IEEE 802.11
Wireless Access Method and Physical Specification

DSSS PHY Adhoc Group Meeting
Monday November 8 - Thursday November 14

Monday PM

The meeting started at 8:15 PM with Jan Boer as the chairman, minutes Don Johnson

The first order of business was the introductions of attendees.

The following documents were recognized:
- IEEE 802.11 93/185 By Paul Strusaker
- IEEE 802.11 93/207 By Jan Boer
- IEEE 802.11 93/187 By Kamilo Feher
- IEEE 802.11 93/189 By Shuzo Kato
- IEEE 802.11 93/198 By Steve Shear

The sequence of discussion and time estimates was established as:

Paul S--	20 minutes
Jan Boer	20 min
Kamillo Feh	20 min
Shuzo Kato	15 min
Steve Shear	10 minutes

The authors made the time estimates.

The chairman proposed that we finish the presentations at this session. This was agreed and a provision for a short question period during or after each presentation was agreed.

The minutes of last meeting were accepted by voice vote with no nays.

Presentations then started. There were a number of questions after each. The minute taker didn't copy all. Questions but includes those that were captured.

Paul Struhsaker presented document 185 which opposed the use of offset PSK modulation.
Kamilo: Why not use different spreading codes on I and Q?
Paul: Only the code and it's inverse are available.
Kamilo: Did you demonstrate DQPSK at 1 watt?
Answer: No, only 100 mw can be used in Europe and Japan.
Kamilo: I'm talking about the US.
Paul: Telesystems haven't published how they do their engineering design. Nor will they.
Kamilo: You are talking about a 3 dB disadvantage for OQPSK. You are getting a 9 dB penalty (note taker missed the arguement).
8:52 end

Jan Boer presented document 207 which opposed the use of offset PSK modulation.
Kamilo: Question to Jan and Paul, you said offset PSK has a 1 dB disadvantage. I take akes issue with this. Kamilo said he had simulated the situation and that offset PSK was as good or better than without offset.

Kamilo also questioned the delay spread sensitivity conclusion. He said that when the situation had been simulated he will believe it. Jan said that it should be evident without extensive simulation.

Shuzo Kato Paper 198 9:29
9:38 paper presentation ends
Kamilo 2 questions
1 did you get your information from simulations answer - no
Another person - what filtering was used to achieve the 7 dB improvement.
questions end at 9:40

Kamilo Feher 9:41 paper 187
9:57 ask for questions
Question - have you done offset QPSK with direct sequence?
Claims Qualcomm designs for 100 microseconds delay spread.
10:13 ends

Steve Shear Cylink Paper 198 10:14
10:20 presentation ends
On a question what spreading sequence:
32 chips 2 symbols per sequence is the response.
Presentations finished at 10:23

Tuesday PM DS PHY

1:10 start Jan Boer as Chairman
Delay to pick up papers
1:15 Shuzo Kato to present more information
Paper 189 clarification
Foil presented September proposal compared to November
Paul S: the Lanair proposal - he disagrees with it - the way they say it don't make sense. Does Shuzo also disagree?
Paul S proposes a compromize:
- allow both standards (OQPSK and DQPSK) to exist
Signalling will be in the Phy header
Basically asks that we provide both
Start out all frames with 1 Mb/s DBPSK

Kamilo Feher - Speaks in agreement - presents a foil
Passed out copies of the foil
Always have the ability to interoperate at the 1 mb/s fallback rate.
Paul: all broadcast packets are at DBPSK. The 1 mb/s is a commor signaling rate - not a fallback.
Kamilo Feher don't agree with DQPSK
Much dispute about just what DQPSK is. Kamilo says the technique we have previously described is not DBPSK.
Maurice France - Let us look at the proposed standards and just see what the differences are.
Dean - OQPSK is constant envelope, can use non linear amplifier; DQPSk - more robust against multipath.
Kamilo agrees just use DBPSk for the 1 mb/s. He proposes to adopt DBPSK 1 Mb/s rate, 11 chip and as the basic interface rate and support DQPSK and/or OQPSK at 2 mb/s, (11 chip per I and Q) as the IEEE 802.11 DS PHY standard.
Jerry Loraine Symbionics re wording
1.) The equipment shall operate at 1 mb/s and 2 mb/s using 11 chip coding.
2.) The 1 mb/s rate modulation scheme shall be DBPSK.

3.) The 2 mb/s rate modulation scheme shall be at least one of the following:
i.) DQPSK (as specified in document 93/145)
ii.)OQPSK. (as specified in sub-issue 14a).

Motion Steve Schear, Bob Buaas seconded:
Reopen the issue 14 in order to adopt the above wording.
15, 0, 2 motion carries

Tom T moves, Bob Buaas seconded:
We adopt Jerry's wording for the sub-issue of modulation(14).
Jan can't vote for motion because .5 chip offset OQPSK won't work.
Kamilo - don't decide now on the amount of offset.
14, 0, 4 passed

Steve Schear moved Bob Buaas second motion to close issue 14 on modulation.
16, 0, 3

PM Return from break

Go thru document 93/83r2 Daft proposal DS and FH
Issue 5 wasn't marked closed, this is a mistake, all agreed it is closed.
ditto issue 8.

Issue 9: receiver maximum input level.
Jan proposes -4 dBm, this gives separation between Tx and Rx 1/2 meter; based on 30 dBm (1 Watt) Tx level, 40 dB isotropic loss (for omnidir antenna) at 1 meter (or 34 dB at 1/2 meter (6 dB per distance doubling)).
Motion to close issue 9 with -4 dBm as the level.
Tom T 2nd Steve Schear
13, 1, 1 passes, closes issue 9

Issue 10.
10b. Reworded to apply a signal 2 dB above the threshold and inject a signal x dB above the receive signal.

Motion Paul S motion I second
Accept the langauge as modified for item 10b: 40 dB at 10 exp -5 measured by the following method: input an inchannel receive signal level at 2 dB above the level specified in item 8; set an ajacent signal modulated in the same fashion to a level 42 dB above the level specified in item 8; The BER shall be better than 10 exp -5.
13, 0, 1 passed.

Item 14 worded to agree with earlier agreements. (Modulations)
Add 14a. OQPSK Specification.

Motion to reopen Dean K, second by Paul S
Reopen issues 15 and 16.
14, 0, 0 Passed

Motion Kamilo F., Second Tom T.
Remove item 16 for direct sequence and change item 15 to 1 Mb/s and 2 Mb/s and close issue issue 15.
14, 0, 0

Motion by tom T, second Paul S.
Change 17a to "Chip Clock Frequency Accuracy" and close the issue.
13, 0, 1 Motion carries

Meeting tomorrow at 8:30
Meeting adjourned at 5:15 PM

Wednesday,November 10, 1993, AM
0850 Minutes taken by Maurice France
Meeting opened and continued on original agenda from previous day's meeting.

Next Item: Preamble/header
Jan led discussion on proposal /145
Paul S. presented fixed length header approach. His presentation was modified with discussion in group and was resolved into the following:
Preamble

(A.) Synchronization Field: 128 bits of "ones"
(B.) Unique Word: 16 bits=Octal 2717 (from doc 93/143)
(C.) 802.11 Signal Bits:

Basic Rate	11000000	1 Mbps DBPSK
Option	00110000	2 Mbps DQPSK
Option	00001100	2 Mbps OQPSK

(D.) Service Bits: 8 bits used at vendors discretion
(shall be all "zeros" for 802.11)

MAC Packet Length: Max length (in bytes) TBD by MAC
End Delimiter: Use both
End (drop) in correlation
Unique 16 bit pattern
plus byte alignment of data
Drop of correlation shall be determined within 16 bits or 2 bytes.

Tom T. moved to amend 18 to:
second by Bob B.
18: Preamble Length(bits)
18a: Preamble content
18b: End Delimiter
10,0,1 passed

Tom T. moved to make 18 read as follows:
second by Bob B.
18: Preamble Length(bits)
160 bits sent at 1 Mbps DBPSK
10,0,1 passed

Tom T. moved that 18a should read as follows:
Bob B. seconded the motion
18a: Preamble content
(A,B,C,D as described above)
10.0.1 passed

Tom T. moved to add 18c rate change
second by Bob B.
11,0,0 passed

Bob B. moved to make 18c read:
All symbols following the PHY preamble shall be at the rate indicated in 802.11 signal bits.
second by Tom T. 11,0,0 passed

Tom T. moved that 18b should read as follows:
seconded by Bob B.
18b: End Delimiter

The end of frame shall be determined by presence of BOTH:
- End of message word
- Loss of correlation

Loss of correlation shall be detected within 16 bits from the end of message word.
The end of message word shall be 16 bits in length of value (1111001110100000) octal 171640.
The EOM immediately follows the last byte of the MAC data (MPDU).
The end of frame indication shall be asserted during the 4th byte from end of the MPDU.
The transmitter shall be disabled immediately following transmission of end of message.
10,0,2 passed

Jan moved that we create item 3c to be called "data scrambler".
Seconded by Bob B.
10,0,2 passed

Jan moved that item 3c read as follows:
seconded by Tom T.
3c: Data Scrambler: All bits transmitted by the PHY shall be scrambled using the following polynomial $1+X^{-4}+X^{-7}$, as described in doc 93/37
Jan changed his motion not to close this item.
12,0,0 passed

Issues for next meeting
adjacent channel rejection
TX RX switching time
Frame to Frame time

Summary of progress was reviewed

Respectfully submitted,
Maurice France

Thursday AM

Extra meeting, minutes taken from overhead sheets.

Discussions on subissues 20,23,24.
Jan proposes not to include switching time in carrier detect response time.
Motion Jan, Tom T seconds:
Item 20: Energy detect time.
Maximum response time from energy incident upon receiver antenna to receiver signal level crossing the threshold described in 20a shall be less than 20 μs.
Item 20a: Energy detection threshold TBD
10,0,0 passed.
adjourn 10:00AM

ATTENDANCE LIST DS ad-hoc

Jan Boer	NCR
Roger Pandanta	MCS
Kamilo Feher	Univ. of Carl.
Shuzo Kato	NTT Radio Comm. Sys Lab.
Dean Kawakuchi	Symbol Techn.
Struart Kerry	Symbol Techn.
Paul Strusaker	Telxon
Vic Hayes	NCR
Sarosh Vesuna	Symbol Techn.
Chris Zegelin	Symbol Techn.
Paul Pirillo	NCR
Ron Mahany	Norand Corp.
Natan Silberman	Wireless One
Kwang-Cheng Chen	National Tsing Hua Univ., Taiwan
Chandos Rypinski	LACE,Inc.
Maurice France	Turner Gold France Engineering
Don Johnson	NCR
Tom Tsoulogiannis	Telesystems
Steve Schear	Cylink
John Eng	DEC
Rick Kunz	Compaq
Paul Fulton	Netcore
Inchul Kang	Radiance
Steven Hall	Comm Quest Tech
Toshio Shimizo	Japan Radio Co, LTD
Satoshi Baba	NTT
Mike Trompower	Telxon
Bob Buaas	The Buaas Corp.
Robert Graven	NDC Communications
David A Fisher	Pacific Monolithics, Inc
Tom Gruber	Plexus Research
Juan Grau	Proxim
Eugen Gershon	Advanced Micro Devices
Tom Phinney	Honeywell
Jeff Rackowitz	Intermec
Bob Achatz	NTIA/ITS
Jerry Loraine	Symbionics
Francisco J Lopez-Hernandez	E.T.S.Ing.Telecom.Univ.Polit.Madrid
Jim Renfro	Raytheon
Rifaat Dayem	Altamont Research
Ryan Tze	Toshiba