

PAR Proposal for 3 Mbit/s extension of 802.11 FH PHY in 2.4 GHz band

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Following is a proposition for a separate PAR for the FH high-speed extension. Although the speed increase is relatively small, the preparedness of the material and the fast expected completion schedule give this PAR a significant chance of being approved by the ExecCom. The workload on the 802.11 group resulting from this project is negligible, as the text for inclusion already exists (802.11-96/80). We propose that the High Speed Study Group will issue a separate PAR for 3 Mbit/s FH PHY extension, as described below.

IEEE STANDARDS PAR FORM

(1/96)

Fill in the answers to the questions in the bracket provided. A Hard Copy of this document must be printed, signed with the appropriate signatures and mailed or faxed to the Standards Department for submission to NesCom.

- 1. Sponsor Date of Request _____
- 2. Assigned Project Number (confer with staff) _____
- 3. PAR Approval Date (leave blank) _____
- 4. Project Title, Copyright Agreement and Working Group Chair for This Project

I will write/revise a Standards Publication with the following TITLE (Spell out all acronyms)

Standard [for] (Document stressing the verb "SHALL."), or

Recommended Practice for (Document stressing the verb "SHOULD.") or

Guide for (Document stressing the verb "MAY.")

TITLE:

[Standard for Wireless Medium Access Method (MAC) and Physical Layer (PHY) Specifications - Supplement for 3 Mbit/s extension for the Frequency Hopping (FH) Physical Layer (PHY) in the 2.4 GHz band]

I hereby acknowledge my appointment as Official Reporter (usually the W.G. Chair) to the (Name of Working Group)

[P802.11 Working Group for Wireless Local Area Networks]

In consideration of my appointment and the publication of the Standards Publication identifying me, at my option, as an Official Reporter, I agree to avoid knowingly incorporating in the Standards Publication any copyrighted or proprietary material of another without such other's consent and acknowledge that the Standards Publication shall constitute a "work made for hire" as defined by the Copyright Act, and, that as to any work defined, I agree to and do hereby transfer any right or interest I may have in the copyright to said Standards Publication to IEEE.

Signature of Official Reporter _____

Name Vic Hayes
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5. Describe this project: (Choose ONE from each group below)

- a. Update an existing PAR
 [] Yes or No
 If YES, project number/approval date)_____

- Is this in ballot now? [] Yes or [] No

- b. New Standard
 [] Yes or [] No
 Revision of an existing standard.
 [] Yes standard number/year_____ or [] No
 Supplement to an existing standard
 Yes standard number/year 802.11-1997 or [] No

- c. Full Use (5-year life cycle)
 Trial Use (2-year life cycle)

- d. Fill in target completion date for submittal to
 IEEE Standards Review Committee (RevCom).

[31 June 1998]

6. Scope of Proposed Project (*What is being done* including the technical boundaries of the project?)

[To incorporate the developed 3 Mbit/s extension to 802.11 Frequency Hopping PHY in 2.4 GHz band .]

7. Purpose of Proposed Project [*Why is it being done*, including the intended user(s) and benefits to that user(s)]

[To extend the performance and the range of applications of the 802.11 compatible Frequency Hopping networks in the 2.4 GHz band by increasing the achievable data rate.]

8. Sponsor (Give full name; spell out all acronyms) Society/Committee:

[**Computer Society - LMSC**]

9(a.1) [NO] Are you aware of any patents relevant to this project?
(If YES, attach explanation, or No)

9(a.2) [NO] Are you aware of any copyrights relevant to this project?
(If YES, attach explanation, or No)

9(a.3) [NO] Are you aware of any trademarks relevant to this project?
(If YES, attach explanation, or No)

9b. [NO] Are you aware of any other standards or projects with a similar scope?
(If YES, attach explanation, or No)

9c. [YES] Is this standard intended to form the basis of an international standard?
(Yes, or if NO, attach explanation, or Do Not Know)

9d. [NO] Is this project intended to focus on health, safety or environmental issues?
(If YES, attach explanation, or No, or Do Not Know))

10. Proposed Coordination/Recommended Method of Coordination (Coordination is accomplished in any of the following three ways:
Circulation of Drafts or Liaison Membership or Common Membership.)

10a. **Mandatory Coordination**

SCC 10 (IEEE Dictionary)	Circulation of Drafts
IEEE Staff Editorial Review	Circulation of Drafts
SCC 14 (Quantities, Units, and Letter Symbols)	Circulation of Drafts

10b. **IEEE Coordination requested by Sponsor:**

(Use additional page if necessary). If you believe your project will require a Registration Authority, please list IEEE RAC (refer to Working Guide).

[**US TAG to JTC-1 SC6**

(Circulation of Drafts)]

If coordination is not required, please attach an explanation.

10c. Additional Coordination Requested by Others. (Leave blank. This will be completed by the Standards Staff).

11. Submitted by: (This **MUST** be the Sponsor Chair or the Sponsor's Liaison Representative to the IEEE Standards Board)

Signature of Submitter_____

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Supplement to a “Higher Speed Wireless LAN PHY in 2.4 GHz band” PAR**Scope of the Project**

The 802.11 MAC defines a mechanism for operation of stations supporting different data rates in same area. The current 802.11 standard already defines two rates - 1 Mbit/s and 2 Mbit/s for both Frequency Hopping (FH) and Direct Sequence (DS) PHYs. The two rates are supported by having same header for both rates with length and rate information passed in the header at the lowest (“basic”) rate; then the body of the packet is transmitted at the rate chosen and with corresponding modulation method. The header structure of the two PHYs already supports passing rate information up to 4.5 Mbit/s (in 0.5 Mbit/s increments) for FH and up to 25.5 Mbit/s (in 0.1 Mbit/s increments) for DS. The 802.11 MAC already incorporates interpretation of this information and computation of expected packet duration even if it the specific station does not support the rate at which the packet was sent.

The proposed 3 Mbit/s extension of the 802.11 standard was reviewed by an ad hoc group high-speed study group of the FH PHY working group of 802.11. The proposed extension is compatible with the existing 802.11 PHY’s on a header level and is able to take advantage of the multirate mechanisms supported by 802.11 MAC. The scope of the proposed project is to incorporate the 3 Mbit/s extension into the standard.

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Five Criteria

Broad Market Potential

The market potential of the 3 Mbit/s FH PHY is synergistic with the market potential of the 802.11 itself. The 3 Mbit/s FH 802.11 products will enable the upgrade of existing networks to a higher speed for selected users or in selected areas. The existence of such possibility will also have a positive effect on the confidence of the public in 802.11 standard.

The 3 Mbit/s extension, relative to the current 2 Mbit/s data rate, may look insignificant. Yet, we may look at the difference between 33.6 Kbit/s telephone modems versus 28.8 Kbit/s modems in which the relatively small difference in performance creates a more positive public image of the technology.

Compatibility with IEEE Standard 802

The compatibility with IEEE 802 requirements will result from the use of 802.11 standard as a basis, which itself was developed to be compatible with those requirements.

Distinct Identity

The proposed Project is a straightforward higher-data-rate extension of the existing 802.11 Project. It might be argued that such an extension should be dealt within a framework of 802.11 maintenance, but it should probably be dealt within a separate Project framework.

Technical Feasibility

Modulation Methods: The 3 Mbit/s modulation method was reviewed by an ad hoc study group of the FH PHY working group. This modulation method is incorporated as a proprietary extension in a product which has operated in the field since 1995. The product in which the proposed modulation method is incorporated passed the FCC licensing procedure.

Radio Technology: The 3 Mbit/s extension uses same radio technology as 1 Mbit/s and 2 Mbit/s modulations. Somewhat tighter specifications may be required for some components.

Range and Cell Size: The increased data rates will need to be traded for shorter range.

Economic Feasibility

The architecture required to support the 3 Mbit/s extension is identical to that required for 2 Mbit/s support. Therefore the cost of such product is only marginally higher than of a 2 Mbit/s product. The slight cost increase may be associated with higher accuracy requirements on the radio.

The installation of extended devices is same as regular 802.11 devices. The infrastructure cost (Access Points) is expected to be almost the same with the exception of cost incurred by somewhat smaller cell size than with lower rate 2.4 GHz equipment. Upgrading an existing network to a higher speed can be performed selectively in areas with a demand for higher instantaneous rate.