
**IEEE P802.11
Wireless LANs**

Tentative Minutes for Task Group a, 6-9 July, 1998

Date: July 10, 1998

Authors: Hatim Zahoul (Wi-LAN) and Roy Sebring (Intermec)

Opening: 8:30am

Introduction - D. Kawaguchi, Symbol Technologies, acted as temporary chair since Naftali Chayat was representing one of the proposals that were being considered.

Secretary: Hatim Zaghoul, Wi-LAN, acted as temporary secretary.

Dean gave a summary of May meeting:

Proposals by Breezecom/NEC, Lucent/NTT, and RadioLan
Lucent/NTT OFDM proposal received 54.39% in Tga
Motion PASSED (required 50% by selection criteria)
In plenary session, Lucent/NTT OFDM proposal received 65.11%
Motion FAILED (required 75%)
Held open ballot and comment resolution session

The Chair asked the meeting for submissions:

Submissions

98/261	Richard Van Nee	OFDM for 5 GHz
98/XXX	Richard Paine	Wireless ATM Requirements
98/262	Naftali Chayat	Lower Speed Extension for Single Carrier Proposal

Agenda for July 1998 meeting:

Responses to Ballot questions so that the Lucent/NTT proposal could try to secure the needed 75%.

98/261 Richard Van Nee.

Vote on acceptance of OFDM proposal.

A discussion to ask what would it take to agree on a single carrier proposal if the vote fails

98/262 Naftali wanted to present a presentation on a lower speed extension for a single carrier.

This presentation will be made only if the Lucent/NTT proposal fails to secure 75%.

98/XXX Wireless ATM (Richard Paine)

Revised specification (Hitoshi)

Richard gave a presentation (98/261) on the OFDM proposal and explained that most ballot questions were answered during the previous meeting.

Dean notified the meeting of the 802.11 Plenary Motion:

That if TGa has to re-open their selection process that they be directed to use non-secret voting, and achieve a 75% or greater acceptance before forwarding to 802.11.

A discussion ensued and there was some question as to whether nearly voting members, who would gain their voting status at the start of the Plenary session at 3:00 pm, can vote on the proposal. Different opinions were presented. Bob proposed to have two votes one for the voting members and for the non-voting members. It was agreed that if the nearly voting members vote could affect the outcome, the decision would be deferred to the Plenary session.

Motion 1:

To accept the Lucent/NTT OFDM proposal as the basis for the 5 GHz PHY in 802.11.

Richard Van Nee / Bruce Tuch

Voting members only 29/2/8 Motion passes by >75%

Nearly voting members 3/1/3;

Total 32/3/11 (91.4%) Motion passes by 91.4%

Naftali said that there was no need to give his presentation on a single carrier.

Richard Paine was not available to give his presentation on Wireless ATM.

Dean notified the meeting that there were no further agenda items for Monday morning meeting. Will reconvene at next scheduled meeting.

Meeting adjourned at 9:20am.

Minutes for 7/7/98 AM TGa Meeting

TGa called to order by Chairman Naftali Chayat at 8:40 AM. 7/7/98 in Salon EF of the Hyatt Regency Hotel, La Jolla, CA.

Richard Paine Boeing presented WATM and IEEE 5.2 GHz Common PHY. Doc 268.

Richard is liaison between ETSI BRAN and 802.11.

Working toward a common 5.2 GHz band.

BRAN leaning toward OFDM same as 802.11 selected OFDM.

Proposal is for common PMD

Rapid scan radio concept using available unlicensed frequencies.

In Sep 97 joint meeting the cooperation did not work out:

BRAN: Thought that 802.11 was ramming interference down their throat while 802.11 felt that BRAN was inflexible.

5.15 GHz dedicated to Hiperlan w/150 MHz extension proposed.

FCC different power levels don't match BRAN

Hiperlan not widely implemented in Europe so if we have common PMD it could be implemented with small impact.

WATM has shifted its focus and now wants to carry all the protocol such as IP as well as other advanced protocols

Lucent's proposal has not changed from the web page version.

Richard will be proposing the Lucent's (802.11) proposal as the common PMD.

BRAN = EC and CEPT frequencies.
802.11 US, EC, AP

Common PMD to important to drop

Collaboration with WRC to make 5.2 international?

Propose a study group of BRAN-WATM and 802.11-Bran-WATM liaisons (Boer, Phipps, Bautz, Paine, Mossarella, others?) Most of these people are crossover members.

Naftali: reasons why we stopped collaboration;

1. our aim was to get access to EC frequencies. not collaboration. This alienated BRAN, and in any case they did not have frequencies available.
2. Bran = tech. differences. Access protocol for 802 is CCA w/ack. for them traffic is tightly scheduled = different requirements.
3. single cell transmissions based on 64 bytes, we optimize for longer packets w/higher overhead.
4. NC thinks there is a shift in bran thinking for "cell trains" = longer packets and brings us closer.
5. we have multiple rate capability. BRAN= single rate PMD.
6. RP thinks they are looking at being more flexible at size of cells and transmission method, along with diff.freqs. (especially HL2 and HL3.)
7. NC: 25 MHz channels spacing (preferred or rigid?) Jan Boer thinks its based on HL1 channelization.
8. After RP meets with BRAN he'll come back with information and try to get a group here to work with him.
9. When will BRAN decide on waveform? Jan Boer: modulation method, trying to pin it down this week. Richard Van Nee: They will narrow down the selection process this week. could be toward the end of the year for final selection...
10. RP: will find out and report back to 802.11.

11. NC: we have a proposal that has won. The proposers have prepared text for standard already. If no major tech. comments we may exit this week with a draft standard. There is an opportunity to work with BRAN if they pick OFDM this week. We will just continue our effort, be willing to work with BRAN, and RP will be our ambassador with BRAN.

RP = no formal action requested. RP has letter authorizing him to work as liaison from WATM.

Don't sell in Europe if we don't cooperate with BRAN? It regulatory dependent.

RP: what do the Bay and Lucent think about this? Do you want a common PMD? No response.

NC: Single carrier proposal has vanished: Need to extend agenda.

1. Accomplish the task of turning the Lucent proposal into a draft text for ballot.
2. Is it mature enough? Review it in detail. and approve it.

NC was approached by ??? about FCC regulatory. action going on about a band above the upper UNII band. IT may be close enough to our band to be of interest.

NC: Agenda

1. Draft text review and approval
2. Regulatory action in 5 GHz

The question was raised about how mature the OFDM proposal is.

WES wants more time to review it since they have been concentrating on 2.4 GHz.

NC: OFDM team will give detailed presentation to resolve Wes/Carls questions. Carl needs to review it in more detail also.

Richard Van Nee /Hitoshi Takanashi/Masahiro Morikura Doc# 272:

HT: "Outline of Draft Standard for 5 GHz...

Presented block diagram of PHY

Data rate 30 to 0.5 Mb/s

48/64 carriers in 12.5 MHz

DPSK, DQPSK, and 16 QAM

carrier separation 15 MHz.

New information: Proposes the use of Pilot Carriers #3, 26, 47 also for QPSK and BPSK (not yet in 98/72r4).

Lower and mid band: 10 carriers, 15MHz separation. Upper band same channelization.

64 state convolutional encoder
coding rate $1/2 - 3/4$ (punctured)

New primitive parameter added.

Questions: Steve Grey (sp), Nokia,
Why pick convolutional coding?

Why did you pick the rates you chose?

HT: bandwidth is 12.5 100-200 delay spread lots of notches in 12.5 MHz causes errors. Need convolutional coding for good performance.

Coding rate of 1/2 and 3/4: 7/8 performance poorer. Strong error correction is necessary.

Why not Turbo code? HT: could be solution Richard van nee: turbo very complex and large interleaving.

Steve: 800 bits is crossover point where turbo out performs convolutional. HT: trying to keep the cost down. RVN: convolutional is reasonable choice.

WES: addition of 3 pilot carriers??? HT: pilot carriers were already included in the original proposal for 16 QAM. HT wants to replace DBPSK and DQPSK with BPSK and QPSK, and use 3 pilot carriers.

Naftali welcomes the change of QPSK and BPSK to coherent detection.
(the change is included in document 98/72r4 to be reviewed)

DOC #: 72R4

Doc. not available to audience... 15 min. break to get it distributed.

Called back to order at 10:05 am by NC. 41 present

Hitoshi: Doc. 72R4:

“OFDM Physical Layer Specification for 5 GHz Band”

Initially aimed at 5.15-5.25, 5.25-5.35, and 5.725-5.825 GHz as stated in FCC Doc. 15.407.

5, 10, 15, 20, and 30 Mbit/s.

HT: possibility of changing Differential Encoding to BPSK and QPSK...

NC: don't amend the basic document until the ballot process.

Richard Van Nee: reviewed section 1.3 OFDM Physical Layer Convergence Sublayer

Service field = 16 bits not defined at this time (copied from current standard).

Preamble is training pattern the rest of the header is transmitted at 20 Mbit/s DQPSK-OFDM modulation.

Direct Sequence scrambler has error effect. Carl Andren.. suggested using the FH type scrambler instead. Scrambler: NC: randomize seed of scrambler? RVN: not clearly defined... should start with random initialized state... currently states that “scrambler should be initialized to any state except all ones when transmitting” needs further discussion.

RVN: Described short training symbol followed by long OFDM training symbol.

There appears to be an inconsistency between time domain concatenation of symbols and its 64 point FFT OFDM representation. Also, power normalization needs to be corrected.

RVN commented that all the pilot symbols were rotated 45 degrees relative to previous version of the document to align notation with QPSK.

RVN: FH scrambler is better choice. He is planning on changing the scrambler to the FH model. NC: to be resolved by the group via discussion at the ballot comment stage.

Occupied bandwidth (3dB) = 12 MHz.

Interleaving important to randomize data errors. (see presentation)

3 dedicated pilot subcarriers: #3, 26, and 47 to facilitate coherent detection..

Statement in subcarrier section about “normalization is left to the manufacturer” belongs in the Average Power section.

Windowing provides smooth Cosine-like roll up and roll down for OFDM symbol (see fig. 116).

Slot time of OFDM frame shall be 6 microseconds.

Center freq. accuracy.. states 40 PPM . may change to 10PPM.

The symbol clock and carrier freq. must be derived from the same clock.

Transmission Modulation Accuracy Section is unclear. Probably should be based on pseudorandom data rather than single carrier being transmitted. That will take into account PA distortion as well.

Receiver Minimum Input Level Sensitivity Numbers need to be reconsidered. Need table that states requirements. Including max. input level, NF, degradation etc.

Adjacent Channel Rejection section needs to be re-investigated. Need safety margin. Also specify measurement method. To be measured at maximum transmit power?

Reception Level Detection section also need so be redone.

HT:

PLCP Transmit Procedure is numbered incorrectly should be Section 1.6.

PLCP Transmit and Receive Procedure Diagrams are substantially different from current DS diagrams.

aMPDUDurationFactor is new variable in Timing Parameters.

PLCP Header is sent at speed of final data rate. This is inconsistent with Section 1.3.3. where it states that entire PLCP header will be transmitted at 20 Mbit/s PLCP header through the Signal Field does not depend on final data rate. Section 1.3.3. will be changed to reflect correct rate.

Section 1.3.3 needs to be re-addressed.

Power control algorithm is not specified but 8 power levels are available in the spec.

Recommended that Hitoshi establish a method for numbering bits in header.

End of Presentation

It was recognized that major inconsistencies need to be addressed before we exercise a motion to accept this document at a basis for a draft standard.

Reconvene at 8:30 AM 7/8/98

Meeting Adjourned at 11:58 AM 7/7/98

Tentative Minutes for TGA 7-8-98

Called to order at 8:45 AM by Naftali Chayat, 43 present

Hitoshi Takanashi

To discuss revisions to his submittal of draft standard. Doc: 98/72r5

1.3.3. PLCP Field Definitions was modified

Only Service Field on in frame is coded/OFDM.

Text was changed to add: The multiplication by a factor of 2 is in order to normalize the average power of the resulting OFDM symbol.

1.3.3.6 Scrambler and Descrambler section was changed to reflect comments made on 7/7/98 about randomizing the initialization of the scrambler. Similar to FH hopper in current standard.

Discussion followed on how the randomizing process could be implemented. (ie. pseudorandom, a counter, shift register, etc.) The text was changed to specify initialization to a pseudorandom non-zero state.

Bit Stolen Data for sent/received data was clarified in Fig. 112. Bit order in transmit was clarified.

1.3.6.4 Channelization Fig 114

Clarification was made that no subcarrier is allocated on the center freq.

1.3.6.6 Modulation changed to reflect the change to BPSK (Table 79) and QPSK (Table 80).

ϕ_k = Phase of the k subcarrier...Phase column was removed from Table 79 and 80.

Tables 79, 80, and 81 should be reformatted to be consistent with each other.

1.3.8.1 Receiver Minimum Input Level Sensitivity. 5 dB implementation margin (assumed) was added to the sensitivity numbers. Group consensus was that 5 dB is sufficient implementation margin.

1.3.7.2 Transmit Spectral Mask figure is inconsistent with text. Should be 15 MHz bandwidth at -20 dBr.

1.3.8.4 Receiver Alternate Channel Rejection: Changed to define Alternate Channel as one that is separated from the other channel by one channel in between them. Needs to be revised to include implementation issues. Section title and text was changed to Receiver Non-adjacent Channel Rejection. Numbers changed to 30 Mb/s 35 dB, 40 dB for 20 Mb/s, and 45 dB for the other rates.

1.5.5.1 PMD_Request... Effect of Receipt... was changed to delete the reference to differential encoding and interleaving.

PMD has no coding only PLCP....

End of Presentation

Motion 2:

To recommend to the Plenary to accept document 98/72r5 as amended during the July 8, 1998 morning session, as a first draft of the 802.11a standard.

Carl Andren/Richard Van Nee 22/0/2 Passed unanimously

Next Agenda Items...

Regulatory matters:

Recessed from 9:45 to 10:00 AM Reconvened at 10:00 AM

Michael McInnis

Recent FCC NPRM Upper part of 5.8 GHz for Dedicated Short Range Comm for Intelligent Transportation

75 MHz of the band 5.850 - 5.925 This would use the upper 25 MHz of the upper ISM band for short range dedicated comm. between vehicles and roadside services

The question is whether or not 802.11 wants to comment on this change. This would be Co-Primary useage.

9/14/98 deadline for comments for this NPRM. ET Docket Number 98-95; FCC 98-119

It does not appear to be considered a threat for TGa so no action was taken.

Next regulatory issue: Canada and 5 GHz band.

Vic Hayes informed Naftali that Canada intends to open 5 GHz band with similar restrictions as U-NII.

Industry Canada published a document on the web that invited comments on it's proposal to allocate 5 GHz bands for LE-LANs and use of spectrum in shared mode with other users on a non-interference basis.

5.15-5.25, 5.250-5.350, 5725-5825 Same as U-NII.

Don Johnson:

The lower band power limit and inside operation restrictions.

Recommend that power level should match the middle band and no restriction on outdoor operation.

Need consultation with Legal staff also, since there was resistance from Satellite interests earlier.

Out of band emissions limitation by FCC – no action suggested.

Suggestion was made to develop a letter to IC describing efforts in this band.

Deadline for comment submission is 9/21/98. The Monday of the week after our September meeting.

Motion 3:

IEEE 802.11 will send a letter to Industry Canada expressing a support for its intent to allow license exempt operation of WLANs in the frequency bands which are the same as U-NII bands. The letter shall:

1. Describe 802.11a activity.
2. Describe 802.11a intent to harmonize the standard with ETSI.
3. Express support for worldwide availability of the frequency band.
4. Recommend to set power/EIRP levles in lower and middle bands same as in middle U-NII band.
5. Recommend to allow outdoor operation in the lower band.

Moved Peter Ecclesine./Masahiro Morikura

Discussion: Send to MKK also?

23/0/0 Passes.

Peter Ecclesine. volunteered to write draft letter before start of tomorrows meeting.

Masahiro is it appropriate for a standards body to send a letter to MKK? Japan has started discussions on 5 GHz band final decision will be March 1999.

Two groups are already working with Japanese officials MMAC and WATM. WATM group already has liaison with ETSI.

What is the right body in Japan to appeal to?

(Recess, discussion among Japanese participants)

Hitoshi: ARIB (Association of Radio Industries and Business) standardization body, such as cell phone.

ARIB is the most appropriate organization to contact. MMAC (Ethernet and WATM forum) is one organization in ARIB.

He believes that 802.11 should have a liaison person with ARIB. They are planning on having a liaison person for 802.11.

Motion 4:

Move to issue a letter to have an 802.11 liaison with MMAC

Hitoshi T./Masahiro M.

There was no discussion.

20/0/1 Passes.

Hitoshi Takanashi volunteered to write a draft letter by tomorrow at 1 PM.

Masahiro: In Japan there will be two standards. Wireless based Ethernet and WATM. Standard channel spacing is important in Japan.

No further agenda items.

Naftali would like to discuss coordination effort with ETSI...what parameters would we be willing to change in order to align ourselves with ETSI...

- a. Currently we have 30/20/15/10/5 Mbit/s and 15 MHz channel spacing with 10 or 11 channels in 200 MHz.
- b. What about 39/26/13/6.5 Mbit/s, 20 MHz spacing with 8 or 9 channels, Naftali.
- c. ETSI parameters: 48/32/24/16/8 Mbit/s with 25 MHz channel spacing with 6 or 7 channels in 200 MHz. (However 200 MHz is not

Straw Poll on preferred rate/number of channels:

a = 0

b = 1

c = 0

NC interprets it as an indication of indifference to exact parameters.

Adjourned by Naftali Chayat at 11:15 AM.

Thursday

Called to order by Naftali Chayat at 1:07 PM 7/9/98 25 present

Agenda

Letter to Industry Canada
Letter to MMAC
Appointment of Editor
Discussion of progression of the standard

Agenda was approved unanimously

Peter Ecclesine presented doc #281r1 Letter to Industry Canada concerning their request for comments about establishing a Licensed Except band in the 5 GHz range

Based on IEEE information from letter to the FCC authored by Don Johnson
Described IEEE effort to work with ETSI.
Included the recommendations approved during TGA meeting on 7/8/98.
Referenced WinForum data on Globalstar information and related interference calculations.
Recommended Industry Canada coordination with ETSI BRAN and IEEE.

Motion 5:

To forward document 98/281r1, after editorial refinement, to LMSC for approval to send it to Industry Canada.

Don Johnson/Roy Sebring
19/0/0 Passes.

Presentation by Masahiro Morikura Doc #280
MMAC Japanese Standard Bodies
Media Mobile Access Council (MMAC)
Showed relationship of Japanese agencies. ARIB and MMAC are different organizations.

PDC = Japanese cellular system (Personal Digital Cellular)

Presentation by Hitoshi Takanashi Doc #279

Presented proposed letter to MMAC to establish a liaison.
Described liaison efforts underway with IEEE/ETSI and letter to Industry Canada in the 5 GHz band.
Stated desire to establish liaison with MMAC for the same purpose.
Stated that IEEE 802.11 had appointed Mr. xxx as liaison to MMAC.
Asked for access to MMAC proceedings database with reciprocation from 802.11.

Masahiro – MMAC Japanese Standards bodies in Japan 98/280

Motion 6:

To approve Masahiro Morikura as 802.11 liaison to MMAC, Japan.

Hitoshi/Roy
25/0/0 Passes

Motion 7:

Move to request Plenary approval to forward the document 98/279r1, after editorial refinement, to MMAC in order to establish liason with MMAC.

Hitoshi Takanashi/Harry Worstell
22/0/1 Passes

Text of report from Richard Paine concerning ETSI proposal to coordinate IEEE 802.11 and ETSI BRAN follows:

From: Paine, Richard H[SMTP:Richard.Paine@PSS.Boeing.com]
Sent: Thursday, July 09, 1998 9:48 AM
To: IEEE Hayes, Vic
Cc: McAuliffe, Patrick; Curgus, Jadranka
Subject: Presentation to BRAN on 7/9/98

Vic, I met with a combined group of the BRAN MAC and PHY groups. They approved a three man team from the BRAN to work with a similar team from 802.11 to work the issues associated with a common PMD. I made some people recommendations that you will need to support or change. I mentioned people like Jan Boer, who know both sides and the issues associated with both sides. The three IEEE people from IEEE 802.11 are up to you to name.

I would like to suggest that I will develop a preliminary issue list for the team to start from, but they will need a leader and agenda to expand on the issues and concerns to deliver to the two groups at their next meetings. The next BRAN meeting is in September. The date we should really shoot for with issues associated with OFDM, however, is the next IEEE 802.11 meeting in Alberquerque.

Richard H. Paine
Phone: 425.865.4921
Fax: 425.865.2965
Pager: 206.645.5256
E-mail: richard.h.paine@boeing.com

This message was forwarded from NWGTW
our old MSmail gateway
Please notify the originator of this message
that he should change your address to become
handle@lucent.com

End of Text from Richard Paine's Email

Motion 8:

To nominate a 3 person team to work with a similar team from Bran to work the issues associated with a common PMD.

PeterEcclesine /Ad Kamerman 26/0/0 Passes.

802.11/ETSI Liaison Team mission: "To work with a similar team from BRAN to work the issues associated with a common PMD."

Motion 9:

To appoint Naftali Chayat, Reza Ahy, and Masahiro Morikura as the 802.11 Team for cooperation with ETSI BRAN.

Hitoshi Takanashi/Ad Kamerman28/0/0

Discussion of appointment of the editor for TGA.
Hitoshi Takanashi volunteered.

Motion 10:

To approve the nomination of Hitoshi Takanashi to the position of Editor of 802.11a.

Harry Worstell./Richard Van Nee Unanimously approved by acclamation

Discussion of progression of the standard

Sections 14 and 15 of 802.11a draft standard need to be cleaned up, editorially, to bring them in line with current 802.11 standard format. Naftali Chayat will request, on the reflector, that people to submit comments 2 weeks prior to the next meeting in order to give our editor enough time to respond to them. People should supply proposed text for their comments.

Meeting was adjourned at 2:57 PM 7/9/98 by Chairman Naftali Chayat

PS Thanks to Hamid Zaghoul and to Roy Sebring for standing in for our permanent Secretary.