**IEEE P802.11**
**Wireless LANs**

# Remaining Technical "NO" Comments from LMSC Re-Circulation Ballot on IEEE P802.11 D5.3

## Summary

The IEEE P802.11 working group has completed processing all comments received during the Sponsor Re-circulation Ballot review cycle. P802.11 would like to take this opportunity to thank everyone for their inputs during the review cycle. Practically all the comments were resolved and incorporated into the revised draft.

Draft 5.3 was approved by the re-circulation ballot as follows:

| | |
|---|---|
| Ballots Sent | 118 |
| Ballots Returned | |
| Affirmative | 80 |
| Negatives | 2 |
| Abstentions | 11 |
| Total | 93 |
| No Response | 25 |
| Total Ballots | 118 |

Percent Returned (93/118) = 78%
Percent Affirmative (80/82) = 98%
Percent Abstentions (11/93) = 12%

Re-circulation comments have resulted in a revised version of the 802.11 draft (version 6.1) which is now available. Draft 6.1 contains several changes to correct inconsistencies brought to the working groups attention via re-circulation ballot comments.

After the re-circulation ballot, there are two outstanding No votes. One was a No vote prior to the re-circulation ballot and the second is a change in vote from Abstain (for lack of technical expertise) to Disapprove.

This document contains a summary of the issues as well as the actual text of the comments which comprise the remaining no votes. The primary issues in the declined comments remain the same as they were before the re-circulation ballot cycle.

## ***Comments which were not resolved to the satisfaction of the reviewer:***

**Declined Comment #1 (received during sponsor ballot)**
**Clauses: 1.2, 5.1.1.4, 5.2, 5.4.2.1, etc.**
**Voter: Rich Siefert**
**Type of comment: Technical**
**Part of the No-vote: Y**
**Comment/ rational**
The fact that high-layer applications may desire the ability to move within or among wireless LANs does NOT imply the requirement, as stated in 5.1.1.4, that this mobility must be provided within the MAC sublayer. In fact, 802.11 does not currently provide this mobility service (see discussion of DS and ESS below). Mobility is best relegated to higher-layer protocols (such as Network). 802.11 should provide the appropriate service interfaces (e.g., allowing a MAC client or management entity to determine the current associations of an AP) that allow higher-layer protocols to implement mobility, but not to attempt to implement it within the MAC. There is no need to "reinvent" the entire ISO protocol stack within the MAC, just because it's wireless.

**Requested change**
Eliminate mobility as a requirement of, and function provided by 802.11. Include a paragraph in the Scope section identifying mobility as a higher-layer function that can be provided among 802.11 LANs.

**Working Group resolution**
Request was respectfully declined.

Mobility is inherently a part of the functionality provided by 802.11. A primary purpose of 802.11 is to provide the support necessary for system implementations which may include additional mobility functionality at higher layers. The functions of association, reassociation etc. accomplish this, as well as enable mobility within the 802.11 coverage space.

There exists is a reasonably well-understood distinction between "local area" and "wide area", aided by the buffer zone of "metropolitan area" that is within the purview of LMSC. There is not a generally accepted upper/lower bound to the size of a "local area". The ESS concept has been used since the origin of 802.11, primarily because many wireless PHYs offer far smaller spatial coverage than even the shortest-range wired LANs. The ESS concept exists to allow an 802.11 network to cover a single local area of comparable extent to that reachable by a single segment of any other 802 MAC/PHY pair. Within this area, the provision of wireless connectivity for moving stations requires some form of ESS and DS. To cover the Local Area radius requires multiple BSSs. The number of BSSs needed to achieve comparable area coverage increases with PHY transmit frequency.

Perhaps an analogy is in order; 802.3 specifies repeaters to permit a single LAN to include more than one segment of network cable. The function served by an 802.3 repeater and a plurality of

BSSs organized into an ESS are conceptually the same -- seamless connectivity of LAN stations spanning a larger area than can be covered by a single instance of that network's PHY. 802.11 explicitly recognizes that the most common way users will want to organize that extended coverage is by connecting the APs (serving an identical role to hubs in many wired LANs) using a DIFFERENT (wired) PHY type. To argue that the ESS and DS concepts should be removed from 802.11 is to argue that 802.11 local areas are substantially smaller than other 802 local areas, which would render the concept of "moving stations" from our PAR useless.

The degree of mobility functionality included in 802.11 is consistent with the 802.11 PAR. To remove all mobility functionality from the 802.11 draft would mean that the working group would not accomplish the task it was chartered for.
Therefore, the working group must respectfully decline this request.

**Declined Comment #2 (received during sponsor ballot)**
**Clauses: 5.4.2.2, 5.3, etc.**
**Voter: Rich Siefert**
**Type of comment: Technical**
**Part of the No-vote: Y**
**Comment/ rational**
There is no specification provided for the DS; neither a specific implementation nor a set of service interfaces and invariants that ensure proper MAC operation across the ESS. Since 802.11 depends on the DS to provide mobility and ESS coverage, it is clear that this standard currently does not provide sufficient information to build an interoperable, conformant ESS. Without conformance requirements, DS's and ESS's become proprietary entities.
In addition, the inclusion of an "unspecified" DS makes the delay as seen at the LLC service interface unbounded and uncontrolled. LAN MAC clients expect a low delay; the inclusion of an arbitrary internetwork (including possible WAN links) invalidates any assumptions about delay that are typically made by LAN clients. IEEE 802.1G allows WAN links for Remote Bridges, but it puts an upper bound on their number and delay, and makes this information available to a management entity.

**Requested change**
Eliminate the concept of DS and ESS from the standard at this time, and note that this is "under study" or "work-in-progress". When specifications are available that allow interoperable, conformant implementations to be built, revise the standard to include these new specifications. Eliminate all discussion of mobility as an 802.11-provided service.

**Working Group resolution**
Request was respectfully declined.
The 802.11 draft specifies what is required for a MAC layer, (i.e. media access to the Wireless Media).

Additionally, since Mobile stations using a WM involve unique problems which 802.11 was required to solve, 802.11 also describes the context within which the 802.11 MAC and PHYs are intended to operate.

The information which explains the architectural context is believed by the working group to be crucial to understanding 802.11 functionality. This approach dates from the earliest days of the working group and is reflected by the fact that the use of the DS and ESS concepts are specifically provided for within the 802.11 PAR.

The conceptual interaction between 802.11 and a DS is important from the 802.11 viewpoint. That interaction is what 802.11 specifies.

As a DS instantiation may (probably will) involve additional non-layer 2 functionality, specific DS internal details are outside the scope of 802.11.

The working group asks the reviewer to consider that the draft is a MAC/PHY std and not necessarily a complete reference for everything required to create an arbitrary network which supports mobility.

The request to eliminate the concept of DS and ESS from the standard was respectfully declined by the working group.

**Declined Comment #3 (received during sponsor ballot)**
**Clauses: various**
**Voter: Rich Siefert**
**Type of comment: Technical**
**Part of the No-vote: Y**
**Comment/ rational**
Use of “shall” and PICS: The use of the word “shall” is critically important in IEEE standards. A “shall” mandates a conformance requirement. Therefore, the word should be used SPARINGLY, in precisely those clauses that absolutely require conformance for interoperability or correctness. In addition, EACH AND EVERY “shall” must have an associated entry in the PICS proforma. This has not been done in this standard. The PICS refers generally to sections that contain many shall statements. This in incorrect. There should be a 1:1 correspondence between the number of “shalls” in the document and the number of conformance requirements in the PICS..
Rather than have a lot of “shalls”, it is common practice to have a complete detailed description of some desired behavior, either in prose or a formal language/state-machine, then have *ONE* statement, such as: “The MAC shall implement the requirements of the Transmit State Machine as specified in clause x.x.”. This allows one PICS entry for a complex entity.

**Requested change**
Eliminate and restructure the use of the term “shall” as indicated, or correct the PICS such that there is a 1:1 correspondence between “shalls” and PICS requirements entries.

**Working Group resolution**
Comment mostly accepted.

As noted in comment 3, the use of "shall" has been removed from the clauses defining the service interfaces and frame formats. The corresponding entries in the PICS have also been removed.

Regarding the request for a strict 1:1 correspondence between "shalls" and PICs entries;

After consulting with other reviewers, 802 members, and other working group members, the 802.11 working group reached the conclusion that a strict 1:1 correspondence is not required. Additionally, the working group thinks that the PICS is more useful in its current form, as it provides significant useful information to a potential user about the implementation. The working group thinks that the PICS contains enough detail when referencing a sub-clause (even though that sub-clause may, in some cases, contain more than one "shall") for implementers to be given sufficient guidance to build confirming implementations.
After giving the matter serious consideration, the working group decided to decline the request to have a strict 1:1 correspondence between PICs entries and "shalls".

**Declined Comment #4a (received during sponsor ballot)**
**Clauses: 9**
**Voter: Rich Siefert**
**Type of comment: Technical**
**Part of the No-vote: Y**
**Comment/ rational**
802.11 specifies an extremely complex MAC in English prose. This is a deviation from all other 802 standards, and unacceptable for a number of reasons:
(1) This standard must be implemented by people unfamiliar with many of the slang terms used by the writers and left undefined, e.g., “transmit again immediately” (How soon is immediately?), or “shall be implemented on top of the DCF” (What does this mean for conformance?), or “shall wake-up” (undefined slang).
(2) This standard must be implementable by non-native English speakers. Having the normative requirements in English prose makes this virtually impossible.
(3) English prose (or any human language, for that matter) is ambiguous. There is not a 1:1 correspondence between *words* and *meaning*; the same words can mean different things depending on the listener’s background. (This is a major reason why we have wars and courts of law; if language were unambiguous, we would have no arguments over the meaning of what was said!)

(4) In particular, the 802.11 MAC is extremely complex, perhaps the most complex MAC yet devised within 802. No other 802 MAC standard allows the use of prose for normative specification.

**Requested change**
(1) Make the English prose description of the MAC (and MAC Management) *informative*, rather than normative. Remove all “shall” statements from the descriptions.

(2) Provide a normative, formalized presentation of the MAC (and MAC Management). This formalization can use state-machine notation, Pascal, C, Verilog or other code, or any method that is truly unambiguous.

**Working Group resolution**
Comment mostly accepted.

As a result of this comment as well as several others from the Sponsor ballot review, the 802.11 working group updated and significantly expanded the formal description of the MAC. The formal description of the MAC was rewritten using SDL, an ITU-T standardized language (Rec. Z100 series) and is now included in Annex C which is a normative portion of the document. The working group believes that this satisfies Requested change (1).

Regarding the request to demote the English prose from normative to informative:

The 802.11 working group has done is best to insure that Annex C and the prose are not in conflict in any way.

However, the act of making the prose informative would have the effect of arbitrarily deciding any conflicts within the draft in the favor of the Annex. After due consideration, the working group decided not to adopt an unknown set of default decisions.

Rather, the working group recognizes that since the work behind both the prose and the formal description was done by humans, it is conceivable that either could possibly contain an error which is currently undetected. In case this possibility should come to be fact, the working group strongly prefers that all such issues, if/when they are found, be brought to the working group's attention. This will enable the working group to track issues and resolve them in a revision of the standard, should that become necessary.

Therefore, the working group respectfully decided to decline the request to make the prose informative.

**Declined Comment #4b (received during re-circulation ballot)**
**Clauses: Supporting comment 4a**
**Voter: Geoffrey Thompson**
**Type of comment: Technical**
**Part of the No-vote: Y**
**Comment/ rational**
I fully support Mr. Siefert's comments on this. It is not acceptable in my concept of standards work to embrace a standards methodology that nurtures ambiguity and then say that the appropriate method for resolving such abiguities is to go back to the standards committee for an interpretation request. This is lengthy process, the experts may have dispersed and the production lines are spitting out product that may not interoperate while the slow standards process is working out the question.

Further, I am highly disturbed by the language which opens C.1, to wit:
"This formal description attempts to define the behavior of 802.11 MAC entities with sufficient precision that independent implementations are likely to interoperate."
This isn't good enough for me.
There needs to be a precedence statement as to which dominates, the text or the FDL. My strong preference is the FDL.
The work needs to continue on the standard until there is every confidence that independent implementations WILL interoperate. Just "likely" isn't good enough for me.

**Requested change**
To make state machines description take precedence over other normative clauses.

**Working Group resolution**
The committee wishes to assure the reviewer that the group has never embraced methods which nurture ambiguity. Rather, the normative portions of the document have been thoroughly reviewed multiple times and we have resolved all issues brought to the groups attention.

The sentence in C.1 pointed out by the reviewer has been changed to: “This formal description defines the behavior of the 802.11 MAC entities.” in draft 6.1. The language in draft 5.3 was an unfortunate editorial holdover from a much earlier, incomplete revision of the draft. The working group has every confidence that independent implementations WILL interoperate.

After again reviewing the issues involved with making of one clause take default precedence over another, the group has decided to maintain its stated position (as confirmed by the 98% approval from the re-circulation ballot results).

**Declined Comment #5 (received during sponsor ballot)**
**Clauses: 5.5, etc.**
**Voter: Rich Siefert**
**Type of comment: Technical**
**Part of the No-vote: Y**
**Comment/ rational**
There are many places in this clause (and others) where what are essentially MAC and MAC management specifications are buried in the service descriptions. These have associated "shall" statements, which require PICS entries. (For example, on p. 24, bottom: "If STA A receives a class 2 frame . . .") All conformance requirements should be in the same section (MAC and/or MAC management) and not strewn through service descriptions and other clauses. All "shall" statements shall be grouped and easy to find and recognize (sic!).

**Requested change**
Put all conformance requirement statements in the clause appropriate to that requirement. There should be no "conformance" requirements in a clause on service specifications, since these are not required to be exposed interfaces.

**Working Group resolution**

The working group attempted to accept this comment before re-circulation. The draft was updated to remove the objections re conformance statements and service specifications. However, the voter, still is not satisfied as of re-circulation. The group believes that the draft is currently in compliance with the IEEE style guidelines and declines to make further changes.

**Declined Comment #6 (received during sponsor ballot)**
**Clauses: 5.6**
**Voter: Rich Siefert**
**Type of comment: Technical**
**Part of the No-vote: Y**
**Comment/ rational**
There is no need to require a device in an IBSS to be able to associate.

**Requested change**
Eliminate the requirement.

**Working Group resolution**

No draft change was needed. There is no requirement that ALL class 1 and class 2 frames be used by a station in an IBSS. Clause 5.6 does not contain any reference to association, hence it already reads as the reviewer requested.

After further communication with the voter, it became clear that the voter does not want to implement Association functionality when operating in an IBSS environment. However, the requirement to implement this functionality arises because of the requirement that all Stations be able to operate in both ESS and IBSS environments. The fact that Association is not invoked in an IBSS environment is not relevant.

The working group decided not to allow implementations which are only capable of operating in an IBSS and not in an ESS.

## ***"No" Comments which were processed even though they were not technically valid re-circulation ballot comments:***

**Declined Comment #8 (received during re-circulation ballot)**
**Clauses: 7.1.2, 7.1.3.1, 7.1.3.4, 7.2.1, 7.3.1.5-9**
**Voter Rich Siefert**
**Type of comment: Technical**
**Part of the No-vote: Y**
**Comment/ rational**
The draft states (correctly) that octets are passed to the MAC across the service interface. Additionally, it states (correctly) the order of bits within an octet when transmitted on the LAN. However, the draft does not make any statement about the order of octets in fields comprising multiple octets. Worse, in 7.1.3.1 (and many other places) bit ordering is shown for multi-octet fields with numbering relative to the multiple octets (e.g., 0-15, rather than 0-7). No specification is provided for the bit order for fields longer than a single octet, making it ambiguous as to the order of octets passed across the service interface.

**Requested change**
The draft must be consistent in its representation of fields. All fields should be specified as a sequence of octets (not as 16 bits or 48 bits, since this is not reflected in the service interface). Specify all bit positions relative to the octet that they are in (i.e., 0-7 only). For multi-octet fields, specify the order in which the octets are transmitted.

**Working Group resolution**
In an effort to consider all issues brought to the working group, the group has looked at the issue described and determined that there is no need for any technical change, some editorial work was done to further insure there is no inconsistency or ambiguity in the draft.

Further, none of the clauses cited contained any technical change regarding bit/frame/octet ordering in draft 5.3 (as compared to Draft 5.0). for the recirculation ballot. The committee decided to consider the request on its merits (even though it is technically not a valid re-circulation ballot comment) and further clarified the prose in clause 7.1.1 (see comment 5 in doc.:44R1) in an effort to finally eliminate any possible misinterpretation.