

Tentative Minutes of the IEEE P802.11 Working Group

**Plenary meeting
West Palm Beach, FL
March 6-10, 1995**

Monday, March 6, 1995, 3:45 PM

The meeting was called to order at 3:45 PM Vic Hayes, chairman IEEE P802.11¹⁾ in the chair. Carolyn Heide secretary. Chris Zegelin managing document originals and copying, Jon Rosdahl managing distribution and pigeon hole organization. Leon Scaldeferri handling the attendance list. The agenda document for this meeting is 802.11-95/13.

Objectives for this meeting

Resolve ballot results; Conformance testing; Comments on FCC NPRM.

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1. Opening

1.1 Roll Call: People in the room were invited to introduce themselves.

1.0 Secretary: Carolyn Heide will do it and resume the position permanently.

1.2 Voting rights:

Voting at the working group level is by voting members only. Chair may permit observers to participate in debate. To become a voting member:

- participate in at least 2 out of 4 consecutive plenary meetings. Voting rights start at third meeting
- participation in at least 75% in meetings, in the room
- one interim may be exchanged for a plenary
- Voting members will get a token to be used at votes

Voting rights can be maintained:

- by participation in 2 plenary meetings within 4 consecutive plenary meetings
- one interim may be substituted for a plenary

Voting rights may be lost:

- after failing to pay the conference fee
- after missing two out of three consecutive letter ballots

Current status:

103	Voting members
10	Voting membership lost
21	Nearly Voting members
74	Aspirant Voting members

1.3 Attendance list, Registration: The attendance list was distributed - 75% attendance according to the attendance list is required to qualify for attending the meeting as a whole, so make sure to sign the book. Copies of the attendance list are handed out before the end of each meeting.

- important for administration of voting rights that the attendance book is used properly.
- sign per meeting (morning, afternoon, evening)
- place initials. Do not cross or underline.

1.4 Check Email addresses: please check your email regularly. Please strike your address if its no longer valid.

1.5 Logistics: Document distribution is done using pigeon holes - you will find your copies and messages in the referenced location in the expanding file folders in the slot *in front of* your name.

Document distribution:

- sign in for a slot, remember the letter and number
- pigeon holes are file folders with a letter id on each folder and a number on each slot
- in each folder are numbered slots, each of which is 'owned' by a person
- each person owns slot in front of number

Coffee breaks at 10 AM and 3 PM. Lunch noon to 1 PM

1.5 Other announcements

1.5.1 FCC published the Report and Order in the ET Docket 94-32 case, 50 MHz to private use. Contains an NPRM with some relevant questions for us:

1. Specific comments to combine the use of the 2390-2400 MHz band for both UPCS and Part 15 devices; should provide recommendations on appropriate technical standards

- 2. Is the Space research operations at 2380 MHz sufficiently protected?
- 3. Are rules required to share between Part 15 devices and amateurs?
- 4. Prohibit use of 2402-2417 be prohibited 30 miles from NAIC?
- 5. Restriction of use of 2412-2418 MHz harmonic for radio astronomy

1.5.2 Recommendations January meeting: Tentative report:

54 members returned ballot

- 1 96 %
- 2 89 %
- 3 88 %
- 4 98 %
- 6 90 %
- 7 85 %

1.5.3. Workshop WINForum/Federal User Forum: Week after May interim. Request for papers for asynchronous Wireless. Subject, see Vic Hayes.

1.5.4 Auerbach: plan wireless communication report, looking for chapter authors, see Vic.

1.5.6 Extensions of PAR (4 year time expired)

P802.11 schedule adopted in March 1994:

Item	Target	Status
User requirements	Jul 92	completed
Establish Architecture	Nov 92	completed
First draft Standard	Jul 93	completed
Final draft Standard	Mar 94	Jul 95
Submission to ISO/IEC	Jul 94	Nov 95
First draft Test Suites	Nov 93	Mar 95
Final draft Test Suites	Jul 94	Nov 95
Submission to ISO IEC	Nov 94	Mar 96

1.5.7 5.2 GHz activity at WINForum

1.5.6 Recognition: to Ed Geiger, Dean Kawaguchi and Barry Dobyns.

2. Approval of the minutes of the previous meeting

- 2.1 Lake Tahoe meeting, Document IEEE P802.11-94/281:** approved by consensus
- 2.2 San Jose meeting, Document IEEE P802.11-95/10:** approved by consensus
- 2.3 Matters arising from the minutes:** none.

3. Reports

3.1 The Executive Committee, by Vic Hayes

Request for 802.11 ARC still in progress.

Long discussion on Confirmation Ballot process.

Further voting on Operating Rules 802. Meeting on Wednesday noon. New set available Thursday 8 AM for approval.

Armstrong liaison letter to ETSI, thanks but no thanks
- publish agenda point time to ExCom for discussing ETSI liaison.

Meeting guidelines
- Tuesday morning available for feedback from 802.11 .

July 1996 meeting site, some inconveniences:
- Netherlands, Twente university campus for meeting, but no one large hotel available;
- Tuesday morning available for feedback from 802.11 .

3.2 The Editors, none

3.3 The Simulators - delayed

3.4 The Letter Ballot Results of Draft Standard, 95/18 by Vic Hayes

Voting members: 94 returned (84%):
17 approve, 66 disapprove, 11 abstain

4 other members:
2 approve, 1 disapprove, 1 abstain

Conclusion: Not approved for sending to sponsor ballot.

3.5 San Jose meeting finances, none

3.6 The Letter Ballot Results from San Jose meeting, by Vic Hayes

See section 1.5.2

4. Review of Contributions: document list is document 95/35.

5. Adoption of Agenda for Monday: Approved by consensus

6. Unfinished Business:

6.1 Comments on Draft standard (skip)

6.2 Method to come to resolution

6.2.1 Editors' meeting (last night) results:

1. Editors' change ability

Motion #1: To authorize the editors to make appropriate changes throughout the draft standard as a result of a specific approved technical change.

Moved by: Ed Geiger
Seconded by: Barry Dobyms

Motion 1 Discussion: none

Approved: 46 Opposed: 0 Abstain: 1 **Motion #1**

2. Should we set a priority on work items by setting goals.

Motion #2: resolved that 802.11 will order its work in responding to the comments of the letter ballot in the following order: 2. ad hoc

networks frame exchange; 1. AP-STA frame exchange; 3. PPCF; 4. roaming; 5. everything else. For the purpose of producing a rational standard in a reasonable amount of time.

Moved by: Barry Dobyms
 Seconded by: Ed Geiger

Motion 2 Discussion:

Arguments against are that all No's must be responded to in the long run, so this would just delay as the comments are already sorted by section. This would have been a great idea for how to proceed a year ago.

Vic rules the motion technical.

Call the question: Jon Rosdahl, second Barry Bobyns (many ayes, one nay)

Approved: 9 Opposed: 31 Abstain: 8 *Motion #2 fails*

3. Talked about subgroup chairs suggesting to people that they bring submissions on items that need clarification's. Not bring a paper or else, but ask for volunteers to bring papers on subjects.

6.2.2 Other discussion

When comments are found that say the same thing; choose one wording submitted as the solution for all. Anyone not in the meeting that decided the solution to their comment has the opportunity to vote against the resolution at plenary.

Format of responses to technical comments - add a column to the comments document for the response. Place in that column accept/reject (or temporarily defer), and the text that is to be added to the draft, and any relevant motion references. Where there are duplicates, refer to other comments.

Comments which are not marked as either E nor T will all be considered technical.

Motion #3: **That all comments marked editorial be refereed to the editors for processing, with them having discretion to make changes and take the responsibility to return back to group any comments that should have been marked technical.**

Moved by: Tom Baumgartner
 Seconded by: Barry Dobyms

Motion 3 Discussion:

Call the question: Barry Dobyms, second Tom Baumgartner (all ayes, no nays)

Approved: 36 Opposed: 0 Abstain: 5 *Motion #3 passes*

If anyone's comments are not in the comments documents, see Vic.

All comments will be handled at the subgroup level, and only brought to the working group if they decide to do so. Each section is being handled by a group:

Section	Group Leader
1 & 2	Dave Bagby
3	Tom Siep
4	Simon Black
5	Pablo Brenner
6	no one
7	Bob O'Hara
8 & 9	Ed Geiger
10	Jim McDonald
11	Jan Boer
12	Barry Dobyms

6.2.3 Agenda adjustment if needed: no objections to working by agenda in 95/13

6.3 Liase with ITUR, by Peter Chadwick: meeting at which this will be discussed has been delayed by up to 2 years.

6.4 ETSI liaison: excom asked for proposal for response. Possibly a subgroup with at least Vic as a member could handle this.

Motion #4: To adjourn.

Moved by: Ed Geiger
 Seconded by: Wayne Moyers

Approved: 23 Opposed: 14 Abstain: 1 *Motion #4 passes*

8. Adjourn for subgroups - 6:50 PM

Tuesday, 7 March, 1995

MAC subgroup & PHY-FH, PHY-DS, PHY HSFH, PHY-IR ad-hoc groups

Wednesday AM, 8 March, 1995

MAC subgroup & PHY-FH, PHY-DS, PHY HSFH, PHY-IR ad-hoc groups

**Wednesday PM, 8 March, 1995
 Full Working Group**

The meeting was reconvened at 1 PM, by chairman Vic Hayes, with Carolyn Heide secretary.

Announcements

Tornado watch in progress;
 Pick up standards at the IEEE office as usual;
 Ed Geiger & Barry Dobyys working on section 9 at 8 PM in room 1022.

Reports from Subgroups re Their Operating Plan for Rest of Week

MAC Group, Dave Bagby

Working on sections 1,2,3,4,5 and 7. Some through all comments, some still not through all. Some easy recommendations have been made. After this meeting comments with responses added are going to reproduction, so they will be available tomorrow AM. Text to be proposed to put into the draft is being created, will be available near the end of today, but not going to reprint the draft here.

There are so many comments it isn't practical to go through each item for an individual vote in the plenary. So the group's majority (though not unanimous) opinion is to look for block approval for groups of changes. Trying to capture enough of the work done this week to get a new document to work on in May.

DS Group, Jan Boer

Announcement - Paul Strusaker resigned as chair & editor. Jan will take both positions.

Went through technical comments of section 11. Did about 75%, categorized as accepted or rejected. Try to be finished by tomorrow AM, adding a column with response to the comments document.

FH Group, Jim McDonald

Reviewed comments in sequence after highlighting contentious areas. About 1/3 through comments. On technical issues, voted on how to instruct editors to resolve, or deferred. Will continue until tomorrow AM, assigning people to make submissions on difficult issues. Can present issues resolved to the group's satisfaction at any time - approximately 25 items. Don't have corrective text, but do have motions.

Would like to have editors amend the text, then that can be reviewed and voted on at the next meeting.

IR Group, Barry Dobyys

Processed all comments editorial and technical. All but one have been accepted, or the author has agreed that issue is resolved. Comments/responses document (95/45) as well as an edited section 12 (95/46) will be available today at about 5 PM. Will ask plenary tomorrow to consider 95/45 as the comment responses and ask for 95/46 to be included in the standard.

Schedule Review & PAR Extension

Schedule proposed by Vic:

Date	Draft Revision
March	d1.1
May	d1.2
July	d2 (letter ballot)
November	d3 to sponsor ballot
March	96 to standards board

Motion #5: 802.11 adopt this schedule and respond to nescom with a request to extend our PAR to accommodate this schedule for the base stand.

Moved by: Barry Dobyms
 Seconded by: Dave Bagby

Motion 5 Discussion: (1 minute per person)

Arguments against: There are mismatches between the PAR and draft that will take a lot of time to resolve. hard to achieve this schedule with those to do. Also that there are inter-group issues that will not be even dealt with this week. When we decided to do d1 we said it would a be good way to get organized and have feedback regardless of the fact that the document was clearly not finished. The d2 policy needs to be changed aim for a complete and consistent standard. This schedule doesn't allow for that.

In favor: the group needs goals, however aggressive.

Call the question: Dave Bagby, seconded Barry Dobyms (many ayes, a few nays)

Approved: 36 Opposed: 12 Abstain: 5 *Motion #5 passes*

Motion #6: To adjourn until tomorrow at 1 PM.

Moved by: Dave Bagby
 Seconded by: Tom Baumgartner

Approved: many ayes Opposed: 2 nays *Motion #6 passes*

Adjourn - 2 PM

Thursday AM, 9 March, 1995

MAC subgroup & PHY-FH, PHY-DS, PHY-IR ad-hoc groups

Thursday PM, 9 March, 1995

Full Working Group

The meeting was reconvened at 1 PM, by chairman Vic Hayes, with Carolyn Heide secretary.

14. Opening

14.1 Announcements/Domestic Items:

1. **Plenary Site Guidelines** - gathered information for the excom about meeting preferences
2. **July 1996 meeting in the Netherlands** - gathered information for excom about acceptability of this meeting site.
3. **ETSI Liaison Letter (95/51)** - Objection to sending that letter out? None.
4. **802 Operating Rule Change** - to empower a vice-chairman to vote at 802 in the absence of the chairman. Vic may have Jon Rosdahl do this.
5. **Intellectual Property**

- The final standard needs to have a notice if IP is needed to implement the standard
- License agreements need to be filed at IEEE
- IEEE will check the license (non-discriminatory and reasonable)

Now that the technical contents of the draft standard has reached this state, the Chair would like to encourage all members to identify any material in the specification that may have been protected by Intellectual Property Rights, such as patents or patent applications. The Chair encourages members to share the name of the patent holder and as much technical information as possible.

- Interested to know all IP known to members
- Private, non-expert observation: IP may render un-enforceable if they were not identified when discussed in meeting.

6. **Mailing Date:** 1st mailing March 10 1995; 2nd mailing March 31 1995 (must have documents in Utrecht on March 29 1995).

7. **Other Announcements** - none

14.2 **Document List Update:** everybody give electronic copies to Chris Zegelin.

14.3 **Agenda Adjustments:** agenda, as modified, adopted by consensus

15. Reports

15.1 **MAC Group**, by Dave Bagby

Misc Subjects

Nov, Jan MAC minutes approved

Papers / subjects / motions

D1 LB comment processing.

MAC Tech Rec Hi-lights - Sec 1

Rec:

Wording improvement

MAC Tech Rec Hi-lights - Sec 2

Rec:

Fixed missing state transition

Consistent sec 1 with sec 2

Under disc:

Default Authentication

WEP / auth mandatory

MAC Tech Rec Hi-lights - Sec 3

Rec:

TB comments - update sec 3 to be consistent with sec 5

Service class primitives updated to match new 802.2

Disc:

Connection service defs - to be disc

Security - under discussion

MAC Tech Rec Hi-lights - Sec 4

Rec:

Improved writting (style)

Mgt frames: driven by other sections; elements remain - used for frame optional info

Frame field definitions improved; Addressing description improved

Under disc:

- Even octet boundaries
- Beacon interval in term of # hops
- Reorg of type and subtype number allocation

MAC Tech Rec Hi-lights - Sec 5-5.2

Sec 5 (thru 5.2 minus a tad not gotten to yet)

Recs: Define terms used that were insufficiently defined.

- General reorg to improve chapter
- Backoff details improved
- Timer naming changes to reduce confusion in text.
- Updated to remove obsolete dup detection section.
- Confusion over use of word "poll" repaired.
- DTBS / QOS stubs removed.

Under disc:

- Gap timing values
- Medium free vs slot boundary interaction
- Apple implicit patent FUD
- Multi-rate details
- Level of detail needed on MAC service primitives, checking other std for guidance.
- UPCS etiquette vs MAC

MAC Tech Rec Hi-lights - Sec 5.4

Rec:

- WEP section updated
- Rec move 5.4 into 3 for clarity (when eds can do easily).
- Avoid 802.10 full impl while remain compat with 802.10 on top.

Disc:

- Optional vs mandatory.
- PRNG still open.
- Implicit auth coupled to WEP, sec 3 etc.

MAC Tech Rec Hi-lights - Sec 5.5,5.6

Rec:

- Cleaned up bad references re MPDUID etc

Disc:

- remove frag for hop quantum stuffing

MAC Tech Rec Hi-lights - Sec 7

Rec:

- Updated 7.1 (others not gotten to yet)
- Timer sync defined
- Beacon gen passive and active scan
- Probe resp procedure
- Init and sync with BSS mech defined
- Ad-hoc net coalesce
- Timing sync between mac and FH defined.

Under disc:

- Some specific timer values
- Mac mgt state machine

Motion #6: 802.11 send out a letter ballot for (closure before the May meeting)
 1. Recognizing that D1 L.B. comment process is incomplete.
 2. In order to capture the progress made in March mtg. The question is 'are the changes a net improvement over D1', not 'is everything perfect'.
 3. Do you approve adopting the changes from March mtg into D1.1 on a document by document.

Moved by: The MAC subgroup
 Seconded by: Tom Baumgartner

Motion Discussion:
 Clarification that item 3 says 'document' - that means the documents which were produced by the small working groups which contain modified sections of the draft.
 There is a suggestion that the ballot should have a comment are so you could say yes with comment. The only reason this is a letter ballot is to give everyone time to read things before they vote on them.
 This is the category of letter ballot such as those that ratify decisions made at plenary, not such as approving a draft.
 All section 'owners' should give a title to Chris Zegelin.
 Call the question, Tom Baumgartner, second Carolyn Heide (all ayes)

Approved: 47 Opposed: 0 Abstain: 2 *Motion #6 passes*

15.2 PHY Group

0. General PHY Group, by Jim McDonald

Motion #7: To approve document 94/278, minutes of the PHY for Nov 94

Moved by: The PHY Group
 Seconded by: Peter Chadwick

Motion #7 passes by consensus

Motion #8: To approve document 95/08, minutes of the PHY Jan 95.

Moved by: The PHY Group
 Seconded by: Larry Zuckermann

Motion #8 passes by consensus

1. IR PHY Group Report, by Barry Dobyms

Comment Summary:
 technical comments - accepted 24, rejected 10, withdrawn 1
 editorial comments - accepted 47, rejected 5, defer 2

Straw poll indicates that people want the issues to go out in letter ballot for voting. Rather than block voting all the changes, or going through the rejects individually and block voting the accepts.

2. FH Group Report, by Jim McDonald

Progress with Comment Resolution
 Editorial comments assigned to editors without committee review

Document 95/052 Distributed. This is a list of the Technical Comments Reviewed by the Frequency Hop Group.

95/052 provides Section number and commenter reference for those technical comments that have been reviewed to date by the Frequency Hop Group

Some Comments were resolved as indicated on the resolution list of 95/52

Some comments were placed on the Issues list of 95/053. Many of these were resolved on Thursday morning. Summary to follow

Resolution in the following manner

Some Comments were the subject of a motion that passed by > 75% majority. Text representing these motions will appear in the April 95 Letter Ballot as changed text in portions of larger segments of the draft standard.

Some Comments were the subject of a motion that passed by > 50% majority, but less than 75%. Corrected text for these will appear has separate motions in the April 95 Letter Ballot.

3. DS PHY Group Report, by Jan Boer

- discussed all Technical comments (45)
- resolved 80%
 - deferred (after discussion)
 - scrambler
 - CCA
 - Tx/Rx Rx/Tx turnaround times
 - MAC/PHY interface issues
- resolution embedded in comment text and minutes
- 3 "main" technical changes to be ratified in plenary:
 1. channel frequency plan: channels on raster of 5 MHz from 2412 up to 2462
 2. define PER instead of BER
 3. minimum Tx level 1 mW

4. Section 8 Report Group Report, by Dean Kawaguchi

Had a short meeting Tuesday night. Listened to some comment authors. No motions or recommendations made. Information may be given to the PHY groups from this discussion. May use email to discuss the comments on these sections.

There is a discussion of also posting collections of the email discussion on the FTP server. This may be done bi-weekly.

There will be no section 8 text in the letter ballot

5. Section 9 Group Report, by Ed Geiger

Ed was the only person in the Section 9 group, he made good progress. There will be no section 9 text in the letter ballot. There may be an email discussion on these issues.

16. Unfinished Business

16.1 Recap of Output Documents: many sections for letter ballot.

16.2 Recap of Document Distribution: There are n documents requiring special attention.

16.3 Next Meeting

Objectives:

To resolve the remaining issues from the letter ballot on D1.

16.5 Other Intermediate Meetings: none

16.6 Future Meetings: as scheduled

17. New Business: none

Motion #: To adjourn.

Moved by: Peter Chadwick

Seconded by: Tom Baumgartner

Motion #9 passes by consensus

18. Closure - meeting adjourned at 3:15 PM.

Tentative Meeting Schedule

Date	Month	Year	Place	Type	Location	Host
8-11	May	1995	Utah	Inter	Hilton	Novell
10-14	July	1995	Maui, HI	Plenary	Hyatt Regency	
28-31	Sept	1995	Chicago	Inter	Marriott	Motorola
6-10	Nov	1995	Montreal, PQ	Plenary	Queen Elizabeth	
11-15	March	1996	La Jolla, CA	Plenary	Hyatt Regency	
8-12	July	1996	Netherlands	Inter	?	
11-15	Nov	1996	Vancouver, BC	Plenary	Hotel Vancouver	

Appendix 1

Attendance list

<u>First name</u>	<u>Last name</u>	<u>Status</u>	<u>Company</u>	<u>communications</u>
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Appendix 1

Attendance list

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Mr. ANDY J.	LUQUE		Open Communications Technology	+1 503 389 6512
Mr. RONALD	MAHANY	voter	Norand Corporation mahanyr@norand.com	+1 319 369 3552

Appendix 1

Attendance list

<u>First name</u>	<u>Last name</u>	<u>Status</u>	<u>Company</u>	<u>communications</u>
Mr. BOB	MARSHALL	voter	Phillips Semiconductors marshall@sigscvl.scs.phillips.com	+1 408 991 2722
Mr. JOSEPH N.	McCORMICK		Continental	+1 913 451 6161
Mr. JIM	McDONALD	voter	Motorola Inc. jim_mcdonald@wes.mot.com	+1 708 576 3169
Dr. AKIRA	MIURA		Panasonic Technologies Inc. miura@tadw.research.panasonic.com	+1 415 858 1000
Mr. ADRIANO J.	MOREIRA	voter	Universidade de Aveiro adriano@ua.pt	+351 34 381937
Mr. DANIEL J.	MORELLI		Telxon dmore@teleng.eng.telxon.com	+1 216 867 3700
Mr. WAYNE D.	MOYERS	voter	WiSE Communications Inc wayne@tetherless.com	+1 408 338 7562
Mr. BOB	O'HARA	voter	Advanced Micro Devices bob.ohara@amd.com	+1 408 749 4952
Mr. FRANK	O'NEILL	voter	LXE Inc. fon1477@engult.lxe.com	+1 404 447 4224
Mr. MITSUJI	OKADA	voter	NEC Electronics Inc. mokada@asic.mtv.nec.com	+1 415 965 6549
Mr. JIM	PANIAN	voter	IBM Corporation jpanian@ralvm6.vnet.ibm.com	+1 919 254 4609
Mr. SHUKI	PERLMAN		Digital Equipment Corp shuki@isv.dec.com	+972 2 892555
Mr. LARRY	PETERSEN		AMI Semiconductors lpeterse@poci.amis.com	+1 208 234 6735
Mr. AL	PETRICK	voter	HARRIS Semiconductor apetrick@cmail.mis.semi.harris.com	+1 407 729 4944
Mr. PAUL	PIRILLO	voter	AT&T GIS paul.pirillo@atlantaga.attgis.com	+1 404 623 7505
Mr. MIKE	POLLMAN		Hittite Microwave	+1 617 933 7267
Mr. JEFF	RACKOWITZ	voter	INTERMEC Corp. jeffr@intermec.com	+1 206 348 2600 x6307
Ms. MIRI	RATNER		LANNAIR mirir@lannet.com	+972 3 6458493
Mr. JAMES A.	RENFRO	voter	Raytheon Company renfro@ed.ray.com	+1 508 490 1934
Mr. JON WALTER	ROSDAHL	voter	Novell Inc jrosdahl@novell.com	+1 801 429 3183

Appendix 1

Attendance list

First name	Last name	Status	Company	communications
Mr. CHANDOS	RYPINSKI	voter	LACE Inc. rypinski@netcom.com	+1 415 389 6659
Mr. LEON S.	SCALDEFERRI	voter	NSA R22 lsscald@alpha.ncsc.mil	+1 301 688 0293
Mr. GLEN	SHERWOOD	voter	INTERMEC Corp. glens@intermec.com	+1 206 356 1791
Mr. THOMAS	SIEP	voter	Texas Instruments siep@hc.ti.com	+1 214 995 3675
Mr. DON	SLOAN		Aironet dons@telxon.com	+1 216 665 7917
Mr. THOMAS G.	SNOW		Aironet tsnow@telxon.com	+1 617 449 2111
Mr. MARVIN	SOJKA	voter	Aironet Wireless Comms. Inc. msojk@telxon.com	+1 216 665 7918
Mr. JOHN	SONNENBERG	voter	Pulse Engineering Inc. johnsonnenberg+asdcorp%pulse@mcimail.com	+1 619 674 8360
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Mr. RYAN H.	TZE	voter	Toshiba America Info Systems Inc. ryant@tais.com	+1 714 587 6769
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