

Friday, July 09, 1999 23:51:38

P802.11b Draft D6.0 Comments and Resolutions

CI **XX** SC P 17 L 41 # 335
 Jack Andresen Vote VA

Comment Type **E** Comment Status **R**
 poor english, add "with" after transmission

SuggestedRemedy

Proposed Response Response Status **U**

REJECT. There seems to be no place to put "with" in the sentence:
 "The 8-bit IEEE 802.11 signal field indicates to the PHY the modulation that shall be used for transmission (and reception) of the PSDU."

CI **XX** SC P **General** L # 337
 Rich Seifert Networks & Communic Vote VD

Comment Type **TR** Comment Status **A**

I wish to add my support to outstanding comment 297 from Mr. Bagby. I agree that the changes to the MAC in 802.11b both go beyond the scope of the PAR, and will likely create interoperability problems with existing MAC implementations. Changes to the semantics of MAC-related fields either: (a) require a change to the version number of the MAC/frame format, or (b) must have been specifically anticipated in the earlier version. For example, it is possible to future-proof a protocol somewhat by specifying certain fields or values as "reserved", to be transmitted as zero and ignored on receipt. In this way, future versions can both detect field usage by an earlier version, and the earlier version will ignore the future usage. However, this behavior must have been explicitly stated in the ORIGINAL specification; it cannot be added later on and still ensure interoperability

SuggestedRemedy

Adopt the changes proposed by Mr. Bagby to eliminate the need for any of the changes proposed to the 802.11 MAC specification; and then delete the corresponding MAC changes.

Proposed Response Response Status **U**

ACCEPT. After a careful review, we find that the extra text requested by the commenter already exists in the standard IEEEstd. 802.11-1997 in clause 7.1.1.

CI **XX** SC P **General** L # 336
 Rich Seifert Networks & Communic Vote VD

Comment Type **TR** Comment Status **A**

I add my support for outstanding comment 332 from Mr. Bagby. I agree with him that the inclusion of options that can cause two standards-conformant devices to be unable to interoperate both violates the requirements of the PAR, and is inappropriate for an industry standard document.

SuggestedRemedy

Remove options which create the possibility that if different combinations of options are implemented by different vendors, it becomes possible for a customer to buy two compliant pieces of equipment which may fail to interoperate.

Proposed Response Response Status **U**

ACCEPT. There are no options in the standard that would cause any combination of selections to fail to interoperate. Therefore there are no options that need to be removed. All combinations of options are properly managed through MAC management, such that all stations, including legacy stations of the original standard that are unable to understand the new options, are informed of the consequence of communication with stations implementing the new options. All stations implementing the new options are required to be fully capable of communication with the legacy stations.

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P802.11b Draft D6.0 Comments and Resolutions

CI **XX** SC **P multiple** L **# 332**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **R**

Review Comment 1: Technical Required

This reviewer does not accept the responses to previous comments I submitted re the 802.11b PHY draft (during internal 802.11 ballots) prior to the sponsor ballot. The responses were specious, sometimes factually incorrect. Therefore most prior positions will be reiterated for this ballot (for the benefit of the sponsor ballot reviewers).

To keep the review process productive, this reviewer asks that the 802.11 group refrain from analogy arguments about options in other portion of the 802.11 standard as an argument for the permissibility of options in this PHY. (The analogy arguments given bring to mind the typical stories of a mother asking a child whether they would jump off a cliff just because all their friends were doing it.) The context within which any given decision was made for previous portions of the 802.11 standard do not constitute out of context precedence for any later extensions of the standard.

When 802.11 authorized the 802.11b working group it was by a specific motion that required that the group develop a single high-speed PHY for the 2.4GHz band. In this reviewer's view the intent of the wording of that motion (which I made, so I believe I am qualified to speak to the intent) was to prevent the group from creating multiple (FH and/or DS) high-speed PHYs. The motivation was market driven by the market requirement for wider adoption of 802.11 is for a single high-speed PHY that meets the industry/market psychological need for at least 10Mbps. From a market perspective, the phrase 'single PHY' means that no matter what combinations of options are implemented by different vendors, it shall be impossible for a customer to buy two compliant pieces of equipment which, under any circumstances, may fail to interoperate. This is the primary technical requirement that the 802.11b PHY specification must meet in order to acquire my yes vote.

In the opinion of this reviewer, the inclusion of several options within 802.11b D5.0 prevents the specification from meeting either the intended goal or the specific restrictions imposed by the motion chartering the group. The response of the group gives (in this reviewer's opinion) poorly developed arguments based on analogy and procedural arguments. The problems are not at the core procedural, they are technical the included options, as specified, create interoperability problems.

Further comments will address specific problems in more detail.

SuggestedRemedy

Required change:

Remove options which create the possibility that if different combinations of options are implemented by different vendors, it becomes possible for a customer to buy two compliant pieces of equipment which may fail to interoperate.

Proposed Response **Response Status U**

REJECT. There are no options in the standard that would cause any combination of selections to fail to interoperate. Therefore there are no options that need to be removed. All combinations of options are properly managed through MAC management, such that all

stations, including legacy stations of the original standard that are unable to understand the new options, are informed of the consequence of communication with stations implementing the new options. This communication occurs in the Association Response frame in the form of the Status Code. This code already provides for "Unspecified Failure" and declares that "If an operation is successful, then the status code is set to 0." Thus any non-zero value indicates a failure, even if the station is unable to interpret the actual reason. In addition, all stations implementing the new options are required to be fully capable of communication with the legacy stations. This requires that response frames are delivered to requesters using options and rates that the requester will understand. This is an extension of the multirate operation that requires a station to avoid communication using rates that are known not to be supported by the destination. Thus it is not possible for a customer to purchase two pieces of compliant equipment that will not interoperate.

CI **XX** SC **# 297** **P # 297** **L # 297** **# 339**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **A**

Position of author on Ballot comment # 297 response as of 6-16-99: Disapprove

The committee response appears to have been to ignore the issue raised. I went to some trouble to point out the interaction combinations that needed to be investigated. The response of the committee does not even address the interactions of old/new mac Implementations vs. header versions. If the committee refuses to even respond to the concerns expressed, then I have no choice but to hold the vote at disapprove until such time as the committee bothers to write up a response that addresses the technical issue raised. If the committee believes that the interactions I questioned are not a technical problem, then it at least needs to write up its reasoning and submit that as part of the response. If the logic and explanation are sufficient, I will change my position on this issue, but I can not do so based on essentially nill amount of the information contained in the comment response.

SuggestedRemedy

Proposed Response **Response Status U**

ACCEPT. This comment is identical to 338. Please see the resolution of that comment.

TYPE: TR/technical required T/technical E/editorial COMMENT STATUS: D/dispatched A/accepted R/rejected SORT ORDER: Clause, Subclause, page, line
 RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn Vote: E/ExCom VD/Disapprove VAC/Approve with Comments

CI **XX** SC **# 297**

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CI **XX** SC # **297** P # **297** L # **297** # **338**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **R**

Position of author on Ballot comment # 297 response as of 6-16-99: Dissapprove
 The committee response appears to have been to ignore the issue raised. I went to some trouble to point out the interaction combinations that needed to be investigated. The response of the committee does not even address the interactions of old/new mac Implementations vs. header versions. If the committee refuses to even respond to the concerns expressed, then I have no choice but to hold the vote at disapprove until such time as the committee bothers to write up a response that addresses the technical issue raised. If the committee believes that the interactions I questioned are not a technical problem, then it at least needs to write up its reasoning and submit that as part of the response. If the logic and explanation are sufficient, I will change my position on this issue, but I can not do so based on essentially nill amount of the information contained in the comment response.

SuggestedRemedy

Proposed Response Response Status **U**

REJECT. Clause 7.1.1 of IEEE Std. 802.11-1997 states "Reserved fields and subfields are set to 0 upon transmission and are ignored on reception." Thus, legacy stations will ignore the new codes and fields. This is the intended operation of the new codes and fields. Since the operation of legacy devices will be unaffected by these changes, no change to the protocol version is required. A new MAC will correctly interpret the CIF in an old MAC frame to indicate that the HRDS PHY options are not present.

Simply because the old MAC ignores the new CIF bits does not imply that the old and new MACs are not interoperable. The old MACs correctly convey that the PHY over which they are operating does not include any of the HRDS options. The new MACs are unable to communicate to the old MACs that they are operating over an HRDS PHY that implements one or more optional capabilities. This is not a failure to interoperate because the old MAC (over an old PHY) would not be able to make use of any of the new HRDS PHY capabilities, anyway.

The CIF bits will operate as they do in legacy MACs when an 802.11a PHY is present. Mixing MAC and PHY capabilities in the MAC header does not violate the "one MAC many PHYs" design goal of 802.11. The legacy MAC already includes PHY dependent information in certain frame types, e.g., FH and DS parameter set elements. This operation does not compromise the MAC any further.

CI **XX** SC # **299** P # **299** L # **299** # **340**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **R**

Position of author on Ballot comment # 299 response as of 6-16-99: Disapprove
 Simply saying 'reject' without any supporting text as to why is not much motivation to change my vote in this subject.

SuggestedRemedy

Proposed Response Response Status **U**

REJECT. The PBCC option provides additional capability to the standard. It has been shown that PBCC provides a small, but significant, increase in sensitivity. This may allow the operation of PBCC in situations where CCK would not operate acceptably. PBCC is left as an option in the standard because it is felt to be more complex than CCK. Leaving it as an option, allows an implementer to choose whether the additional complexity is balanced by the benefits of greater sensitivity.

CI **XX** SC # **300** P # **300** L # **300** # **341**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **X**

Position of author on Ballot comment # 300 response as of 6-16-99: Approve.

SuggestedRemedy

Proposed Response Response Status **C**

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CI **XX** SC # **301** P # **301** L # **301** # **342**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **R**

Position of author on Ballot comment # 301 response as of 6-16-99: Disapprove
 I am not sure what to make of the committee's response on this issue. Is channel agility option included in the proposed spec or not? Please clarify for me.

SuggestedRemedy

Proposed Response Response Status **U**

REJECT. This comment refers to comment #301. The channel agility option is still included in the draft and, thus, requires an entry in the PICS. The PICS of the previous draft referred to the wrong clause. The correct clause is 18.3.2. The PICS has been updated to refer to this clause.

Inclusion of this option does not introduce interoperability problems. The hop sequences have been included in 18.4.6.7 to ensure that agile BSSs maintain synchronization. The MAC has been updated to include the necessary information in the Beacon and Probe Response frames, so that stations are aware that an HRDS BSS is agile and of the parameters necessary to maintain synchronization. Finally based on the CIF field, stations may be denied association with an agile BSS if they do not implement the agility option.

CI **XX** SC # **302** P # **302** L # **302** # **343**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **R**

Position of author on Ballot comment # 302 response as of 6-16-99: Disapprove
 I really wanted to make this one an "approve" but the response of the committee only addressed a part of the submitted comment. Coupling use of the short preamble between RX and TX will improve the situation. However, that only takes care of case 3 in the comment. How about cases 1 and 2? I think they still fail. The suggested remedy offered two choices (numbered a and b in the comment) and neither were adopted – therefore I can not agree, in spite of how the response is labeled, that the comment was accepted. The problems still remain. Please either accept one of the suggested solutions or take the time to explain in detail why the other cases cited are not a problem.

SuggestedRemedy

Proposed Response Response Status **U**

REJECT. Referring to the 3 cases described by the commenter:
 Vendor A implements short headers on TX and RX. What the commenter has not stated is that Vendor A must also implement long headers on TX and RX. Vendor B implements only long headers on both TX and RX. Vendor C is not a possible implementation, given the current PICS where both short preamble processing on TX and RX are required if the short preamble option is implemented.

Case 1: The choice to use long or short headers is a decision similar to that of what rates to use, those that are mandatory or those that are optional. The algorithm for choosing a rate is outside the scope of the standard. However, the standard does require that a station does not attempt to communicate using rates that are know not to be implemented by the destination. Changes to clause 9.6 (Multirate) extend this operation to the options used. Granted Vendor A may not be immediately able to communicate with Vendor B if Vendor A begins by using short preambles. However, Vendor A is still capable of using long preambles. A reasonable algorithm, though outside the scope of the standard, would be for Vendor A to retry its transmissions using the long preamble.

Case 2: Since the configuration of Vendor C is not allowed (either both or neither, but not just one of TX and RX), this devolves to Case 1.

Case 3: Similarly, Vendor C must either implement short preamble on both TX and RX or on neither. In either case, Vendor C will be immediately able to exchange frames with like equipment.

The editor inadvertently allowed the changes to the MIB to not be properly reflected in the draft 5.5cmp. It is correct in draft 6.0. This may have caused the changes to escape the commenter's attention.

TYPE: TR/technical required T/technical E/editorial COMMENT STATUS: D/dispatched A/accepted R/rejected SORT ORDER: Clause, Subclause, page, line
 RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn Vote: E/ExCom VD/Disapprove VAC/Approve with Comments

CI **XX** SC # **302**

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CI **XX** SC # **332** P # **332** L # **332** # **344**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **R**

Position of author on Ballot comment # 332 response as of 6-16-99: Dissapprove
 This response is not acceptable as is. The ballot comment raised the question of charter and the technical problems that result from the proposed options in the specification. The response simply says that since the group did not opt to take the suggested remedy that they reject the comment. That is not a sufficient response as it totally ignores, and does not address the charter issues or the technical problems created by the existence of the options. Additionally, the response sent to me appears to be incomplete as it ends with a partial sentence: "All options are required to carry the basic". This ballot comment therefore must remain "disapprove" until the committee actually responds to the issues cited.

SuggestedRemedy

Proposed Response Response Status **U**

REJECT. The technical issues of comment 332 are addressed in the response to comment 332. Only the charter issues will be addressed here. The issue is one of whether the HRDS PHY is a definition of one or more PHYs. The position of the working group is that the HRDS PHY defines a single high rate extension of the DS PHY. It also defines an agility option that provides significant capabilities to the HRDS PHY to avoid stationary interferers. The fact that this allows an implementer to build a single dual mode radio that allows that system to communicate with legacy FH PHYs does not constitute the definition of a second PHY in this standard.

CI **XX** SC **10.3.3.1** P L # **183**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **T** Comment Status **R**

PLME_join should be updated to reflect the station's support for the new options.

SuggestedRemedy

Proposed Response Response Status **Z**

REJECT. It is assumed that the commenter is referring to the MLME_Join.request and requesting that this mechanism be used to modify the content of the Capability Information Field (CIF) in MAC Management frames. The MLME_Join.request is not the proper mechanism for selecting the bits in the CIF. It simply identifies the BSS description of the BSS to join. The intent of the MLME_Join.request is to take the information that has been received previously during a Scan operation and delivered by the MLME to a management agent outside the MAC, using this information to identify the parameters required to synchronize with the requested BSS. The mechanism for setting the bits in the CIF is described in 7.3.1.4. A station sets these bits based upon the value of attributes in its MIB, which are also set by an outside manager.

MLME-Start includes the CIF information to be advertised by an AP for the BSS.

CI **XX** SC **18.1** P L # **188**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **R**

Last paragraph of this section.

We are under NO restrictions to make a high rate phy which interoperable with current FH PHY.

This statement implies many characteristics which are not defined in the current text.

SuggestedRemedy

Change the paragraph to the following:

Capability for identifying a channel agile mode is also provided. However, management of this function is outside the scope of this standard.

Proposed Response Response Status **U**

REJECT. This is an editorial comment. The paragraph to which it refers is entirely illustrative and includes no normative text. The description of channel agility is presented accurately and makes no implications about characteristics that are not described in either normative text of clause 18 or in the informative text of Annex F. The paragraph has been modified to be the following: "include paragraph from draft 6.0"

CI **XX** SC **18.1.2** P L # **190**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **A**

Strike the last sentence.

The sentence creates many ambiguities - such as, do Cwmin, Cwmax, slottime, turnaround times, etc. default to those provided in the high rate PHY mib, or should the MAC be made aware of those currently used by the FH PHY.

SuggestedRemedy

Delete the last sentence

Proposed Response Response Status **C**

ACCEPT. The requested action was taken in the last draft.

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CI **XX** SC **18.2.1** P L # **192**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **R**

This section creates ambiguity.

It says that the long preamble is mandatory. Which means that it must always be supported. It then implies that the short preamble is intended for exclusive use; ie. a BSS will use only the short preamble.

In order to have the exclusive case, additional parameters must be added to the MIB and MAC which allow this mode.

If exclusivity is the intent of the PBCC and agility as well, then variables must be added for these as well.

In other words, will the PHY chips be created so that they can recognize on the fly which preamble is being used, or will they operate in one mode (long or short) only in order to demodulate the packet?

Will the PHY chips be created so that they can recognize on the fly whether or not PBCC is used and correctly demodulate the packet?

Likewise with the other combinations !!

SuggestedRemedy

Proposed Response Response Status **U**

REJECT. The many combinations described in the comment, and those that are not, do not introduce ambiguity or non-interoperability. The PHY options are simple extensions of the mechanism already in place for the support of multirate and can be supported in the same way. The request for additional MIB attributes is not necessary. There are sufficient attributes to define the presence and use of the options. The particular algorithms used to enable and select the use of the options are outside the scope of the standard, as are those for multirate.

CI **XX** SC **18.2.3.9** P L # **215**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **A**

Confusion added - as stated in previous comments --

This section says ..."A receiver not configured to receive the high rate signals will not detect this SFD."

The implication is that the high rate PHY will be able automatically detect (at all times) between long and short preamble usage.

SuggestedRemedy

Clarify that this statement is correct or that the intended use is one or the other (long or short preamble) per BSS.

Proposed Response Response Status **C**

ACCEPT. Accepted, clarify that a station not configured to receive the short preamble will not detect this SFD.

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CI **XX** SC **18.3.3** P L # **222**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **A**

This section also adds to the confusion about intended operation.
 Reporting a single value, implies that the intent is to have exclusive operation.

Reported values for Preamble Length, Cwmin and Cwmax should be changed to report all valid values in a "mix and match" environment.

The fact that a mix and match mode MAC will be UNDULY BIASED towards stations using short preamble - better access because of shorter Cwmin, suggests that the intent is to have exclusive operation

SuggestedRemedy

I believe the intent is to have "mix and match", therefore, reporting Cwmin and Cwmax consistent with legacy systems is correct.

If the hooks are added to allow for exclusive BSS use of some options, shortening of CWMin andMax would be OK

This points out that there is a hole in the system, which says that the BSS ought to report the current Cwmin and Cwmax times in the BEACON and PROBE frames.

Also points out that statements ought to be added to the standard which specifies which values a station uses.

Should the station use values reported by its PHY, or should it adopt those values presented in the BEACON and PROBES

Or remove all doubt, the high rate PHY uses same values as legacyDS PHY, regardless of mode of operation. However, this leaves a bias towards DS vs FH which "combo vendors" will have to address.

Proposed Response Response Status **C**

ACCEPT. Accepted, the legacy values are to be used and the shorter values removed.

CI **XX** SC **18.3.3** P **28** L **15** # **314**
 Anil K. Sanwalka Neesus Datacom Vote VD

Comment Type **T** Comment Status **A**

I have made this comment before.

There is no way for aPreambleLength to have 1 of 2 possible values. I would suggest leaving this as the value for long preamble. The TXTIME primitive should not use this value leaving it in the structure only to provide compatibility with the TGrev DSSS system.

SuggestedRemedy

Change value to 144

Proposed Response Response Status **C**

ACCEPT. Change aPreambleLength to have only a single value. Then add a variable "PreambleLength" for use in calculation of TXTIME. Because the HRDS PHY must be aware of the header type being used (long or short) when calculating the TXTIME, it can select the appropriate value for PreambleLength to be used in the calculation. The PreambleLength and TXTIME calculations are entirely internal to the HRDS PHY.

CI **XX** SC **18.4.4.2** P L # **225**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **A**

Add 'X' to table for PMD_CS.request

Add new section (18.4.5.xx) for PMD_CS.request which states the method for setting the CS_THRESHOLD according to the text

SuggestedRemedy

Proposed Response Response Status **C**

ACCEPT. Accepted in principle, Change CS_threshold to correlation threshold which does not have a setting method.

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CI **XX** SC **18.4.6.12** P L # **247**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **A**

The TBD must be resolved.

More accurately, this section ought to specify an exact hop time.
 If one system hops in 100usec and begins transmitting, the 224usec station (while compliant) is at a disadvantage or worse the two won't interoperate.

SuggestedRemedy

Resolve the TBD

Specify an exact hop time specification or put a statement that no transmission will occur until after the time specified here.

Proposed Response Response Status **C**

ACCEPT. Accepted, the TBD is resolved by removing the specification of settling rate. The hop time statement will be added by editor.

CI **XX** SC **18.4.6.14** P L # **250**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **A**

The PICS (Annex A4.3) references two temperature types, the text references three.

SuggestedRemedy

Change 18.4.6.14 to reflect two temperature ranges.

Proposed Response Response Status **C**

ACCEPT. Editor will remove reference to temperature Type 3.

CI **XX** SC **18.4.6.6** P **45** L **48** # **294**
 Jeff Fischer MICRILOR, Inc. Vote VD

Comment Type **TR** Comment Status **R**

The PBCC (i.e. coded) mode should be required, not optional. This issue is not related to the debate of having "options" in the standard, but to needing the PBCC mode because it is the only way the standard can be generally useful to the industry. The CCK modulation is inherently very weak by today's communications standards. If the PBCC is not used then the only way to make this waveform useful is with a severe measure of equalization. Therefore the only way to make this standard a useful one depends on a companies implementation, not on the standard waveform itself. By making the PBCC a requirement then the standard waveform itself will have inherent utility. The argument that there are commercial reasons to make a poor link is not a good one. Commercially speaking, the equalizer is a more complex, more costly, more power consumptive circuit to implement than the PBCC circuits.

SuggestedRemedy

Make this mode required for a standard implementation.

Proposed Response Response Status **U**

REJECT. The working group agrees with the commenter that PBCC has certain advantages over CCK. However, there is a difference of opinion between the commenter and the working group as to the relative complexity of PBCC vs equalization, the amount of equalization required for CCK, and the severity of the environment in which CCK will operate reliably. For these reasons, the working group has repeatedly decided that PBCC should be part of the standard, but that it should remain optional, allowing an implementer to make the trade-offs inherent in the definition of a product incorporating the PBCC option.

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CI **XX** SC **18.4.6.7** P L # **255**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **R**

We are under NO restrictions to make a high rate phy which is interoperable with current FH PHY.

The agility option enables a form of tolerance and coexistence, but not interoperability with current FH phys.

The statement referencing "shall meet requirements of ..." opens a can of inconsistency worms as described above.

SuggestedRemedy

Change text to following:

The channel agility option gives a high rate phy implementation the flexibility to move about the band. The management (determination of when and where to hop) of this option is outside the scope of this standard. When the channel agility option is enabled, the implementer may make use of both FH and DS parameter sets in BEACON and PROBE frames.

Proposed Response Response Status **C**

REJECT. The management of the channel agility (when and where to hop) must be included in the normative portion of the standard in order to ensure interoperability of agile HR PHYs with themselves as they move from one channel to another. The commenter's suggested text regarding Beacon and Probe (Response) frames is already described in the changes to Clause 7 and does not belong in the Clause relating to the PHY.
 Remove the word "optional" from the first sentence of paragraph 18.4.6.7.1.

CI **XX** SC **18.4.6.7** P **48** L **34-35** # **316**
 Anil K. Sanwalka Neesus Datacom Vote VD

Comment Type **TR** Comment Status **A**

Sorry guys but this one is important.

Firstly:

Channel agility does not enable FH interoperability as it is claimed here and in Appendix F. It simply allows an implementer to build a "dual-mode" radio that can be used to colocate a DS and FH BSS. My understanding of the result of the last meeting was that we would put in frequency agility as an option without any specific claim for FH interoperability, with the knowledge that a "smart" implementer could create a system with radios that could switch between DS and FH modes.

I feel that frequency agility may be a useful thing in and of itself without any reference to FH interoperability.

Secondly:

Here it says that the hop sequences shall be as described in Annex F. In other places it says that Annex F is informative. I don't think you can have it both ways.

My feeling is that for there to be any kind of interoperability the hop sequences have to be normative.

SuggestedRemedy

Remove references to FH interoperability from clause 18.
 Define Hop sequences and make them mandatory in clause 18.
 Include Appendix F as an informative annex describing FH interoperability (I think that is what it is now).

Proposed Response Response Status **Z**

ACCEPT. The hop sequences are now normative and included in clause 18. Annex F is entirely informative and provides a description of the conceptual "dual mode" AP that provides a manner of interoperability between legacy FH stations and an agile HRDS AP. The wording of clauses 18.1 and 18.4.6.7 will be modified to say "This option can also be used to implement 802.11 compliant systems that are interoperable with both FH and DS modulations." This is describing a system that does both FH and DS, not implying that HRDS is directly interoperable with FH.

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CI **XX** SC **18.4.8.1** P L # **265**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **R**

These sections should specify as to whether this performance is achieved with or without or regardless of the "LOCKED" bit.
 If different performance expectations are anticipated, so state.

SuggestedRemedy

Proposed Response Response Status **Z**

REJECT. Rejected, the specification apply whether or not the locked bit is set. There is no mention of the Locked bit in any of these sections.

CI **XX** SC **18.4.8.1** P L # **266**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **R**

These sections should specify as to whether this performance is achieved with or without or regardless of the "LOCKED" bit.
 If different performance expectations are anticipated, so state.

SuggestedRemedy

Proposed Response Response Status **Z**

REJECT. Rejected, the specification apply whether or not the locked bit is set. There is no mention of the Locked bit in any of these sections.

CI **XX** SC **18.4.8.1** P **54** L **16** # **267**
 Stan Reible MICRILOR, Inc Vote VA

Comment Type **T** Comment Status **R**

We need to select a transmit modulation approach which can provide better receiver input level sensitivities in fielded equipment.

SuggestedRemedy

Place a tighter sensitvity constaints on the equipment (and emerging chip designs)implementing the proposed standard.

Proposed Response Response Status **C**

REJECT. The sensitivity specified describes a minimum value. An implementer is free to select a tighter value. The value chosen is felt to allow implementations with a reasonable difficulty and complexity.

CI **XX** SC **18.4.8.2** P L # **268**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **R**

These sections should specify as to whether this performance is achieved with or without or regardless of the "LOCKED" bit.
 If different performance expectations are anticipated, so state.

SuggestedRemedy

Proposed Response Response Status **Z**

REJECT. Rejected, the specification apply whether or not the locked bit is set. There is no mention of the Locked bit in any of these sections.

CI **XX** SC **18.4.8.4** P L # **270**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **R**

Remove the reference to a timer in CCA mode 2.
 The mode says report busy upon detection of signal by carrier sense, therefore, the timer is not necessary.

I take this to mean that a high rate PHY must recognize and determine carrier sense for BOTH barker and CCK modulation.
 This means that a high rate PHY which does not implement or recognize the

SuggestedRemedy

Delete reference to timer in mode 2.

Proposed Response Response Status **C**

REJECT. In the cases where a station is unable to process the short header or a station does not correctly receive the header, the timer is necessary to prevent the medium from being indicated to be available prematurely. This allows the coexistence of long preamble only stations with short preamble stations. Detailed rationale for this mode of operation is provided in document 802.11-99/01

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CI **XX** SC **18.4.8.4** P L # **269**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **A**

If the timer is not removed, then
 The algorithms for CCA should have different numbering from those used in section 15.
 The MIB should reflect the additional modes as well.
 The algorithms using a timer are not the same as those which do not.

SuggestedRemedy

Mode 2 should become new mode 4
 Mode 3 should become new mode 5

Change in 18.4.8.4 and in PICS HRDS11

Proposed Response Response Status **C**

ACCEPT. The new CCA modes will renumbered as requested by the commenter. Mode 4 will be represented in the MIB with a value of 08. Mode 5 will be represented in the MIB with a value of 16. The range of dot11CCAModeSupported will be changed to (0..16). The allowable values of dot11CurrentCCAMode will be updated to add the new values as follows: SYNTAX INTEGER {edonly(1), csonly(2), edandcs(4), CswithTimer(8), Hrscanded(16)}, as well as adding the new values to the description.

CI **XX** SC **18.4.8.4** P **55** L **15** # **271**
 Stan Reible MICRILOR, Inc. Vote VA

Comment Type **T** Comment Status **A**

While lower-transmit-level equipment is likely to be of a lower performance nature, dropping the energy detection threshold levels for such equipment by 10 dB does not appear to be full justifiable.

SuggestedRemedy

Consider a 4-6 dB lowering of the energy detection threshold levels for lower performance equipment.

Proposed Response Response Status **C**

Accepted, Use a CCA backoff of 6 dB for low power transmissions when in the high rate mode.

CI **XX** SC **7.3.1.4** P **5** L **18** # **274**
 Stanley Reible MICRILOR, Inc Vote VA

Comment Type **T** Comment Status **R**

Channel Agility is not a requirement for high rate DS nor does it insure backward compatibility with devices implementing the existing standard. The options of short preamble, PBCC, and channel agility will combine to introduce a Multi-Standard Product

SuggestedRemedy

Eliminate the option for channel agility. Greatly shorten the long preamble to eliminate a need for the optional short preamble.

Proposed Response Response Status **C**

REJECT. The operation of the channel agility option is not a definition of a new PHY, but an option of the HRDS PHY that provides functionality that may be used by a system implementer to create systems that include a dual mode (FH and DS/HRDS) radio capable of a manner of interoperability between legacy FH stations and a channel agile HRDS AP. The use of this option in a pure HRDS environment allows a BSS to move its channel of operation in order to avoid interference, or for other reasons.

The long preamble is chosen specifically to allow interoperability with legacy DS PHYs. Shortening this preamble would introduce interoperability problems with the legacy DS PHY. However, in the spirit of the comment, to increase performance through the use of a shorter preamble, is part of the proposed standard. The use of the short preamble option allows a user of the standard to select a higher performance level when interoperability with legacy DS PHYs is not an issue.

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CI **XX** SC **7.3.1.9** P L # **276**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **R**

The three new reason codes are not supported by stations which are compliant to the current (1997) standard.
 The existing products, "should" ignore the three new capabilities bit definitions established in 7.3.1.4, however, the 1997 spec says they are defined to be always zero - it does not say what is proper course to take when a '1' bit is received.
 Since the current systems cannot interpret these bits and are not aware of these new reason codes, there is no way for them to determine the reason for denied association.

Section 18 states that the long preamble is MANDATORY. Section 18.2.3.9 implies that long and short are used together. Section 18.2.5 states that the decision for using long or short is a management decision and implies packet by packet basis. To me this means "mix and match" is the intended operation.

Section 18 states that these new capabilities are optional. Section 7.3.1.4, when defining these new capabilities, implies that these features may be used (or not) on an individual packet by packet basis.

If the intent is to define the use of these new options as exclusive use and mandatory to join a BSS when enabled, then the station must know in advance (PHY bits) how to decode the frame and whether to recognize the short preamble.

SuggestedRemedy

I believe the intent was to allow mix and match operation. Therefore, no station can be denied access to the BSS based on non-support and these reason codes will never be used and should be deleted.

If the intent is to give a vendor the ability to selectively discriminate against stations not supporting a particular optional mode, additional MIB parameters should be defined which allow configuration of the use as mandatory or optional within a BSS. - then the reason codes can be kept, although only recognized by stations compliant to this newer version of the draft.

Proposed Response Response Status **U**

REJECT. The commenter claims that the standard does not specify what is to be done with values received in reserved fields. This is not correct. Clause 7.1.1 of IEEE Std. 802.11-1997 states "Reserved fields and subfields are set to 0 upon transmission and are ignored on reception." Thus, legacy stations will ignore the new codes. Even though the legacy stations are not able to interpret new codes, they will determine that the code means "failure" from the description of the original codes in the standard. The intent of these options is to allow either mix and match operation or exclusive operation requiring the implementation of one or more options. Precedent for this is already established in the original standard with the allowed use of the basic rate set, which may include only an optional rate. Additional MIB attributes are not required, since it is only legacy stations that might have a use for these new attributes and they are the ones that will be completely unaware of them. In order for a mobile station to be able to query the MIB of an AP, it must first be associated, which it could not do if it did not implement the required options. We agree that attributes telling an AP how to make its association

decisions with regard to the new options are desirable, they belong outside the MAC and MAC Management, in the external AP functionality.

CI **XX** SC **Annex A.4** P L # **280**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **R**

HRDS8 - states that hop sequences are MANDATORY when agility is present.
 First, this line item is not given a text reference.

Second, this feature falls outside the scope of 802.11. It must be controlled by an outside management entity, and therefore is outside the bounds of 802.

There are many 'desirable' methods which could be employed to decide when and where to hop. Unless ALL methods are provided for (and defined) this spec should not define a specific method. Besides, it is 'legally' outside the scope of 802.

SuggestedRemedy

Delete this check box from the spec.

Proposed Response Response Status **Z**

REJECT. Rejected, the hop sequences are moved back into the normative part of the text. Therefore the check box is needed.

CI **XX** SC **Annex A4.3** P L # **281**
 Mike Trompower Telxon Corporation Vote VD

Comment Type **TR** Comment Status **A**

If the timer is not removed, then
 The algorithms for CCA should have different numbering from those used in section 15.
 The MIB should reflect the additional modes as well.
 The algorithms using a timer are not the same as those which do not.

SuggestedRemedy

Mode 2 should become new mode 4
 Mode 3 should become new mode 5

Change in 18.4.8.4 and in PICS HRDS11

Proposed Response Response Status **U**

ACCEPT. The PICS will be updated to reflect the changes made to the CCA modes.

TYPE: TR/technical required T/technical E/editorial COMMENT STATUS: D/dispatched A/accepted R/rejected SORT ORDER: Clause, Subclause, page, line
 RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn Vote: E/ExCom VD/Disapprove VAC/Approve with Comments

CI **XX** SC **Annex A4.3**

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CI XX SC Annex F P L # 284
 Mike Trompower Telxon Corporation Vote VD

Comment Type TR Comment Status R

Delete this entire annex and all references to it. The information in this annex is outside the scope of 802.

This information (and many pointers to it in the text) alludes to the creation of a NEW PHY. This phy must be capable of receiving both FH and DS preambles. AS A SPECIFIC REFERENCE, the first sentence of annex f states that this option creates an "INTEROPERABLE" FH and DS PHY. This new PHY is not a part of the PAR.

If you attempt to use two radio devices, the mechanism for transferring the information between the two radios is not defined (and is outside the scope of 802) and will likely NOT Result in an "interoperable" solution as stated.

Further, the CCA mechanism which is referenced, is new functionality, not part of the main spec. no provisions have been provided in other parts of the spec (MIB and PICS)

SuggestedRemedy

Delete this entire annex - do not any of this information into section 18.

Proposed Response Response Status U

REJECT.The operation of the channel agility option is not a definition of a new PHY, but an option of the HRDS PHY that provides functionality that may be used by a system implementer to create systems that include a dual mode (FH and DS/HRDS) radio capable of a manner of interoperability between legacy FH stations and a channel agile HRDS AP. The use of this option in a pure HRDS environment allows a BSS to move its channel of operation in order to avoid interference, or for other reasons. Annex F is now purely informative and does not create new requirements. Clause F.4 will be retitled to be "Additional CCA Recommendations".

CI XX SC Annex F P 60 L # 296
 John H. Cafarella MICRILOR, Inc. Vote VD

Comment Type TR Comment Status R

I believe the frequency-agility option violates our single-PHY PAR restriction. It perpetuates the dual-PHY situation into the future. It will work against acceptance of this already complex standard. Uncoordinated users (i.e., SOHO environment) may cause/experience disruption when this option is employed, and they will not understand why.

SuggestedRemedy

Remove Annex F, and all related cross-referencing from the main body of the standard.

Proposed Response Response Status U

REJECT. The operation of the channel agility option is not a definition of a new PHY, but an option of the HRDS PHY that provides functionality that may be used by a system implementer to create systems that include a dual mode (FH and DS/HRDS) radio capable of a manner of interoperability between legacy FH stations and a channel agile HRDS AP. The use of this option in a pure HRDS environment allows a BSS to move its channel of operation in order to avoid interference, or for other reasons. Rather than causing problems with uncoordinated users (SOHO), the presence of this option may allow such users to operate in environments that would not otherwise be possible.

CI XX SC Annex F - Frequency H P 60 L 51 # 285
 Stanley Reible MICRILOR, Inc. Vote VA

Comment Type T Comment Status R

The option for FH interoperability introduces unnecessary system complexity without enhancing high data system capability. The ability for users to readily switch operating channels will make it very difficult for high rate DS uses to find and effectively use any clear channels in environments such as office and industrial parks. In such environments there can be many small company users, each with different equipment and widely varying MIS and networking management approaches. This will be made more serious by the fact that some of these small companies will have multiple offices and sites within the same office parks which need connectivity. Yet htis is exactly the environment where wireless data links may be most needed.

SuggestedRemedy

Discourage the use of the channel agility option by striking it from the high rate standard.

Proposed Response Response Status C

REJECT. The operation of the channel agility option provides functionality that may be used by a system implementer to create systems that include a dual mode (FH and DS/HRDS) radio capable of a manner of interoperability between legacy FH stations and a channel agile HRDS AP extending the operation of an HRDS system into precisely the environments where the commenter claims it would cause difficulty. The use of this option in a pure HRDS environment allows a BSS to move its channel of operation in order to avoid interference, or for other reasons. Rather than causing problems with uncoordinated users (SOHO), the presence of this option may allow such users to operate in environments that would not otherwise be possible.

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Cl **XX** SC **ballot comment #** P L # **345**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **R**

Position of author on Ballot comment # 332 response as of 6-16-99: Dissapprove
 This response is not acceptable as is. The ballot comment raised the question of charter and the technical problems that result from the proposed options in the specification. The response simply says that since the group did not opt to take the suggested remedy that they reject the comment. That is not a sufficient response as it totally ignores, and does not address the charter issues or the technical problems created by the existence of the options. Additionally, the response sent to me appears to be incomplete as it ends with a partial sentence: "All options are required to carry the basic". This ballot comment therefore must remain "disapprove" until the committee actually responds to the issues cited.

SuggestedRemedy

Proposed Response Response Status **U**

REJECT. This comment is identical to #344. Please see the resolution to that comment.

Cl **XX** SC **MAC changes to suppo** P **multiple** L # **297**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **A**

Review Comment 7: Technical Required
 Essentially all the proposed changes to the MAC portions of the 802.11 standard are present to support the options addressed in previous review comments (1 thru 6). I think there are additional problems that are created by the proposed MAC changes.

New bits have been defined in the capability information field. However, the MAC header version has not been updated. How is a station supposed to know how to parse the information? If you change the version level then only new implementation (presumably those that come with an 802.11b implementation) will understand the new capability bits. That would of course also prevent the long PHY header interoperability capability since the old version MACs will not understand the new version mac info.

If you don't change the version information, then what problems may occur? What will a new MAC implementation do when it gets an old MAC capability frame? Will it take action based on the values of the newly defined bits? Will the action be correct? What will happen if an old MAC gets a new MAC header with information in bits that were specified as reserved.

I believe these problems arise because the 802.11b draft proposes putting PHY capabilities into the MAC capability field. The MAC Capabilities field is for MAC capabilities. Mixing PHY info into the MAC capability field makes the MAC version dependent upon the PHY being used. That violates one of the prime design goals of 802.11: A single MAC for multiple PHYs. How should the bits be set in a new MAC header when it's running some other PHY (802.11a or a later developed PHY...)?

I also note that the charter of 802.11b was to create a PHY specification. It was not to change the MAC. Personally, I would accept minor changes to the MAC that do not cause any issues with existing 802.11 MAC implementations – but the changes proposed in 802.11b probably fail that test. Until an analysis of all possible combinations of interactions between "old" and "new" MAC implementations containing the proposed changes is done, presented and circulated for review, and deemed not to contain any problems, I will have to vote no on the 802.11b draft.

Please note that there is an easy way out of the problem: Adopt all the other 802.11b PHY changes requested in my review comments. That would eliminate the PHY options that are the source of the problems; there would be no need for any of the changes proposed to the 802.11 MAC specification, and without the proposed changes, this particular set of issues disappears.

SuggestedRemedy

Required change:
 Adopt all the other 802.11b PHY changes requested in my review comments; eliminating the need for any of the changes proposed to the 802.11 MAC specification; and then delete the corresponding MAC changes.

Proposed Response Response Status **U**

ACCEPT. This comment is identical to #338 and #339. Please see the resolution to those comments.

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Cl XX **SC many** **P many** **L** # **298**
 John H. Cafarella MICRILOR, Inc. Vote VD

Comment Type **TR** **Comment Status** **R**

My concern here is the existence of too many options: 1) for the high-rate PHY there are 11- and 5.5-Mbps rates using either CCK or PBCC; 2) the long and short PLCP Headers; and 3) the frequency-agility option. This standard is all on paper, and is a design by committee. Unlike the adoption of 802.3 and the original 802.11, where there was considerable experience before the standards, there is no practical experience with this complex collection of stuff.

SuggestedRemedy

- 1) Keep CCK or PBCC, not both (prefer keep PBCC);
- 2) Keep long or short header (prefer short);
- 3) Eliminate frequency agility.

Make the standard simpler to implement and EASIER TO USE.

Proposed Response **Response Status** **U**

REJECT.The working group believes that the proposed standard incorporates only options that have reasonable justification. Each option provides a distinct advantage, but also requires an increase in complexity. The base standard, without options has been implemented and found to provide the expected performance and features. In addition, several years of experience have been accrued using the original 802.11 standard and other WLAN technology. With this base of experience, the working group feels that the proposed standard is well designed and provides an implementer the flexibility to provide interoperable solutions with a variety of performance-enhancing options.

Cl XX **SC PBCC related text** **P multiple** **L** # **299**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** **Comment Status** **R**

Review Comment 6: Technical Required
 Prior to Sponsor ballot I had requested the deletion of the PBCC option. I again make the request as part of my sponsor ballot. The utility provided by the option is insufficient (in this reviewer's opinion) to merit the complexity involved. In my (informal) sampling of people planning to implement the 802.11b PHY, I did not find anyone that planned to implement the option. The option exists due to political deals made in earlier meetings. It's time to be pragmatic and clean up the side effects of past politics – delete the option that (I believe) will not be used. If this is done it makes the resolution to the next comment (#7) easier as a positive benefit.

SuggestedRemedy

Required change:
 Delete PBCC option.

Proposed Response **Response Status** **U**

REJECT.This comment is identical to #340. Please see the resolution of that comment.

Cl XX **SC PICs CF6** **P 55** **L** # **300**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** **Comment Status** **A**

Review Comment 4: Technical Required
 Item CF6 in the PICs (page 55) is OFDM PHY for the 5GHz band. Delete this line from the 802.11b PICs. It has no business existing in the 802.11b PHY draft (it should exist in the 802.11a draft instead).

SuggestedRemedy

Required change:
 Delete item CF6 in the PICs (page 55) for the OFDM PHY for the 5GHz band.

Proposed Response **Response Status** **C**

ACCEPT. line was removed in draft 6.0, but deletion was not noted in draft 5.5CMP..

Cl XX **SC PICs HRDS3** **P 56** **L** # **301**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** **Comment Status** **R**

Review Comment 5: Technical Required
 Prior to the sponsor ballot I had requested during internal 802.11 ballots that the FH interoperability option be made mandatory. The group responded to that request by saying "Partially accepted, the FH PLCP frame format option has been deleted". Doing exactly the opposite of what was requested is really stretching the meaning of the phrase "partially accepted"...

However, my primary concern was that the option created interoperability issues. The deletion of the option does remedy my concern. I accept the change in draft 5.0. Please complete the deletion by making the following edit:

Delete PICs item HRDS3 page 56 "Channel Agility Option". Section 18.2 no longer has the option so the PICs can't reference it.

SuggestedRemedy

Required change:
 Delete PICs item HRDS3 page 56 "Channel Agility Option".

Proposed Response **Response Status** **U**

REJECT. This comment is identical to #342. Please see the resolution of that comment.

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CI **XX** SC **PICs HRDS3&6** P **56** L **# 302**
 David Bagby 3Com Corporation Vote VD

Comment Type **TR** Comment Status **R**

Review Comment 3: Technical Required

I had previously requested that the use of the short preamble be either deleted or made mandatory. The 802.11b group prior to sponsor ballot declined the request. The problems caused by the option specifications remain.

Please refer to the PICs in draft 5.0:

Item HRDS3 (page 56) is shown as optional and refers to section 18.2.

Item HRDS6 (page 56 - short preamble process on RX) is shown as optional and refers to section 18.2.6.

Neither the PICs nor the referenced text sections tie the two options together.

From what I've read that the following are possible compliant implementations:

Vender A: Implements Short header on TX and RX (both options).

Vender B: does not implement any short header options (neither Option)

Vender C: Implements short header on TX option, but not the RX option.

Once the use of short headers is turned on at a sending station here are some of the bad cases possible given the current draft:

Case 1: A's equipment always sends short headers, B can never talk to him. Result: non-interoperability.

Case 2: B can't talk to C. Result: non-interoperability

Case 3: C can't talk to C! Result: non-interoperability

Suggested Remedy

Required change:

Here is what is required:

1) RX short header processing must be mandatory if the Tx short header option is implemented. That will prevent case 3 above.

2) The purpose of the short header is to provide performance (as the long header limits throughput). The purpose of the long header is antenna to antenna interoperability between 1 and 2 Mbps 802.11 DS PHYs (the FH is now irrelevant due to the removal of the FH compatibility stuff in D5.0) and an 802.11b PHY.

The use of an option is an attempt to have both. The option approach fails because it causes interoperability issues, effectively providing neither benefit.

Either

a) Delete the short header (effectively deciding that old PHY interoperability is more important than performance) or

b) Make the use of the short header mandatory (making performance more important than old PHY compatibility).

I can accept either choice a) or b).

My preference is that the standard take choice b) as there are other ways to achieve data interoperability between 1-2 Mbps DS PHYs and the proposed 802.11b PHY. It can be accomplished by multiple APs and let the interoperability occur in the DS; it is not necessary to have antenna to antenna interoperability between the various PHY specifications (this is how

one moves data from a current FH PHY station and a DS PHY station). This gives the 802.11b system both data interoperability (the real user requirement) and performance.

Proposed Response Response Status **U**

REJECT. This comment is identical to #343. Please see the resolution of that comment.

TYPE: TR/technical required T/technical E/editorial COMMENT STATUS: D/dispatched A/accepted R/rejected SORT ORDER: Clause, Subclause, page, line
 RESPONSE STATUS: O/open W/written C/closed U/unsatisfied Z/withdrawn Vote: E/ExCom VD/Disapprove VAC/Approve with Comments

CI **XX** SC **PICs HRDS3&6**