSE questions
      i. on why 40 MHz should be mandatory? A – both 20 and 40 MHz are mandatory and interoperable; 40 MHz PPU into a 20 MHz receiver will be deferred gracefully; capability depends on where device is purchased, e.g., if bought in Japan only 20 MHz operation will be enabled. 40 MHz has better performance than 20 MHz at the same power.
      ii. Details of LDPC code? A – in the process of merging in LDPC solutions; the next revision to be tabled at the Jan meeting will include the LDPC details.
      iii. Calibration of close loop process? A – est correction coef and then apply those coef; relatively infrequent; simple sounding calibration protocol which has minimal overhead at the client; AP calculates; see 1488r0.

iv. Large number of modes, what is the value? How can a testing body test them all? A – coding rate, modulation, length of GI and number of streams are the variables; this is really comparable with other proposals; optimal channel depends on MIMO channel conditions which may result in the same
v. Mandatory vs Optional? A – Multiple Rx Aggregation optional at TX but is mandatory at RX, Header compression is optional at the TX and mandatory at the RX; TX must use a protection mechanism; beam forming is optional at the TX but mandatory at the Rx
vi. Use of Reserve bit #22 at the TX? A – General problem for body
vii. MSDU Aggregation Memory Req'ts? A – not necessary to buffer a whole aggregate.

b. Interdigital Qs
   i. Implicit feedback using sounding packet, why not explicit feedback since implicit FB is more overhead than explicit FB? A – CSI is too much overhead; compression by quantization hits performance; implicit FB uses reserve fields in IAC/RAC so no overhead on MAC scheduler.
   ii. Additional coding on top of Eigen beamforming? A – independent rates on each spatial stream
   iii. How did you achieve higher data rates then others? A – in topology; assumed closer to AP
   iv. What is average packet size where aggregation and channel aggregation show improvement? A – aggregation is always preferred regardless of MPDU length; block ACK is similarly better.
c. Dell's Questions
   i. Backwards Compatiblity? A – preamble design is 100% interoperable; .11b interop based on RTS/CTS
   ii. Heterogenious Networks? A – IAC and RAC frames are sent at legacy (a/g) basic rates; ie same techniques as used by g today
   iii. Mandatory/Optional? A – see 888r4; Optional PHY - Tx beam forming, LDPC, spatial streams; Optional MAC – bidirectionnal data flow and MIMO RX power management
   iv. Scalability? A – see dimension slide in yesterday's presentation - Performance up to 630 MHz, depending on markets, regulatory domains; scheduling techniques on the MAC side
d. Summary of benefits of TGnSync preamble recalled
e. Questions from the floor
   i. Number of Modes (38 mandatory modes for 2 TX an 20 MHz) justification? A – optimum selection due to rate feedback; several possibilities to realize a given rate set but rate adaptation algorithm not given
   ii. 1488 basic beam forming focus? A – yes; bidirectional beamforming will be delt with in Jan; calibration procedures likewise will be disclosed in Jan.
   iii. What does the client need to do for advanced beamforming? A – if going to TX then you need to apply coeff at the client instead of relying on those coeff being sent by the AP
   iv. Def'n of basic beamforming? A – necessary to RX not to TX; killer app is MM distribution in the home (4 TX AP to 2 RX client); noted Qualcomm seems to believe more in the symmetrical case
   v. FEC code? A- LDPC code will be spec'd by Jan meeting
   vi. Will your focus be on .11 only? A – focus is on .11 and not .16

vii. What code was used for the simulations? A – random code; August sims based on random structure similar to codes in .16e
viii. Reserve bit issue, section 7.1.1 sets reserve bit to zero for TX and ignored at Rx? A – will comply
ix. What is the physical mode recommenrded for VoIP? A – closed loop since transmission is periodic at a fast rate therefore training at a previous packet can be used for the next packet
x. Rate feedback is used for open loop
xi. Have any test results in hardware? A – Agere does not for rate 7/8

4. WWiSE Q&A; 11-04-1495; Chris Hansen, Mathew Fischer, Bruce Edwards
   a. Feinberg Q's
      i. Mixed mode preambles, were they validated in sims and hw? A – yes using legacy equipment and sims but not for channel models B,D,E
      ii. Would errors on signal field dominate? A – not simulated but will not dominate for long packets
      iii. Only use 2 pilot tones; are advanced receiver techniques required? A – No; see proposal
      iv. > 3 TX antennas; how to transmit one stream? A – if one stream would only use 2 antennas
      v. ? A – power difference is 0.5 dBrms
      vi. Do you control your IP for channel estimation scheme? A – see www.wwise.org
      vii. Mixed mode/legacy and green field interactions? A – all will be fully backward compatible
      viii. Circumvent Alimouti STBC patent? A – all STBC modes are now optional so no issue with Alimouti
      ix. In a low error environment high MSDU aggregation will be effective
      x. HTP bursting and A-PPDU for multiple RXs?
   b. Interdigital Q's
      i. Hard or soft Viterbi decoder? A – soft
      ii. A – actual phy rates have been changed
      iii. Frame size? A – 1kB frames
   c. Dell's Q's
      i. Backward Compatibility? A – backward compatible with a/b/g
      ii. Herogeneous clients? A - backward compatible with a/b/g
      iii. Mandatory/Optional? A – 2 TX, CC codes, 20 MHz is all that is mandatory
      iv. Scalability? A scales with both BW and # of antennas
      v. Q's from the floor
         1. Since STBC is now optional, how to TX at less than 54 Mbps without using STBC? A – we would use legacy or do aggregation using legacy rates
         2. So limited to 4 KB due to length bits? A – yes
         3. MAC sim results have changed significantly between ppt and word, do you have an FRCC doc? A – should be rev 5 doc; main difference is that they included MSDU aggregation
         4. Sim include real channels? A – 2 pilots only for 20 MHz modes; strived for spectral efficiency

5. Same algorithm for channel est and pilot tracking? A – yes; phase noise included in simulation; clarification in January
6. Perf results don't match FRCC doc, why? A – no RF impairments in some results presented yesterday so there is a 3 dB difference in performance
7. Closed loop vs open loop, why not use a closed loop MIMO preamble? A – many varieties of closed loop, our presentation does not preclude them all;
8. ACI with abg systems is problematic, won't using two tones on the side cause a problem? A – no, mask has not been violated and simulations do not show
9. How does RX know what to expect in ZIFS case? A – bit in signal field (LPI bit)
10. Slide 12 of PHY, 135 Mbps at MAC SAP, what PHY mode? A – take off line
11. STF and large cyclic delays; interop analysis; any published results? A – yes we have a set of measured results
12. Full impairments in FRCC? A – yes
13. Comparison materials? A – no, to get an apples to apples comparison no all impairments were used in every case
14. Greenfield network, lowest data rate? A – 6 Mbps legacy rate
15. ACR, with 56 tones? A – have not measured impact on ACR however added tones do not make system sensitive to ACI; compared 56 to 52 tones in ACI sim
16. MIMO training in HT preamble; why use that preamble; will it support Eigen beam steering? A – allow accurate ch. est. and to make the preamble as short as possible for spectrum efficiency; considered many short preambles; will share results soon . Preambles can be found that do not limit beam forming.
17. 2x2 20 ch B -> 20Mbps, do they meet QoS requirements? A- off line
18. Legacy LTF for MIMO ch est? A – NO; all ch est after signal field
19. Slides 35, 36; cyclic shifts better behaved if the same? A – yes

5. Recessed at 3:30 until 4 PM

6. Reconvened at 4 PM
    a. Qualcomm Q&A; Sanjiv Nanda and John Ketchum; 1449r1, 1452r1
    b. Interdigital Qs 1449
        i. Spatial coding (eg STBC) on top of Eigen beam forming? A – no need since BCC already optimal for ES mode
        ii. What constraints on MAC in order to use CSI feedbacl? A – not constrained to the MAC
        iii. Why throughput for 4x4 > 2x for 2x2? A- actually ~ the same
    c. Dell Q's:
        i. Backwards Compatibility? A – signal and preamble are unchanged; rate field set to an undefined value in a/g; different from spoofing for protection but at a cost of one OFDM symbol for the signal field
        ii. Legacy Sharing? A – used FRCC parameters; legacy only 24 Mbps; 12 Mbps in shared legacy

iii. Scalability? A – 1-> 4 spatial streams (SS) + antennas; EV steering; will last years; low complexity STAs.
iv. Mandatory vs Optional? A- PHY mandatory – SS, 2 antennas, PLCP header support, PLCP extensions for rate feedback plus steered PLCP fro training; MAC mandatory = frame aggregation, sched and scap, extensions to Block ACK; compressed Block ACK is optional.

d. Hallway PHY Q's presented by Qualcomm
   i. Over-the air Calibration? A – compensates for ampl and phase changes in the RX; required very infrequently, e.g., 24 hours; simple exchange of calibration symbols; 1000 symbols for 2x2, >2400 symbols for 4x4
      1. Sounding waveforms (STA returns a calibration PPDU at the request of the AP) == MIMO reference waveforms
      2. Send the two sounding waveforms to AP close together to make air channel quasi-stationary
      3. Channel estimates are returned to the client; client performs calibration for itself and for the AP. This is not time critical. Can fall back to unsteered mode in the meantime.
   ii. How accurate does the calibration have to be? A – slide 8, Cal Error vs RX SNR, at SNR ave = 20 dB, cal error averaged only -20 dB; shows residual errors do not significantly affect system performance
   iii. What if repeat cal process to average thermal effects? A – error drops with averaging so limit is thermal noise (see slide 6); slide 7 shows Cum Distribution Fnc of capacity assuming perfect calibration and a -10 dB error in calibration when SNR=20 dB
   iv. Summarize – calibration infrequently, low overhead message exchange, non-time critical ch. Est., cal errors have minimal impact
e. Q's from Floor
   i. Does cal need to be done on both sides? A – only one
   ii. Signal diversity wrt legacy devices? A – should not affect legacy performance; should look like channel it decorrelates. CDD (channel delay diversity?) has positive effect in highly correlated channel, e.g., in ch model B diversity is increased.
   iii. CDD in Qualcomm different than WWiSE due to larger delay
   iv. ? A – 12 bit quantization for ch. Est. and cal coef.
f. Hallway MAC Q's
   i. Scalability – use ACF in addition to frame aggregation; no immediate ACK has value; ACF facilitates close loop throughput, data rate feedback, Eigen steering
g. MAC throughputs are significantly higher, 100Mbps realistic in 20MHz. results are now better with new rate selection. See summary on slide 10 in document1452.
h. ACF: benefit over HCF with frame aggregation, due to (1) PHY152Mbps at vs 112Mbps, and higher MAC efficiency. No immediate ack gives 18%, SCHED frame gives 7%, mean PHY rate 37%.
i. Benefit of rate feedback: get to rate fast, useful with short transactions, but simultion scenarios have long running flows. Open loop is entirely withou feedback: scenario 1 50% better, scenario 6 38% better.

j. Benefit of eigensteering: closed loop rate selection or closed loop without eigen steering: 30% and 40% throughput gains in scenario 1 and 4.
k. The AP does not have to memorize steering vectors. Channel is not fixed (doppler is included).
l. Q's form Floor
    i. Is complexity of storing steering vectors worth the complexity? A – yes
    ii. You assume the channel is stationary, is that reasonable? A – sim results show affect of dopplers
    iii. Constant TX power on all antennas in Eigen steering modes. A – yes if all modes are filled

7. Eigen Value Decomposition (EVD or SVD) complexity? A – Eigenvalued decomposition EVD only required by one pair. Full SVD is not required, just 'right' vectors required. For a device with 2 antennas Hermition matrix for each subcarrier: 21 mul, 3 inv, 2 sqrt: 20us with low complexity FPGA at 80MHz.; 4x4 completes in 800us.
8. At 4:59 PM the chair asked that the panel Q&A session be set up
9. Questions:
    a. Could off-line discussions per se be made public including slides for TGnSync
        i. Mit-Mot A – no offline questions
        ii. nSync – A – yes
        iii. WWiSE – A – yes
        iv. Qualcomm – A - yes
    b. For Optional modes, how will interoperability be achieved?
        i. nSync – for 40 MHz channelization are the benefits lost in a heavily loaded network? A – no, 40 MHz does not compromise capacity since rates are higher to compensate for fewer channels; on the other hand for a single cell (i.e. home) there is a 5 dB benefit . It ws also noted that if 40 MHz is optional interop problems could occur.
        ii. Mit-Mot – A don't have that issue
        iii. Qualcomm – A agree that optional modes should not be proliferated however beam steering offers significant performance gains hence future proofing
    c. 40 MHz showed 6 dB performance gain but when cell planning is considered you have to give back the 6 dB?
        i. WWiSE – 40 MHz buys 2x data rate or range; market will first release 2x2 systems in 20 MHz and then 40 MHz NxN up to 4x4 with advanced coding. Interop testing in WFA will define a small core set of modes that manufacturers can agree on.
        ii. Qualcomm - will support 40 MHz
    d. Could WWiSE clearly identified which results apply to the FRCCs? A – yes before tomorrows vote
    e. For WWiSE, what is the reason for not facilitating retransmission of individual MPDUs in an aggregated frame? A – efficiency by tracking Acks on an MPDU basis. In high error rate conditions expect PPDU aggregation to occur.
    f. For Qualcomm, what is the reason for facilitating retransmission of individual MPDUs in an aggregated frame? A – robustness
    g. For nSync, what is the reason for facilitating retransmission of individual MPDUs in an aggregated frame A – robustness is better than for aggregation at PPDU level.

h. For MITMOT – it is important to retransmit even small MSDUs; segment MSDUs and retransmit segments.
i. For WWiSE – what is reason for error floor in a ch model B? A – error floor should not be there; inflection point occurs at a mode switch and when capacity of channel is exceeded (CC28,29)
j. For Qualcomm – error floor in ch. Model B caused by not selecting the right rate or backing off on rate.
k. For Qualcomm – since 40 MHz and Advanced coding work to be done; how can the membership choose in time for the Jan meeting? A – get info on server; use email reflector, complete proposers need to engage
l. For MitMot - channel 'E' and 'F' sometimes exceeds GI results in error floor. So no compromise in GI length in proposal and prefer doubling the number of carriers. Mitmot will embed changes as learned during sessions
m. For WWiSE – will cyclic shift of 400 us affect cross-correlation receiver in a legacy device? A – not encountered in testing; open to further discussions
n. For nSync – in a 40 MHz cell won't a legacy device reduce you capacity by 50% A – yes; but the point is that just because you lose channels by going to 40 MHz (and co-channel interference increases) you do not loose capacity since you transmit at twice the rate.
o. To all - What are your roadmaps to completion? A – WwiSE is ready to go to draft right now – TTM is critical and we need to go through LB then SB and Wi-Fi Alliance will need to certify product); Mit-Mot - all based on OFDM however some differences but none are insurmountable, we already have prototypes; nSync – we are not 100% complete, e.g., LDPC, MAC protocol is open; Qualcomm – are not 100% complete, e.g., did not include 40 MHz and advanced coding; also SS and Eigen Vector steering are ways to future proof our standard.
p. Partial Proposals – have panel members seen anything valuable in the group of partial proposals? nSync is already talking with partial proposers; WWiSE – basic framework is pretty solid but will be considered; mit-mot – already being discussed; Qualcomm – ditto

10. Chair asked floor for permission to exceed the time limit so that the questions remaining in the queue can be heard; no objection was raised and questions continued:
    a. For WWiSE – aggregate MSDU (A-MSDU) once formed it is not puntured by the MAC? A – conceptually yes, A-MSDU is passed as a single MSDU; MAC makes the rate adaptation not the PHY
    b. For nSync – does an omnidirectional link RX need to be closer to the TX than in the case of a beam steering link? A – close loop beam forming reduces the signal to legacy devices but long omnidirectional NAV can protect; beam forming is not new and has been embraced by other standards.
    c. To all: Should Close Loop and Beam forming be a separate TG? A – Qualcomm – not real difficult learning curve, unnecessary; WwiSE – interesting idea, as much work as .11k; nSync – no, it is integral to whole system design, e.g., preambles; mit-mot – should not be put off
11. Chair recessed the meeting at 6:18 PM until 1:30 tomorrow.

Thursday 11-18-04 at 1:30

1. Chair called the session to order at 1:31 PM

2. Chair reviewed the agenda for the next 2 Hours (11-04-1281r1); i.e., logistics for the Low Hurdle Vote (LHV)
3. At 4 PM
    a. Voting results
    b. Jan Planning Process
    c. Presentations time permitting
4. Mit-Mot 5 min summary presented by Marc de Courville; doc 11-04-1446r1
    a. Overall Goal and Positioning
        i. Preserve compatibility with legacy IEEE802.11 system
        ii. Evolution: expand current WLAN application domain, offer a consistent solution to
            1. *Provide required QoS* to support consumer electronics (multimedia home environment and VoIP enterprise)
            2. *Grant range extension* for limited outdoor operation (hotspot) as well as full home coverage
            3. *Support heterogeneous traffic*: increase overall peak data rate without jeopardizing lower data rates modes
            4. *Manage diversity* (laptop/PDA/VoIP Phone) and *evolution* (independent STA/AP antenna configuration upgrade) *of devices* through asymmetric antenna configurations
        iii. Proven and simple solution: combine a highly efficient contention-free based MAC with robust yet low complexity open-loop MIMO PHY techniques
    b. MAC Evolutionary Approach
        i. Solutions:
        ii. Centralised on demand resource allocation with grouped resource announcements,
            1. embedded in .11e superframe
            2. providing contention free access for all type of .11n traffics
        iii. Aggregated PHY bursts made of short fixed size MAC-PDUs
            1. allows 1 or multiple destinations and/or PHY modes
        iv. Enhanced ACK: low latency and low overhead selective retransmission
        v. Benefits:
        vi. Actual QoS: guaranteed throughput, stringent delay constraints support
            1. even in heavily loaded system
        vii. High efficiency and scalable architecture
            1. scenario SS16 (point to point): 86% - extended SS6 (Hotspot): 67%
            2. maintain constant overhead when data rate increases
        viii. Efficient for heterogeneous traffics (bursty, VBR, CBR, high or low data rates)
            1. without parameter tuning
        ix. Easy implementation, low power consumption
    c. PHY

i. Goal: define new OFDM MIMO modes with the constraints to
   1. handle asymmetric TX/RX antenna configurations with 1, 2 or 3 parallel streams
   2. focus on open-loop for stability, avoiding calibration circuit or feedback signalling

ii. Solution: exploit a hybrid combination of
   1. Spatial Division Multiplexing (SDM) to increase spectrum efficiency and peak data rates
      a. classical Space Time Block Coding (STBC) to improve link robustness or range for low to medium data rates (suited to small packet size e.g. VoIP)

iii. Additional key features:
   1. mandatory: 20MHz bandwidth, minimum of 2Tx antennas (up to 4Tx)
   2. new two stage space and frequency interleaver design

iv. Forward Error Correction scheme:
   1. supports all .11a CC rates, adds low redundancy 5/6 (mandatory)
   2. advanced optional scheme: binary turbo code derived from 3GPP
   3. second 20MHz/128 carriers OFDM modulation (8% rate increase), with double duration guard interval (Hotspot: limited outdoor)
   4. optional high rate 40MHz bandwidth/128 carriers modes (117% rate gain)
   5. new nPLCP preambles: code overlay STS/orthogonal LTS

5. TGnSync PHY sumary by Aon Mujtaba and MAC summary by Adrian Stephens (11-04-1506r0)
   a. Mandatory -> Hooks for Optional
      i. Open Loop SDM - > Closed Loop TX BF
      ii. Convolutional Coding - > LDPC
      iii. Rate Feedback
      iv. Throughput:
         1. 2 Spatial Streams - > 4 Spatial Streams
         2. If regulatory constrained to 20 MHz channels 6-140 Mbps if two spatial streams
         3. If not then 40 MHz channels buy 6 to 243 Mbps if two spatial streams
         4. If 4 spatial streams => 6 to 630 Mbps
   b. Simple Preamble
      i. Simple baseline channel estimation algorithm
         1. No need for complex interpolation/smoothing algorithms
      ii. 100% backward compatible
      iii. Low fluctuation of average receive power
         1. low cost ADC & high precision AGC
      iv. Flexible per spatial stream training
         1. SDM
         2. Spatial Spreading (Walsh + CDD) for Nss < Ntx

3. TX Beam-forming
4. STBC (if TGn chooses to add that as an option)

v. Extensibility
1. up to 4 spatial streams, across 40MHz, with TX beamforming
2. Future PHYs will be backwards compatible to 11a/g/n

c. MAC
i. Mandatory Features:
1. MAC level frame aggregation
2. RX assisted link adaptation
3. QoS support (802.11e)
4. MAC header compression
5. Block ACK compression
6. Legacy compatible protection
7. 20/40 MHz channel management

ii. Optional Features:
1. Bi-directional data flow
2. MIMO RX Power management

iii. Support for PHY closed-loop modes with on-the-air signalling
iv. Request for training and feedback are carried in control frames
v. Rate feedback supported
vi. Transmit beamforming training supported
1. sounding packet
2. calibration exchange

vii. Timing of response is not constrained permitting a wide range of implementation options

d. Summary of Key Features
i. Scalable PHY & MAC Architecture
ii. 20 and 40 MHz channels – fully interoperable
iii. Data rate scalable to 630 Mbps
iv. Legacy interoperability – all modes
v. Robust preamble
vi. Transmit beamforming
vii. Robust frame aggregation
viii. Bi-directional data flow
ix. Receiver assisted fast link adaptation

6. WWiSE 5 min summary by Sean Coffey (1505r0)
a. Common points across the complete proposals:

i. 2 transmitter space-division multiplexing
ii. 20 MHz
iii. Open loop
iv. Varying evolutions to the 802.11ag OFDM format
v. Data rates significantly in excess of 2x54 Mbps
vi. Aggregation of varying kinds
vii. Block acknowledgements

b. WWiSE Mandatory Proposal
i. Mandatory modes:
ii. 2 transmitters, 20 MHz, open-loop
iii. Evolution to OFDM format, raising data rate to 135 Mbps
iv. The specific modifications have been validated by simulation and laboratory experiments

v. *We believe the specific methods of the WWiSE proposal provide very high robustness*

c. WWiSE Optional
i. The WWiSE proposal provides full support for 40 MHz
ii. *Every mode offered in 20 MHz is also offered in 40 MHz*
iii. At this point 40 MHz channels have regulatory problems and are prohibited in major domains
iv. To provide a unified worldwide 11n experience, it makes the most sense to have 40 MHz be optional
v. The WWiSE proposal defines 40 MHz channel modes, but does not *rely* on them

d. WWiSE Proposal and Closed Loop
i. We believe that the WWiSE system is compatible with closed loop operation
1. There is no fundamental barrier within the WWiSE proposal to the addition of closed loop modes
ii. We intend to provide further details on interoperability mechanisms and compatibility at the January meeting

e. Summary
i. WWiSE proposes 2 transmitters in 20 MHz mandatory
1. Rates 54, 81, 108, 121.5, 135 Mbps
2. High performance, maximum robustness for given data rate
ii. Optional extensions to 3 and 4 transmit antennas
iii. Optional space-time block codes for longer range
iv. Optional 40 MHz counterparts of all 20 MHz modes
v. Optional LDPC code
vi. MAC: HTP burst, aggregation, extended Block Ack

f. Patent Position
i. Essential patent claims owned or controlled by WWiSE companies will be available on zero royalty basis
ii. Important information on terms & conditions available at

iii. **http://www.wwise.org/IPinformation.htm**
iv. **http://www.wwise.org/IPstatement.htm**

7. Qualcomm 5 min summary by John Ketchum 11-0401507r0
    a. Summary
        i. Qualcomm proposal builds on existing 802.11a,g,e design
        ii. 802.11n can enable new markets & applications:
            1. Multimedia distribution in the home
            2. Enhanced enterprise applications (e.g. VoD, Video Conf.)
        iii. These applications require:
            1. High throughput → SS/ES, ACF, rate feedback
            2. High QoS → SS/ES, ACF, rate feedback
            3. Maximized range → ES
            4. Maximum spectral efficiency → ES
        iv. SS/ES + rate feedback + ACF meet the requirements associated with these new markets & applications:
            1. Highest network capacity: greater than 100 mbps above the MAC inside 30 m (20 MHz, 2x2, 5 GHz)
            2. Reliable coverage
            3. QoS: Less than 50 ms latency with "ZERO packet loss"
        v. PHY techniques proven in FPGA-based prototype
    b. Throughput Comparison
        i. Results given with closed loop rate control
        ii. SS-STBC can achieve 120Mbps at 30m (20dB)
        iii. ES has > 6 dB advantage over other at 150 Mbps PHY throughput
        iv. At 30 m (20 dB) ES has >50% PHY t'put advantage over others
    c. Overall Goals
        i. \Maximize Throughput, QoS, and Spectral Efficiency
        ii. Minimize complexity and assure backward compatibility
        iii. Provide balance between TTM needs and 11n design longevity economics
8. Chair noted special order of Low hurdle vote at 2:15 PM
    a. Chair reviewed the voting process
        i. Chair described the ballots as indicated in 1281r1
        ii. Table will offer validation service in case of ambiguity
        iii. Tally results – goal will be to announce the result at the 4 PM session
        iv. Roll Call voting – LMSC Procedure Options was reviewed by the Chair
            1. Discretion of the chair
            2. 25% threshold
            3. Chair says no

v. Chair elected option 2 above
vi. Distinction of a roll call vote was simply how the results will be reported
vii. Bill Carney moved to proceed with Step 12 was seconded by Jim Zyren without objection
viii. There was a motion for a roll call vote by Rolf de Vegt; it does not require a second
ix. In favour of a roll call vote – 69
x. Opposed to the roil call vote – 145
xi. Approved at 32% since threshold is set at 25% by LMSC

9. Low Hurdle Vote was held at ~ 2:55 PM
10. Low Hurdle vote finished 3:45PM
11. Chair recessed the session at 3:45 PM

12. Chair called session to order at 4:04 PM
13. Tally team, including the secretary, has left the room to count the ballots. Will be brought back to room if tally completed before 6pm. Results will be reported during closing plenary in any case. Aryon Saed assumed secretary duties.
14. Chair presented selection procedure document 665r9 and noted TGn have completed step 12 the low hurdle vote. Step 13 is an informative step, indicating that mergers may take place. The dialogue taken place this week will have impact on the proposals. There will be some changes when proposals return in January.
15. Chair directed discussion to planning for the January meeting.
16. Chair: Selection criteria states 60 min of presentation followed by Q&A for surviving proposals.
17. Floor: what procedure would be needed to extend the 60min time slot.
18. Chair: are we filling-in blanks or redefining the process? Certainly better to view 60min as a minimum.
19. Chair: Step 15 assumes there is more than one proposal, so next step is 16 which is an elimination vote. If we return in January with 4 proposals we will use a process similar to the ballot process of today, indicating one you would wish to see continue.
20. Chair: For revised technical presentations we have to set presentation time, 1hr minimum. How many hours TGn will have is unknown. There are generally more hours available at interim than at plenary. Had 18hrs here, expect 24hrs available in January. Time will be arranged with dot11 chair depending on our needs.
21. Chair: Still need presentations and deadlines for posting documents. We need a clear description of what should be posted and when. Split between presentation and Q&A needs to be determined. Questions submitted in writing had well prepared answers, so submission of written questions is beneficial and should take priority over questions from the floor, but not restricting to only written reports.
22. Chair: 11-04-1400 was a comparison presentation and provided value; John Egan and team plan to return in January. Perhaps someone else would prepare another comparison report.
23. Chair: at Step 16 we anticipate a down selection vote which based on today's result will take 2 hours.
24. Chair: Technical presentations are also possible in an effort to enhance the few surviving proposals.
25. Chair: Question to the audience: any other items to be placed on agenda in January?

26. John Egan: has had discussions with service providers who would like 15min to 30min for input, more market information less technical. Market application reports. And will come back with revision on comparison presentation, 1hr.
27. Floor: would it be beneficial to start with technical presentations and split Q&A in two buckets to give people time to think about presentations and answers. Then people will have opportunity to discuss information from first Q&A and then reconvene for second round of Q&A.
28. Floor: recommend 1 hour for PHY, 1 hour for MAC for each of 4 proposals.
29. Qualcomm team supported that recommendation
30. Chair: This time is separate from Q&A time.
31. Floor: we have panel time at second round which is another step between Q&A and downselect, according to procedural steps around step 16. Recommend a summary step, 5min to 10min.
32. Chair: there is nothing in procedure. Referring to 665r9 flow diagram, free forum, can be discussed here, between Q&A and down select.
33. Floor: suggest the time is 2hrs and let presenters split the time between PHY and MAC.
34. Chair: that is fine. Assumption is 1hr for each part, but not dictated.
35. Floor: recommend randomization of order of speaker sequence.
36. Chair: ok
37. Floor: it's feasible to hold a second vote. Would like to hear debate on number of down selects in January. Are two rounds possible?
38. Chair: it is conceivable, but challenge to complete in time available, could require 8 to 10hrs of time.
39. Floor: requests straw poll to find out whether people would like a second round if timing allows for it
40. Straw Poll: "If time allows, should TGn prepare for 1 downselect or 2 downselect
41. Discussion:
    1. Floor: one downselection preferred, because merger may take place
    2. Floor: wait until tally returns today.
    3. Chair: reasonable that we could execute two rounds.
42. 16:36 poll starts, voting members only
43. Result: 1 downselect : 83; 2 downselects: 38
44. Chair: Majority is for one down select. Agenda would likely be overturned if there were two downselects, so we will proceed preparing for one down select.
45. Floor: 5min summary is sufficient. Considering that blocks are 2hrs, and some agenda items have more overhead than others. For example the request to randomize per event will require pulling a number before the event.
46. Floor: please review intentions for election of officers.
47. Chair: directive by Stuart is to adequately justify the creation of more positions. Position for TE would be needed when there is a single candidate remaining. In case of vice-chair, the group would have to defend that the work load would be justified.
48. Floor: in principle downselect to one is possible, does that trigger election of TE?
49. Chair: Yes. Now added conditional election to agenda.

50. Floor: in the event that chair is to become ill, what are the plans?
51. Chair: in case of problems with facilities or distractions from other duties in ExCom it would be proper to have a vice chair. But Stewart requires justification. Now delegating that request for a VC to group.
52. Floor: important part will be technical comparisons, and suggest 4hrs before down select vote, involving at least the authors. Different from Q&A. Also need to add planning for March as an agenda item.
53. Chair: need clarification for format of time and presentation.
54. Floor: documents by authors must be on server well in advance to allow for technical comparisons. Recommend 2 weeks before the meeting.
55. Chair: ok
56. Floor: suggest specific time for down selection, special order.
57. Chair cannot specify now. Depends what the agenda looks like but can make vote a special order.
58. Floor: moves that we have the election of the VC at the next session.
59. **"Move by Adrian Stephens to elect the VC for TGn at the January meeting" was seconded by Steve Shellhammer**
60. Discussion:
    a. Floor: against, need has not been established
    b. Floor: in favour, this is the largest group in 802 history
    c. Floor: how often did you, chair, not leave meeting when you needed to?
    d. Chair: zero
    e. Floor: that's reason alone to have a VC
    f. Chair: No more people against the motion? Seeing none, proceed with vote.
61. Vote starter at 16:55, voting members only.
62. Result: In favour: 76; Against: 41; Abstain (since this is a formal motion): 5
63. Motion is procedural and therefore passes.
64. Chair declares nominations are open for January meeting. Nominations are open up until the point that the elections are held.
65. Nomination process: interested people have to make their name known during times that we assemble, stated to chair TGn or chair dot11.
66. Returning to discussion of the January agenda:
67. Floor: recommend technical presentation before 2nd Q&A.
68. Chair: accepted
69. Floor: found that Q&A was not satisfactory, answers were not detailed, some parts were not answered and inconsistencies were not answered. Some of those things are quite important. Process seems canned for speeches rather than interaction. Prefers real technical presentation and not just a debate as an end. More detailed discussion, but don't know how to get there.
70. Chair: is the dialogue between authors or between audience and authors?
71. Floor: Both. The questions are not simple, they need research. Sees no time, would prefer not to see skipping. Prefers less time spent in professing the merits of ones own presentation.

72. Floor: recommend written questions (deadline two weeks before meeting) with responses a week later (Friday before meeting). Questioner can say the response is unsatisfactory.
73. Chair: for written questions, require written answers from authors?
74. Floor: on general technical presentations, some presented theirs, others presented comparison. Allocate specific time to compare head to head, and give explanations, item by item.
75. Chair: that would be presentation plus Q&A
76. Floor: the agenda is getting complicated moving us away from a vote. Most of the material will be a repeat from material presented in September. Adding restrictions to what is discussed in time slots, proposal or comparison, does not add value. Proposers should be free to discuss whatever topic they choose.
77. Floor: if we do get a discussion going, proposals might be modified. People should be allowed to bring responses and new material. It is an important objective that all of the presenter information from items in the agenda will be provided and even more should be allowed.
78. Floor: not in favour of down selection every time there is a discussion. Prefer to put things together that everyone can live with. Better than picking from what we have.
79. Chair: what could we do to encourage that in an orderly fashion.
80. Floor: we don't want to see the same presentations again. People need to see comparisons, there is little new information.
81. Chair: TGn is not using the email reflectors as much as other groups. There is nothing to prevent members from asking for clarification about discrepancies by email, and thus alleviate the time constraints in January. This is another mechanism not used at all so far.
82. Floor: encourage the group to get into technical discussion, and when the group determines there is nothing more to be learned then there should be a downselect vote; it is a naturally explorational process, rather than following a vote by schedule process regardless of where we are in process.
83. Floor: if there are mergers, then presentations will contain new content. So keep revised technical presentations.
84. Chair: purpose of establishing agenda by group is to ensure the group has provided input. Chair retains the right to tweak the agenda. Process needs input from authors and audience
85. Floor: suggest to consider the winner from today's tally to be a baseline and the other proposals to be discussed in terms of deltas
86. Chair: this is a modification of the selection process. Requires 75% change. Requires a motion to amend the selection process.
87. Summary by Chair of January agenda items:
    a. Dates to clarify: 2 weeks prior for document submission. Written questions to be supplied, but no date discussed, assume 1 week. Answers to be submitted by Friday before the meeting.
    b. Second down select removed from agenda.
    c. Chair: where is the election of the VC best inserted.
    d. Floor: suggest at end. Point out to group that number of hours is not at discretion of TGn chair but is negotiated with dot11 chair.

e. Floor: suggestion to combine setting of agenda and other administrative overhead in one hour and add election of VC, considering 2 hour blocks and leaving only one hour for technical presentations that are 2 hours long.
f. Floor: How much time for first round of Q&A
g. Chair: answers to written questions posted Friday. Should answers have time allocated as a Q&A, or distribute in writing only? Refusing time to ask questions is not productive for audience. Suggest Q&A within 2 hour block of presentation by authors.
h. Floor: make sure we know what to expect as listeners and presenters depending on ordering of items on agenda.
i. Chair: more appropriate to have authors respond to written questions, and add agenda item for questions from the audience.
j. Floor: allow breaks in the middle of the TGn schedule, spread over multiple days, rather than all hours concentrated in a few days.

88. At 17:50 Chair recessed for 2min to check on status of today's tally results.
89. Results are still being tabulated
90. Motion to adjourn November meeting by Adrian Stephens was seconded by John Rosdahl.
91. Chair noted that the results from vote will be reported at the plenary. We will attempt to email results to everyone.
92. No objections to adjourn.

The detailed results of the LHV are contained in the following spread sheet:

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Aboba	Bernard	D					_						0	
Aboul-Magd	Osama	S	1	1		1	1			1		1	4	
Abraham	Santosh	P	1	1	1		1		1		1		4	
Adachi	Tomoko		1	1		1	1			1		1	4	
Agre	Jonathan	R	1	1		1	1		1		1		4	
Aldana	Carlos	H	1	1	1		_	1	1		1		4	
Alexander	Thomas		1	1		1	1		1			1	4	
Alimian	Areg						_						0	
Allen	Richard	C	1	1		1	_	1	1			1	4	
Amann	Keith						_						0	
Amer	Khaled						_						0	
Andelman	Dov						_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Andrade	Merwyn	B					_						0	
Andren	Carl	F.					_						0	
Andrus	David	C					_						0	
Aoki	Hidenori						_						0	
Aoki	Tsuguhide		1	1	1		1			1		1	4	
Aramaki	Takashi						_						0	
Ariyavisitakul	Sirikiat Lek						_						0	
Armstrong	Lee	R	1	1	1		1		1		1		4	
Arnett	Larry		1	1	1		1		1		1		4	
Asai	Yusuke		1	1		1	1		1			1	4	
Astrin	Arthur	W.	1	1		1	_	1	1			1	4	
Aubin	Raymond		1	1		1	1			1		1	4	
Audeh	Malik						_						0	
Awater	Geert	A					_						0	
Bagby	David		1	1		1	1			1	1		4	
Bahr	Michael						_						0	
Bain	Jay						_						0	
Baker	Dennis	J					_						0	
Balachander	Ramanathan						_						0	
Barber	Simon						_						0	
Barel	Avi						_						0	
Barr	John	R.					_						0	
Barry	Kevin	M.					_						0	
Bartel	Charles	R.	1	1		1	1		1		1		4	
Baysal	Burak	H	1	1		1	1		1			1	4	
Benko	John	L	1	1	1		_	1	1		1		4	
Benveniste	Mathilde		1	1		1	1		1			1	4	
Berry	Don						_						0	
Bersani	Florent						_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Bhandaru	Nehru						_						0	
Bilstad	Arnold						_						0	
Bjerke	Bjorn	A	1	1	1		1		1		1		4	
Black	Simon		1	1		1	1		1			1	4	
Blue	Scott						_						0	
Boer	Jan						_						0	
Bonneville	Herve		1	1	1		1		1		1		4	
Bowles	Mark	V					_						0	
Brasier	William	M					_						0	
Bray	Jennifer	A					_						0	
Brunel	Lo?c		1	1	1		1		1		1		4	
Buttar	Alistair	G	1	1	1		1		1		1		4	
Calhoun	Pat	R					_						0	
Cam-Winget	Nancy		1	1		1	1			1		1	4	
Carney	Bill		1	1	1		_	1	1		1		4	
Carson	Pat						_						0	
Cash	Broady	B	1	1	1		1		1		1		4	
Chang	Kisoo						_						0	
Chang	Ron						_						0	
Chaplin	Clint	F	1	1	1		1		1		1		4	
Chari	Amalavoyal						_						0	
Chen	Ye		1	1	1		_	1	1		1		4	
Chen	Yi-Ming		1	1	1		_	1	1			1	4	
Cheng	Hong						_						0	
Chesson	Greg	L	1	1		1	1			1		1	4	
Chhabra	Jasmeet						_						0	
Chindapol	Aik						_						0	
Choi	Eunyoung						_						0	
Choi	Sunghyun						_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Choi	Won-Joon		1	1		1	1			1		1	4	
Choi	Yang-Seok						_						0	
Chung	Simon		1	1	1		1		1		1		4	
Ciotti	Frank						_						0	
Cnudde	Peter						_						0	
Coffey	John T.		1	1	1		1		1			1	4	
Cole	Terry	L					_						0	
Conkling	Craig						_						0	
Conner	W. Steven		1	1		1	1		1			1	4	
Connors	Dennis						_						0	
Cook	Charles	I	1	1		1	1			1		1	4	
Cook	Kenneth						_						0	
Cramer	Mary	E					_						0	
Crowley	Steven						_						0	
De Vegt	Rolf	J	1	1	1		1		1		1		4	
Del Prado Pavon	Javier		1	1		1	1			1		1	4	
Dick	Kevin						_						0	
Diepstraten	Wim	J.M.					_						0	
Doi	Yoshiharu						_						0	
Douglas	Brett	L.											0	
Dundar	Baris	B											0	
Durand	Chris												0	
Durand	Roger	P	1	1		1	1		1		1		4	
Dure	Sebastien		1	1	1			1	1		1		4	
Dycian	Yaron												0	
Eastlake	Donald	E.											0	
Eaton	Dennis												0	
Ecclesine	Peter												0	
Edney	Jonathan	P	1	1		1	1		1			1	4	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Edwards	Bruce		1	1	1		1		1		1		4	
Ellis	Jason												0	
Emeott	Stephen	P	1	1	1			1	1		1		4	
Engwer	Darwin		1	1		1	1			1	1		4	
Eriksson	Patrik		1	1		1	1		1		1		4	
Estrada	Andrew	X	1	1		1	1			1	1		4	
Euscher	Christoph												0	
Faccin	Stefano	M	1	1		1	1			1		1	4	
Fakatselis	John	C.	1	1		1		1	1			1	4	
Falk	Lars	P	1	1	1		1		1		1		4	
Faulkner	Michael												0	
Feinberg	Paul	H.	1	1		1	1			1	1		4	
Feldman	Alex						_						0	
Filauro	Valerio						_						0	
Fischer	Matthew	J	1	1	1		_	1	1		1		4	
Fisher	Wayne	K	1	1	1		1		1		1		4	
Flygare	Helena		1	1	1		1		1		1		4	
Formoso	Ruben	R	1	1	1		_	1	1		1		4	
Gardner	James						_						0	
Garrett	Albert	L					_						0	
Gerson	Eran		1	1		1	1		1			1	4	
Ghazi	Vafa						_						0	
Ghosh	Monisha						_						0	
Gilb	James	P K					_						0	
Gilbert	Jeffrey	M	1	1		1	1			1	1		4	
Godfrey	Tim		1	1	1		_	1	1		1		4	
Goel	Sandesh		1	1		1	1			1		1	4	
Gohda	Wataru		1	1		1	1		1		1		4	
Goubert	Gerard						_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Gray	Gordon	P					_						0	
Green	Larry						_						0	
Gu	Daqing		1	1	1		1			1	1		4	
Gummadi	Srikanth		1	1	1		_	1	1			1	4	
Gupta	Vivek	G	1	1		1	1			1		1	4	
Habetha	Joerg	K					_						0	
Haisch	Fred		1	1		1	1			1		1	4	
Halasz	David	E					_						0	
Halford	Steve	D					_						0	
Hall, P.E.	Robert J						_						0	
Hamady	Neil	N					_						0	
Hanaoka	Seishi						_						0	
Hansen	Christopher	J	1	1	1		_	1	1		1		4	
Harada	Yasuo						_						0	
Harford	James	J					_						0	
Harkins	Daniel	N					_						0	
Harriman	Adam		1	1	1		_	1	1		1		4	
Haslestad	Thomas		1	1	1		1		1		1		4	
Hassan	Amer	A	1	1	1		1		1		1		4	
Hasty	Vann						_						0	
Hauser	James	P.					_						0	
Hayakawa	Yutaka		1	1		1	1		1			1	4	
Hayes	Kevin	N.	1	1		1	1			1		1	4	
He	Haixiang		1	1		1	1			1	1		4	
He	Xiaoning						_						0	
Hedberg	David	J	1	1	1		_	1	1		1		4	
Heile	Robert	F					_						0	
Hepworth	Eleanor						_						0	
Hermodsson	Frans	M	1	1	1		1		1		1		4	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Hetherington	Dave						_						0	
Heubaum	Karl	F	1	1	1		_	1	1			1	4	
Hideaki	Odagiri						_						0	
Hiertz	Guido	R.	1	1		1	1			1		1	4	
Hillman	Garth	D	1	1	1		1		1		1		4	
Hinsz	Christopher	S	1	1	1		1		1		1		4	
Ho	Chin Keong		1	1		1	1		1		1		4	
Hoghooghi	Michael	M	1	1	1		_	1	1			1	4	
Hollister	Allen						_						0	
Holt	Keith						_						0	
Horne	William	D					_						0	
Horng	Henry		1	1		1	1			1		1	4	
Hosur	Srinath						_						0	
Housley	Russell	D					_						0	
Howley	Frank	P.	1	1	1		1		1		1		4	
Hsu	Yungping	A					_						0	
Hunter	David						_						0	
Ikram	Muhammad	Z					_						0	
Imamura	Daichi		1	1		1	1			1		1	4	
Inoue	Yasuhiko		1	1		1	1		1			1	4	
Ishida	Kazuhito		1	1	1		1		1		1		4	
ITO	Takumi						_						0	
Jackson	Stephen	S					_						0	
Jacobsen	Eric	A	1	1		1	1			1		1	4	
Jalfon	Marc		1	1		1	1			1		1	4	
Jang	KyungHun		1	1		1	1			1		1	4	
Jechoux	Bruno		1	1	1		1		1		1		4	
Jeon	Taehyun		1	1		1	_	1	1			1	4	
Jeong	Moo Ryong						_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Jiang	Daniel						_						0	
Johnson	Walter						_						0	
Johnston	David						_						0	
Jokela	Jari	E					_						0	
Jones	VK		1	1	1		_	1	1		1		4	
Jose	Bobby		1	1		1	1		1		1		4	
Jou	Tyan-Shu						_						0	
Kain	Carl	W					_						0	
Kakani	Naveen	K	1	1		1	_	1		1		1	4	
Kandala	Srinivas		1	1		1	1		1		1		4	
Kang	You Sung						_						0	
Karaoguz	Jeyhan		1	1	1		_	1	1		1		4	
Karcz	Kevin	J					_						0	
Karimullah	Khalid						_						0	
Karnik	Pankaj	R					_						0	
Kavner	Douglas		1	1		1	1		1			1	4	
Kelly	Patrick		1	1		1	1		1			1	4	
Kennedy	Richard		1	1		1	1		1			1	4	
Kerry	Stuart	J	1	1		1	1			1		1	4	
Ketchum	John	W.	1	1	1		1		1		1		4	
Khieu	Andrew	K					_						0	
Kido	Ryoji		1	1		1	1			1		1	4	
Kikuma	Tomohiro		1	1		1	1		1		1		4	
Kim	Byoung-Jo	J					_						0	
Kim	Joonsuk		1	1	1		_	1	1		1		4	
Kim	Taekon		1	1		1	1			1		1	4	
Kim	Yongsuk						_						0	
Kim	Youngsoo		1	1		1	1			1		1	4	
Kitchin	Duncan						_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Klein	John	R					_						0	
Kleindl	Guenter						_						0	
Kneckt	Jarkko		1	1		1	1			1		1	4	
Kobayashi	Kiyotaka		1	1		1	1			1		1	4	
Kobayashi	Mark	M	1	1	1		_	1	1		1		4	
Koga	Keiichiro		1	1	1		1			1	1		4	
Kojima	Yasuyoshi						_						0	
Kojukhov	Andrei						_						0	
Kolze	Thomas		1	1	1			1	1		1		4	
Kopikare	Milind		1	1		1	1			1		1	4	
Kowalski	John	M	1	1		1	1		1		1		4	
Kraemer	Bruce	P											0	
Kruys	Jan	I	1	1		1	1			1		1	4	
Kuehnel	Thomas												0	
Kumagai	Tomoaki												0	
Kunihiro	Takushi		1	1		1	1			1	1		4	
Kuo	Ted												0	
Kurihara	Thomas	M	1	1		1		1	1			1	4	
Kuwahara	Denis												0	
Kwak	Joe		1	1	1		1		1		1		4	
Kwon	Edwin		1	1		1	1			1		1	4	
Lambert	Paul		1	1	1			1	1		1		4	
Landeta	David	S	1	1		1	_	1	1			1	4	
Landt	Jeremy	A	1	1		1	1		1			1	4	
Lanzl	Colin		1	1		1	1		1		1		4	
LaRosa	Jon	A					_						0	
Lauer	Joseph	P	1	1	1		_	1	1		1		4	
Leach	David	J.	1	1	1		_	1	1		1		4	
Lee	Dongjun		1	1		1	1			1		1	4	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Lee	Insun						_						0	
Lee	Sok-kyu		1	1		1	_	1	1			1	4	
Lee	Taejin		1	1		1	1			1		1	4	
Lee	Tae-Jin						_						0	
Lefkowitz	Martin		1	1		1	1		1			1	4	
Lemberger	Uriel		1	1		1	1			1		1	4	
Levy	Joseph						_						0	
Lewis	Mike						_						0	
Li	Pen		1	1		1	1			1		1	4	
Li	Sheung		1	1	1		1			1	1		4	
Liang	Haixiang		1	1	1		_	1	1		1		4	
Liang	Jie		1	0	0		0		0		0		0	only 2/4 columns checked
Lim	Wei Lih		1	1		1	1			1		1	4	
Lim	Yong Je						_						0	
Lin	Huashih	A	1	1		1	_	1	1		1		4	
Lin	Victor						_						0	
Liu	Changwen		1	1		1	1			1		1	4	
Liu	Der-Zheng		1	1	1		_	1	1		1		4	
Liu	Xiaoyu						_						0	
Loc	Peter		1	1	1		1			1	1		4	
Lojko	Peter	M	1	1	1		1		1		1		4	
Lou	Hui-Ling		1	1		1	1			1		1	4	
Love	Robert	D					_						0	
Mahadevappa	Ravishankar	H					_						0	
Malek	Majid	m	1	1	1		_	1	1		1		4	
Malik	Rahul						_						0	
Malinen	Jouni	K					_						0	
Mani	Mahalingam						_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Mankin	Kevin		1	1		1	1		1			1	4	
Marshall	Bill		1	1		1	_	1	1			1	4	
Martin	Art						_						0	
Mathews	Brian						_						0	
Matsumoto	Yoichi						_						0	
Matsuo	Ryoko						_						0	
Matta	Sudheer		1	1		1	1		1			1	4	
Maufer	Thomas	A					_						0	
McCann	Stephen		1	1		1	1		1		1		4	
McClellan	Kelly	P	1	1	1		1		1			1	4	
McFarland	William	J	1	1		1	1			1		1	4	
McGovern	Timothy						_						0	
McIntosh	Bill	J					_						0	
McNamara	Darren	P	1	1		1	1			1		1	4	
McNew	Justin	P					_						0	
Medvedev	Irina		1	1	1		1		1		1		4	
Mehta	Pratik		1	1	1		1		1		1		4	
Meyer	Klaus		1	1	1		1		1			1	4	
Meylan	Arnaud		1	1	1		1		1		1		4	
Miki	Morgan	H	1	1		1	1		1		1		4	
Miller	Robert	R.	1	1	1		1		1			1	4	
Miyoshi	Kenichi						_						0	
Mlinarsky	Fanny						_						0	
Molisch	Andreas	F					_						0	
Molnar	Peter	R					_						0	
Monteban	Leo						_						0	
Montemurro	Michael		1	1		1	1			1		1	4	
Moore	Rondal	J					_						0	
Moore	Tim	M					_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Moorti	Rajendra	T	1	1	1		_	1	1		1		4	
Moreton	Mike		1	1	1		_	1	1		1		4	
Morioka	Yuichi		1	1		1	1			1		1	4	
Morley	Steven	A.	1	1	1		1		1		1		4	
Mourot	Patrick						_						0	
Mueller	Joe		1	1	1		_	1	1		1		4	
Mujtaba	Syed	Aon	1	1		1	1			1		1	4	
Murphy	Peter	A					_						0	
Murray	Peter						_						0	
Myers	Andrew	D					_						0	
Myles	Andrew		1	1		1	1			1		1	4	
Nagai	Yukimasa		1	1	1		1		1			1	4	
Naka	Katsuyoshi						_						0	
Nakamura	Michiharu		1	1	1		1		1		1		4	
Nakao	Seigo		1	1		1	1			1		1	4	
Nakase	Hiroyuki		1	1		1	1			1		1	4	
Nanda	Sanjiv		1	1	1		1		1		1		4	
Narasimhan	Partha						_						0	
Narasimhan	Ravi						_						0	
Nedic	Slobodan		1	1	1		1		1		1		4	
Newton	Paul	D					_						0	
Ngo	Chiu		1	1		1	1			1		1	4	
Ni	Qiang						_						0	
Nitsche	Gunnar		1	1		1	1			1		1	4	
Noble	Erwin						_						0	
Oakes	Ivan	F	1	1	1		_	1	1		1		4	
Odman	Knut	T					_						0	
Oguma	Hiroshi		1	1		1	1			1		1	4	
O'Hara	Bob		1	1	1		1			1	1		4	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
O'Hara	Sean	T					_						0	
Ohtani	Yoshihiro		1	1		1	1		1		1		4	
Olson	Timothy	S	1	1		1	1			1		1	4	
Ono	Hiroshi						_						0	
Oomen	Peter						_						0	
Ophir	Lior						_						0	
Ota	Atsushi		1	1		1	1		1			1	4	
Oyama	Satoshi		1	1	1		1		1		1		4	
Ozer	Sebnem	Z					_						0	
Pai	Pratima	M					_						0	
Paine	Richard	H					_						0	
Paljug	Michael	J	1	1	1		_	1	1		1		4	
Palm	Stephen		1	1	1		_	1	1		1		4	
Park	Jong Ae		1	1		1	1			1		1	4	
Parker	Steve		1	1		1	1			1	1		4	
Patel	Vijay		1	1	1		_	1	1			1	4	
Peleg	Yaron		1	1		1	1			1		1	4	
Perahia	Eldad		1	1		1	1			1		1	4	
Petrick	Al		1	1	1		1		1		1		4	
Pitarresi	Joe		1	1		1	1			1		1	4	
Platis	Konstantinos						_						0	
Pope	Stephen	P	1	1	1		_	1	1		1		4	
Portaro	James	D					_						0	
Potter	Al						_						0	
Ptasinski	Henry		1	1	1		_	1	1		1		4	
Purkovic	Aleksandar		1	1		1	1			1	1		4	
Qi	Emily	H					_						0	
Qian	Luke		1	1		1	1			1		1	4	
Raab	Jim	E					_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Raissinia	Ali		1	1	1		_	1	1		1		4	
Rajkumar	Ajay						_						0	
Rangwala	Noman		1	1	1		1		1		1		4	
Rasor	Gregg		1	1	1		1		1		1		4	
Rayment	Stephen	G					_						0	
Reede	Ivan						_						0	
Reible	Stanley	A					_						0	
Repice	Joe	A					_						0	
Reuss	Edward		1	1		1	1		1		1		4	
Ribeiro Dias	Alexandre		1	1	1		1		1		1		4	
Riegel	Maximilian						_						0	
Rios	Carlos	A					_						0	
Roebuck	Randy		1	1		1	1		1			1	4	
Rollet	Romain		1	1	1		1		1		1		4	
Rommer	Stefan						_						0	
Rosdahl	Jon	W	1	1		1	1			1		1	4	
Rude	Michael						_						0	
Rudolf	Marian	X	1	1	1		1		1		1		4	
Sadot	Emek						_						0	
Sadowsky	John	S	1	1		1	1			1	1		4	
Saed	Aryan		1	1	1		1		1		1		4	
Saifullah	Yousuf		1	1		1	1			1		1	4	
Sakoda	Kazuyuki						_						0	
Sakurai	Shoji						_						0	
Salhotra	Atul		1	1		1	1			1		1	4	
Sampath	Hemanth		1	1	1		1		1		1		4	
Sandhu	Sumeet		1	1		1	1			1		1	4	
Sanwalka	Anil		1	1	1		1		1		1		4	
Sarrigeorgidis	Konstantinos		1	1		1	1			1	1		4	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT Consider	MITMOT Not	TGnSync Consider	TGnSync Not	WWiSE Consider	WWiSE Not	Qualcomm Consider	Qualcomm Not	Total per Ballot	Comments
Sashihara	Toshiyuki						_						0	
Sastry	Ambatipudi	R					_						0	
scalise	fabio	M					_						0	
Schaffnit	Tom						_						0	
Schiffer	Jeffrey	L					_						0	
Schnacke	Richard	N					_						0	
Schnier	Steven	D	1	1	1		_	1	1		1		4	
Schreder	Brian						_						0	
Schylander	Erik		1	1		1	1			1		1	4	
Seals	Michael						_						0	
Sensendorf	Joe						_						0	
Shellhammer	Stephen	J	1	1		1	1			1	1		4	
Shen	Yangmin						_						0	
Sherlock	Ian		1	1	1		_	1	1		1		4	
Sherman	Matthew	J	1	1		1	1		1			1	4	
Sheu	Ming						_						0	
Shimada	Shusaku		1	1	1		1		1		1		4	
Shvodian	William	M	1	1	1		1		1		1		4	
Shyy	D. J.						_						0	
Siep	Thomas	M					_						0	
Simpson	Floyd		1	1	1		_	1	1		1		4	
Singh	Manoneet						_						0	
Siti	Massimiliano		1	1	1		_	1	1		1		4	
Skafidas	Efstratios (Stan)						_						0	
Skidmore	Roger	R					_						0	
So	Tricci						_						0	
Sood	Kapil		1	1		1	1			1	1		4	
Soomro	Amjad						_						0	
Soranno	Robert	T	1	1		1	1		1		1		4	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Spalla	Filippo		1	1	1		_	1	1		1		4	
Spiess	Gary	N					_						0	
Stacey	Robert		1	1		1	1			1		1	4	
Stanley	Dorothy		1	1		1	1			1		1	4	
Staszak	Martin	J					_						0	
Steck	William	K					_						0	
Stephens	Adrian	P	1	1		1	1			1	1		4	
Stevens	William	M					_						0	
Stevenson	Carl	R.					_						0	
Stolpman	Victor	J	1	1		1	_	1		1		1	4	
Surineni	Shravan	K	1	1	1		1		1		1		4	
TAGIRI	HIROKAZU						_						0	
Takagi	Masahiro		1	1		1	1			1	1		4	
Takahashi	Seiichiro		1	1		1	1			1		1	4	
Takai	Mineo						_						0	
Takaoka	Katsumi						_						0	
Takeda	Daisuke		1	1		1	1			1	1		4	
Tal	Nir						_						0	
Tamaki	Tsuyoshi						_						0	
Tan	Pek-Yew						_						0	
Tan	Teik-Kheong						_						0	
Tanaka	Hideki		1	1	1		1		1		1		4	
Tang	Kevin		1	1		1	1			1		1	4	
Temme	Carl						_						0	
ten Brink	Stephan		1	1	1		_	1	1		1		4	
Thornton	Timothy	J					_						0	
Thrasher	Jerry		1	1		1	1		1		1		4	
Tokubo	Eric	T					_						0	
Tomcik	James	D.	1	1	1		1		1		1		4	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Trachewsky	Jason		1	1	1		_	1	1		1		4	
Tsao	Jean						_						0	
Tsoulogiannis	Tom		1	1	1		1		1		1		4	
Tung	David						_						0	
Turner	Sandra	L	1	1		1	1			1		1	4	
Tzamaloukas	Mike	E	1	1		1	_	1	1			1	4	
Tzannes	Marcos						_						0	
Uchida	Yusuke		1	1	1		1		1		1		4	
Valle	Stefano						_						0	
Van Erven	Niels		1	1	1		1		1		1		4	
van Leeuwen	Richard						_						0	
Van Nee	Richard	D.J.	1	1	1		_	1	1		1		4	
Van Poucke	Bart						_						0	
van Waes	Nico	J	1	1		1	_	1		1		1	4	
van Zelst	Allert		1	1	1		_	1	1		1		4	
Vandenameele	Patrick						_						0	
Varas	Fabian		1	1	1		_	1	1		1		4	
Varsanofiev	Dmitri		1	1	1		1		1		1		4	
Venugopal	Madan						_						0	
Visscher	Bert						_						0	
Vlantis	George	A	1	1	1		_	1	1		1		4	
Vogtli	Nanci		1	1	1		1		1		1		4	
Wakeley	Tim		1	1		1	_	1	1		1		4	
Walker	Jesse	R	1	1	1		1			1	1		4	
Walrant	Thierry						_						0	
Wandile	Vivek						_						0	
Wang	Huaiyuan		1	1	1		_	1	1		1		4	
Wang	Stanley						_						0	
Ward	Robert		1	1	1		1		1		1		4	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT		TGnSync		WWiSE		Qualcomm		Total per Ballot	Comments
					Consider	Not	Consider	Not	Consider	Not	Consider	Not		
Ware	Christopher	G	1	1	1		_	1	1		1		4	
Watanabe	Fujio		1	1	1		1		1		1		4	
Webster	Mark	A					_						0	
Wells	Bryan						_						0	
Wendt	Jim						_						0	
Wentink	Menzo	M					_						0	
Weytjens	Filip		1	1		1	1		1			1	4	
Whitesell	Stephen	R					_						0	
Wilhoyte	Michael	E	1	1	1		_	1	1		1		4	
Williams	Michael Glenn						_						0	
Williams	Richard		1	1	1		_	1	1			1	4	
Wilson	James	M	1	1		1	1			1	1		4	
Winters	Jack	H	1	1	1		1		1		1		4	
Wojtiuk	Jeffrey	J	1	1		1	1		1			1	4	
Wong	Jin Kue		1	1		1	1			1		1	4	
Wong	Timothy	G					_						0	
Woodyatt	James						_						0	
Worstell	Harry	R					_						0	
Wright	Charles	R					_						0	
Wu	Gang		1	1	1		1		1		1		4	
Yagi	Akiyoshi		1	1	1		1		1			1	4	
Yamada	Katsuhiko						_						0	
Yamamoto	Takeshi		1	1		1	1		1		1		4	
Yamaura	Tomoya		1	1		1	1			1	1		4	
Yang	Lily		1	1		1	1			1		1	4	
Yaqub	Raziq		1	1		1	1			1		1	4	
Yasuhiro	Tanaka						_						0	
Yee	James		1	1		1	1			1		1	4	
Yee	Jung						_						0	

Last Name	First Name	Middle Initial	Ballot Taken	Ballot Returned	MITMOT Consider	MITMOT Not	TGnSync Consider	TGnSync Not	WWiSE Consider	WWiSE Not	Qualcomm Consider	Qualcomm Not	Total per Ballot	Comments
Yin	Jijun						_						0	
Young	Chris		1	1	1		_	1	1		1		4	
Yu	Heejung		1	1		1	_	1	1			1	4	
Yung	Hon	M					_						0	
Yurtkuran	Erol	K					_						0	
Zaks	Artur		1	1		1	_	1	1			1	4	
Zhang	Jinyun		1	1	1		1		1		1		4	
Zuniga	Juan-Carlos		1	1	1		1		1		1		4	
Zyren	James		1	1	1		_	1	1		1		4	
							_							
TOTALS			267	266	126	140	196	70	172	94	151	115		
							_							
PERCENTAGES					47%		74%		65%		57%			

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_

Valid Ballots	MITMOT			TGnSync			WWiSE			Qualcomm		
1.1.1.1 Returned	Consider	Not	Total	Consider	Not	Total	Consider	Not	Total	Consider	Not	Total
266	126	140	266	196	70	266	172	94	266	151	115	266
	47.37%			73.68%			64.66%			56.77%		
Note: one spoiled Ballot												
Total Ballots Issued = 267												

IEEE P802.11
Wireless LANs
Minutes of Task Group "p"

Date: November 15-19, 2004

Location: Hyatt, San Antonio, TX

Chair: Lee Armstrong, Armstrong consulting, lra@tiac.net

Secretary: Filip Weytjens, TransCore, Filip.weytjens@transcore.com

Monday, November 15, 2004, 4:00 PM Session

The meeting was convened at 4PM by Lee Armstrong (Armstrong Consulting). Lee introduced himself as chair of the WAVE Study group and went over the policies and rules applicable for task group "p".

Lee expressed appreciation for the attendance of each member and presented the agenda. The agenda was reviewed and approved by the group.

The minutes for the Berlin meeting (11-04-0838-00-wave-meeting-minutes-wave-sg-portland-july 2004.doc) were posted shortly after the meeting. It was noted that the minutes were wrongly presented as the Portland minutes. Lee will check on the filename to get it corrected.

An overview was provided on the WAVE program status review. It was mentioned that the upper layer standards (IEEE 1609.1, 3, and 4) are ready by February 28 including IEEE 1556.

Changes are being made to ASTM 2213-03 and will have an impact on 802.11p. Wayne Fisher (ARINC) noted that the ASTM 2213-03 is on hold till feedback is available from the prototype development. In any event, the 802.11p will be kept consistent with the ASTM document. There will be a point in time when no changes will be made any longer to ASTM 2213-03 and only the IEEE 802.11p will be kept up to date. This will happen from as soon as the IEEE 802.11p has been balloted and when the FCC accepted the IEEE 802.11p document to be included in the ruling.

It was requested how ISO WG16 would cooperate with the IEEE 802.11p. It was commented that ISO WG16 could provide comments to the document. Also, it was agreed that there would be an agenda point on the agenda to discuss international issues.

It was requested that the IEEE body has access to background information that was used to develop the ASTM 2213 standard. Lee replied that there was no problem for the body to have access to this information.

Peter provided feedback on what needs to happen in order to get the IEEE 802.11p approved. He mentioned that the process to go through is similar to what 802.15.1 had to go through.

Knutt Evensen (Q-Free), representative of ISO WG16 (CALM), presented comments from CALM M5 to IEEE 802.11p. The presentation was not available in the IEEE 802 format. This will be corrected by Knut after the session.

The session was recessed at 4:55 PM till 7:30PM.

Monday, November 15, 2004, 7:30 PM Session

The meeting was convened at 8:40PM.

Wayne Fisher (ARINC) went over the IEEE 802.11p proposed draft amendment under discussion. Changes to document proposed during this session:

- IEEE 802.11e should not be included at the top of the document. The reason why "e" was included was that it was expected that "e" would be available by the time that "p" would be final. Moreover, the document is using important concepts out of "e". As "e" has no status today, we should not use it.
- Formatting of the table of contents
- Suggestion made by Knutt Evensen (Q-Free) to use ITS-band instead of frequency allocated was brought up by Peter (Cisco) in support of the suggestion.
- Major contributors should be defined at the time of vote. For now it should say "To be supplied".
- Numbering system of the list of figures requires update. Similar for the list of tables.
- A replace needs to be added to the editing instructions.
- User service table has been highlighted because it is still under discussion.
- Section 5.1.2 is a description of what WAVE is about.
- Section 5.1.2.6 is informative. It is under consideration to add more informative section to the document.
- Section 5.1.2.7 highlights show areas that are focussed on North America. It was also mentioned that not all 7 channels could be used at all locations in Canada.
- A lot of information in section 5.1.2.8 belongs in section 11 or 12.
- It was mentioned that section 5 is always informative. Links should be included to the actual requirements.
- It was questioned why section 5, which is an informative section, is going into so much detail? It was agreed to bring the details into the applicable section.
- In the document DSRC is used for the devices and WAVE in case of the specific operation in the 5.9 GHz band.
- Since section 5 is informative, it was requested not to use the word "shall".
- Section 5.1.2.8.2 id highlighted to emphasize the existence of a time limit on the service channel and the control channel. It needs to be mentioned that this includes fragmentation.
- It was requested to lower the power level and transmission intervals under certain circumstances (section 5.1.2.8). This will be taken on by Jeffrey Zhu (MarkIV) and Stephen Spenler (MarkIV).
- Section 5.1.2.12 was included to identify the possibility to have multiple devices as part of an OBU or RSU. It was suggested to include coordination between the different devices.

General comments made during the discussion:

- It was suggested that we would get the document out as soon as possible to get feedback from the IEEE body.
- It was requested to include country information in order to make the standard useful not only in America. This was discussed in relation to IEEE 802.11j. In order to support regulation out of different countries, it was suggest to include a table. Advantage is that it is easy to amend.
- It was requested to have a discussion on the request made by the FCC on channel 172 and 184. The FCC wanted to have some channels restricted to safety only.
- It was requested were the restriction on channel 172 came from (section 5.1.2.8)? This needed further discussion but primarily comes down to the use of the priorities.
- It was requested to lower the power level and transmission intervals under certain circumstances (section 5.1.2.8).
- It was suggested that we would make sure that we would use terminology as it was defined by regulation.
- It was suggested that we would include a description of terminology to provide reference to the regulation. It was mentioned that there are other IEEE standards better suited for this purpose.
- It was suggested that we would talk to TGk about the RSSI.

Meeting was recessed at 9:30 PM.

Tuesday, November 16, 2004, 8:00 AM Session

The meeting was convened at 8:15 AM.

Wayne Fisher (ARINC) went over the IEEE 802.11p proposed draft amendment under discussion. Changes to document proposed during this session:

- Section 6.1.1.1 includes a table. Similar information as provided in the table, is shown in 802.11e in a different section. We should think about moving the table into the same section as 802.11e.
- Section 6.1.1.1: The odd priority numbering has an historical reason were it matches priority definitions of 802.11d. The reasoning is that 0 is best effort and 1 and 2 is not meeting best effort.
- Section 6.1.1.1: It was requested that we would match the chart with 802.11e and add a column for the ITS band priority designations as described in 1609.3.
- Section 7.3.2.22: It was requested that Jeffrey Zhu would study "k" and provide input to TGp on its applicability for the RSSI parameters.
- Section 7.4.5: Action field 1 is reserved per request of the car industry. Purpose is not clear.
- Section 10.3.16: Wording of reference to 1609.3 for WSIE needs to be revised.
- Section 10.3.17.1.1: The MLME-WAVE.request is a primitive used to put information in an action frame.
- Section 10.3.17.1.2: There are parameters missing in the MLME-WAVE.Request definition. This information was defined in the September draft of 1609.3. As it cannot be defined both documents, we need to decide which document it belongs to. Most likely this becomes part of 802.11p. Lee and Wayne will work on this.
- Section 11.8.2: It is not clear the information on (page 21, line 36 – 42) belongs. This is a requirement to monitor the control channel such that it not gets overloaded.
- Section 11.8.2: It was questioned how you can reduce power when in a congested environment. The logic here is that power can be reduced as in a congested area, the cars are all close together.
- Section 11.9.1: Confidentiality needs to be changed to protect privacy.
- Section 11.9.1: It was mentioned that Dynamic MAC Addresses are not allowed in certain countries. A statement should be included
- Section 11.9.1: Need to address Dynamic MAC Address generation for RSUs. Suggested to exclude it from the RSU.
- Section 11.9.1: It was discussed on what to do with a PSOBU. It was agreed that this was a normal OBU allowed to use a higher power level and therefore not fundamentally different from an OBU.

General comments:

- Do we need to keep references to USTs: Since it is only in informative sections, there is no problem with having it in.

The meeting was recessed at 9:45 AM.

Tuesday, November 16, 2004, 10:30 AM Session

The meeting was convened at 10:30 AM.

Wayne Fisher (ARINC) proceeded with the discussion on the IEEE 802.11p proposed draft amendment. Changes to the document proposed during this session:

- Section 11.9.4: A group was assigned to discuss the language of this paragraph. The discussion on this section will proceed as soon as the session is recessed.
- Section 12.3.5.15: It was suggested to specify a minimum randomness instead of algorithms.
- Section 20.1.2: It was emphasized that the diagram should be part of the draft. It is not clear however if this is the right section. A suggestion is to reference to section 5 or put it in section 5 (preferred).
- Section: 20.2.3.2: It was mentioned that the accuracy as specified in the document is not practical. This will need to be consistent with TGk. It was decided to make this accuracy +- 3dB.
- Section 20.3.2.3: It was requested that we would highlight those numbers in the document (not just this section) that cannot be changed.
- Figure 20.3.3.1: This diagram has been changed from 802.11a to reflect the changes proposed by TGp.
- Section 20.3.8.2: It was requested that we would make this table more generic. We could for instance move specifics into an annex. Another solution would be to refer to the annex that was created by TGj. Another suggestion was to include 11d, j, …
- Section 20.3.8.3.3: It was questioned whether IEEE can specify the channels outside North America/Canada as they have not been assigned outside North America and Canada.
- Section 20.3.8.3.3: It was suggested to delete the sentence “The channels reflect the 10 MHz ….” As this does not take the 20 Mhz channels into account and it is overlapping with the information below the table. The odd numbered channels are the 20 Mhz channels. It was recommended to include a footnote to address the 20 Mhz.
- Section 20.3.8.3.3: The table needs to be checked against 11j (17.3.8.3). There are significant differences observed between 11j and 11p.
- Section 20.3.10.1: It was suggested to change the sensitivity to match the change to 10 Mhz (include 3 dB change in sensitivity). It was suggested that we would look at 11j to update the table.
- Section 20.3.10.1: Need to verify the Adjacent channel rejection with 802.11j.

General comments:

- It was suggested to include an annex for regional/regulatory requirements (such as FCC requirements). This would be separate from the annex prepared for “j”. Wayne will take this on.
- It was requested were type 1 and type 2 channel rejection is described. The comment is that it was used but never described.

The meeting was recessed at 12:00 PM till November 17, 2004, 8:00 AM.

Wednesday, November 17, 2004, 8:00 AM Session

The meeting was convened at 8:00 AM.

Wayne Fisher (ARINC) proceeded with the discussion on the IEEE 802.11p proposed draft amendment. Changes to the document proposed during this session:

- Bob Soranno brought up an objection on removing the PSOBU category from the IEEE 802.11p draft. Bob Soranno discussed the original reasoning for the extra PSOBU category. Broady Cash explained that all the capabilities sought by the PSOBU category can be met by the current IEEE 802.11p OBU requirements and the IEEE 1556 security requirements. He also stated that there is no need for a special PSOBU category in 802.11p as there should be no such category distinction in the lower layers. Basically it is functionally an OBU used for public safety. The distinction between the PSOBU attributes and those of a regular OBU must be handled by applications at the upper layers. After some discussion Bob Soranno and others involved in the discussion acknowledged that there is no longer a reason to add a PSOBU category to the IEEE 802.11p draft. Tom Kurihara acknowledged that P1556 and P1609 must address these requirements.
- Tom Kurihara identified a possible coordination activity before the ASD SG PAR and 5 Criteria wording is decided, by citing the words in 11-04-1214-0ads-draft-par.doc, specifically, "This amendment proposes to defend and protect IEEE 802.11 management frames from attack, to provide data integrity, data origin authenticity, replay protection, and data confidentiality for selected 802.11 management frames."
- Section 20.3.8.8: The question was raised whether it was appropriate to list type 1, 2, and 3 for WAVE. Because it is an addition to the paragraph 17 to include type 4 for WAVE. The suggestion was to make the WAVE type 4-temperature range as the first sentence and then mention the other 3 temperature ranges. This was updated during the meeting.
- Section 20.3.9.1: A discussion was brought up on how to incorporate cable losses between antenna and the output of the device. It was decided to include a footnote addressing the losses between antenna and cable. The reason why it is referring the output of the device is because the FCC wanted to type certify the device. The FCC did not have a problem with have the Class D device float. For the other device classes, they wanted to have it fixed.
- A concern was raised by Knutt Evensen (Q-Free) that there was no relation between the spectral mask and the EIRP (An active antenna could conform output power requirements but not spectral mask). Broady mentioned that this relation was available in the FCC regulation and he took action to look this up. It turned out that the tables have been changed between two versions and therefore the concern that was brought up hold. As a result we need to address the relation between antenna radiated power (EIRP) and spectral mask. This was corrected by including a column in table 20.3.9.1.1 describing the maximum EIRP (dBm) for each device class.
- Table 20.3.9.1.1: Need to explain the device classes and the relation to the implementation below. Also, the table has to be moved into an annex.
- Table 20.3.9.1.3: Updated frequency designation and included “Power limits per channels”
- Table 20.3.10.2-1: In the table there is use for “Type 2” which is also used for environmental requirements. It was suggested that we would use a different wording instead of “type” such as “Category”.

Recessed at 10AM.

Thursday, November 18, 2004, 8:00 AM Session

The meeting was convened at 8:00 AM,

Wayne Fisher (ARINC) proceeded with the discussion on the IEEE 802.11p proposed draft amendment. Changes to the document proposed during this session:

- It was mentioned by Broady that the tables in the FCC rules were combined between version which resulted in yesterdays confusion. The table that we plan to update in 802.11p, as discussed yesterday, will provide further clarification to the FCC rules.
- The MIB tables require update to match the upper layer standardization that is on-going.
- Table 20.4.4.1: This table primarily the table available in "j" but some parameters were added such as switching time.
- Section J2: It was brought up by Jerry Landt (TransCore) that "k" is using RCPI instead of RSSI and +-5 dB instead of +-3dB. We need to coordinate with the manufacturers on which parameters and values 802.11p should be referring to.
- Table 20.5.1: Jerry also brought up that in this table, WAVE_RATE was using the values of 20 MHz channels. Wayne took an action to clarify this.
- Table 20.2.2: Jerry brought up that Data rate for WAVE should not include 54.

No further comments were provided.

Bryan Wells (Denso) presented several proposals. It was clarified that this was not presented as a Denso position but his personal. The doc number is: IEEE 802.11-11-04-1499-00-000p.

1. Proposal to provide a Cancel Transmit primitive to the 802.11p MAC.
2. Proposal for the 802.11p MAC to process only one transmit packet at a time.

Comments:

- The proposals were presented for both control and service channels.
- Same priority level is processed first-in-first-out.
- The purpose of the proposals is to not hold up the transmission of high priority messages.
- Question was raised why we should cancel the pending transmission. It was discussed that we cannot wait 100ms for a message to be transmitted by the MAC if a high priority message is waiting to be sent out by the MAC.
- It was commented that this would have implications to the 802.11e implementation as the queuing today is performed by the 802.11e implementation, which is part of the MAC.
- An action was suggested that we would discuss with the manufacturers how the priority management is done within 802.11e. The question is whether each message or priority queue has its own back off timer. If so, a priority message would be send out immediately after its back off time even if a low priority message is still waiting for its back off time.

General consensus was reached on the need to explore the requirement to be able to cancel messages by the upper layers that were submitted to the MAC for transmission. Bryan took action to study the problem further.

It was requested to the task group if a motion can be presented at the closing plenary to have an adhoc meeting to discuss this in more detail. This motion passed with unanimous consent.

The meeting was recessed at 10 AM.

Thursday, November 18, 2004, 10:30 AM Session

The meeting was convened at 10:40 AM.

Broady Cash (ARINC) proceeded with the discussion on the IEEE 802.11p proposed draft amendment. Broady incorporated several of the modifications requested during previous sessions and presented his proposed language to the body.

John Rosdahl provided an overview of TGp and the relation with the voting that is going on in TGn. It was requested for the TGp group to participate in the voting. Information on the 4 proposals can be find on 802wirelessworld.

Lee asked if there were additional comments on the draft. None. The discussion on the draft was closed.

Lee asked for new business. Broady suggested that we would start liaisons with efforts that are feeding in to 802.11p. For instance IETF (as 802.11p is processing IP packets), IEEE 1609, ISO WG16, IEEE 1556 (as the size of some packets (certificates) do not fit the available size in the 802.11 packets), and FCC. It was requested that requirements for each of these groups are presented to TGp at the next meeting such that the requirements are addressed. The suggestion to start liaisons was supported by the body. The following persons are assigned as the liaison:

- ISO WG 16: Knutt Evensen (Q-Free)
- IEEE 1609: Doug Kavner (Raytheon)
- IEEE 1556: William Whyte (NTRU)
- IETF: Knutt Evensen (Q-Free)
- FCC: Broady Cash (ARINC)

It was understood that the liaison with ISO WG 16 also included European ruling (ETSI). Lee took action to inform the liaisons of their responsibility.

It was requested whether there was a time frame to submit the 802.11p document for ballot. There was no specific time frame identified.

The meeting was adjourned at 11:20AM.

IEEE P802.11
Wireless LANs

ESS MESH Networking Task Group Meeting Minutes

Date: November 18th, 2004

Authors:

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Abstract

Minutes of the meeting of the IEEE 802.11 ESS MESH Networking Task Group held in San Antonio, TX from November 16th to 18th, 2004 under the TG Chairmanship of Donald Eastlake III of Motorola Laboratories. Minutes were taken by Stephen Rayment and edited by Donald Eastlake III. The final agenda for the meeting is in document number 11-04/1149r6.

Contents

Minutes

Session I, Tuesday, November 16th, 13:30 – 15:30, Hyatt Hotel – Rio Grande East

Meeting was called to order at 13:32 by Donald Eastlake III - Chair, Stephen Rayment - Secretary, W. Steven Conner - Editor

The IEEE and 802.11 Policies concerning Patents and Inappropriate topics were explained by the Chair and there were no questions.

Approval of Minutes of September 2004 Meeting, document 11-04/1125r1
by unanimous consent

Approval of the Minutes of the Teleconferences held since the last meeting
29 September 2004, 11-04/1161r0
13 October 2004, 11-04/1177r0
27 October 2004, 11-04/1221r0
10 November 2004, 11-04/1396r0
by unanimous consent

Approval of Agenda, 11-04/1149r1
by unanimous consent

Presentation #1: "Draft 802.11 TGs Functional Requirements & Scope", W. Steven Conner, 11-04/1174r5

Presentation #2: "Draft IEEE 802.11 TGs Comparison Categories and Criteria", W. Steven Conner (Intel), 11-04/1175r3

The Chair adjourned the session at 15:18

Session II, Tuesday, November 16th, 16:00 – 18:00, Hyatt Hotel – Rio Grande East

The Chair convened the session at 16:01

Presentation #3: "Usage Models", W. Steven Conner (Intel), 11-04/0662r10

Presentation #4: " 802.11s Proposal to Merge Military Usage Case with Public Safety Usage Case", D.J.Shyy (MITRE) and J.Hauser (NRL), 11-04/1393

Straw poll on "should military be a separate usage case?"

1. Don't include 0
2. Include as separate 23
3. Include merged with public safety 20

Decision taken to add military as a separate case in the Usage Models document

Presentation #5: "Draft Terms and Definitions for 802.11s", Tricci So (Nortel) et al, 11-04/969r2

The Chair adjourned the session at 17:41.

Session III, Tuesday, November 16th, 19:30 – 21:30, Hyatt Hotel – Rio Grande East

The Chair convened the session at 19:37.

The Chair proposed that the session adjourn and the rest of the allocated time be used for Ad Hoc discussion to update documents 1174 and 1175.

The Chair adjourned the session at 19:42.

Session IV, Wednesday, November 17th, 13:30 – 16:00, Hyatt Hotel – Rio Grande Centre

The Chair convened the session at 13:37

Presentation #6: "Draft 802.11 TGs Functional requirements and Scope", W. Steven Conner, 11-04/1174r6

Steven Conner overviewed the changes made in last night's session. Numerous further changes were made to the document based on feedback from the group.

The Chair adjourned the session at 15:31.

Session V, Wednesday, November 17th, 16:00 – 18:00, Hyatt Hotel – Rio Grande Centre

Presentation #8: "Site Specific Knowledge for Next Generation Wireless Networks", Prof Ted Rappaport (U of Texas at Austin)

Presentation #9: "Routing and Rbridges", Radia Perlman (Sun) and Donald Eastlake III (Motorola), 11-04/1462r0

Presentation #10: "Mesh Networking Task Group Process", Donald Eastlake III (Motorola), 11-04/1384r1

The Chair explained the rationale, based on previous straw polls, of the "Schedule Projected at Berlin"

Presentation #11: "Draft Call for Proposals", Donald Eastlake III (Motorola), 11-04/1430r0

The Chair adjourned the session at 17:39.

Session VI, Thursday, November 18th, 08:00 – 10:30, Hyatt Hotel – Rio Grande West

The Chair convened the session at 08:04.

The Chair reviewed the updated "Mesh Networking Task Group Process" document, 11-04/1384r2

Motion to replace TGs Working Document 11-04/969r2 (Draft Terms and Definitions for 802.11s) with 11-04/1477r0 (Terms and Definitions for 802.11s)
Moved – Steven Conner
Second – Guido Hiertz
Adopted by unanimous consent

Motion to replace TGs Working Document 11-04/662r10 (Usage Models) with revision number 11 of that document.
Moved – Steven Conner

Second – Guido Hiertz
Adopted by unanimous consent

The Chair reviewed the latest version of "Draft Call for Proposals", 11-04/1430r2

Straw Poll on issuing Call immediately after this meeting using existing documents with deadline for proposals by the May meeting, ie. shift everything forward by one meeting
For – 7
Against – 20

Straw Poll on issuing Call immediately after this meeting, keep Proposal deadline the same (July)
Discussion
For – 8
Against – 21

Motion to replace TGs Working Document (Proposed 802.11 TGs Scope) with 11-04/1174r7 (Draft 802.11 TGs Functional Requirements and Scope)
Moved – Guido Hiertz
Second – Jim Hauser

Motion to amend by replacing 1174r7 with 1174r8
Moved – Steven Conner
Moved – Guido Hiertz
Amendment adopted by unanimous consent

Motion as amended adopted by unanimous consent

Motion to adopt 11-04/1175r5 (Comparison Categories and Criteria) as a TGs Working Document
Moved – Guido Hiertz
Second – Steven Conner
Adopted by unanimous consent

Teleconferences Motion
Moved that TGs have teleconferences at 16:00 Eastern Standard Time Wednesdays on 1 December, 15 December, 5 January, and 12 January. Notice will be given, including UTC time, at least 10 days in advance.
Moved – Steven Conner
Second – Guido Hiertz
Adopted by unanimous consent

Chair adjourned for the week at 9:46am

Detailed Record

Session I, Tuesday, November 16th, 13:30 – 15:30, Hyatt Hotel – Rio Grande East

Meeting was called to order at 13:32 by Donald Eastlake III - Chair, Stephen Rayment - Secretary, W. Steven Conner - Editor

The Chair reminded everyone to use the On-line Attendance system.

The IEEE and 802.11 Policies concerning Patents and Inappropriate topics were explained by the Chair and there were no questions.

Approval of Minutes of September 2004 Meeting, 11-04/1125r1
by unanimous consent

Approval of the Minutes of the Teleconferences held since the last meeting
29 September 2004, 11-04/1161r0
13 October 2004, 11-04/1177r0
27 October 2004, 11-04/1221r0
10 November 2004, 11-04/1396r0
by unanimous consent

Approval of Agenda, 11-04/1149r1
by unanimous consent

Presentation #1: "Draft 802.11 TGs Functional Requirements & Scope", W. Steven Conner, 11-04/1174r5

Steven presented the history and structure of the document. It was created after the Berlin meeting. Intent is for this document to replace its predecessor 11-04/970r4. The document is an addition to, not replacement for, the PAR. The document was walked through, section-by-section.

Discussion…

FR1
What's difference between status and quality?
Status means it's there at all vs quality which refers performance
What will those metrics include?
TBD
Is Link Adjacency defined?
ed. no it's not in the Terms document

FR2
What's difference between protocol and algorithm?
Algorithm (the logic) was added – protocol is the signaling
Why does algorithm need to be specified?
It has been felt that interoperation will require one minimum algorithm
Would guidelines be an acceptable alternative?
Many urged for algorithm to be specified
Want to be able to allow improved algorithms

FR3
Could read that more than one "alternative path selection…" could be allowed at the same time
Not the intent

There is on-going research on routing, breaking it down into steps, looking for commonality, there may be a mix at the lower levels
How to evaluate this requirement?
Not too hard if interpretation above is used

FR7
Does "single administrative entity" extend to Public Safety?
Yes – although there is flexibility in interpretation
May require cross-administrative domain interactions
Does this include wired network management?
No - focus here is on securing links between nodes, not the wired connections

What happened to WDS being a requirement?
It's used in the PAR to define an ESS Mesh.

Does 802.2 LLC need to be supported?
Warrants further investigation
Not in PAR, may be in 5 Criteria
Mesh should be transparent

Comments can be sent to the author or to the TGs reflector <STDS-802-11-TGS@listserv.ieee.org>.

Presentation #2: "Draft IEEE 802.11 TGs Comparison Categories and Criteria", W. Steven Conner (Intel), 11-04/1175r3

Steven walked through the document. It is a supplement to the 1174 document. It resulted from discussion at the Berlin meeting. The desire was for lightweight criteria.

Discussion…

What's the use of QC1? – it's "easy to fudge"
The QC's may not be good for quantitative numeric comparison but are at least areas proposers should address.

No mention of mobility in either document.
Mentioned in Use Case document, where focus was mostly on changing radio characteristics
Public Safety may have the greatest need
Car to car was previously straw-polled out

The Chair adjourned the session at 15:18.

Session II, Tuesday, November 16th, 16:00 – 18:00, Hyatt Hotel – Rio Grande East

The Chair convened the session at 16:01.

The Chair reminded everyone to use the On-line Attendance system.

Given the material remaining to be covered, it was deemed likely that there would be no need for an evening session. In that case the time will be used for Ad Hoc document work as required.

Presentation #3: "Usage Models", W. Steven Conner (Intel), 11-04/0662r10

No questions or comments.

Presentation #4: " 802.11s Proposal to Merge Military Usage Case with Public Safety Usage Case", D.J.Shyy (MITRE) and J.Hauser (NRL), 11-04/1393

Discussion…

Doesn't military have unique requirements?
Military is only interested in MAC, may use their own PHY (combat) or 802.11 PHY (peace-keeping) depending on application and frequency band

Vehicle to vehicle speed not specified, but is expected to be very slow.

Suggestion to add language indicating non-tactical military apps

How can Radio aware metrics be de-coupled from 802.11 PHY?

Does military require additional MAC functions or, conversely, does military PHY handle eg. DoS attacks, etc?

If military needs no changes why are changes to Public Safety Use Case required?

Military does add requirement for APs and Clients to be able to exchange roles – what else will come as understanding evolves?

Usage model count originally reduced from 12 uses to 6 categories

Straw poll on "should military be a separate usage case?"
Don't include 0
Include as separate 23
Include merged with public safety 20
Decision taken to add military as a separate case in the use case document

Presentation #5: "Draft Terms and Definitions for 802.11s", Tricci So (Nortel) et al, 11-04/969r2

The Chair reviewed the document at a high level. Figure 2 is more useful than Figure 1.

Questions and comments…

Core Terms;

Comment – 3. Mesh Point may or may not have an IP stack and perform applications. Any STA may, so entity includes STA. Definition does not preclude

Isn't Mesh Point a Mesh Portal to a single node? Degenerative case!

Use "WLAN" always or never throughout the document?

Clarify 6. Mesh Link. More than one hop away is a Member, not a neighbor, could add that. Note, TGe uses "direct link" to describe a uni-directional STA to STA communication in the presence of and permitted by an AP, so we should say bi-directional. Agreed to say "A bidirectional 802.11 link between two Mesh Points"

9. Path Metric – Change "Criteria" to "Criterion" (singular)

Supplementary Terms;

Define WM in 2 (Wireless Media).

Clarify Partitioned Mesh in 11. Disconnected Mesh

Add Mesh Member as a Supplementary Definition. Distinguish between Mesh Neighbors and Mesh Members.

14. Mesh Service Area – should say within "which" (grammar fix)

Add an Abbreviations table

The Chair adjourned the session at 17:41.

Session III, Tuesday, November 16th, 19:30 – 21:30, Hyatt Hotel – Rio Grande East

The Chair convened the session at 19:37.

The Chair reviewed Agenda for the week – 11/04-1149r3.

The Chair reminded everyone to use the On-line Attendance system.

The Chair proposed that the session adjourn and use the rest of the allocated time for the session be used for Ad Hoc discussion to update documents 1174 and 1175.

The Chair adjourned the session at 19:42.

Session IV, Wednesday, November 17th, 13:30 – 16:00, Hyatt Hotel – Rio Grande Centre

The Chair convened the session at 13:37

The Chair reviewed Agenda for the week – 11/04-1149r4

The Chair reminded everyone to use the On-line Attendance system.

Presentation #6: "Draft 802.11 TGs Functional requirements and Scope", W. Steven Conner, 11-04/1174r6

Steven Conner overviewed the changes made in last night's session.

Discussion…

Suggestion to add signaling to share Mesh Point capabilities to section 4.8 Configuration and Management

Discussion on size of the mesh;
- Add a FR (about 32) with text from the PAR as a clarification.
- Also add an item to the routing Scope section about size.

Discussion on the definition of Mesh Point vs Mesh AP;
- Infrastructure mode
- Not Ad Hoc, IBSS, STA to STA
- Mesh AP = Mesh Point + "legacy" AP (that beacons, etc.)

All Mesh APs contain Mesh Points
There is no Mesh Station definition

Strawpoll on using terms in FR's
"Mesh Point" 22
"Mesh Point and Mesh AP" 1

Can an ESS Mesh be made of only Mesh Points not Mesh APs?
Yes, for example if they are all just Mesh Portals.

What to do with TBD items in Scope

Discussion on mobility requirements;
Not clearly spelled out as a FR.
Vehicular was dropped as a use case
Dynamic captures this but we may need to be more explicit
Add a note that "dynamic encompasses mobility…"
Also add two items to the routing Scope section on "recognize" and "reconfigure"

Clarification sought on routing topology synchronization Scope item.
Replace with mesh topology consistency?
Is the item required at all? Agreed it is not.

Should we be using the word routing when we are working at layer 2?
There is clarification in the Terms and Definitions document.

Presentation #7: "Draft IEEE 802.11 TGs Comparison Categories and Criteria", W. Steven Conner, 11-04/1175r4

Steven Conner overviewed the changes made in last night's session.

Discussion…

Difficult to define more criteria until we see proposals.
Intention is these are not mandatory, they are high level indicator categories
Onus is on proposer to demonstrate "goodness"

Anything mandatory or binding?
Can largely be interpreted by proposer
Section 3 – simulation methodology MUST be described if simulation provided

The Chair adjourned the session at 15:31pm

Session V, Wednesday, November 17th, 16:00 – 18:00, Hyatt Hotel – Rio Grande Centre

Presentation #8: "Site Specific Knowledge for Next Generation Wireless Networks", Prof Ted Rappaport (U of Texas at Austin)

Presentation #9: "Routing and Rbridges", Radia Perlman (Sun) and Donald Eastlake III (Motorola), 11-04/1462r0

Presentation #10: "Mesh Networking Task Group Process", Donald Eastlake III (Motorola), 11-04/1384r1

The Chair explained the rationale, based on previous straw polls, of the "Schedule Projected at Berlin"

Presentation #11: "Draft Call for Proposals", Donald Eastlake III (Motorola), 11-04/1430r0

The Chair review the updated Agenda for tomorrow

The Chair adjourned the session at 17:39pm

Session VI, Thursday, November 18th, 08:00 – 10:30, Hyatt Hotel – Rio Grande West

The Chair convened the session at 08:04.

The Chair reminded everyone to use the On-line Attendance system.

The Chair reviewed the Agenda for the week – 11/04-1149r5

The Chair reviewed the updated "Mesh Networking Task Group Process" document, 11-04/1384r2

Motion to replace TGs Working Document 11-04/969r2 (Draft Terms and Definitions for 802.11s) with 11-04/1477r0 (Terms and Definitions for 802.11s)
Moved – Steven Conner
Second – Guido Hiertz
Adopted by unanimous consent

Motion to replace TGs Working Document 11-04/662r10 (Usage Models) with revision number 11 of that document.
Moved – Steven Conner
Second – Guido Hiertz
Adopted by unanimous consent

The Chair reviewed the latest version of "Draft Call for Proposals", 11-04/1430r2
Discussion…
Referenced document version numbers should be frozen at Call time.
Clarified that partial proposals are permitted
It was highlighted that the plans set and publicly announced in Berlin have driven company's and individual's planning and schedules so they should not be changed lightly
Attendance at non-US meetings is only slightly lower than those at US meetings

Straw Poll on issuing Call immediately after this meeting using existing documents with deadline for proposals by the May meeting, ie. shift everything forward by one meeting
For – 7
Against – 20

Straw Poll on issuing Call immediately after this meeting but keep Proposal deadline the same (July)
Discussion…
What would we do between now and July? Work on proposal comparison process and criteria, receive technical presentations, etc.
Early versions of Proposals could be presented before the July meeting.
Debate on the degree of completeness of the Functional Requirements document…

For – 8
Against – 21

Motion to replace TGs Working Document (Proposed 802.11 TGs Scope) with 11-04/1174r7 (Draft 802.11 TGs Functional Requirements and Scope)
Moved – Guido Hiertz
Second – Jim Hauser

Steven Conner reviewed the changes to "Draft 802.11 TGs Functional Requirements and Scope", 11-04/1174r7 and 1174r8. r8 moves all the TBD entries in the document to the "in scope" category and was originally intended for use if we decided to go ahead and issue the Call for Proposals now.

"TBD" items are not indicated as in or out of scope and so might get ignored. Moving them to "in scope" may make people pay more attention to them.

Motion to amend by replacing 1174r7 by 1147r8Moved – Steven Conner
Moved – Guido Hiertz
Adopted by unanimous consent

Amended motion
Adopted by unanimous consent

Motion to adopt 11-04/1175r5 (Comparison Categories and Criteria) as a TGs Working Document
Moved – Guido Hiertz
Second – Steven Conner
Adopted by unanimous consent

Teleconferences Motion
Moved that TGs have teleconferences at 16:00 Eastern Standard Time Wednesdays on 1 December, 15 December, 5 January, and 12 January. Notice will be given, including UTC time, at least 10 days in advance.
Moved – Steven Conner
Second – Guido Hiertz
Adopted by unanimous consent

Discussion…
Schedule for next 802.11 meeting as to days on which TGs will meet? Not available yet.
Suggestion that group identify areas requiring improvement in the documents.
This was in the nature of a brainstorming session so individual items were not debated or voted on in any way.

- Relationship with other TGs
- Interfaces to other networks – relationship to LLC
- Stability of the network – affects routing algorithm, care must be taken in using radio aware metrics, eg. shortest path may not always be most reliable path
- Selection criteria should use a channel model
- Use channel information being provided by TGt
- Simulations don't capture all impacts of real environment
- There are numerous Internet White Papers that could be referenced
- Invite presentations from companies having done real deployments
- Compile mesh bibliography
- We'll learn as we see real proposals
- Time synchronization – proposals say if it's required, how is it done?

Chair adjourned for the week at 9:46am

Remaining session time was allocated for Ad Hoc discussions on documents.

IEEE P802.11
Wireless LANs

TGr Meeting Minutes for September 2004 Session

Date: November 14-19, 2004

Author: Kapil Sood
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Monday November 15, 2004

4:00pm – 6:00pm

Chair: Clint Chaplin
Secretary: Kapil Sood

- Call to order
- Agenda – Document 11-04/1414r0
- Review operating rules for a Task Group.
- Review IEEE 802 policies and procedures for Intellectual Property.
- Any comments on the minutes in document 11-04/1034r0 from the September meeting?
- Approve meeting minutes from last meeting 11-04/1034r0.
  - No objections to approving the minutes.
- Discussion on the agenda (Doc: 11-04/1414r0) for this meeting:
  - Presentations in this meeting
  - Overview of additional presentations on Thursday, beyond 8 proposal scheduled presentations.
  - Each presentation given 59 minutes for presentation and discussion. 1 minute for the straw poll.
- Any objections to approving and accepting the agenda? None
- The agenda is unanimously approved.
- Group stand-down till 4:25pm. No objections.
- Presentation #1: 11-04-1179-00-000r-fast-bss-transition-tunnel.ppt: Haixiang He
  - The frame for STA tunnelling cause impacts on hardware, silicon, firmware, and drivers, and software. All in software can be serious complications.
  - Latency in the tunnelling path is still to be determined. Movement of MPDUs between APs can be complicated. Speakers response that backend inter-DS transition is assumed, and dependent on backend architecture.
  - Question whether APs can be reached from STA. Answer is yes.
  - Buffering time and latency involved may break higher applications like TCP. Is this signalling time impacting higher layer. Clarification recommended offline.
  - Security and QoS assumptions of the proposal. They use existing standards for doing these, and follow supporting assumptions.

- Looks like multiple APs within a switch. Discussion offline due to time constraints for this presentation.
- Is traffic to new AP in tunnel encrypted? Yes, in old APs keys
- Does tunnelling involve MTU changes and fragmentation. Answer: Yes, maybe.

STRAW POLL: Straw Poll on presentation 1: 11-04-1179-00-000r-fast-bss-transition-tunnel.ppt: Haixiang He: The TG requests the presenter to provide further details of the proposal at the next step.
Result: Yes - 36; No - 25; Abstain – Not Done, due to time constraints.

- Recess until the 7:30pm session

Monday November 15, 2004

7:30pm – 9:30pm

- Call to order.
- Reminder for online Attendance.
- Presentation #2: 11-04-1180-00-000r-fast-roaming-using-multiple-associations.ppt: Bob Beach
  - 802.1h does not exist anymore. Response that this is an 802.3 packet.
  - TSPECs setup with multiple APs, so a lot of TSPECs are setup. Can cause resource exhaustion. Response that TSPECs come and go with associations.
  - TSPEC and security is separable, and good this proposal showed that.
  - When does the STA get a list of multiple APs? Does STA changes channels to get this information? Response that STAs always scan, when they get a chance. They scan in background, and build the list of AP table. This proposal takes this model one step forward.
  - Question on slide #13, second point. Response clarifies that this is not just data, but management packets. Clarification on which management frame…which can be dis-associate frame.
  - What happens when secondary APs want to send information to the STA? Response that STA sets in PSP mode.
  - TSPEC schedules updates to prevent locking multiple resources. Response that this will have to be taken into consideration.
  - Assumptions on overlapping of areas between multiple APs, and how fast the STA moves. Response that mobile STA could have association with every AP, and make the list as it roams. So, STA can remember which APs it has associated with.
  - Cannot work as stated, even if concept is good. Power save mode with one AP, and broadcasts (due to 802.11F) can cause the current AP to drop the STA, even before the STA re-associates with any new AP. So, proposal needs modification to disable 802.11f functionality.
  - How do you maintain live-ness of a local association. What if an AP is suddenly overloaded or crashes? How does STA know if resources are still at that AP. Response that when STA sends a data packet to this AP, then it will fail and STA knows resources are no longer there.

- Does not address long delay in DS data transfer, like in mesh? Response that this item needs to be looked at.
- How does the broadcast key be updated? Response that this needs to be thought of.
- Can this proposal go all the way to 4-way handshake? Response that this needs to be looked at.
- 4-way handshake uses data packets, so to what extent does the proposal uses data packets. Response that the data packet is to the extent that DS sees or does not see this data packet.
- At what point you reserved resources? Response is at either time, before or after the data packet is sent. So, a concern that a lot of resources be reserved.
- Main concern on power save and channel switching. Is it acceptable to ding the application? Response that it depends on implementation. Periodic voice traffic can be handled well.

STRAW POLL: Straw Poll on presentation 2: 11-04-1180-00-000r-fast-roaming-using-multiple-associations.ppt: Bob Beach: The TG requests the presenter to provide further details of the proposal at the next step.
Result: Yes - 47; No - 4.

- Next presentation starts at 8:30, so next presenter prepares setup. Group stand down until 8:30pm
- Presentation #3: 11-04-1185-00-000r-motorola-fast-handover-proposal.ppt: Steve Emeott
  - Pre-authenticate is slowed down. Why was it done this way? Response that PMK is associated with the authenticator, and is done to take care of cases not covered by pre-authentication.
  - Experience in cutting down the messages, and implications, like messages getting lost and re-transmissions. Response that the proposal makes things more predictable.
  - In 802.11i, STA moves back to older AP, that PMK has to be cached. This proposal requires a new PMK at the AP. Response that this is taken care of, and this can allow re-use of PMK.
  - A lot of backend communications needs to take place. Response: yes.

STRAW POLL: Straw Poll on presentation 3: 11-04-1185-00-000r-motorola-fast-handover-proposal.ppt: Steve Emeott: The TG requests the presenter to provide further details of the proposal at the next step.
Result: Yes - 54; No - 8;

- Recess until November 16th, 2004, 8:00am.

Tuesday November 16, 2004

8:00am – 10:00am

- Call to order; Online attendance reminder.
- Presentation #4: 11-04-1186-00-000r-pekm.ppt: Bernard Aboba
  - Not clear how many original MAC frames intend to keep. Response that PEKM frames may not need all original frames like open auth.
  - Slide 9, how are ANonce and SNonce are being derived. Response that they are increments.

- Authenticator keeps the keys and is it OK to share with multiple APs. Response that there are multiple ports and can be shared.
- How do we determine the key scope. Response that Key scope is advertised, and verified using EAP channel binding.
- No QoS support. Response that the capabilities field is broad to include TSPECs.
- You may be wasting resources by too many reservations. Response that Yes.
- The first 2 messages can be done over pre-auth channels, as they are data frames. Second 2 messages are not data frames.
- Slide 10, next-payload field: does it show continuation. Response just like IKE.
- Main proposal is to make them data frames. In some situations, this frame could become large, and hence, fragmented. Response that this would limit number of PMKIDs.
- Why do we want PTK lifetime, as either STA or AP can initiate a new handshake. Response, that resource exhaustion defense from AP. PTK timer is just to ensure the STA shows-up before this timer expires.
- On channel binding issue, AAA server is shown to wireless system, as opposed to showing wireless information to AAA server. Example, STA may not have any clue about NAS-ID, and STA should be able to send SSID and that verified with AAA server.
- This is "Auth before Associate", and how can this be media independent. Response that this is intended to be media independent, and can be encapsulated over Ethernet. 802.16 can use the same key exchange.
- If STA decides to roam, then what happens when STA roams to new AP. Response that PMKs states at APs as in .11i. Now, we establish PTK state at new AP. When STA decides to roam, re-associate request with PEKM messages 3 and 4 is sent to new AP.
- Agrees with most stuff, and bothered by channel binding. Key binding should be based on authenticated identities, and should be orthogonal to the money part in channel binding. Response that NAS-ID should be sent same in both directions. Suggested that a hash.

STRAW POLL: Straw Poll on presentation 4: 11-04-1186-00-000r-pekm.ppt: Bernard Aboba: The TG requests the presenter to provide further details of the proposal at the next step.
Result: Yes - 58; No - 0;

- Group stand-down for 15 minutes.
- Presentation #5: 11-04-1181-00-000r-proposal-fast-inter-bbs-transitions.ppt: Xiaoning He
  - Not described clearly if AP requires backend communication with Policy Server. Response that this is showing packet delivery sequence.
  - Also, the setup is also part of critical data path, and data path is cutoff temporarily with current AP. Response that this is true, but this sequence is dealing with roaming packets. It is not related to payloads, and is a short 2-4 packet delivery. AP scheduler can decide how to handle this. The discussion on benefits was done.
  - The math may be correct, but insidious. 10 msec of data in codec is 16 bytes for VoIP, and you may not be able to work in networks, as VoIP packets smaller than 1000 bytes. Response that this takes care of other packets beyond VoIP, like data packets. Main point that delay changes a lot with multiple APs.
  - Currently, with existing APs, few APs can perform the handshake in turnaround time proposed in this proposal. So, some assumptions can be misleading. Response that a response time field is included to measure time taken by APs. Channel will not be held for entire duration of the poll.

- Slide 11, what about turnaround time for TSPEC, when TSPECs can or not be honored. Response that there is no processing delay in this proposal, and is orthogonal. That is because processing delays can be part of other delays. This proposal is part of a larger problem to be solved.
- Wondering if TGr needs to address polling situation. Response that this is a decision for group to make.
- In an HCF system, can we do fast roaming without using HCF? Response that yes, it can be done, and EDCA mode can be used. Request Information IE is new IE in this proposal.
- Mode can also be addressed in bits in TSPECs. Response that this proposal is just for short package exchanges. When roaming between 2 modes, bits in TSPECs will also be needed. Response, yes.
- Slide 4: Clarification that there are 10 frames that STA must exchange. Response that current STA can select a backoff number (say, 10).
- Slide 5: Optimistic to think AP can receive a request frame, and what about latency in APs processing. Response that there will be processing delays, and will be taken care in scheduling by the AP.
- How does AP enforce that packets sending are used for handoffs? Why cannot STA send all packets at high priority. Response that this is how TGe is designed. However, TGe can authorize STA for some traffic to be high priority. Response that if DoS is a concern, then there are other ways to do so.
- Is this subject to admission control? Response that response given in last question.

STRAW POLL: Straw Poll on presentation 5: 11-04-1181-00-000r-proposal-fast-inter-bbs-transitions.ppt: Xiaoning He: The TG requests the presenter to provide further details of the proposal at the next step.
Result: Yes - 31; No - 12;

- Recess until 10:30am.

Tuesday November 16, 2004

10:30am – 12:30pm

- Call to order; Online attendance reminder.
- Presentation #6: 11-04-1184-00-000r-ap-scanning.ppt: Fujio Watanabe
  - If STA gets an ACK, and goes off-channel, then probe response may not gets its ACK back, and be re-transmitted. Response that it is appropriate for finding an AP, but ACK scheme needs to inform AP to not keep re-transmitting.
  - You can see 20 msec or higher time that this scheme may take. Response that this is valid.
  - You know deterministically when AP is not there, and when you get a response. In highly loaded situation, you may get delays in the response. Response that this needs more thought.
  - 802.11i currently allows unicast probes. There was a discussion on this. It was discussed in TGm, as well. Any probes can be sent, but not called scanning. You can send it to the broadcast address with an individual BSSID, as mentioned by someone.
  - Is scanning out of scope for TGr? Can we specific what information is needed from TGk? These were general comments.

- TGk came up with a deterministic scan. If there was a loading problem on a channel, it was marked as dead. You can do scan often if it does not take a lot of time.
- Do we need to invite more interpretations of scanning in 802.11 ☺. Mentioned by someone.
- Active scanning is OK in 2.4 GHz band, but illegal in some other bands. Response that this will be used only in this band.
- Concern on how one gets more information from TGk, as indicated by people. We can get information from TGk mechanisms, beyond scans. So, TGk can give a lot of information, but may not be up-to-date and may be delayed.

STRAW POLL: Straw Poll on presentation 6: 11-04-1184-00-000r-ap-scanning.ppt: Fujio Watanabe: The TG requests the presenter to provide further details of the proposal at the next step.
Result: Yes - 49; No - 5;

- Group stand down for 20 minutes
- Online attendance reminder
- Presentation #7: 11-04-1170-00-000r-just-in-time-2-phase-association-fast-bss-transition-proposal.ppt: Nancy Cam-Winget
  - This outline has a property that a new exchange with next AP. How these exchanges interleave with voice calls? When we make final decision, final mechanism has to show this interleaving with existing VoIP calls. What happens when we miss a response? Looks like some exchanges will have a measure of time. Response that it is a good observation. Clarified that reservation is over-the-DS, and so, interleaving may be addressed. The only off channel case is query.
  - Why do we need query? Response that it is under consideration.
  - One or more Policy Servers on the subnet? Response that it depends on implementations.
  - Discuss 3 levels in details. From STA perspective, dueling scenarios on whether to make reservations. Asking for a case for reservations? Response that not dictate particular policy on everyone. Networks may need, or never need a reservation.
  - What we don't hear from proposals that what happens to data piled up on old AP? Response that data flow may not be disrupted. It is in-scope, but it may be dropped. First proposal addressed this scenario.
  - Is LPS local in the neighborhood? Whether reservations require latency in backend? Response that minimize DoS attack. Can something be done to minimize this latency? Response that it is indeterministic, and network dependent.
  - If STA allocates all resources at APs, that is a DoS attack. Backend is out of scope of TGr. Is proposal backend a recommendation only, or something beyond that? Will they be in TGr? Response that they are just recommendations, and currently, not intended to be as part of TGr. The properties are required, and how you get them is out of scope.
  - When do you initiate this process? Response that this is done by STA, just like in any proposal.
  - Someone likes the Query response mechanism, but it is concurrent with current channel. Now, STA decides to do something with new AP, then when will decision point happen? Response that STA has way of monitoring voice quality, and may happen when STA determines. These are implementation issues. Questioner disagreed with this response. An important property in 802.11 is nothing is absolutely guaranteed.

- Comment on reservations not being free, cost of IT, policy, and for every network condition.

STRAW POLL: Straw Poll on presentation 7: 11-04-1170-00-000r-just-in-time-2-phase-association-fast-bss-transition-proposal.ppt: Nancy Cam-Winget: The TG requests the presenter to provide further details of the proposal at the next step.
Result: Yes - 76; No - 0;

- Recess until 1:30pm.

Tuesday November 16, 2004

1:30am – 3:30pm

- Call to order
- Presentation #8: 11-04-1183-00-000r-tap-proposal.ppt: Paul Funk
  - When you switch to another AP to send this message, do you need to know which channel this new AP is on? Response that yes. STA will normally look for new APs.
  - During Discovery phase, you find a number of APs, and when you get on-channel and older AP is gone, then what do you do? What if you have to find a next AP in a hurry? Response that if we have to address AP discovery, and specify what in 802.11k can be used.
  - Useful if we can quantify how this key hierarchy is better than what exists today? Response that we have 4 packets before association in normal 802.11, and in this proposal, there are 2 roundtrips/1 roundtrip prior to association.
  - One advantage of this proposal is saving trips to backend server.
  - How is it different from PMK caching? Response that caching is akin to going back to the previous AP.
  - Do all APs belong to the same NAS? Response is yes. There could be 1 or more RADIUS clients in the key circle. AAA server now cannot tell the clients apart, as they are impersonating each other. Response that there is no flooding and no impersonations. AAA server can differentiate between where the client is coming from.
  - Derived PMK is being shared. So, what if someone gets this Derived PMK.
  - A number of questions on how to delete the reservations, or remove state from old AP? Response that this may be done in proprietary ways, or some other ways of maintaining state. A cap on how many reservations limit this state changes. In principle, you can make other resources reservations, and there is a timer on each reservation.

STRAW POLL: Straw Poll on presentation 8: 11-04-1183-00-000r-tap-proposal.ppt: Paul Funk: The TG requests the presenter to provide further details of the proposal at the next step.
Result: Yes - 54; No - 0;

- Original threshold was 25% in down selection process. Every proposal got over this percentage.
- On to Step 2 of Down Selection process. All documents on the server will follow new templates, which are not available, yet.
- All preliminary text must be on the server by Dec 17th, 2004.
- Defining what is “preliminary draft text”? Anyone awake?
  - Should be more than a pager, or couple of pagers

  - If people do so, then those proposals will be penalized in Step 3 of the down selection process.
  - Make no changes, and let is be what it is. So, if people don't have enough text, then they may not be considered for next round.
  - Suggestion to make the draft text, as a stand alone text, and minimize references to original drafts.
- Is it still possible for proposals to combine, and that is encouraged?
  - Yes, and is encouraged.
- Is it possible to use the 50% voting rule and be used to circumvent the 75% rule
  - Suggestion to hold all votes at the end, or hold the results at the end
  - Holding results may not help very much
  - A motion may be proposed Thursday
- Review agenda and modifications
  - A number of presentations scheduled
  - Break session for TGn vote on Thursday at 2:15pm.
  - Agenda accepted as modified for 2 presentations. No objections.
  - Any objections to recessing until Thursday 10:30am. No objections.
- Recessed until Thursday 10:30am.

Thursday November 18, 2004

10:30am – 12:30pm

- Call to order
- Review agenda. Discussion on TGn vote at 2:15pm, and break for people to walk over to Convention Center, and vote. TGr may be working in the 3rd session today.
- Agenda accepted, with no objections.
- Online attendance reminder.
- Presentation: 11-04-1498-00-000r-ieee-802-11-keying-requirements.doc: Jesse Walker
  - Concern that all current EAP methods to not meet these requirements. Where does this document fit in time? Most current methods are meeting existing IETF EAP method requirements. Russ Housley asked for 802.11 input into the EAP keying requirements, currently underway in IETF. This document is attempt as a first cut of the requirements from 802.11, into the EAP keying requirements.
  - Clarification that all text in this document was written by the authors, and not taken out from any existing IETF RFCs or drafts.
  - Editorial comments that bullets 3 and 4 should be clarified in section 3.2. Bullet 5 also talked about the NAS, just like bullet 3, and needs editing.
  - Comment 9 may be asked to be included into the EAP method requirements in IETF.
  - Do these requirements apply to the derived keys? Response that these are only pertinent to initial session keys, and not to how 802.11i or .11r may derive these keys. The binding is actually constructing a contract on the correct use of the key. These requirements ensure that bad guy also has to follow the rules!
  - Bullet 12 needs to be clarified in defining "all parties".
  - Comment that there is some conflict from US Govt. to not re-use keys. Comment that in NIST SP-56 (ongoing), there is suggestion that all keying inputs be not re-used. However, TLS session resumption is possible using prior key inputs. This ambiguity needs to be resolved by NIST.

- In IEEE 802.11r, cached keys may be used by bad guys, and this is done to buy performance in .11r. So, compromised devices and key caching duration are some factors that are not clarified in .11i.
- EAP keying requirements specify mechanisms to name EAP peer/server and keys.
- No distinction between keying and re-keying. Re-keying will push the old key out. "Freshness" is tied to the current session, and so, for long lived sessions, policy may enforce re-keying.
- Question on the motive of this document, besides being educative. Response that the keying issues are spilling over into IETF CAPWAP, and so, a goal is to make these part of .11r proposals. Different AP architectures tend to share keys in different ways, and some of which violate good usage. This document is official input into IETF. More work may be required by IETF to fill-in few functions that are missing

- Document: 11-04-0160-07-000r-ieee-802-11-eap-requirements.doc: Dorothy Stanley
  - Review edits, changes, and comments in this document.
  - Substantive change in requirement 4. Other comments are normative.
  - Can changes be made to documents in RFC editor queue? This can be done with an IETF process, including permission from IETF Area Chair.

MOTION: Move to request Stuart J. Kerry, Chair of IEEE 802.11 to send the letter in 04/0160r7 to Herald Alvestrand, IETF Chair, with a copy to the IESG, requesting publication of the "EAP Method Requirements for Wireless LANs", as an IETF Informational RFC, including the one sentence change indicated in r7.

By: Dorothy Stanley
Second: Jesse Walker
Discussion: An amendment to add last sentence.
- None.

Result:
Yes – 46; No – 0; Abstain – 7. Motion Passes.

- Document: 11-04-1387-00-000r-network-beacon-announcement-scanning-method.ppt:Dirk Kuijsten
  - Refer to document 11-04-1380-00-000r for additional details, as a supplement to this document.
  - Clarification that STA will perform the scans and report back to the serving AP, which will send to other APs and to other STAs. This does not require NTP. Multiple scans can be done at multiple APs, but this generates more packets on the air. This is the expense of more management frames on the air, and will congestion be seen?
  - This proposal requires time distribution and time synchronization, as it becomes more important. Concern that reliance on time of the STA may be unreliable, or may not even be possible. Dependence on time requires robust, accurate, and distributed time from the wired network, and not depends on the STA time. Response that all STAs may not participate
  - TGk does not depend on STA for any measurement, and explicitly states that how those values are filled-in is out of scope of TGk. TGk focuses on deliver of measurements to the STA, and not how those measurements are filled.

- Is this active scanning, but is termed passive scanning? Clarification that this still comes within the passive scanning.
- Comment that it is extremely important that the TBTT is accurate to within 1.5 msecs. If this does not happen, then the schemes will break down. With load balancing, this becomes more critical.

- Document: 11-04-1121-02-000r-tgr-process-requirements: John Edney
  - Change the down select process to vote at the end of all proposal presentations.
  - Discussion why the motion is worded in a negative tone? Explanation that this was a positive action to ask proposals to be eliminated. Add explanatory comments to the ballot.
  - Can the ballot be politicized? Can voters be left out? Once vote is done, then all votes will be tabulated. There may be an ExCom ruling on how voting is done.
  - Single vote will be done on paper. There will be multiple options on the same voting ballot. A rule for roll-call is at the discretion of the Chair.

MOTION: Modify Step 2 of process outlined in doc 11-04-1121-02 as follows:

- Proposal sponsors announce intention to continue or withdraw 30 days prior to January meeting
- Order of presentations of proposals drawn randomly by the TGr chair.
- Yes/No/Abstain Voting Member written ballot on proposals after all proposals have been presented
- The motion shall be "The TG will eliminate this proposal from further consideration."
- Results of votes are not announced until after all votes are recorded.
- For each proposal, if the motion passes by a simple majority the proposal is eliminated

By: John Edney
Second: Mike Moreton
Discussion:

- Voting will be simple majority of 50%
- MOTION: Motion on calling the question by Mike Moreton, and seconded by Jesse Walker

Result:

Yes – 47; No – 1; Abstain – 3. Motion Passes.

- Recessed until Thursday 1:30pm.

Thursday November 18, 2004

1:30pm – 3:30pm

- Call to order; Online attendance reminder
- Document: 11-04-1460-00-000r-proactive-pre-allocation: Mike Moreton
  - Slide 4: Are these considered realistic numbers for a realistic network case? Any data which may be useful will help in developing a queuing model. Any estimate of rate of arrival of voice calls, and allocation times? Most people with voice calls may be relatively stationary. No estimate of the time required for pre-allocation of resources.
  - You can use Pareto distribution or others based on patterns.

  - Comment that this can be done without establishing contact with new AP. This can be done over DS.
- Recess until 4:00pm for TGn vote.

Thursday November 18, 2004

4:00am – 6:00pm

- Call to order; Online attendance reminder
- Updated document 11-04-1039-04-000r to reflect changes
  - One hour for every presentation
  - Next deadline Dec 18, 2004, midnight EST (NOTE the change to EST)
  - Use new formats for document.
  - Presentations, along with Preliminary draft, are also due Dec 18th, 2004
  - No revisions have been allowed for any text on file server, after Dec 18th, 2004
  - Merges allowed and encouraged
- Document: 11-04-0202-00-000i-4-way-handshake-analysis.ppt: Mike Moreton
  - What is "2 armies" problem? Is it Byzantine General problem, or 2 armies trying to make peace? Jesse's knows it.
  - The handshake race conditions can be solved in other different ways, besides recommended in this presentation
  - What's the role of TGr in fixing TGi problems? Response that this is meant to have people think about other design issues, besides security and QoS.
- Is there any objection in empowering the Chair to handle merges after the Dec 17th timeline has passed, and how and when they can update their proposals on the file server? Seeing no objections, this was accepted by the group.
- How to deal with proposals that do not merge, but handle one aspect of the solution. And, then accept someone else's ideas, as their own. Response that this may not happen as easily.
- Do we down-select unless only one proposal is left? Response that No. On the contrary, there may be too many proposals left at the end of the down selection process.
- We still may not have enough time in Monterey to give all proposals 2 hours. So, with new study groups, less time is left for TGr. TGr may not get 18 hours or more.
- Meeting is adjourned.

IEEE P802.11
Wireless LANs

Minutes for the Task Group T November 2004 Session

Date:

November 15 - 18, 2004

Authors:

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Monday, November 15, 2004, 7:30 PM

The meeting started by appointing Areg Alimian to do the work of secretary for San Antonio November TGT meetings.

Tom Alexander is appointed as editor of task group T by unanimous consent.

Chair presents "Welcome to TGT Evaluation of 802.11 Wireless Performance".

After agreeing on agenda the presentations should start tomorrow morning. If there is a motion that there is a large presentation associated with it, they need to be present on the server for 4 hours before the presentation.

This means that the latest that the presentations can appear on the document server is 11:30 on Thursday.

Agenda from document 04/1389 is accepted by unanimous consent.
The minutes from the Berlin 802.11 meeting (11-04/1166r0) are accepted by unanimous consent.

Chair asked the Task group for any additional presentations not listed on the agenda.

"A proposed controlled Open Air Test Methodology" – By Mark Kobayashi. Presentation expected to take around 45 minutes.

Comment by Fahd P. – Paul Canaan will not attend this meeting and I have to sync up with the Intel folks before I present. The presentation we were planning to give originally will be changed to a different one. The presentation will address the second usage scenario for streaming multimedia applications.

Chair: Tom Alexander, you have 3 presentations listed. One where you were going to present the template for TGT presentation. Has that changed? Tom: No, the presentation will still have the same document and revision number.

Fahd P.: We actually deleted the Streaming Media presentation, but I'm also going to present another presentation 04/1222r1 "Measurement Methodology Proposal based on Approved Framework".

Tom: Is r1 of document 04/1222 on the server yet. Fahd P.d: No. The presentation is expected 45 minutes to one hour.

Fanny Mlinarsky: Expecting the presentation on Rate Vs Range to last 20 minutes.

Chair: What order do you want to present. Michael Foeglle - 11/04/1402r0 – "Standardizable Measurements of 802.11 PHY Layer Performance" expected to last 45 minutes to one hour.

Chair: You'd sent me an E-mail requesting to present on Wednesday at 9am. Which presentation is that: Answer: The first one on the agenda.

Chair coordinates with Tom Alexander for him to present all of his 3 presentations on Tuesday morning.

Tom: Don't you need to have the presentation on the server for 4 hours before presenting it. Chair: No, this is only necessary if there's a presentation and motion(s) associated with them. A good practice I've seen in other task groups is to make a presentation and inform people during it that the presenter intends to have a vote on it subsequently.

Chair: Does anyone know if they have motions associated with their presentations. No definitive response from the audience.

Michael Foegelle agrees to present before Fanny Mlinarsky.

Chair: I have an irreconcilable schedule conflict tomorrow morning. We can either call recess or have the group meet in ad-hoc mode tomorrow from 10:30-11:30.

Chair: I think we've worked out a schedule for ourselves which allows a certain amount of flexibility. We have to accept the agenda.

Tom: Q: What's the plan for Thursday, 6 hours of motions?

Chair answer: no, want to allow for additional presentations in new business, as well as potential conflict with TGn.

Chair: Ask for a motion to accept changes to the agenda. Moved by Tom Alexander. By unanimous consent, we accept the modified agenda.

Chair proceeds to presenting the timing schedule for the week for TGT meetings. (Slide 7 of 1389r0).

Chair presents slides 8 and 9 on Timeline going forward and Progress since Berlin meeting.

Chair discusses slides 11 and 12 on how IEEE 802.11 standards development process and how to Write a draft and make a corresponding presentation.

Q. Fanny M: If there is a written Word document, how's the editing done before a vote is made. A: If the group needs to collaborate and have input on the draft, then this can be done separately and submitted as a document with incremented revision number. The 4 hour submission to the server applies.

Tom: Both of the draft changes described on slide 12 apply to letter ballot. Once the draft goes into a letter ballot, proposed changes to the draft have to pertain to already existing letter ballot comments.

Slide 14 shows a block diagram on 802.11 process on draft approval.

Q: Where are the drafts for different task groups stored on 802wirelessworld website. Chair: I thought they were available on the 802wireless world for non-voting members attending IEEE meeting. I will take an action item to find out.

Next presentation: Doc 04/863r2 – Presentation templates.

Chair: With regard to references, why would it be a problem to refer to specific references that are germane to that test? Tom: If you have an RFC reference, you can put the reference inline in the text.

Chair: As long as you can refer to a reference within the template, the references can be listed separately.

Fanny: We have a template for submission that's not directly linked to the structure of the documents.

Tom: What I've typically done when appointed as an editor, I've called for editorial coordination within IEEE. As part of that, we'll solicit feedback on the template.

Fanny: For all practical purposes, it's acceptable to have changes to the template when it makes sense. Mark: It's fine to a point in the process before we're too close to the letter ballot.

Chair: The sense I get that we should at this time follow the template in document 04/863r2. The template has to be up in the air and unsettled if we're going to go with this approach. A given proposal will be evaluated based on conformance to this template. Tom: I was hoping we can mandate this requirement after this template gets some mileage.

Mark: Maybe the way to go about it is to straw poll whether people want to use this template going forward. Given that we have a starting template, and after we can work the kinks out, we will have something cooked by the next task group meeting.

Chair: Do we want to go over the template now or shall we work on it in the privacy of our desks. Tom: I'm more interested in the back part of the template. I've tried using this already and have found it to be wanting. What I did was to take my internet draft and to port it into this template. Starting from section X.5, things were not too clear.

Michael F: It does not make sense to describe the DUT for each test, but to create a summary list of test equipment and for each sub test reference the specific device in the list.

Mark: It may be desirable that a particular test was being run for a particular test metric. If you've written out a test procedure, now you've actually run the test procedure and shown the test results. Section X.5 intent was to report what the actual test setup for a given test was.

Chair: Is what you're suggesting to describe how the test was run as part of the test. Now we're digressing from the test template.

Mark: This can be more of a backup information to substantiate the test.

Tom: I think what Mark is saying is when the presenter makes a presentation on a given metric, they should have gone into their lab and come up with a validation for their test by actual data.

Mark: It's important, as part of X.5 section, to list out the exact description of the test and list of the specific test equipment.

Mark: There are going to be situations where we're not going to be able to test a given technology.

Fanny: I think it's important to mandate that each test have repeatability.

Charles: If we're coming out with new standards all the time and TGT has productive life to create new test methods.

Areg: As the Study group has agreed not to list test equipment in the normative standard, how do you correlate this to you suggestion of listing specific test equipment in section X.5 of the test proposal document.

Mark: Right, not in the normative document, but in the test results section of a test proposal people present.

We must consider future technology and how far we go out to test such technologies.

Tom: If for example we don't come up with something for 802.11n, if we need a test bus to allow for basic testability of their standard, it's better to work on the upcoming technology testing ahead of time to resolve such issues before it's too late.

Comment: Part of proposal backup is an actual live example of the test that the presenter has done showing how the test technology works.

Comment: We need to start to come to an agreement as to what constitutes a proposal.

Chair: What kind of test are we going to accept? Test on Performance metrics? If there is a conformance proposal, do we rule it out? The consensus seems to be that the Task Group should focus on performance characteristics.

Chair: Recessing for the day, to meet tomorrow morning with Tom Alexander's presentations.

Michael Foegelle's presentation 04/1402 has been uploaded to the document server.

Tuesday, November 16, 2004

Chair started the meeting by introducing the revised agenda as agreed in yesterday's meeting. Without further due, chair hands the floor over to Tom Alexander to commence his presentation 04/1203r1 – "Proposed Template for TGT draft".

Fanny: Since this is a recommended practice, do we still use words like "should".

Tom: Yes.

Chair: It is understood that TGT will be a recommended practice, so the test would be commended with "should", and if the test is used, then the user is required to do it in a certain way by "shall".

Every single definition we're going to define in our standard, they are going to be dropped wholesale into the IEEE standards definitions.

Fanny: Does the group agree that each one of the clauses will be followed by sub-clauses? Tom: If we have 5 or 6 tests, then this will work, but if we have 50 tests, then having 50 main clauses would be overwhelming.

Chair: He did say he's taking editorial license after clause 4.

Fanny: Test conditions and reporting are specific to each test and should be sub clauses. It might make sense to divide the test by categories such as link layer tests, PHY tests, etc, which would be major clauses.

Chair: For every dotted paragraph heading, does there need to be a TOC heading. We want to make sure we have test names in the TOC so people know where to turn. For instance we could have clause 8, 8.0, Introductory statements about MAC layer measurements, etc, and each test could be written with a test template format.

Tom: Most of the publications in the IEEE standards are in PDF format, and the TOC is hyperlinked. If you can generate the table of contents automatically in Word for example, they I would say go for it. Tom: Typically the IEEE SA converts the final standard to Framemaker, so this would not work.

Fanny: If we categorize the tests by categories like Link Layer, PHY, etc and each one has several tests as subclauses, this could get too confusing.

Chair: We can have actual tests listed in clause 9.

Fanny: How many tests does this committee expect to be the result of the spec. Tom: I think 50 is a nominal realistic number.

Chair: Unfortunately we've chosen the same word to describe two different things – template. Without causing confusion, we can call this draft as a boiler-plate.

Craig: Is the plan to make once of these(templates) for every standard. Chair: My personal feeling is that no. We're not actually going through PICS. Like take roaming for example, where would you put roaming tests in difference to PHY layer tests. Roaming might spread over clauses 8,9 and 10.

Tom: I haven't yet seen a performance standard that actually referred to explicit pieces of the corresponding functional spec.

Chair: How do we know we've done enough? We get work done until the time the PAR runs out, and whatever draft we have becomes the standard.

Tom: Should I put a motion in to recommend this template as the starting point for TGT draft?

Straw poll: Is the group in favor of accepting document 11-04/1203r1 as the starting point for TGT draft, provided clauses 5,6,7,8 are deleted?

- **Yes - 16**
- **No - 0**

Q: What are going to do with the results of the straw poll? A: This is just a guidance point for Tom to bring a motion on Thursday to take this draft as a starting point for TGT draft.

Comment: I think having clauses 5,6,7,8 are important clauses to provide organization to test metrics.

Chair: We take a straw poll to the draft as is, if people don't like it you can modify it and put it on the server before Thursday.

Comment: I'm concerned that people look at documents as gospel, so if we don't intent to put those clauses in, it's not worth putting this in.

Comment: I would agree with this idea of removing the clauses since we've not settled on the organization.

Mark: Is there going to be revision of this document without those clauses. Yes, it will be uploaded to the server and be announced on the reflector.

Tom proceeds to presentation of "A Taxonomy of Metrics". 04/1419r1.

The idea here is that we can map each one of these bins to a clause or a group of clauses. This is just organizational and are not descriptions of actual metrics.

Fanny: It may be confusing if we start mixing layers – classification by layers and classification by type of DUT. Maybe if we have to classify, a better way to classify is what are you testing, what's the DUT, Client, AP, or systems of Access Points or Switches. I would speak in favor of bullet point 4 on your slide to classify metrics by device categories.

Chair: I think that has a lot of merit simply because there can be no argument as to what the DUT is in any given test. I'm not sure if all the metrics we're going to be covering will be so easily parsed out to a given layer.

Tom concludes the presentation by commenting that this was intended to have the group to think about how the test plan is structured.

Fanny: I may be able to put a proposal together as part of new business.

Chair: I'm going to have to call recess to about 5 minutes to 10 until 11am due to another commitment I have. The group is welcome to convene at 10:30 in ad-hoc mode.

Tom proceeds to presenting 04/1420r0 "Layer 2 Metrics Proposal". Note: There is a wrong document number in the header of document 1420/r0.

There is a corresponding presentation on the server as document 04/1226.

Tom: Comment: This document needs to be revised in light of IBSS testing.

Fanny: Roaming is a pretty complicated subject where there is a lot of interaction between a client and an AP and we're working with the TGr task group to define the test methodology. Hence I believe roaming should be in a test category of its own.

Comment: There is a requirement to measure radio kill. It is user initiated and can be software kill or hardware kill.

Tom: One test that's not here but can be a probe response test. How soon does the AP respond to a probe request.

Tom concludes the presentation.

Comment: I'm assuming this could be a clause in the draft document.

Tom: Most of this stuff here would not be applicable to PHY layer tests.

Chair: The editor has a certain amount of leeway to move the text on tests. This document started off as an IETF internet draft and was submitted to the IETF Benchmarking working group. There were some questions that came up from this draft by IEEE-IETF liaison related to the rate adaptation clause.

This is just a cut and paste from and E-mail I received so it will need some explanation.

Chair: The IEEE has stated that the contents of this IETF Internet draft are within the scope of TGT, hence I'm assuming IETF will not proceed with discussions related to this draft.

Fanny: I want to thank you for putting all this together and doing all this work. I think we should definitely use the material in this draft, but I think there's already too many standards out there and this work clearly belongs here in TGT.

Q: Do you have definitions of terminology such as roaming time? More specifically wireless terminology. Tom: Scott Bradner and I talked this over at great length and concluded that most of the terminology has been defined elsewhere, so we just used the definitions in other IETF documents.

Chair: I would advise that we break at this time…

Tom: What should I do with this presentation/work?

Chair: Do you want to have an ad-hoc and people can discuss your presentation and come up with a joint proposal? I think there is obviously value in this proposal. You can work on this document further to fit this into the TGT template. Is this a proposal with motions coming out of it? Unless you can incorporate other people into commenting and working on this, it won't go anywhere.

Fahd P.: You being an editor and I'm not clear that how this ties back to you being able to work on this. I'm wondering how your being an editor will hinder you from bringing proposals with impact on technical content.

Tom: Usually in a role of editor I've refrained from making frequent technical presentations, unless there is something of value that I have to present and I will work with other task group members to have it presented.

Chair: I think so long as the process is followed, I don't think there's anything wrong in you making technical comments and contributions. This is more of an issue with your time and the time you can spend on this going forward.

Tom: You can volunteer to form an ad-hoc and ad-hoc group can instruct me to make changes and I can do the editing work.

Chair: Is there interest from the group to form an ad-hoc to contribute to Tom's document?

Tom: Should they send their names to you? Ad-hocs are pretty informal and can be done offline.

The group recesses at this point to continue with presentations as listed on the agenda after the break.

The group re-convenes to have a discussion on the test template. (doc 04/863r2)

Fanny: One of the ideas to proceed is to have a baseline on a given test and have variations thereof.

The group collaborates to do online editing of the document 04/863r2. Following is the outcome of the edits:

1. Test Setup
    a. Baseline and Variations of Baseline.
2. Specifically differentiate between devices under test (configuration parameters) and setup of test equipment and environment(test conditions).
3. Leave the references section in the template, but make a note that the action draft standard will collect all the references in Clause 3 and the "references: section will be omitted when creating the test clause/sub clause.
4. Section 5 should be called "Reporting Requirements". We should have a common clause up front that list all the reporting requirement and each test clause/subclause will then have a subclause that is titled "Specific Reporting Requirements".
5. The common clause on reporting requirement will also state that any special modification performed to the DUT in order to carry out the test (beyond what is described in the test procedure) will be reported along with the test results.
6. Condense the first three subclauses (Introduction, Purpose, Discussion) into "Introduction and Purpose" with appropriate disclaimers. See modified template.

The group has determined that another ½ hour would be required to collaborate on editing the template. The chair and editor agree to have the editor coordinate the ad-hoc group to continue editing the test template document. The group agrees to do this work lunch time on Thursday in ad-hoc fashion.

Presentation by Michel Foegelle: Traceable Measurements of 802.11 PHY Layer Performance", Doc 04/1402r0.

Q: It's really difficult to measure the Gt and Gr of some devices, for example laptops. I hope you're going to cover how to do this in your presentation (re: slide 7).

Comment: There's some spectrum analyzer equipment that has a front end bandwidth of wider than 3 Mhz (re: slide 20).

Comment: Slide 18 of the presentation should have an attenuator between the Traffic Generator and Directional Coupler to provide better isolation.

Tom: In the case of bi-directional traffic, you can get a packet and then an ack following it, and there could be a 30 dbm difference between the two.

Comment: What you're talking about here that a general problem you're going to have here when the DUT works with the driver is to isolate the driver effect and have more firmware control. We need to have a mode where we can turn the driver off and have the firmware transmit packets continuously for power measurement purposes. The driver can make a decision to transmit at different power levels.

Comment: There are a lot of software drivers that will do transmit power control. Your comment about having a standardized API which will allow the driver being factored into the measurements.

Chair: Let's address the test API issue a bit. We're chartered to create a recommended practice. We cannot instruct the 802.11 to have an API amendment to the MAC. There are also regulatory issues where a device being put in a special continuous transmit mode and allow for people to use the driver to switch the device mode.

Comment: As a manufacturer I'm required to provide regulatory code for an FCC test to allow transmitting at all power levels.

Chair: This is not something I know a lot about, but if people have a lot of background in this, we can talk about this further. So long as there is a provision which would enable the device to be switched to that special mode, I believe that capability would be helpful.

Comment: This is looking at very specific cases of isolated measurements, where I think the various usage cases of higher layer applications tests play a significant role in impacting the test results.

Fahd P.: You're minimizing the variability by having isolated environment, however I think it's valuable to have these benchmarks and tests done in various environments. You had a slide on a receiver about one specific receiver, but how do you correlate the real life off the shelf device testing.

Q: What did you have in mind for the Traffic Generator? A signal Generator or an AP?

Fahd P.: Can we have a follow up discussion on Michael's presentation tomorrow morning?

Joe K. I have a presentation that I can present this Thursday morning at 10:30am.

Ted: I also have a presentation on Wednesday morning. The group agrees to continue discussion on Michael's presentation and have Ted's presentation at 9pm, which will be followed by Fahd P.'s presentation.

Wednesday, November 17, 2004

Tom Alexander takes over as TGT secretary as Areg Alimian must leave for another engagement.

Charles opened the session at 8.00 AM Wednesday morning. He reviewed the agenda. He noted that item #5 had been moved to new business, so there was an hour before the first presentation in which to discuss matters from Tuesday. He then turned the floor over to Mike Foegelle to continue discussions on doc 1402/r0.

Mike resumed the discussion from Tuesday. He started with a small SW application that showed propagation in an environment over ground. He discussed how the interference pattern would produce peaks and nulls in the pattern, and noted that there was no need to measure the real-world performance in this scenario, it could be easily predicted.

Charles: Are you giving a justification for the conducted measurement? Answer: Yes. Also, you are trying to get the comparative measurement between devices.

Question from Tom: What was the question to which you are providing the answer today? Response: The issue was how we combine the information from the propagation prediction and the measurements.

Fahd: Yesterday we talked about rate transitions, and you don't get to define the rate transitions. How do you handle that? Answer: The problem is that the transition decision occurs on the sender. You would need to come up with some way to test the sender. The question is, how many NAKs would it take to determine that.

Charles: There is a presentation coming on Thursday that talks about rate management. to get at what Michael's talking about, his test is designed for a single rate, the follow-on is to do something like Mike Wilhoyte's presentation.

Comment: The paradigm of rate selection at the TX is not always true, in TGn we're looking at feedback from the receiver to the transmitter. I'm not sure how that factors into this. Charles: there's been a lot of discussion about how we can test TGn, there's some

fear that it may be untestable. We have not claimed that we will address TGn in our PAR, but I hate to just leave it there. TGn offers some completely new challenges to testing.

Comment: It would be helpful if you could get involved in TGn.

Mike continued, and noted that this was supposed to be a question and answer sort of thing. There's still some R&D that needs to be done. Primarily, what he was looking to be done were independent and traceable tests for the DUT. Discussion on desensing. Mike noted that the point of OTA testing was to get this desense effect into the picture. Discussion on extending the tests performed at this level to that of an actual network. Mike noted that it all came down to link budget.

Charles: Some of the uses of TGT per the PAR won't require such stringent measurements; others will. That's why it's a good idea to think about such stringent measurements. The next speaker will address the question of looking at such link budgets and so on.

Question from Tom: I'm interested in knowing if you and Fahd have resolved the philosophy difference in terms of top-level performance measurement vs. low-level performance measurement? Answer: I don't object to the test methodology, it's great, but I need to see how these physical layer measurements are correlated to the application level effects seen by the user.

Question: So you are suggesting that we include such correlation as a work item? Answer: Yes, and I'll present on this.

With that, Michael closed his presentation. Charles turned it over to Ted Rappaport for his presentation.

Ted presented document #1473/r0. He acknowledged his coworkers, and noted that Chen Na was looking for a job. Ted started by explaining that we needed rapid and repeatable measurements directed at the end-user experience. We should look at different platforms, and applications. He would cover such a set in his presentation. He noted that an example of solving real-world problems was typified by Schlotzky's Deli, who came to them when they were rolling out WLAN in their restaurants.

He noted that companies shipping WLAN all over the country were looking to reduce their support costs. He also noted that the fundamentals of wireless mean that you have to include the environment, because the walls and ceilings do really matter.

Craig: Can you define what you mean by user profiles? Answer: I'm thinking of streaming video, downloading, etc. If we can as a group determine different user profiles, that will allow us a means of comparing delay, jitter, etc.

The notion of using site-specific throughput prediction was new to the wireless industry. A lot of Fortune 500 enterprises are starting to use site-specific modeling. Ted showed a

contour of coverage that dictated coverage. He then talked about covering throughput using this approach as well, and showed some of the existing work in his presentation (slide 7).

Question: How accurate are these models? Answer: In a large building scenario you can get an accuracy of 3 dB. Now 3 dB may sound terrible, but you can get much more variability in the devices.

Question: Does this prediction include the effects of multipath? ans: this is based on straight line ray tracing. In closed environments you don't have to include the multipath.

Question from Niels: As a remark - today, inside an enterprise environment, cubicle walls can have metal foil inside, there are a substantial amount of scenarios where the link is just built up using reflections. Answer: You can still get very accurate predictions.

Question from Michael Foegelle: The first equation on slide 8 is just the Friis transmission equation in dB.

Ted went on to discuss the various issues of site-specific modeling, and talked about whether we can abstract all of the requirements into a model. The question was, how variable was the real world in comparison to the modeling technique. He then discussed the test and measurement approach, and the tools used in the process of the actual measurements in Schlotzky's Deli. He noted that the attenuation factors were only relevant for the largest attenuators, the smaller ones could be neglected. He also talked about how these attenuation factors were arrived at.

Question: It looks like 1/10 dB accuracy is a bit much. Answer: Yes, yes, I have to talk to my grad students about significant figures.

Craig pointed out that you can get 3 dB or more variability in RSSI measurements, so what is going to be good enough is probably not a lot of accuracy.

Ted showed a comparison between two restaurants and noted that there was not a lot of difference between the material properties. He also showed the points where measurements were taken at the two sites. He discussed the issue of hidden nodes being predicted by site-specific knowledge. He then went on to discuss two different throughput to SNR models, and the parameters for both. He also showed the throughput curves vs SNR for various situations, and noted that there was very good correlation between the various models and curves.

Question: Did you have one of these that was modeling VoIP - is that was the modeling was trying to achieve? Answer: These are the specific applications we used in this modeling.

Ted also noted the differences between various NIC card vendors, which he said was quite large (10 - 20% variations in throughput). He also talked about the critical SNR (the

point at which the throughput saturated with a given application). With all this data, the question was: could these be integrated into a blind deployment? Ted then showed how the blind deployment was done using the data, and demonstrated that the blind tests verified the predicted throughput by a close margin (10-15%).

Question from Charles: What would you recommend that we measure on a piece of HW that would enable your models? Sensitivity? Interference? Answer: That's a great question. One thing's clear - we have to tie the measurements to throughput. The difficulty of trying to get it to antennas is that the wireless world is so complex when it comes to the antenna, unlike the cellular world. We may need probes at the 1st IF.

Question: Long-term averaging on throughput? Answer: 10 second average and autocorrelation 85%. Comment: 20% variation in throughput is a big deal.

Question from Niels: How you performed your measurements - did you put it on a turntable? Answer: We did N/S/E/W

Question from Vic: Did you do any correlation on the actual user experience.

Question from Craig: Most of what you did was CCK? Answer: Yes. Would there be different issues with OFDM? Answer: I think you are going to see the same thing, but I can't tell you right now.

Question from Pratik: Do you feel there is a need to do some sort of compliance testing on the devices before hand? Answer: Yes. These govern things like Tmax, SNRc, etc.

Question from Charles: There ought to be a smaller set of measurements you can do on a device that predicts the throughput you can get on a device? Answer: Yes.

Charles thanked Ted as he rushed out of the room to the WNG meeting. He then turned the floor over to Fahd Pirzada for his presentation #1222/r1 on a measurement methodology proposal based on the approved framework.

Fahd started by talking about the proposals that had been presented already, and then briefly covered what he was going to talk about in this presentation. He would also talk about battery operated devices. Fahd noted that his presentation covered methodology that was presented in Berlin, and discussed what his presentation would drive at and what it would not. He noted that everything builds on top of the user scenario. He then noted that Case scenario #1B would be merged with #1A, and that he would discuss how Chariot throughput in a controlled environment was measured in this presentation.

Fahd covered user scenario #1A (file transfer + indoor environment) in detail, noting that the key things that mattered to users was throughput and range. He noted that doing the test with 4 orientations (N/S/E/W) was an acceptable alternative to doing the measurements with a turntable, but reducing interference was critical. He further noted that the concern was repeatability. Fahd then presented a diagram of the test setup,

followed by a table of test results. There was a high variability for the indoor runs, and a low variability for the outdoor runs. He said that case 1B could be collapsed into case 1A.

Fahd then talked about scenario #1C, and discussed the number of sub-metrics that went into this, which he said were much more numerous. After this, he discussed the vision going forward, which was to do analysis and correlation between cases #1A and #1C.

Fahd then went on to case #1D, which was an analysis of battery usage vs indoor environment. He noted that in this case the controlling factor was how the WLAN device transitioned between sleep states and wake states, and how much power was being drawn from the PCI or mini-PCI device.

Fahd covered the partitioning approach for usage case #2: case #2A covered video quality over the indoor environment, case #2B covered multiple AV streams in an indoor environment, and case #2C covered AV streams in a controlled environment. He noted that there was an issue where there might not be enough bandwidth left for data after three streams of video, which is what drives #2B.

Fahd then wrapped up his presentation with a summary. He said that he had presented use case #1, and then requested validation that the work was in the right direction for the scope of the group. He asked that the details be held as of minor consequence, but wanted support regarding the direction.

Question from Areg: In general this was excellent work that you have done, it shows the idea of usage cases and customer needs and environments. With the correlation metrics and observations with LOS and chamber testing, what kind of deviations did you observe and were they with an acceptable margin of error? Answer: Good question; that variability is all over the place, with .11b, that variability is within 5% because the chips are quite good, with .11g it is much higher. In the chamber you are looking at 10% variation, indoors the maximum variability that I have seen with a decent testing environment it's about 20%. Pratik noted that the variability was fairly constrained but not within 1%. What he's really trying to point out is the need to correlate. Just because a test is repeatable, if it does not have a good relationship or correlation with what a user thinks it is, it doesn't matter.

Question from Michael: To me the validation step is R&D, this is what we need to do ourselves. Once you have correlation you have completely eliminated the need for on-site testing. So why do we need to put this into the standard? Answer: At Dell we can buy a chamber, what do you do with the people who cannot buy a chamber, such as magazine reviewers, and so on? What we do here is the real-life test environments, 5-10 years down the road, everything can be done in a test lab, and there is a good enough correlation between indoor and chambered testing that we don't have to do this.

Question from Craig: With MAC layer encryption, I see people doing analysis without encryption, is that a valid model we want to throw in here? Answer: That's very good input, that's the stuff that we need to cover in use case #2.

Question from Matt: At first I thought you were proposing a method of correlating these solid repeatable cabled tests to what you might experience in the real world, but I guess that you're advocating a test plan for what you might do in the real world. In 4 years of testing, there is just too much variability. I'd actually contend that the methodology for ensuring a clean environment is far more complex than performing the test over the air. Answer: As far as repeatability is concerned, your point is very well taken. There are steps that we need to take before we start on that correlation. Fahd: the methodology in depth is not what we're looking for, what we are actually looking for is the general direction.

Question from Mike Wilhoyte: We've done a lot of live testing as well, if you are putting a lot of live packets on the air there's a lot of other stuff to contend with. Even if you come up with a recommended practice for conducted testing, people are going to do their own open-air tests to find out how they correlate.

Question from Fanny: I like some of the stuff here, but I think that a test that's not repeatable is not a valid test. We need to have common methodologies, and while I agree that there's some value in correlating, you have to have repeatable tests. Fahd: it's a nasty job but someone's got to do it.

Pratik: What I'd like to propose is that we modify the agenda so that people have time to discuss this further. We could add time to the agenda to allow people to discuss Fahd's presentation. I'd like to propose that we add time to enable people to ask questions and make comments.

Motion #1:
Move to modify the agenda to allow additional discussion on this presentation on Thursday at 10:30 AM for 30 minutes.
Moved: Pratik
Seconded: Areg
Fanny proposed a friendly amendment to have the discussion after the presentations.
This was rejected.
The question was called and Charles took the count.
Yes: 8, No: 1, Abstain: 6. Motion passed, procedural.

Charles then recessed the meeting until 10.30 AM Thursday.

Thursday 10:30am session 11/18/2004

Dalton Victor was recording secretary for the meeting.
Go over Agenda

Question of whether to recess for .11n vote at 2:15pm

Straw poll on how many people will attend 1:30 TGT meeting
Yes: 11
Can't: 3

Fanny suggests using that time to look at template and document structure. [11-04-1503-00-000t-tgt-document-structure]
Tom asks about a lunch discussion on [11-04-0863-02-0wpp-test-plan-template]
Joe requests that his presentation be added to new business due to his time constraints. He'd rather present in person rather than over the phone. [11-04-1441-00-0wnm-wnm-tgt-collaboration]

Continuation of discussion on [11-04-1222-01-000t-measurement-methodology-proposal-based-approved-framework] (30min allocated) :

Fahd asks for comments and questions on where TGT is going. He mentions that there will be a few motions at the end.

Steve Shellhammer: Asks general question on clarity of group's direction? What tests? How to measure? Real world translation? Do we want to correlate lab measurements with real world?

Fahd: Need both. Real world measurements would be a sanity check for controlled environment results. Final draft should cater to the concerns of everyone in the room including silicon provides, systems integrators. Without correlation we will not be able to see the draft as a recommended practice. Customer service call should be translatable back to test results.

Mike Foegelle: Start from real world case, but every one is different. Use model of real world…where you can measure parameters and apply them. They should drive what goes into the doc but not dictate procedure. We can define methods to model and use field tests for verification. TGT standard should be able to help make a decision on what to buy. Consumer cannot deal with a large matrix of APs/STAs.

Fahd: All manufacturers should put out data that allows formation of a good opinion for IT type people. Deployment types would factor in. 3 step process: look at use, controlled environment testing, relate controlled testing to real life. How do we convince the customer that chamber data is good enough to be within 20% error of real world performance?

Standard will be around for awhile. We don't know how things like .11n will turn out. We need a sanity check that allows for updateable models on the fly. We need flexible models.

SteveS: 3 steps? Real world, what are do we measure, predict?

MikeF: From R&D side…there is already a lot of work out there. Do real world, figure out physics. Look at test plan, if real world model works, no need to do real world testing. Agrees with verification by real world measurement…

Fahd: Based on slide 14…we'll have controlled environment testing, we should have sanity check with field testing. He's trying to figure out how other presentations fit into big picture. His approach allows him to visualize how things fit together.

Craig: It's important to make correlations. Look at methodologies….from the phy all the way to the app level. Fading, multipath will be difficult. Document will have to be living to cover new scenarios. Things could change model over time.

Fahd: agreed

Areg: Question is…who is targeted audience? Three categories: chip man, IT and system integrators. For silicon manufacturers, you need fairly accurate numbers. If you are a PC mag editor, use real world scenarios with averaging. Looking for good enough.

Pratik: Passes

Niels: Who's going to use .11T is not understood. We like to talk about the technical stuff but we need to discuss who will use and how accurate we are striving for.

Charles reads the PAR regarding constituents and target audience.

Fahd: Dell does laptops, pda's, set top boxes, access points, etc. We want to have a standard way of evaluating competitors' products. How do you put one product up against another product, apples to apples comparison without going through legal contstraints?

Pratik: Being able to compare products is what we want. Be able to design a set of products that are consistent and behave well. Over time, expectation is that everyone applies this at different levels in order to make for better user experience.

Niels: Designers will have different levels of capabilities

Fahd: Si developer may focus on a certain usage scenario…IT manager may focus on different usage scenario.

Fanny: Different test methodologies: conducted, chamber, ota. Template is missing accuracy and repeatability of test. When describing test, we need to specify accuracy. How repeatable is environment? Dell test lab does not correlate to PC mag test environment.

Charles: Template should address repeatability?

Fanny: yes…Should be addressed in ad hoc group.

MikeF: my reaction to this is: "Magazines are doing something and that is good enough…why do we need a standard? "

Usage environments….agree that they exist but are they actually test cases? How do we use them to predict?

Fahd: Fall back to framework from Berlin. Define environment, then define metrics which are most important within that usage case , then define methodology, then define test cases. There is a logical flow from real life to metrics to sub-metrics.

MikeF: looking at slide 5, chamber environment is not a usage case.

Pratik; Confusion between usage case and partitioning. This slide is not saying 1a, 1b, 1c are usage cases. It is explaining how to partition a usage case (#1)

Charles: asks Mark re time for presentation.

Mark: 45 minutes including discussion

Fahd: We'll wrap up discussion. Lets get to motions.

Approve the two cases for Data-oriented applications- usage scenario 1
-usage scenario #1a – file transfer, indoor environment
Metrics, submetrics, methodology
-usage scenario #1c – controlled environment
OTA, conducted + antenna radiation pattern

Pratik makes the motion to approve the two cases for Data-oriented applications : usage scenario #1 as described in 11-04-1222-01 slide 6.
Second: Amer Hassaan

Pratik: Motion is trying to say that this is the approach that we want to take. Make sure that we're doing things for the real world in the right perspective.

Fanny: needs clarifications on meaning of "approved". With respect to test template/document

Pratik: We're not saying that this is the test template. We're trying to suggest that we do conducted, chamber, other measurements that make sense. We don't know what they are. We're trying to approve the approach of partitioning things in this way.

Fanny: Looking for acceptance of the fact that there are going to be different types of tests? Clarify in the text of the motion.

Friendly amendment: Approve test approach based on following configurations: open air, anechoic chamber, conducted.

MarkK: Keep chamber more general…we've had no discussion on it, yet.

Charles: This is a friendly amendment, not second motion.

John: Approving usage scenarios and test approaches sounds like 2 different topics.

Friendly amendment was rejected by Pratik
Motion edited to:
Approve the two approaches for Data-oriented applications : usage case #1 as described in 11-04-1222-01 slide 6.

Tom: What would you see being added to the draft as a result of slide 6? Text of motion implies something to be added to draft

Fahd: Template would have to take shape around this framework

Pratik: We're trying to figure out approaches. This is a guiding document/motions. Does not propose any actual verbatim text for proposal

Areg: There are millions of tests and lot of ground to cover. We're trying to put into perspective usage scenarios.

Pratik: We're trying to keep our eyes on the end goal during development of the document.

Tom: Suggests adding correlation or comparison to motion.

Pratik: Not part of this motion

Charles: Slide 6 involves a lot of detail that "needs to be worked on". Uneasy about approving something that will be corrected later.

Pratik: These are not the exact words that will go into the final document.

Charles: More desirable to specifically state what is being asked approval of.

Fanny: Clarification on what we're voting on. Approach? Many different tests, is this one? Some tests do not fit this framework. How does it impact what we've been discussing?

Pratik: Trying to figure out what our approach is. We're not saying which test. We're trying to guide the group's development of document.

MikeF: Sounds like we're asking for pre-approval of something we're going to write. This should be a case of sets of test plans that already have work done. If we want real world testing, we write up a test procedure and vote on it. Tired of being hit over head with Berlin motions.

Craig: Thought purpose of document was to give performance parameters.

Charles: Define an outline and get that stuck into draft. If an outline is defined that is consistent with approach, then that's a great thing. What are we going to accept? Monday night we talked about the template from August. The discussion about working on the template is the perfect place to explain what is required by proposals.

Pratik: Is that a comment on this motion?

Charles: Its just a comment.

MikeF: Does the draft template have a section with use cases? Does this make the tests we come up with relevant to real world? He would not call this a methodology or test approach, rather a usage case.

Pratik: This goes one level beyond use cases to methodology, approach. It's not about nailing anything down for the draft. It's the approach for usage case 1.

Tom: Says that he believes that Pratik and Fahd are emphasizing approach rather than Fanny and himself who are emphasizing actual language of draft.

Steve: After this, this group needs to decide what's going to go in the draft…something like a requirements doc.

Uri: Looked at slide: "OTA in controlled environment", it's a contradiction

Pratik: Calls the question
Steve seconds

Question has been called: Vote on motion:
Approve the two approaches for Data-oriented applications : usage case #1 as described in 11-04-1222-01 slide 6.

Yes: 12
No: 2
Abstain: 11

Other 2 motions to be added to new business.

MarkK presentation: 11-04-1476-00-000t-proposed-open-air-test-methodology

Questions, comments:
Veera: How is this different than anechoic chamber?
MarkK: Cost

JasonT: You can do a test in an anechoic chamber. We're trying to be cost effective and make sure that it is repeatable. Anechoic chambers can be non-repeatable.

MikeF: Positioning accuracy is mainly a function of distance between antennae. If you go to a more advanced chamber, some of those limits go away.

Niels: Location of DUT antenna is extremely important. Embedded antenna could be difficult. Use turntable

JasonT: It was on a turntable, but we haven't used rotation yet.

Pratik: Is the directional antenna in a fixed position? Is distance or angle more important?

MarkK: Everything is important. You won't see the same channel otherwise.

Pratik: Was that easy?

MarkK: Yes. Relatively.

Charles: Is the issue that if the antenna gets knocked, you won't be on the main point of the beam. That could skew your x-axis.

Mark: Correct

Uriel: What is the difference between this and conducted?

MarkK: One of the challenges is to look at the total system. Adding antenna allows you to look at the system in its entirety.

JasonT: Good question. Conducted + antenna gain pattern would seem good enough but there are non-linear second order effects.

Charles: Good point to make in the antenna.

Ivan Oaks: Didn't mention space diversity.

MarkK: Correct, we'll need further thinking on those issues.

Niels: Radiated is useful for seeing desensitivation by the processor, feedback from antenna, etc. It's important to do radiated measurements from a system point of view.

Charles: No further questions.

Plan for .11n: Meet at 1:30pm to talk about future business but adjourn to vote. Resume at 4pm.

Joe Kwak's presentation: 11-04-1441-00-0wnm-wnm-tgt-collaboration
Veera: How far along is WNM?
Charles: PAR and 5 submitted, waiting for approval on Friday.

Steve: Are the types of measurements in TGT and WNM really the same? Seems different
Joe: We're looking at metrics that only apply to station/AP. WNM is only concerned with a subset….application metrics are not appropriate for standardization. It's unclear if there will be output from TGT that goes into WNM, but it's possible.

MikeF: We could use a test API.

Joe: TGe may require the ability to disable certain standards. Someone would have to be a proponent of things like APIs. Someone would need to convince the WNM group that it would need to be put in.

Tom: Performance measurement on Station Management Entity within the standard?

Joe: It's a "jellyfish" but yes it's within the purview of the standard.

Charles: we're in recess until 1:30. Adhoc to discuss template during lunch.

Thursday 1:30pm session 11/18/2004

Teleconference info
No teleconference during Thanksgiving.
Dec23rd & 30th, possibly no telecom. TBD on Dec16
Motion to empower TGT to hold Telecons on Thursdays at 12 noon Eastern time.
Duration 1 hour
Next: Dec 2, 2004

Moved : Fanny
Second: Bob Hall

Yes: 3
No: 0
Abstain: 0

Discussion on schedule of recesses.
Recess to adhoc at 2pm until 2:45

Charles: We will recess in light of the fact that other Task Groups recessed after lunch.

Veera: Is there a place in the draft for usage cases?

Charles: Nothing has been proposed for the draft, yet.

Tom: Not planning on making a proposal for the draft.

Charles: We're in recess until 4pm.

Thursday 11-18-04 4.00 PM to 6.00 PM

Charles opened the meeting at 4.05 PM. Tom Alexander was recording secretary for the meeting.

He asked Fanny and Mike (the new business presentations) to decide which should go first. Fanny won the toss and took the floor.

Fanny started by noting that she was presenting this contribution on behalf of Sean Farrelly. The presentation was #1397/r0. She noted that Mike Wilhoyte had a lot of good clarification on the issue of determining the optimum rate in the presence of signal loss. The effect of loss at a higher data rate might actually yield less throughput. In addition there was the question of receiver sensitivity at the higher rates.

Fanny showed a diagram of the test setup, and then discussed the effects of distance on the signal strength. She noted that people like PC Magazine rolled DUTs on carts in order to simulate increasing range, but got different results every time. PC Magazine now uses a conducted test environment to do range tests to get more repeatable results.

Question from Fahd: Is this test setup conducted, so there is no antenna? Answer: yes.

Question from Fahd: in reference to Mike's presentation, you have rate vs. range, but his has attenuation? Mike clarified that the range is converted via a path loss model to equivalent attenuation. They do correlate with real range in an actual environment. He noted that they had done a lot of conducted tests and a lot of open-air tests, and they do correlate quite well.

Question from Fahd: the clarification I was asking for was, how do you actually make that correlation so that you can determine when the transitions are made from rate to rate? Answer; you have to test devices as a pair to really compare.

Question from Fahd: So there is no master unit? Answer: no, but Mike has a way to deal with this. You can have a receiver and multiple transmitters

IEEE P802.11
Wireless LANs

Minutes of Wireless Interworking with External Networks Study Group (WIEN SG) Meetings

Date: November 16 - 17, 2004

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Abstract

Minutes of WIEN SG meetings held during the IEEE 802 Plenary meeting in San Antonio, Texas, November 15 - 19, 2004, chaired by Stephen McCann, with Cheng Hong as the secretary.

Executive Summary

1. Agenda of the WIEN SG session (04/1406r1)
2. Report of last WIEN SG session (04/1112r1)
3. Minutes of last WIEN SG session (04/1113r0)
4. Minutes of ad hoc WIEN ID review session (04/1150r0)
5. SSCAN presentation (04/1415r0)
6. 3GPP2 presentation (04/1474r0)
7. Interworking Architecture for WLAN presentation (04/1468r0)
8. Soft QoS-based radio resource management for Interworking presentation (04/1411r0)
9. Interworking implications on QoS realization (04/1408r0)
10. Interworking requirements (04/1392r0)
11. Introduction to the EAP netsel draft (04/1020r0)
12. Roadmap discussion (04/1407r0)

4 motions raised in the SG session. Attendance list is in the appendix.

Tuesday evening Session of WIEN SG: November 16, 1930 - 2130

1. Logistics

WIEN Meeting called to order by Stephen McCann (Chair) at 1930.

Agenda was reviewed (**04/1406r1**) and approved.

The IEEE 802 & IEEE 802.11 Policies and Rules were reviewed.

Patents and By-laws read out by the chair, together with licensing terms and associated conditions.

2. Report from last meeting and Teleconference

The chair gave an overview of the last meeting outcome (**04/1112r1**).

Minutes of the last meeting **04/1113r0** is reviewed and approved.

Minutes of the ad hoc session in last meeting **04/1150r0** is reviewed and approved.

3. General review of the current PAR and 5Criteria

The chair gave a general overview of the PAR (**04/506r9**) and 5Criteria (**04/507r3**).

Some comments were received from IEEE802.21 on the PAR document. The chair suggests address those comments.

* Suggest dropping the “wireless” from the name “Wireless Interworking with External Network”
* Suggest inserting “ongoing formal” into the section 16 notes.

Question: What happens if the group rejects those comments?
Stephen (Chair): They will be raised again in the ExCom meeting.
Comment: Those comments from IEEE 802.21 have not been voted in their group.

1. **Motion**: In order to clarify the efforts of the new Task Group and align those efforts with 802.21 WG, the title of the document, item 4 of the PAR changed to "Amendment to Standard [for] Information Technology - Telecommunications and information exchange between systems - Local and Metropolitan networks - specific requirements - Part 11: Wireless LAN Medium Access Control (MAC) and Physical layer (PHY) specifications: IEEE 802.11 Interworking with External Networks"

Moved: Stephen McCann
Second: Charles Wright
Result: 11-1-14 (for-against-abstain): Approved

2. **Motion**: 802.21 WG feels that the following change would help to address the similar scope in relation to 802.11 WIEN PAR It is therefore moved to change the final paragraph of section 16 of the PAR from:
”it is worth noting that an agreement has been made between IEEE 802.21 and IEEE 802.11 WIEN SG to co-ordinate in avoiding any overlap in their scopes" to **“**It is worth noting that an agreement has been made between IEEE 802.21 and IEEE 802.11 WIEN SG for an ongoing formal co-ordination in order to avoid any overlap in their scopes”

Moved: Stephen McCann
Second: David Hunter
Result: 11-0-16 (for-against-abstain): Approved

Question: Does it mean that liaison needs to be set up between the group and IEEE 802.21?
Stephen (Chair): Could be. But not addressed here.

4. Presentation on SCCAN (04/1415r0) Mahalingam Mani

Information about the SCCAN forum is given.

5. Presentation on 3GPP2 interworking activities (04/1474r0) Jim Tomick

Stephen (Chair): Is the document of the 3GPP2 interworking in public domain?
Jim: Needs to check. It should be open to public to access.

Action point: Jim will check the availability of the document.

6. Presentation on Interworking Architecture for WLAN (04/1468r0) Yeong Min Jang

Question: We are talking about multi-mode in this group or IEEE 802.21
Answer: Yes.
Question: What is the impact of this to WLAN?
Answer: This is the background introduction, and next presentation will be on the radio resource management. It will be explained.

7. Presentation on Soft QoS-based Radio Resource Management for Interworking (04/1411r0) Yeong Min Jang

Stephen (Chair): What should SG do with the contributions? Is there any requirement that we can derive from it?
Yeong: For support QoS, needs to have triggers from MAC, and need Layer 2.5 for handover, Soft QoS could be applied there.

8. Presentation on Interworking implications on QoS realization (04/1408r0) Eleanor Hepworth

Question: If someone wants to increase their QoS, they need to do the authorization
Eleanor: Yes, that is to differentiate users

Comment: There is some overlapping with TGr issues.
Comment: It may need to be done in 3GPP/2, IETF
Comment: RADIUS-QoS, or COPS could be used or made used of for the purpose.
Comment: We have lots protocols in hand, and we need to make use of them. A requirement is useful
Comment: LS with 3GPP/2 should be useful.

Stephen (Chair): We need to LS with 3GPP/2. And maybe should have a joint meeting with TGr.

9. Presentation on Interworking requirements (04/1392r0) Hong Cheng

Question: in this scenario do you include sharing policy, e.g. one operator 75% one 25% or just thinking in terms of traffic separation?
Hong: in this scenario, just in terms of traffic separation, but same problem applies to more complicated policy cases.

Question: effects type mechanism need to introduce into 802.11
Hong: so far from the requirements from 3G networks only see that separation is necessary, for more detailed policy enforcement there will be some separate requirements.

Wednesday Morning Session 17th Nov 2004, 0800 - 1000

10. The SG went to ad hoc mode for the first hour of the session (08:00 – 09:00) to review an IETF internet draft

- Presentation of IETF Network Discovery and Selection Overview **(04/1020r0)** Stephen McCann (Chair)

Comment: They are working at L3
Stephen (chair): They are only defining problems.

- Bernard Aboba & Jari Arkko's presentation for IETF is presented. Note: This document was subsequently uploaded to the server as document (**04/1502r0**) with permission from both authors.
- Mike Moreton assisted with the generation of some draft text for the liaison letter.

At 09:06 the WIEN SG reconvened

Text from the ad-hoc session was then presented to be included in a liaison letter to be sent to the IETF regarding the internet draft as shown in document **11-04-1500-00-wien-input-to-ietf-from-wien-ad-hoc-november-2004**.

The Chair will bring a revised version of the text to the closing plenary for approval

3. **Motion**: Move to authorize the WIEN SG chair to draft a liaison letter to the IETF and forward this letter to the IEEE 802.11 working group, said letter to include the following issues:
   * Scope of further work and division of problems between IETF and IEEE 802.11
   * Specific pre-association information
   * Beacon issues

   Mover: Mike Moreton
   Second: Dorothy Stanley
   Result: 22-0-1 (for-against-abstain): Approved

11. Next Step for the WIEN SG

4. **Motion**: Move to request that the IEEE802.11 Working Group extend the (WIEN) Study Group for another 6 months.

Moved: Stephen McCann
Second: Mike Moreton
Result: 24-0-0 (for-against-abstain): Approved

12. Roadmap discussion: (1407r0) Stephen McCann

More info on 3GPP2 will be given in January 2005.

Question: What is the policy, is that general or something specific to be documented here?
Comment: There are different types, not sure what people are looking at
Comment: Think the text is not referring to an exact one. Just general point
Stephen (chair): Need to figure out that in the IEEE 802.11u.
Question: Why the text is there in the PAR?
Stephen (chair): Last meeting, people feel that we need those extra info to explain the scope.

Question: This group has many bits of problems, not like other group that has a very specific problem, will it have a CFP?
Stephen (chair): We can craft the CFP for proposals for different bits.

Comment: Should list IEEE 802.21 in the external groups
Stephen (chair): Yes. Should have LS to IEEE 802.21 at some future point.

Comment: Regarding the IEEE 802.11i co-existence should also put TGr co-existence there.
Stephen (chair): Maybe the ADS SG should also be included.

The document is updated to **04/1407r1**

The Meeting adjourned till next meeting in January 2005.

Fanny then showed an example of the sorts of things that we would see as an output from this test. As the path loss was varied the device would change its rate. She closed by stating that this was a good test for rate vs. range.

Question from Michael: I wanted to address Fahd's question. If you look at one of my very first slides, I broke it apart so that if you want to qualify a single device you could do so.

Question from Jorjeta: which one is a bad device, the one with a purple line or the blue line? Answer: the one with the lower throughput.

Mike noted that you have to be careful as this is a total system test and the effects of both devices must be taken into account. Fanny echoed this concern.

Question from Jorjeta: the point of this test is only to compare devices, it's not to try to figure out how to better configure those devices? Answer: it's to compare these devices. Comment: I think it would also be interesting to figure out how to compare that.

Question from Uri: I don't see that all of them are necessary for benchmarking, some of them for the developers. Which are important? Answer: I believe the area under the curve would be the key.

Question from Fahd: we have seen similar behavior as in the chamber. As the range increases, the throughput number goes down and then goes up again, and we have a hard time explaining that to customers. What's your perspective on that? Answer: the dips are a direct result of how the rate transitions work. A good algorithm will optimize that and make that transition really quick. Mike has some good data that shows that.

Question from Fahd: each time you have a dip, you can correlate that with a rate change? Answer Mike: we've seen things like that when you have TX power control implemented.

Question from Fahd: you reported RSSI values on the second chart, with RSSI values they have a variance depending on how the driver reports it. If you are using values from three different silicon providers then you will have multiple different values reported. This is an issue, right? Answer from Charles: TGk has spent a lot of time on this. Craig clarified: I was looking at doing the same thing for ACI, and we can calibrate the path loss and measure the power, and thus extrapolate to RSSI.

Question from Tom: throughput numbers?

Question from Dong-Ho: this is very interesting, but this is golden device testing. The golden device means the AP in this case. If the DUT is the client only, how do you choose a golden AP? Mike answered: this is a system test, so your DUT is the AP as well as the client. Mike F. had come up with a very detailed test on a specific single device. My personal view of that is that it is very difficult to characterize anything as a golden device.

Question from Fanny - but you have these waterfall curves that you get with these different transmitters and receivers? Answer: yes, but that should be considered part of system testing. I am not proposing a test methodology that is rigorous. I think it is dangerous to be reporting RSSI from the driver.

There were many more questions for Fanny. In the interests of time, however, Charles requested Mike to go ahead, after which Fanny's presentation would be brought back for questions.

Mike Wilhoyte: presentation #1466/r1, concepts on rate management testing.

Mike presented a block diagram of the rate management model used by a generic STA, and explained it. He also discussed the general goal of rate management algorithms, and the possible metrics for selecting different rates versus channel impairments. He then gave an example of a test that he did that correlated well to live range data. The question was whether metrics could be defined for this example and whether metrics could be generalized.

Mike showed the general view of the test setup, consisting of an AP and a DUT, plus an attenuator. He then showed the results of running the test, which were a set of waterfall curves. He also noted that their driver switched from 18 Mb/s OFDM to 11 Mb/s CCK, and this had to be factored in. He then showed a curve fit to the measurements, and then presented the efficiency modeled as a function of TX and RX levels.

Mike then discussed the issue of when the driver was changed, and presented the results. The average efficiency went up from 94% to 99%. He noted that this was how they tuned their rate management algorithm. Mike then noted that these metrics could be applicable to rate adaptation stepping down under static channel conditions.

Mike then went on to talk about some additional work regarding calculations and measurements on fractional loss in throughput vs PER. He also showed some curves of throughput vs multipath from Matlab simulations.

Question from Fahd: I like the metrics that you have. You mentioned that stepping up gives you a different behavior, and what we've seen in the past, it varies quite a bit depending on the product you are testing. When you talk about efficiency, do you want to consider just the step down, or do you want to consider both? Answer: you need some kind of time metrics coming up. One problem with 11a and 11g is that there is a 6 dB gap coming up, and if you don't account for this you'll spend a lot of time bouncing back and forth between rates.

Question from Michael: you've done some things that I was proposing earlier this week, and this is a great presentation. What if you simply acked only packets at a certain speed, and did not ack the higher or lower rates? Answer: how do you do that?

Question from Fanny: I want to clarify what I mean by calibration on slide 14. If you look at the tops of the curve, that's essentially your test limit. If you take two devices and run curves like this, you get a test limit, and then you can compare devices to the test limit. Answer: the rate adaptation doesn't get controlled by a piece of hardware, you are testing a piece of software. You need to run a calibration to see how these two pairs act. A reasonable thing to do to validate this metric would be to run the same test over many pieces of hardware. This test was run with a transmitter and it wasn't necessarily golden, and you need to run this with a signal generator to get receiver sensitivity tests.

Question from Tom: these attenuation factors are quite narrowly distributed, what about manufacturing tolerances? Answer: good point, this should be run with multiple APs as transmitters to see what the baseline is.

Question from Charles: if you run this with different receivers you might get different results, but the shape of the efficiency curves would be the same? Does this give you better range with some receivers and less with others? Answer: I haven’t had a lot of time to look at this; also the receivers are likely to be different.

Question from Charles: when decreasing the signal level and seeing how it performs with the signal level going down and going back up again, that would be a problem. When static, that doesn't happen. (Audience did not agree, pointing out that other things would be moving about and there would be ACI that was bursty.) How about if the algorithm was run so that things were run for more time at each data point? Answer: these curves were run with a dwell time at each data point.

Question from Charles: you could define this with an ACK machine, but this won't work with TGn sorts of things. Answer: 11n does open up another can of worms, but I still think you could apply conducted tests.

Question from Jorjeta: what was the packet size for these experiments? Answer: max Ethernet packet length, 1532 byte packets. Good point. If you did these tests with UDP, you could change the packet length.

Question from Craig: from past experience, if you take two Cisco cards and put them together, they work really well, but other cards don't work too well with that. For example, Cisco uses RTS/CTS. What do you want to show here, rate scaling or interoperability? Answer: what you are saying is that test conditions will have to be exactly right.

Comment from Fanny: to address the throughput measurement, I don't know that this type of measurement is optimized to measure throughput, and also throughput for a client is different from measuring AP throughput, and it has to be done with different sized packets. I think this metric is intended to show the range of the device.

Mike said that the test conditions would constrain the test of the device. Tom clarified that the generally accepted methodology is to establish a baseline and then test variations on the baseline.

Question from Dong-Ho: I think this result is system-specific efficiency. A single rate is bad, but the total efficiency is 100%. Answer: if you want to move this to the next step, you have to characterize test conditions, come up with a calibration scheme, and then validate this test.

Question from Craig: What I'm going to look at when we do this is try to come up with usage models. I don't want to spend months and weeks and days coming up with a subset of test parameters. Is that valid? Answer: that's what I was referring to earlier today, you have to drive this by use cases, or else you will come up with a 500 page document.

Comment from Charles: we're specifying a methodology for making a baseline test, we won't be specifying a whole lot of test modifiers for the test to be valid; it’s up to the users to decide what is useful in terms of modifiers. We don't have to define every possible case of measurement.

Craig: the argument against that is that someone goes into a lab and does a measurement with a different modifier, then you would get different results. Charles: you need to specify the modifiers.

A comment was made that all test reports must give results for the baseline test, then to add the modifiers. That way, tests performed by two different labs could be compared on this basis first.

The questions then turned to Fanny's presentation.

Question from Fahd: you mentioned that you were using Chariot, do you see any advantages of using Chariot? Answer: I think what's important is that you have deterministic traffic. The traffic we were using was TCP that requires L4 acks, that could affect the throughput. Another question that Jorjeta raised is important, the industry is currently measuring throughput over range using a client, but the group needs to discuss how to check the throughput of an AP.

Question from Jorjeta: I'm primarily interested in mesh networking, here you may have to have different tests for different clients. The performance challenges are much bigger in mesh networking. Answer: we'll be working on different tests, and it would be important to include different tests, and we'll be looking for input.

There was discussion on the issues in mesh networking.

Charles then went over the teleconference schedule, noting that it was not clear how many people would be around on all of the dates, but we would discuss whether the

December 23 and 30 telecons would be held. We would have at least 5 telecons before Monterey, though.

Charles then thanked the group for a good discussion and presentations, and then asked for a motion to adjourn.

Motion #3:

Andrew Myles moved to adjourn. Mark Kobayashi seconded. Andrew Myles objected to adjourning, but withdrew after he realized the consequences. The meeting was therefore adjourned.

IEEE P802.11
Wireless LANs

Minutes for the Study Group WNM November 2004 Session

Date:

November 16-17, 2004

Author:

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Monday, November 16, 2004
7:30 PM – 9:30 PM

1. Chair called meeting to order at 7:30 PM.
2. Attendance:
   Richard Kennedy, Ted Rappaport, Patrick Mourot, Jason Luther, Paul Gray, Stuart Kerry, Bob O'Hara, Pat Calhoun, Ed Finn, Darwin Engwer, Tim Olson, Lily Yang, Paul Lambert, Marty Lefkowitz, Charles Wright, Niels van Erven, Areg Alimian, Ioanna Samprakou
3. Reviewed IEEE 802 & 802.11 Policies and Rules
   a. Patent Policy
   b. Inappropriate Topics
   c. Study Group Function, Formation, Continuation, Operation
   d. Documentation – 4 hour rule for changes that are normative
   e. Voting in a study group.
4. Secretary: Jason Luther will serve as the secretary for the November sessions.
5. Chair status update
   a. SG is looking for a chair. Harry Worstell will continue in the position if it is not filled.
   b. Pat Calhoun is considering the position, but is currently committed to TGr.
   c. PAR+5C has passed letter ballot 72, so SG has no further work to do on PAR until executive committee acts on it.
      i. There was some confusion about letter ballot comments. The letter ballot was a Yes/No/Abstain ballot, so comments from the WG do not require action by SG—it was a procedural vote to send the PAR to the EC, not a draft that would require comment resolution.
      ii. A 40-day letter ballot was used instead of a vote at the last plenary meeting because the PAR could not be uploaded successfully in time to meet the 4-hour rule. This was explained at the plenary meeting.
      iii. Comments on were forwarded to the SG, and the chair had planned to upload a document containing all of them, but he did not have time before the session started.
      iv. Based on the passage of the letter ballot, PAR+5C was forwarded to the executive committee (EC) where there will be a motion to forward it to NesCom. No comments were received from the EC by 5:00 PM on Tuesday, November 16, so SG had no action to take on PAR.
      v. If TG is formed from PAR, TG will have the option to revise the PAR if necessary.
6. Agenda modified to show presentations from Joe Kwak, Darwin Engwer, and Pat Calhoun and then accepted.
7. Minutes from last meeting approved unanimously.
8. Summary of last meeting was discussed during update from chair.
9. Comments from ballots were reviewed. Following are summaries of the comments covered:
   a. Comment 1: remove "and PHY" from sentences.
   b. Comment 2: John Barr: PAR is too broad. Firmware upgrades shouldn't be included.
   c. Comment 3: John Kowalski: Why do this at L2? Could preconfig with UPnP.
   d. Comment 3: questions L2 approach, questions conflicting work in IETF, notes that assumption that client will have IP is not always valid.
   e. Comment 4: James Wilson: no discussion of security. What are security issues specific to WNM? Recommendation: require/authorize WNM to consider security issues. Also questions use of SNMP, relevance of AP MIB.
   f. Comment 5: Should consider security.

g. Comment 6: WNM might not have resources until TGk concludes; should wait until TGk has been implemented in field; should wait until something works demonstrably before taking to a committee; ambiguities related to TGk;
h. Comment 7: PAR is vague
i. Comment 8: Nancy Cam-Winget: need to consider security
j. Comment 9: Tim Olson: thought WNM was supposed to be about control for improved radio management, fast roaming, load balancing, not SW upgrades and parameter configuration. Don't mention AP MIB. Don't restrict to MAC and PHY. No need to discuss SNMP, just need to define MIB (MIB does not imply SNMP). Tim mentions that original intent of group was to be a next step after TGk—use the TGk measurements to control stations. Doesn't think that PAR covers that goal. Security must be considered.
k. Time ran out to cover the rest of the comments.

10. Note: regarding discussion of relevance of security to WNM, assertions by SG participants that ADS would handle security are probably incorrect. ADS will deal with only with the protection of management frames.
11. Meeting recessed at 9:30 PM until 8:00 AM Wednesday, November 17, 2004.

Tuesday, November 17, 2004
8:00 AM – 10:00 AM

1. Chair called meeting to order at 8:00 AM.
2. Attendance:
   Jason Luther, Paul Gray, Richard Paine, Bo Kuitenstrom (spelling?), Lars Falk, Justiman Rosca, Pat Calhoun, Marty Lefkowitz, John Klein, John Wlater, Simon Black, Byungho Chung, Bruce Edwards, Ed Finn, Burak Baysal, Tim Olson, Joe Kwak, Lily Yang, Patrick Mourot, Darwin Engwer, Richard Kennedy, Yaron Peleg, Allert van Zelst, Ali Raissinia, Majid Malek, Arthur Zaies, William S. Mueller, James ? (Unreadble), Paul Lambert, Stuard Mis??? (Unreadable), Nancy Cam-Winget, Bobby Jose, Jon Agre, Samprakou Ioanna, Dmitri Varsanofiev
3. Agenda: Rich Kennedy moves to approve agenda, Joe Kwak seconds, approved unanimously.
4. Reviewed last meeting:
   a. See minutes above for discussion of letter ballot 72.
   b. Chair compiled comments received into document 1479 and remarked that comments generally fell into two categories: scope is too broad or too vague, need to address security.
5. Chair status update
   a. SG is looking for a chair. Harry Worstell will continue in the position if it is not filled.
6. Technical submissions:
   a. Darwin Engwer presented 1451, an analysis of the PAR.
      i. Comment: One of the original motivations for WNM was that TGk only provides a mechanism to request and report measurements, not to control stations.
      ii. Comment: PAR should include references to TGk and should address whether to manage ESS, BSS, and/or BSA. Questions desire to configure stations before link is established.
      iii. Comment: much of this has already been discussed. Is there anything in the PAR that prevents group from implementing anything in 1451? Answer: no, but lack of clarity in PAR could be problematic.
      iv. Comment: References to TGk are about taking advantage of existing measurements and allowing WNM to feed more needed management measurements back to TGk. It's late in the process and counterproductive to change PAR; group should proceed.
      v. Comment: SG is responsible for PAR.
      vi. Comment: SG should take 1451 and create a more detailed requirements document that should guide the group's work.
      vii. Comment from chair: SG is tasked with getting PAR+5C passed. The TG will then figure out how to proceed.
   b. Pat Calhoun presented 1450, a proposed new WNM PAR test
      i. Question: why use AP MIB instead of TGk-defined management entity (SME) as point of control?
      ii. Answer: Because AP MIB is all that exists in the field. It's difficult to reconcile what's in the field with what's in the spec.
   c. Joe Kwak presented 1441, a proposal for ongoing TGt/WNM collaboration
      i. TGt is not modifying spec; just producing recommended practices.
      ii. If TGt identifies useful points of control, WNM should provide them.
7. Review next steps
   a. How does group move forward?

i. Chair proposed that the next step be to define usage scenarios and requirements for the group. For the next session (January meeting), the group should thing about putting together a requirements document.
ii. If EC rejects PAR, it goes back to the WG, which would send it back to WNM SG. That's why chair will move to extend the SG. If it passes, PAR will go to RevCom to make sure that procedures were followed correctly.
iii. Question: will effort be made to avoid scheduling WNM and TGk sessions at the same time? Answer: Chair will try to work that out for the next meeting.

8. Move to adjourn

   Moved: Kennedy
   Seconded: Lefkowitz

   Motion passes unanimously

9. Meeting Adjournment:

IEEE P802.11
Wireless LANs

Minutes of Wireless LAN Next Generation Standing Committee Meeting

Date: September 12th-17th, 2004

Contact: TK Tan
Philips Semiconductors

Abstract

Minutes of WNG SC meetings held during the IEEE 802.11 Interim meeting in San Antonio, Texas from November 14th-19th, 2004.

1. Executive Summary:

1. Spectrum Agile Radio – Good presentation from Kiran, Philips Research.
2. Site-Specific Knowledge for Next Generation Wireless Networks – impact on WLAN in next generation. In a site specific client, if we have site specific knowledge, we can perform blind throughput rredictions for a New Environment using Site Specific map.

Morning Session Wednesday 08:00-10:00

2. Logistics

WNG Meeting called to order by TK Tan (Philips) at 08:00.

The objectives of the session were reviewed.

The IEEE 802 & IEEE 802.11 Policies and Rules were reviewed.
Patents and By-laws read out by TK Tan, together with licensing terms and associated conditions.

There was a single session on Wednesday 17th November 2004.

The agenda was reviewed (**1424r0**).

The minutes from the Berlin 2004 meeting (**1098r0**) were reviewed. There was no discussion on the minutes and no objection to approve as presented.

Move to accept minutes: TK Tan, seconded: Simon Chung, minutes approved.

There were no industry updates at this meeting.

3. Spectrum Agile Radio: 1472r0, Kiran Challapali
This presentation provided a very broad overview of spectrum agile radio. It covered applications of agile radios, the FCC policy modernization and standardization. Spectrum-agile radios operate in radio spectrum originally licensed to other radio systems but that is currently vacant. Licensed radio systems are also referred to as incumbent or primary radio systems, with TV broadcast and radars being examples.

4. Site-Specific Knowledge for Next Generation Wireless Networks: 1478r0, Ted Rappaport

This presentation highlighted the use of site specific knowledge to enhance the prediction of traffic for a wireless network. It outlined the challenges for site specific adoption and discussed how current techniques can be used to effectively perform blind throughput rredictions for a new environment using site specific map.

TK Tan: moved to adjourn. Clint Chaplin seconded.

Motion to adjourn session, no objections.

Session adjourned.

IEEE P802.11
Wireless LANs

Advanced Security SG Meeting Minutes for November 2004 Session

Date: November 14-19, 2004

Author: Nancy Cam-Winget
Cisco Systems
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Phone: 408-853-0532
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Tuesday November 16, 2004

4:00pm – 6:00pm

Chair: Jesse Walker
Secretary: Nancy Cam-Winget

Call to order.

Review IEEE 802 policies and procedures for Intellectual Property.

Agenda – Document 11-04/1431r1

Discussion on the agenda (Doc: 11-04/1414r0) for this meeting:

- C: the agenda should be modified to reauthorize study group. Modify Agenda item 6 to reflect this change.
- C: 04/1214 is draft PAR
- C: will there be a call for presentations?
- Ch: yes, will add a call for presentations into the agenda. Will make modifications and fix slides later.
- Any objections to approving and accepting the agenda? None
- The agenda is unanimously approved.

Meeting objective: develop a PAR and 5 criteria.
Call for Proposals: does anyone have proposals to offer?

- 11-04/1445r0 presentation "Issues of MAC Management security" by Jon Edney

PAR and 5 Criteria discussion:

- Any volunteers to be the SG editor? Kapil Sood volunteers only for life of study group.
- Template was generated by Stephen McCann, made from the PAR submission form in html format only. So, when it is sent to ExecComm, it will be transcribed to html form again….intent is to use this boilerplate for group to fill out.
- C: Do we have a motion to change the name for this group?

- C: this was discussed with great length in WNG. Members felt the focus of this group is to address management frames only as there was some urgency to address this. Would like to understand the process that enabled the naming of this process to occur.
- Ch: not aware of the process. By the Berlin meeting, the name had been changed with ADS, without known knowledge. Investigation is in order.
- C: How can the name have changed?
- C: was in the room when the name was discussed. They could not call it SEC, so it was logical to call it a security study group and then formulated to the notion of an advanced security study group.
- C: can this project live within the task group that is ADS? Does the title need to correspond to the task at hand?
- C: ADS came about as a matter of convenience. It's up to this group to define the PAR.
- C: but it's more than just an acronym. It can send the wrong message and it will see how would like to see the name go back for reconsideration.
- C: having just started a task group with a name no one liked; while it is hard to get rid of, what really matters is the title of the PAR document as that demonstrates what the focus of the group is for.
- C: don't believe there's anything that would disallow the working group to focus on something other than what the task group reflects.
- Ch: perhaps the way to move forward is to ask for motion to accept or change the title.
- C: we can make the title anything we want, but we are stuck with the task group name.

Motion by Dorothy Stanley

Accept the title that is in Section 4 of document 04/1214r0 whose last 3 words end with "Protected Management Frames"

Second: Jon Edney

Discussion on the motion: none
Vote: Yes-38 No-0 Abstain-4

Discussion on Section 5 of 04/1214: Life Cycle is 5 years.

- No discussion

Discussion on Section 6 of 04/1214: Type of Project

- C: this group is stuck with the 'reaffirmation of 2003', which needs to be spelled out explicitly in this section

No objections to move discussion to Section 10.

Discussion on Section 10: Sponsor Balloting Information

- We should come back to discussion of expected date of Submission.

Discussion on Section 11:

- We should defer till later discussion for this section

Discussion on Section 12: Scope of Proposed Project

- Proposed text was drafted in Berlin meeting.

- C: what's the difference between defend and protect?
- C: not clear, but that is the text we drafted in Berlin (during WNG session).
- C: the essence of what we are going to do is in this section. We're not proposing to defend the management frames; propose to change to "This amendment will provide data integrity, data origin authenticity, replay protection, and data confidentiality for selected 802.11 management frames"
- No objections to the above change.
- C: how about "This amendment will define extension that provide….."
- C: is there a specific limitation to the extensions?
- Ch: don't believe we've defined what an extension means
- C: this statement sounds more than a purpose than scope. So, begin sentence with "The scope of this amendment is to provide a mechanism that provide data integrity…."
- C: propose something that's been accepted in PARs before and has a narrowing that we need to discuss. It should begin with "Enhancements to the 802.11 Medium Access Control layer to provide mechanisms that provide data integrity …."
- C: should we limit ourselves to the MAC? The answer is NO since in 802.11i defined stuff above the MAC. Can we exclude PHY and just state enhancements to 802.11.
- C: I'd like to speak for limiting it to the MAC. Because it would be better to not have to reinvent a new key hierarchy and have to go above the MAC.
- C: but that would speak in favor for a particular proposal, but others may exists where there may be changes above the MAC.
- C: what was the scope of 802.11i?
- C: it was vague but limited to the MAC.
- C: how about "Enhancements to the 802.11 Medium Access Control layer to provide mechanisms that enable data integrity …."
- C: make sure we do not prevent discussions that may be out of scope. How about including confidentiality?
- C: someone may want to protect the MAC address.
- Ch: sure if there is a good crypto means to achieve this?
- C: why would it be difficult?
- Ch:because every packet would have to have a different MAC address to enable this
- C: in GSM, someone who is not in the network should not be able to disclose identity.
- Ch: so this would only apply to management frames, since that is our scope?
- C: well, we are trying not to preclude further discussions on other solutions.
- C: change to "Enhancements to the 802.11 Medium Access Control layer to provide mechanisms that enable data integrity, data origin authenticity, replay protection, data confidentiality, and data origin confidentiality for selected 802.11 management frames"
- C: the scope defines exactly what we will be focusing on.
- C: not sure we would want to provide confidentiality for management frames only. Perhaps we can expand the scope later.
- C: we should keep scope simpler to something we can solve.
- C: if we include origin confidentiality, we should expand the scope.
- C: the original point then of changing the name of the group.
- Ch: want to make sure we do have a vote for the scope of this work.
- C: want to make sure we discuss the scope. Members have not wanted to adopt something that was too broad in scope.

- C: a counter situation, where party may decide to push one of the things that may not be germane to the group and hold up progress.
- C: if the group defines that it is a requirement versus scope, then we can withdraw the data origin confidentiality.
- Any changes to scope? Scope currently reads:
- "Enhancements to the IEEE 802.11 Medium Access Control layer to provide mechanisms that enable data integrity, data origin authenticity, replay protection, and data confidentiality for selected IEEE 802.11 management frames"
- C: curious to know what "enhancements" mean, are they extensions or modifications to current mechanisms?
- Ch: any mechanisms that provide data integrity, data origin authenticity, data confidentiality and replay protection would be a topic of discussion we can entertain for the draft.
- C: enhancements is taking something there and modifying it only. Extensions is adding new mechanisms, so perhaps we should add extensions to it as well.
- C: as a point of history is that 802.11i only includes "enhancements" so past history states that this word would enable us to achieve the broader sense of the enhancements.

Motion by Clint Chaplin

Accept "Enhancements to the IEEE 802.11 Medium Access Control layer to provide mechanisms that enable data integrity, data origin authenticity, replay protection, and data confidentiality for selected IEEE 802.11 management frames" as the response to Section 12 of the PAR.

Second: Nancy Cam-Winget

Any Discussion? None
Vote: Yes-38 No-2 Abstain-3

Clause 13: Purpose of Project

- Discussion of Initial Text.

Motion by Clint Chaplin

Accept "To defend selected elements of the IEEE 802.11 management plane from attack" as the response to Section 13 of the PAR.

Second by: Dorothy Stanley

Discussion on the motion:

- C: worried about "management plane", is this a concept in the base standard.
- Ch: it is not a concept defined in the base standard
- C: don't know what it means.
- C: it was already raised in the section before.
- C: would it be better to just say "frames" vs. "plane"

Move to amend by Jon Edney

Change motion to read " To defend selected IEEE 802.11 management frames from attack"

Second: Fred Haisch
No objection to Motion to Amend.

New Motion:

Accept "To defend selected IEEE 802.11 management frames from attack" as the response to Section 13 of the PAR

Discussion continues as commenters want to make further changes to the new motion on the floor and whether it can be updated or modified.

Call to question by Clint Chaplin
Second: Nancy Cam-Winget
No objection to the call to question.

Vote on the New Motion: Yes-30 No-0 Abstain-7

Discussion continues about the text in Section 13. Suggestion is to make the Purpose section read closer to Section 12, the scope. Commenters suggest potential text to read:

> "To improve the security of some or all IEEE 802.11 management frames by defining enhancements to provide data integrity, data origin authenticity, replay protection and data confidentiality."

Discussion of the term "selected" and whether strict identification of which management frames to protect ensued. Concerns that the specification of which management frames is really up to the task group to decide after its inception.
Discussion of the word "selected" being replaced by "some or all" ensues.

Motion by Charles Wright

Move that the text "To improve the security of some or all IEEE 802.11 management frames by defining enhancements to provide data integrity, data origin authenticity, replay protection and data confidentiality." be accepted and replace the previous text as the text for Section 13.

Second: Kapil Sood

No discussion on the motion.
Vote: Yes-30 No-0 Abstain-4

Clause 15: Are there standards or projects with similar scope?

- Document 04/1214 states that 802.11r is similar
- C: this response may open up a can of worms especially in the upper echelons of IEEE. Since the scopes between this study group and TGr are different, this group is legitimate in answering "No".

Clause 16: International Sponsor Organization

- defer to a future discussion

Clause 18: Additional Explanatory Notes for the scope

- C: there is some text missing there?
- Ch: yes, will review it against the template.
- C: The explanatory note must be explicit in defining the item. Is this necessary at all?

- Ch: this is text that came from the form template. But, we can do whatever we want, so we can remove the first paragraph if needed.
- C: which one will finish first TGr or the group that we are trying to create? Not sure we want to place a dependency to TGr.
- C: the text should read that it should not conflict with any mandatory portions of the current standard and published amendments. Suggest to change the text accordingly.
- Stop edits for today. The document will be posted this evening and discussions on the PAR will resume on Thursday.
- C: is there a proposed 5 Criteria.
- Ch: there wasn't a template to borrow from
- C: we can reuse one from previous groups.
- Ch: can we get a volunteer for the 5 Criteria submission

Presentations of document 11-04/1445r0 "Issues of MAC Management Security" by Jon Edney and Stefano Faccin.
Presentation Discussion:

- Q: would there be a means to define a new MAC Address identifier?
- It would be up to the group to decide if this is an area of focus; the presentation was to stimulate thought
- Q: Is it useful to make the class distinction of management frames as they could be class 1 or 3?
- Personally, no, but others may have a different opinion.
- Q: Is this mechanism a means to provide further protection beyond management frames?
- It is a side benefit yes, but the main goal of the proposal is to prevent deadlocks. Although the added benefit is that it does enable STA anonymity.
- Q: on the last slide, who is the STA?
- STA is a non-AP station

Recess until Thursday 4pm.

Thursday November 17, 2004

4:00pm – 6:00pm

Call to order.
Would like to recess until 4:40pm. Are there any objections? No one wants to recess, the group continues.

Other item: discussion of PAR editor and Jon Edney has volunteered to take it over, are there any objections? None.

Agenda Review:

- Modified since there are no presentations, update to continue review of PAR and 5 criteria.
- No objections to agenda modification.

Clause 18 continued:

- Discussions on 3rd paragraph ensue to address concerns of the binding and potential dependencies on TGk and WNM's completion. Suggestions were made to accommodate the concerns by rewriting the 3rd paragraph. Concensus is that the original 3rd paragraph should be deleted and replaced with a new suggested one:

  > The secure use of the mechanisms being developed in TGk and WNM may require the facilities developed under this PAR.

- C: are there going to be functions in WNM that are going to need security for us to address?
- Ch: we are going to design mechanisms for management frames only and not necessarily for all mechanisms that WNM defines.
- C: why do we need to reference TGk and WNM at all? Isn't this going to be more generic?
- Ch: while it can address broader scopes than WNM and TGk, those were the groups that instigated the creation of this group as they were unwilling to address security.
- Proposed change:

  > IEEE 802.11 Task Group k and IEEE 802.11 Wireless Network Management Study Group may take advantage of the mechanisms for protecting management frames developed under this PAR.

- C: experience indicates that you should spell out every abbreviation, like WNM.
- Next discussion is the timeline:
  - Discussion of study group vs. task group status. Comment was made that we proceed as if we were a task group until we are authorized as a task group. Earliest this group would be a task group is May.
  - Call for proposals can happen in May 2005
  - Select proposals in November 2005
  - Initial sponsor ballot in March 2007
  - Submit to RevCom in September 2007

Discussion on Clause 10, 11: none. Responses seem acceptable
Discussion on Clause 16: none. Responses are acceptable

Discussion on Clause 12: quick review; no discussion.

Discussion on Clause 13: quick review

- It reads like it is all or nothing. Though there may be times in which confidentiality is not required.
- Further changes ensued to address the possibility that not all mechanisms are included.

Any more changes to the PAR? None.

Commence discussion on 5 Criteria

- C: it's not clear that we can review this live.
- Ch: how should we proceed? Options are: (a) have conference calls, (b) a group can be tasked to initiate a 5 criteria document
- C: we can subdivide the document and assign them to different groups
- Ch: what's the groups preference?

- C: given the amount of time and given that we can not get the document approved then we should just divide it into sections and ask for volunteers
- Do we have volunteers? Jon Edney, Mike Moreton, Sandy Turner, Jesse Walker, Nancy Cam-Winget
- C: would we consider having a single editor?
- C: Jon Edney will be the editor for the document
- C: do we need a teleconference?
- Ch: it's not clear we need one
- C: lets set a date for the contributions to be coalesced and placed into the reflector
- Ch: any objections to having document by Jan 10th in the reflector?
- Section partitions are as follows:
    - 6.1 Broad market potential : Jon Edney
    - 6.2 Compatibility : Sandy Turner
    - 6.3 Distinct Identity : Mike Moreton
    - 6.4 Technical Feasibility : Nancy Cam-Winget
    - 6.5 Economic Feasibility : Jesse Walker

Discussion on the PAR document:

- C: is this document in the form as required by ExComm and NASComm?
- Ch: this is the form that was provided by Steve McCann
- C: not sure how it plays with the current NesComm form, since clause 18 is different.
- Ch: ok, we should investigate this
- C: suggest we should abide by the form available on the net
- Ch: yes, this is where we had a deletion problem, so we do need to clean this up.
- Ch: please provide Jon Edney with the URL for the form to review.
- Any objections to having the editor reconcile the PAR forms? None

Motion by Mike Moreton
Motion: To request the Working Group to extend the ADS Study Group through the March 2005 meeting and forward to the Executive Committee for Approval
Second by Russ Housley

Discussion on the Motion: None.
Vote: Yes:18 No:0 Abstain:0

Motion by Clint Chaplin
Motion to adjourn
Second by Nancy Cam-Winget

Vote passes by unanimous consent.

Attendance for the Advanced Security Study Group:

Jesse Walker	Nancy Cam-Winget	Mike Moreton	Clint Chaplin
Jouni Malinen	Fred Haisch	Paul W Panish	Lars Falk
Thomas Haslestad	Gus Raju	Steve Whitesell	Yaron Peleg
Ken Steck	Fujio Watanabe	Yasuhiko Inoue	Dennis Volpano
Veera Anantha	Mariko Yoshida	Jason Luther	Ted Rappaport

Marian Rudolf	Justinian Rosca	William S. Mueller	Matthew Kuhfahl
Kevin Hayes	Mike Wilhoyte	Satoshi Oyama	Thomas M Kurihara
Charles Wright	Ron Moore	Sten Sjoberg	Steve Fantaske
Bill Marshall	Bob Hall	Bill McIntosh	You Sung Kang
Jon Edney	Tim Godfrey	Sandy Turner	Stefano Faccin
Kapil Sood	Hesham Elbakoury	Andrew Myers	Henry Ptasinski
Dorothy Stanley	Chris Hinsz	Paul Nguyen	Mike Geipel
Haixiang He	Pat Calhoun	Russ Housley	Donald Eastlake