Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal

Section 6 comments from Ballot on Draft Standard D2 (Vic Hayes, Chair, AT&T WCND)

1	1.X, 2.X, 3.X 4.X, 5.X, 6.X 7.X 8.X	BD	E	N	My editorial comments are contained in the files D2lb_edx.doc (where x is the relevant major section number) which were submitted along with this ballot response. All comments in these files are purely 100% editorial in nature (incorrect fonts, extra blank lines, misformatting etc). Any change for which there was any question in my mind that anyone might think it other than editorial, I have included as separate comment in this table.	Doc D2 is of Insufficient quality. 1) There are numerous editorial errors in the D2 draft which need to be corrected before the draft can be forwarded for sponsor ballot. The editorial errors range from incorrect fonts in the middle of sentences & page formatting to a dire need to have a spelling check run on the document. 2) While no single item is enough to prevent forwarding of the draft, in aggregate they impact the draft quality to such an extent that it would be embarrassing to forward it in this state. I have forwarded to the editors a marked up copy of the draft showing the editorial errors I noticed during review (this was at the editors request, for various obscure reasons a hard copy was requested over an electronic copy as being easier to deal with in this instance). 3) Additionally all the section X.X, Y.Y etc place holder in the text need to be found and changed to correct section references.	
2	6	FMi	E		correct subsection references in the introductory paragraph	This paragraph was never updated to reflect the removal of 6.4 when the WEP description was moved into the security chapter (5).	Accept
3	6.	ZJ	E	N	Delete reference to "6.4" since that stuff has moved to clause 5. Insert reference to 6.1 (which I am proposing we move 4.4 to). Delete reference to 6.7 (which I am proposing we move to an annex). Correct numbering	Number soup.	Accept

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					throughout the paragraph.		
4	6.1	HC	e		3rd para, 5th sent, spelling of "classes"	spelling error	Accept
5	6.1	GE	e		Remove following sentence... The MAC State Machine shall not interfer with time-bounded nor contention free communications...	I would hope that the MAC State machine can run without interfering with itself....although simulation might prove this not so. I believe what this is trying to say is that the async MAC state machine will respect the contention free period even though a node doesn't support the option.	Accept
6	6.1	BTh	e		**in 1st paragraph correct...** time bounded service classes.	typo	Accept
7 defer	6.1	FMi	t	N	Incorporate changes from Clause 6 of document 95–222, which updates the MAC architecture description, figure 6–1, and several of the 6.1.x subsections to match the current state of the MAC and current MAC data service definitions.	Consistency, especially with the current reference model, the MAC State Machines, and the removal of the scattered vestiges of connection services and time–bounded services (without removing the mechanisms to support connections and TBS in the future).	
8	6.1.2	HC	e		1st para, 5th sent, spelling of "efficient"	spelling	Accept
9	6.1.2	HC	e		2nd para, 3rd sent, missing space "stations_are"	spelling	Accept
10	6.1.2	HC	e		3rd para, 2nd sent. missing spaces "when_the" and "stations_are"	spelling	Accept
11	6.1.2	HC	e		3rd para, last sent, missing space "contention_for"	spelling	Accept
12	6.1.2	GE	e		replace sepcified with specified	Spelling	Accept
13	6.1.2	BTh	e		**in 2nd paragraph correct...** smaller than the IFS_for data... **in the 3rd paragraph correct...** at a time when_the medium is free, by starting its transmission before the other stations_are allowed...so as to eliminate contention_for a limited...	someone has a problem space bar on their computer	Accept
14	**6.1.2**	**MB**	**e**		**second paragraph, second sentence. add. ... different values of the Inter Frame Spacing (IFS)**		**Accept**
15	**6.1.2**	**ws**	**e**		**first paragraph - "effiecent"**	**spelling**	**Accept**
16	**6.1.2**	**ws**	**e**		**3rd paragraph - 'contentionfor"**	**typo**	**Accept**
17	6.1.2	GE	T	X	Add the following text to the first paragraph.	Everyone is worried about how WLAN	Declined:

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					For some physical layers, such as FHSS and DS, addition coordination via a wired or wireless structure may not be allowed by regulatory agencies. In addition, adjacent BSSs may not ever be coordinated due to different ownerships and adminstrations, for example, two adjacent but indepent offices, eliminating the usefulness of this function for these two PMDs	customers perceive this standard from a conformance viewpoint, from a throughput viewpoint, and from a performance vierwpoint, etc. But when we have a function in the standard that is required by the PAR but technically is a poor implementation, we can easily find wording to hide its deficiencies.	This sentiment is well enough expressed by last sentance of the first paragraph already. The suggested text too strongly implies that coordination of overlap cannot be acheived
18	6.1.2 6.1.4	ZJ	e		Replace "defined as" with "called"	Better usage of the language	Accept
19	6.1.4	HC	E		2nd para, 3rd sent: It is possible than any fragment may contain a frame body smaller than aFragment_Threshold~~Payload~~.	Cannot findan "aFragment_Payload" anywhere	Accept
20	**6.1.4**		**E**		**Revise Second sentence** ~~Fragmentation creates MPDUs smaller than the MSDU size to increase reliablity of successful transmission of the MSDU over a given PHY~~**"Fragmentation creates MPDU's smaller than the MSDU size to provide successful transmission of the MSDU in cases where channel characteristics limit transmission reliability for longer frames".**	**This is a channel issue, not a limitation of a "given PHY"**	**Accept**
21	6.1.4	HC	t	N	1st para, 2nd sent replace with: Fragmentation creates MPDUs smaller than the MSDU size to increase probability~~reliability~~ of successful transmission of the MSDU over a given PHY. OR Fragmentation creates MPDUs smaller than the MSDU size to increase reliability, by increasing the probability of successful transmission of the MSDU over a given PHY.	Because I beleive one of these is what the author meant to say.	Accept: the second choice
22	6.1.4	BTh	t	N	**change...** aFragment_~~Payload~~Threshold	I can't find a Fragment_Payload in chapter 8 and believe that the name was	

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						changed to Fragment_Threshold.	
23 defer	**6.1.4 6.4**	**DW**	**T**	**Y**	**Implement the changes described in 95/206, with the exception of the deletion of the second to last paragraph. Section 6.1.4 should include a small change. The second to last sentence is to be deleted.**	**The optimization of fragment length near the end of a Dwell boundary is imposing too much complexity.**	
24	6.1.4 6.2.6.5 6.2.6.6 6.4	ZJ	t		Renumber figures so that the first fragment is fragment "0", the next is fragment "1" and so forth	Inconsistent with definition of fragment number field in 4.1.2.5.2	Accept.
25	**6.1.5**	**EG**	**e**		"pseudo"	**misspelled as "psuedo"**	
26	**6.1.5**	**DW**	**E**		**delete the last sentence about Connection-ID I each of the two paragraphs.**		
27	**6.1.5 6.7.6.2**	**DW**	**E**		**There is a mismatch between this section and the MAC State Machines in section 6.7.6.2**	**This section translates the request into two different Tx_data_req and Tx-unitdata_req primitives, based on the length and RTS_threshold.**	
28	**6.1.5**	**TT**	**e/t**		Delete this section.	This section does not match in any way the new state machines. I'm not sure what should go in here but I'm quite sure its not what's there. (Maybe I just don't understand what it's trying to say)	**Accept - removed technical details and refered to relevant section in state machines. As suggested by 95/222.**
29	6.1.5	GE	t		MA_DATA.request sb MA_UNITDATA.request Add LENGTH parameter to MAC Data Services (3.2) to be consistent with the service requirements of 6.1.5.	Not consistent with service primitives. This section or the MAC Data Service section 3.2, needs to be re-written to be consistent. Passing a MA_UNITDATA.ind to the LLC with a CRC_error is meaningless. Who knows what any of the parameters are if the CRC is bad. Format errors are possible, but I can not understand how this would happen unless a non-conforming unit was developed.	Accept: resolved by response to comment 28
30	**6.1.5**	**SA**	**t**	**N**	**The pseudo-code provided here seems to have no purpose and is not correct (length(MSDU) has no relationship to RTS_threshold). I think it should be**		Accept: resolved by response to comment 28

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					deleted.		
31	**6.1.5**	**BD**	**T**	**N**	**Make section 3 and 6 consistent in terminology.** ***Connections incomplete problem***	**1) The use of MA_DATA.request and MA_DATA.inidcation appears inconsistent with section 3 where the terms MA_UNITDATA.request and MA_UNITDATA.indication are used.** **2) this section refers to connection ID which is not defined and is not one of the params defined to the data .request or .indicate in sec 3. Either correct or remove connection ID.**	Accept: resolved by response to comment 28
32	6.2	HC	e		4th para, last sent, speeling: destiniations	spelling	Accept: resolved by response to comments 38 & 39
33	6.2	HC	E		5th para, 1st sent: ~~It~~ The RTS/CTS mechanism can also be viewed as a Collision Detection mechanism.	Should explain what "it" is.	Accept: resolved by response to comments 38 & 39
34	6.2	HC	e		para 10: Although a station can be configured not to use the ~~initiate~~ RTS/CTS mechanism for transmission of data~~to transmit its~~ frames, every station shall use~~respond to~~ the duration information in the RTS/CTS frames to update its virtual Carrier Sense mechanism, and shall send~~respond with~~ a ~~proper~~ CTS frame in response to receipt of an addressed RTS frame.	poorly written	Accept: resolved by response to comments 38 & 39
35	**6.2**	**BSi**	**e**		**End of 4th paragraph. Replace with 'When multiple destinations are addressed by broadcast/multicast frames, then this mechanism is not used' with 'When multiple destinations are addressed by broadcast/multicast frames, then the RTS/CTS mechanism is not used'**	**Clarity - not clear whether mechanism refers to the duration field or the RTS/CTS.**	Accept: resolved by response to comments 38 & 39
36	**6.2**	**MB**	**E**		**The description of the Distributed Coordination Function is not very readable.**		Accept: resolved by response to comments 38 & 39
37	**6.2**	**TT**	**e**		Delete paragraph 7: 'However in situations ....' The second sentence of paragraph 6 is not complete.	This paragraph is repeated in the next one. I'm not sure what the point this	Accept: resolved by response to comments 38 & 39

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						sentence is trying to make. If the editors know they should add appropriate text.	
38	6.2	BTh	E	N	**after "Carrier Sense shall be performed both through physical and virtual mechanisms." replace the existing text in the next 5 paragraphs with...** The virtual Carrier Sense mechanism is achieved by distributing reservation information announcing the impending use of the medium. The exchange of RTS and CTS frames prior to the actual data frame is one means of distribution of this medium reservation information. The RTS and CTS frames contain a duration field that defines the period of time that the medium is to be reserved to transmit the actual data frame and the returning ACK frame. All stations within the reception range of either the originating station (which transmits the RTS) or the destination station (which transmits the CTS) will learn of the medium reservation. Thus a station can be "hidden" from the originating station and still know about the impending use of the medium to transmit a data frame. Another means of distributing the medium reservation information is the duration field in the data frame itself. This field gives the time that the medium is reserved, which is through the end of the ACK. The RTS/CTS exchange also performs a type of fast collision detection and transmission path check. If the return CTS is not detected by the STA originating the RTS, the originating STA can start the process over (after observing the other medium use rules) more quickly than if the long data frame had been transmitted and a return ACK frame had not been detected. Another advantage of the RTS/CTS mechanism occurs where multiple BSA's utilizing the same channel overlap.	This section has been hacked so many times it doesn't contain sentences. I tried to rewrite it without changing the meaning.	Accept with minor editorial changes

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					The medium reservation mechanism works across the BSA boundaries. The RTS/CTS mechanism can also improve operation in a typical situation where all STAs can hear the AP but not all other STAs in the BSA. The RTS/CTS mechanism can not be used for broadcast and multicast frames because there are multiple destinations. This mechanism need not be used for every data frame transmission. Because the additional RTS and CTS frames add overhead inefficiency, the mechanism is not always justified, especially for short data frames.		
39	6.2	BTh	E	N	**after the first 5 paragraphs after "Carrier Sense shall be performed both through physical and virtual mechanisms." replace the existing text in the next 3 paragraphs with...** The use of the RTS/CTS mechanism by the originating STA is controled by the RTS_Threshold attribute. The values are always, never, or only for frames longer than the specified payload length. A STA configured not to initiate the RTS/CTS mechanism must still update its Virtual Carrier Sense mechanism with the duration information contained in an RTS or CTS frame, and must always repond to an RTS addressed to it with a CTS. The medium access protocol allows for stations to support different sets of data rates. All STAs must receive all the Basic Rate Set and transmit at one or more of the Basic Rate Set data rates. To support the proper operation of the RTS/CTS and the Virtual Carrier Sense mechanism, all STAs must be able to detect the RTS and CTS frames. For this reason the RTS and CTS frames must be transmitted at one of these mandatory rates. Note that this means that the duration information in the data frames can not always be detected because the data	This section has been hacked so many times it doesn't contain sentences. I tried to rewrite it without changing the meaning.	Accept with minor changes

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					frames may not be transmitted at one of the Basic Rates. Thus the Virtual Carrier Sense mechanism is not reliable in multirate environments where RTS/CTS is not used.		
40	6.2	HC	t	N	4th para, 2nd sent: ~~For stations & all AP's that do not initiate an~~To facilitate the vitual carrier sence mechanism when data is exchanged without the preceding RTS/CTS sequence, the duration information is also available in all data frames.	APs are stations, the "stations & all Aps" clause introduced confusion as to whether all APs did not initiate RTS/CTS. The duration information in the data frame is more for everyone else than it is for those that initiated the data, which is what the original sentance said.	Accept: resolved by response to comments 38 & 39
41	6.2	HC	t	N	4th para, 4th sent: This information is distributed to all stations within detection range of both the transmitt~~er~~ing and the receiv~~er~~ing station, because every station is required to process the duration information of all frames, regardless of whether or not a station is the intended frame recipient. This means that even stations which may be "hidden" from the receiving or transmiting station are capable of correctly updating their virtual carrier sense information. ~~so also to stations that are possibly "hidden" from the transmitter but not from the receiver.~~	The sentance implied that the information was directly distributed to all other stations, rather than automatically by the use of the duration information sent by the receiving and transmitting stations. It is also very important to make sure that potential implementer know that their receivers must be promiscusous at all times for the virtual carrier sense mechanism to work to its fullest extent..	Accept: resolved by response comments 38 & 39
42	6.2	HC	t	N	para 6-9: ~~However the addition of these frames will result in extra overhead, which impacts short data frames. Also since all stations will likely be able to hear traffic from the AP but may not hear the traffic from all stations within a BSA.~~ ~~However the addition of these frames will result in extra overhead, which impacts short data frames. Also since all stations will likely be able to hear traffic from the AP but may not hear the traffic from all stations within a BSA.~~ This medium reservation mechanism also works accross the BSS boundary where multiple BSS's utilizing the same channel overlap. The stations within each BSS adhere to the virtual carrier sense mechanism information	These paragraphs did a poor job of saying what they intended. I made this a technical comment because I wanted my suggetsed text did not change the original intent of the paragraphs.	Accept: resolved by response to comments 38 & 39

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					in all frames, regardless of in which BSS they originated. However, the overhead resulting from the addition of the RTS/CTS exchange to data transfer can be significant burden to the transfer time of short data frames. Also, as it is likely that all stations within a BSS will be able to hear traffic from the AP, RTS/CTS use on traffic outgoingfrom an AP may be an un-necessary overhead. For these reasons, the use of RTS/CTS is controllable. The use of the RTS/CTS mechanism is under control of RTS_Threshold attribute. ~~However in situations where multiple BSS's utilizing the same channel do overlap, then the medium reservation mechanism will work accross the BSS boundaries, when RTS/CTS is also used for all traffic.~~ This parameter is a manageable object and can be set on a per station basis. This mechanism allows stations to be configured to use RTS/CTS always, never, or only on frames longer than a specified payload. ~~This parameter is a manageable object and can be set on a per station basis. This machanism allows stations to be configured to use RTS/CTS either always, never or only on frames longer then a specified payload length.~~		
43	6.2	SA	t	N	**The last sentence in this section "This set of restrictions will assure that the Virtual Carrier Sense Mechanism described above will still work on multiple rate environments" needs to be deleted.**		Accept: resolved by accepting comments 38 & 39
44	6.2	BD	T	N	The virtual Carrier Sense mechanism is achieved by distributing medium busy reservation information through an exchange of special ~~RTS and CTS (~~medium reservation~~)~~ (RTS and CTS) frames prior to the actual data frame. For stations and~~& all~~ AP's that do not initiate an RTS/CTS sequence, ~~the~~ duration information is also available in all data frames. The RTS and CTS frames contain a duration field that defines the period of time that the medium is to be reserved (time enough to	**I believe that the changes shown at left are really editorial in nature, however I found the text difficult enough to read that I was not positive of the intent of several sentences. The altered text is intended as an improvement that does not change the intended meaning. Because the original**	Accept: resolved by accepting comments 38 & 39

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					transmit the actual data frame and the returning ACK). This information is distributed to all stations within detection range of both the transmitter and the receiver, and thereforeso also to stations that are possibly "hidden" from the transmitter but not from the receiver. This scheme can only be used for directed frames. When multiple destiniations are addressed by broadcast/multicast frames, then this mechanism is not used. RTS/CTS exchangesIt can also be viewed as a Collision Detection mechanism. Because the actual data frame is only transmitted when a proper CTS frame is received in response to the RTS frame, this results in a fast detection of a collision if it occurs on the RTS. However Tthe addition of RTS?CTSthese frames will result in extra overhead, which impacts system thruput with short data frames. Also since all stations will likely be able to hear traffic from the AP but may not hear the traffic from all stations within a BSA. However Iin situations where multiple BSS's utilizing the same channel do overlap, then the medium reservation mechanism will work accross the BSS boundaries, when RTS/CTS is also used for all traffic. The use of the RTS/CTS mechanism is under control of RTS_Threshold MIB variableattribute. However in situations where multiple BSS's utilizing the same channel do overlap, then the medium reservation mechanism will work accross the BSS boundaries, when RTS/CTS is also used for all traffic. RTS_ThresholdThis parameter is a manageable object and can be set on a per station basis. This mechanism allows Sstations mayto be configured to use RTS/CTS	**wording of the section was unclear to me, I consider this a technical comment required to clarify the meaning.**	

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					either always, never, or only on frames longer then a specified sizepayload length. Although a station can be configured not to initiate RTS/CTS exchanges when to transmiting its Data frames, allevery stations shall userespond to the duration information in the RTS/CTS frames to update its virtual Carrier Sense informationmechanism, and send respond with a proper CTS frame in response to an addressed RTS frame. The basic medium access protocol allows for stations which supporting different sets of transmisstion and reception rates to coexist., this is achieved by the fact that Aall stations are required to be able to receive allny frames transmitted at a rate which is included in the on a given Basic Rate Set, and must be able to transmit at (a minimumat leastof) one of these rates. All Multicast, Broadcast and Control frames (RTS, CTS and ACK) shall be are always transmitted at one of theis mandatory Basic Rrates. Theseis set of restrictions will assure that the Virtual Carrier Sense Mechanism described above will still work inon multiple rate environments.		
45	6.2 6.3	FMi	t	N	Incorporate changes from relevant sections of document 95–174.	Correct error in D2.0 updates — document 95–174 (remaining section 6 D1 ballot changes) was adopted at the July 1995 meeting, but problems merging revisions caused many of the changes, including several important figure updates, to be absent from D2.0.	resolved by accepting comments 38 & 39
46	6.2	ZJ	t	N	Rephrase second sentence ("Also, since all stations will likely...") in sixth paragraph	Not in English, and I don't know what it is trying to say	resolved by accepting comments 38 & 39
47	6.2	ZJ	t	N	Add to the end of the seventh paragraph: "That is, since stations defer to ongoing transmissions regardless of the transmitting station's BSSS, all stations will share the medium fairly."	It isn't clear what "across the BSS boundaries" means in this case.	resolved by accepting comments 38 & 39
48	6.2	ZJ	T	N	Rephrase fourth and last paragraphs to indicate that the	The last paragraph is simply not true. We need to have Duration information in the PLCP header, since that is the only part of high-rate frames that all stations are guaranteed to be able to receive	resolved by accepting comments 38 & 39

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					virtual carrier sense mechanism relies on having the Duration field in the PLCP header.	We need to have Duration information in the PLCP header, since that is the only part of high-rate frames that all stations are guaranteed to be able to receive.	38 & 39
49 defer	6.2	GE	T	X	a) Remove RTS/CTS functionality or b) Approach Apple Computer for licensing agreement and develop strategy for implementing RTS/CTS in a manner where implementations are conformant and performance meets minimum goals.	The use of RTS/CTS has been claimed as IPR by Apple Computer, Inc. The 802.11 committee has not met any of IEEE guidelines regarding IPR claims in LAN standards. Non-legal opinions have been presented which attempt to show prior art as the only resolution mechanism for this IPR matter. The committee has not approached Apple Computer to discuss licensing agreement nor has it followed any IEEE guideline in exploring alternate technologies. A recent submission 1195182.doc discussed the advantages and disadvantages of the use of RTS/CTS to reduce collisions due to hidden nodes and long packets versus short packets. This paper is the only study on RTS/CTS presented to the 802.11 committee which shows any quantitiative results via simulation of the value of it use. This paper made assumptions about slot times and preambles which are more in line with the ETSI HyperLAN timing and not 802.11. ETSI performance is much higher than 802.11 which will probably raise many of the conditions for packet size, etc. where performance gains can be realized. When CTS is used to determine a collision and CTS is not optional, the RTS/CTS IPR of Apple's patent is invoked.	

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50	**6.2.**	**FMa**	**T**	**N**	**Last paragraph - mentions that "All Multicast, Broadcast and Control frames (RTS, CTS and ACK) are always transmitted at one of this mandatory rates" (i.e. of the basic rate set for a given PHY) - well, two of the PHYs have two basic rates in the basic rate set - so at which of these two rates will the RTC, CTS, etc be transmitted?**		resolved by accepting comments 38 & 39
51	6.2.10	HC	E		change diaglog token to "Sequence Control field"	out of date text	Accept
52	6.2.10	BTh	e		**change 2nd paragraph....** within D~~ATA~~ata and M~~ANAGEMENT~~anagement frames **change penultimate paragraph...** in e~~E~~thernet.	Style consistency please.	Accept
53	**6.2.10**	**ws**	**e**		**paragraph 4 - "tuples" is this a word**		**Reject, yes it is a word**
54	**6.2.10**	**DW**	**E**		**The second paragraph still contains the term "Dialog Token" this is to be deleted.**		**Accept**
55	**6.2.10**	**DW**	**T**		**The size of the <source-address, sequence-number, fragment-number> tuples must be defined. For an AP it should be one tuple for each associated station. For a station it should be a defined minimum sufficient to allow simultaneous operation with a number of stations. A minimum of 6 should be adequate.**		**Reject - this is an implementation issue. It would be a bad implementation if the size was low, but we shouldn't mandate that. To be cosistant we will remove the hard number from the fragmentation section.**
56	**6.2.10.**	**FMa**	**e**		**Replace last paragraph of section with the following text: The ACK procedure is performed on DATA frames regardless of whether or not the received frame is determined to be a duplicate.**	**Text of last paragraph is non-causal as written: "The Destination STA shall perform the ACK procedure even if the frame is subsequently rejected due to duplicate filtering."**	
57	6.2.11		e		change: Tx_SIFS = SIFS - a Rx/Tx_Turnaround_Time ~~(MIB variable)~~	fix MIB parameter names	

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					Tx_PIFS = Tx_SIFS + aSlot_Time Tx_DIFS = Tx_SIFS + 2 * aSlot_Time.		
58	6.2.11	GE	E		MIB variables defined in this section should match those in PHY, they don't		
59	**6.2.11**	**RJa**	**E**		Delete last three paragraphs and references in figure 6-13 to Tx_SIFS, Tx_PIFS, and Tx_DIFS.	Not really necessary. Times should be entirely specified at air interface. Fore example, a SIFS should be the time from the end of the last symbol of the message to the beginning of the first symbol of the preamble for the next frame. Any other times will be implementation specific and won't matter from to interoperability.	
60	6.2.11	FMi	t		MAC_Delay–1 and MAC_Delay–2 should be defined behaviorally.	Completeness, uniformity of interpretation of two very important time intervals.	Addressed by comment 61a
61a	6.2.11	HCH C	T	N	[1] change definitions in Figure 6-13 to match clause 10: D1 = ~~Rx-delay~~ aRx_RF_Delay+a_Rx_PLCP_Delay D2 = ~~Medium+Rx-delay~~D1+Air_Propagation_Time RxTx = ~~Full Tx delay including rampup~~ aRxTx_Turnaround_Time M1/M2 = ~~MAC decision delay~~ aMAC_Prc_Time CCAdel = ~~CCA evaluation time~~ aCCA_Asmnt_Time ~~Assumption:~~ ~~SIFS = minimum (components listed or Tx/Rx_Turnaround time)~~ [2] Following figure 6-13, remove the text which duplicates information in clause 10, which can be refered to now that the above change is made:	[1] Definitions in 6.2.11 don't match clause 10 definitions, and D2 is wrong. [2] remove redundant and incorrect information. This change needs to be made in concert with fixing the definitions of aSIFS, aDIFS and aPIFS which I have submitted as comments for clause 8.	Accept [1] Reject [2] - aSIFS, aPIFS, aDIFS removed from clause 8, defined here only remove SIFS def, fix PIFS and DIFS to refer to correct MIB variables remove medium delay def

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					~~All timings are referenced to the end of the last symbol of a frame on the medium.~~ ~~The SIFS, and Slot_Time are defined in the MIB, and are fixed per PHY.~~ ~~SIFS is based on: Rx_Delay + MAC_Delay-1 + Rx/Tx_Delay.~~ ~~Slot_Time is based on: Rx/Tx_Delay + Medium_Delay + Rx_Delay + CCA_Delay + MAC_Delay-2~~ ~~The PIFS and DIFS are derived by the following equations, as illustrated in figure 6-13.~~ ~~PIFS = SIFS + Slot_Time~~ ~~DIFS = SIFS + 2 * Slot_Time~~ ~~The Medium_Delay component is fixed at 1 usec.~~		
61b	**6.2.11**	**SA**	**t**	**N**	**The parameter Tx_SIFS specified in this section should be declared as a maximum.**	**As well a SIFS_min needs to be defined to prevent a responder from starting transmission too early to prevent its receiver from being able to synchronize to the received preamble.**	**Reject - We agree with the sentiment, but SIFs in no longer defined here, this comment should be re-submitted as a Clause 10 comment.**
62	6.2.11	BTh	T	N	**The assumption in Figure 6-13 really belongs in the text--remove it from the figure** **change the SIFS calculation line...** SIFS is based on: Rx_RF_Delay + Rx_PLCP_Delay + MAC_Prc_Delay~~<hyphen>1~~ + Rx/Tx_~~Delay~~Turnaround_Time. **change the Slot_Time calculation line...** Slot_Time is based on: Rx/Tx_~~Delay~~Turnaround_Time + ~~Medium~~Air_Propagation_Time~~Delay + Rx_Delay +~~	The assumption of Figure 6-13 doesn't make any sense to me and is covered by the formula for SIFS. No such MIB variable as Rx_Delay; section 10.1.4.11 says this means Rx_RF_Delay + Rx_PLCP_Delay. No such thing as MAC_Delay-1; section 10.1.4.11 says this is MAC_Prc_Delay.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					CCA_~~Delay~~Asmnt_Time + MAC_Prc_Delay	No such MIB variable as CCA_Delay; section 10.1.4.4 says this means CCA_Asmnt_Time. No such variable as Rx/Tx_Delay; section 10.1.4.4 says this means the Rx/Tx_Turnaround_Time. No such thing as Rx_Delay; I guess that MAC_Prc_Delay is used in Slot Time calculation. The other alternative is to delete all of this and refer to the MIB definitions in section 10.	
63	6.2.11	BTh	T	N	**Change the Medium Delay...** The Medium_Delay component is fixed at 1 ~~u~~microsecond for FH and DS PHYs and at 100 nanoseconds for IR PHY.	The IR PHY only needs less than a 100 nanosecond medium delay due to its designed range. It is very unfair to cause the IR efficiency to degrade for the convenience of the other PHYs.	
64	6.2.11	ZJ	t	N	Change second paragraph to read "All timings are referenced from the end of the transmission of the last symbol of a frame on the medium to the beginning of transmission of the first symbol of the next frame on the medium."	Need to specify when an interval ends as well as when it begins for a timing reference to be meaningful.	Almost accept: the intend is to define 'end of frame' and 'beginning of frame' this will be added using his text.
65	6.2.11	ZJ	t	N	Question: Shouldn't there be a bit of slop defined for the IFS timings? I think requiring every station to respond to within +/- 1 uS tolerances constrains implementations too much. There should be an early time at which a STA may start transmitting, and a late time after which it has lost its chance.	Having the IFSs all be single numbers rather than windows seems unrealistic to me.	Reject: IFS definitions have been removed to Clause 10. Our opinion, however, is no.
66	**6.2.11**	**DW**	**T**	**Y**	**The DCF timing relations do depend on two MAC related delay parameters M1 and M2. These need to be defined, such that SIFS and Slottime can be defined on a per PHY basis.** **The best way is probably that the MAC does specify fixed numbers (not variables) for M1 and M2, such that clear values for SIFS and Slottime can be defined by each PHY.**	**The SIFS and Slottime should be clear for every PHY type, and as such defined there, rather then a formula of variable MAC and PHY components.**	
67	6.2.2	HC	t	N	A virtual carrier sense mechanism shall be provided by the MAC. This mechanism is referred to as the Net	This section was written as if RTS/CTS was the only use of the NAV, when it is	sentiment accpted, change modified as follows:

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					Allocation Vector(NAV). The NAV maintains a prediction of future traffic on the media based on duration information that is announced in the duration/ID field of the MAC Header of ~~RTS/CTS~~ frames specified in subclause 4.1.2.3~~prior to the actual exchange of data. The duration information is also available in all data and Ack frames. The mechanism for setting the NAV is described in 6.2.6.4~~ The NAV state shall indicate the busy/free state of the medium. The NAV can be thought of as a counter, which is counting down while the medium is busy, and when it reaches zero the medium is free. The mechanism for determining the medium free/busy state using the duration field is described in subclause 6.2.6.4. When its NAV is non-zero, indicating that the medium is busy, a STA shall not attempt to access the medium. The STA shall behave, with respect to medium access and backoff procedures, as if the medium had been sensed and found busy throughout the period of time in which the NAV is non-zero. Only when its NAV state is zero, shall an STA actually access the busy/free state of the medium using the physical carrier sense mechanism.	in many frames. There did not seem to be a place where what the STA was to do based on the condition of the NAV was explained - we all take it for granted, a novice reader was missing information. I made this technical comment in case I got it wrong.	A virtual carrier sense mechanism shall be provided by the MAC. This mechanism is referred to as the Net Allocation Vector(NAV). The NAV maintains a prediction of future traffic on the media. The mechanism for setting the NAV for DCF is described in 6.2.6.4, and for PCF is described in 6.3.2.2. The NAV state is combined with physical carrier sense to indicate the busy/free state of the medium. The NAV can be thought of as a counter, which is counting down. When the counter is zero the virtual carrier sense indication is free.
68	6.2.2	BD	T	N	The duration information is also available in all D~~d~~ata, Management, and the appropriate control A~~c~~k frames.	**Data and Ack are an incorrect list as the duration field is in more than those frames. The proposed change corrects the sentence w/o requiring an exhaustive list of frame types in the sentence.**	
69	6.2.2.	BTh	e		**change...** Allocation Vector (NAV). in all Ddata and ACK~~e~~k frames.	typo and consistency	
70	6.2.3	BTh	E		**change...** The ~~ga~~pinter-frame space between	more specific and accepted word	
71	6.2.3	MB	e		**1st paragraph, 3rd sentence ... and the ACK frame shall be the Short Inter Frame Space (SIFS)**		

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
72	6.2.3	EG	T		Remove following text "The following frame types shall be acknowledged with an ACK frame: Data, Poll, Request, Response"	**Not all Data, nor all Poll, frames are acked. List is out of date in terminology. Material in this section is inconsisent with the more accurate contents of Section 4.4.**	
73	6.2.3	EG	T		change first sentence: "... ACK frame shall typically be returned ..."	**Acks are not always returned.**	
74	6.2.3	EG	T		Change first sentence of last paragraph: "The lack of an expected ACK frame from a destination STA ~~on any of the listed frame types~~ shall indicate ..."	**Acks are not always expected.**	
75	6.2.3	HC	t	N	para 2: The following frame types shall be acknowledged with an ACK frame when transmitted to a specific destination station, not broadcast or multicast:	clarification	
76	6.2.3	BD	T	N	The following frame types shall be acknowledged with an ACK frame: a) Data b) Poll c) Request d) Response	**The text at left is incorrect. We no longer have request, response, or poll frame types. This section must be updated to itemize the exact frame types for which an ACK is required.**	
77	6.2.3	BTh	t	N	**change list of frame types requiring an ACK...** a) directed Data b) PS-Poll **correct c) and d) by listing the correct Request and Response frames**	The list of frame types requiring an ACK is not specific and therefore not accurate. Request and Response are not frame types. I don't know enough to create an accurate list myself, but I'm pretty sure there is no ACK after a Probe Request.	
78	6.2.3	KJ	t	N	It should be made clear that Poll can have a Data response which is therefore a partial exception to this "shall" clause. The following frame types shall be acknowledged with an ACK frame:	Shall has been defined to mean that there is no exception. Therefore it must be explicit about this exception of Data responses to Poll type frames	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					a) Data ~~b) Poll~~ b~~e~~) Request c~~d~~) Response The lack of an ACK frame from a destination STA on any of the listed frame types shall indicate to the source STA that an error has occurred. Note however, that the destination STA may have received the frame correctly and the error has occurred in the ACK frame. This condition shall be indistinguishable from an error occurring in the initial frame. The following frame type shall be acknowledged with either an ACK frame or a DATA (or DATA+CF-ACK in the case of the Poll being a CF-POLL) a) PS-Poll b) CF-Poll		
79	6.2.4	HC	e		2nd para, should end in "." rather than ","	syntax error	
80	**6.2.4**	**MB**	**e**		**Inter Frame Space definitions need clarification** **a) SIFS Short Interframe Space** **b) PIFS Point Coordination Function (PCF)Interframe Space** **c) DIFS Distributed Coordination Function (DCF) Interframe Space**	**Need to clarify for new readers of the Standard**	
81	**6.2.4**	**MB**	**e**		**3rd paragraph, second sentence.....timegaps as further specified in ~~6.2.13~~ 6.2.11**		
82	**6.2.4**	**ws**	**e**		**"bitrate" should be "bit rate"**	**typo**	
83	6.2.4	BTh	E	N	**correct...** specified time_gaps as further specified in 6.2.1~~1~~3.	type reference is to non-existant section; this seems to be appropriate reference	
84	6.2.4	HC	t	N	last para: The IFS timings are defined as time gaps on the medium.	there is no section 6.2.13, so far haven't been able to determine what	Reject - information is in 6.2.11

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					The standard shall specify the relation of the relative PHY MIB parameters to achieve the specified timegaps as further specified in 6.2.13.	section it means###	
85	6.2.4	BD	T	N	~~It should be noticed that t~~The different IFSs are independent of the station bitrate~~.~~, The IFS timings are defined as time gaps on the medium. and are a fixed length for~~per~~ each PHY (even in multi-rate capable PHYs), ~~The IFS timings are defined as time gaps on the medium.~~ The standard ~~shall~~ specifies~~y~~ the required~~relation of the relative~~ PHY MIB parameters to achieve the specified IFS ~~time~~gaps (see section~~as further specified in~~ 6.2.13).	**1) clarification of the fixed nature of IFS gaps.** **2) The draft should not talk about what the draft shall do in the future tense. This is confusing instructions to the draft writers (us) with the draft contents. The changes shown straighten this out.**	**Accept**
86	6.2.4	ZJ	T	N	Add after final paragraph: "The MAC shall compensate for any variability in PHY response time to ensure that all IFS timing constraints, measured on the medium interface, are met."	We should be explicit in demanding this of an implementation	Reject - the PHY shall do this compensation, thisc omment should be re-made addressed to a PHY section.
87	6.2.4.1	HC	e		Frame exchange sequences are in section 4.4 not 4.3	bad sections reference	
88	6.2.4.1	HC	E		1st sentance: This is the shortest of the inter-frames spaces. It is used when stations have seized the medium and need to keep it for the duration of the frame exchange they have to perform. Using the smallest gap between transmisisons within the frame exchange prevents other stations, which are required to wait for the medium to be free for a longer gap, from attempting to use the medium, giving priority access to completion of the frame exchange in progress.~~This inter-frame space shall be used for an ACK frame, a CTS frame, a Data frame of a fragmented MSDU, and, by a STA responding to any polling as is used by the Point Coordination Function (PCF) (See 6.3, Point Coordination Function).~~	(1) Clarification of the reason for the SIFS, rather than just a description of when it is used; also (2) repeating the list use time that it is used just means that there are two places to change whenever the list changes. The reference to section 4.4 is good enough description of when to use the SIFS..	
89	6.2.4.1	HC	e		another reference to the non-existant 6.2.13	what should this refer to ###	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
90	**6.2.4.1**	**SA**	**e**		**The reference to 6.2.13 should be replaced by 6.2.11**		
91	**6.2.4.1**	**TT**	**e**		Correct section reference: 6.2.13 should be 6.2.11		
92	6.2.4.1	BTh	E	N	**correct...** MSDU, and~~<comma>~~ by a STA... are listed in 4.4, Frame Exchange Sequences ~~found in 4.3~~. specified in 6.2.1~~3~~1.	comma is grammatical error sentence doesn't cornform to style precedent set by rest of document and 2 reference section numbers are incorrect	
93	6.2.4.2	HC	e		another reference to the non-existant 6.2.13	what should this refer to ###	
94	6.2.4.2	HC	E		last sentance: Section 6.3 describes the use of the PIFS by the PCF.~~This can occur at the start of and during a CF-Burst .~~	Don't try to repeat information from another section. This description may be incomplete, or may become wrong when section 6.3 changes. It is better to just refer to the section.	
95	**6.2.4.2** **6.2.4.3**	**MB**	**e**		**recommend that the PCF and DCF be better defined by stating what they are (in addition to the acronym)**		
96	**6.2.4.2**	**TT**	**e**		Correct section reference: 6.2.13 should be 6.2.11		
97	6.2.4.2	BTh	E	N	**correct...** as defined in 6.2.1~~3~~1. **CF-Burst is introduced here with no previous definition. What is it?**	reference to section that doesn't exist; I think this is correct reference What is CF-Burst, readibility demands an explanation.	
98	6.2.4.3	HC	e		another reference to the non-existant 6.2.13	what should this refer to ###	
99	6.2.4.3	BTh	E	N	**correct...** as defined in 6.2.1~~3~~1,	reference to section that doesn't exist; I think this is correct reference	
100	6.2.4.3	HC	t	N	1st sent: This inter-frame space is used by the DCF when a station wishes to seize the medium to begin a frame exchange with another station, or to send a single frame which requires no response from the destination station(s).~~The DCF priority level shall be used by the DCF to transmit asynchronous MPDUs.~~	The sentance that was there was wrong. ### check this - in a DCF what IFS does a station use to send a beacon? or probe or whatever?	Accept with modification: The DIFS is used by a station prior to the initial frame of a frame exchanges, as listed in 4.4, exclusive of the PCF period. To maintain consistancy change first sentance of 6.2.4.1 and 6.2.4.2
101	6.2.5	BTh	e		**correct...** The CW shall double every retry until it reaches C~~w~~W<subscript>max</subscript>. The CW will remain at CW<subscript>max</subscript> for the remaining ~~of the~~ retries.	numerous typos tighter writing Some more changes to the same paragraphs are in next comment which deals with technical content.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					Suggested values for CW are ~~for~~: CW<subscript>min = 31, C~~w~~W<subscript>max = 255. CW<subscript>min and CW<subscript>max are MAC...		
102	**6.2.5**	**MB**	**e**		**backoff time formula clarification** **CW= Contention Window = An integer between .....**		
103	6.2.5	GE	t		Remove following text. CWmin and CWmax are MAC constants that should be fixed for all.. Replace following text. Suggested values are for: CWmin=31, CWmax = 255... New text... CWmin is defined as 31, CWmax is defined as 255	This is a standard, not do whatever you want if you can build something better. Implementations using different values such as 1 and 2, will have a better chance of access then units picking another number. The standard needs to specify this a rather than suggest.	Reject - there is no mechanism provided to allow this. Also, this is a standard, variable values are not acceptable. Must be fixed per PHY.
104	6.2.5	GE	t		Use this backoff procedure G(x) = x7 + x3 + 1 Backoff time is defined as (G(x) / CW) * slot time CW values are 16,8,4,2,1 with 1 being CW max	The equation INT(CW * Random()) * slot time is not a linear function because the function INT is not linear. There is a lower probability (1/2) in picking the first slot or the last slot in the Contention window. This is because to pick slot 0, the results of CW*Random() must fall between 0 and < .5. This is true for the last slot also. All slots between can run from .5 to < 1.5 for slot 1, 1.5 to < 2.5 for slot two, etc.	Reject - beleive it is more appropirate to fix the algorithm we have than create a new algorithm. See section 6.2.5 for the fix.
105	**6.2.5**	**MB**	**t**		**change 2nd paragraph** **~~Suggested~~ Required values are for : CWmin=31, C~~w~~Wmax=255** **change 3rd paragraph** **CWmin and Cwmax are MAC constants that ~~should be~~ are fixed for all MAC implementations, because.....**	**If it is only sugessted, there can be 'cheating' on the access. Required means that no one is disadvantaged**	**Accept that values are required, those values have been adoopted from doc 95/207**
106	6.2.5	HC	t	N	1st para, last sent: This process minimzes collisions during ~~resolves~~ contention between multiple STA that have been deferring to the same MPDU occupying the medium.	This procedure does not resolve contention. Contention and collisions both still happen, it just lowers the odds of a collision ocurring.	Accept
107	6.2.5	HC	T	N	Replace section as described in 95/207, with the exception of the defintion of Slot Time. Change this as	CWmin and CWmax must be specified, not suggested. Clarity.	Accept

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					follows: Slot Time = PHY MIB parameter aSlot_Time ~~Transmitter turn-on delay + medium propagation delay + medium busy detect response time (including MAC delay) and is PHY dependent.~~		
108	6.2.5	BA	T	N	Need to specify CWmin and CWmax.	Suggested values are not the same as required values.	**Accept, doc 95/207**
109	6.2.5	BD	T	N	The value for ~~Suggested values are for:~~ CWmin shall be =31, and the value for Cwmax shall be= 255. CWmin and CWmax are MAC constants that effect the access fairness between stations and are~~should~~ be fixed for all MAC implementations.~~, because they effect the access fairness between stations~~.	**1) These two sentences (which bracket figure 6-5) contradict each other. One says the values must be fixed for all MAC implementations, the other says they are "suggestions". The values must be fixed - the changes shown fix these values as part of the draft specification.** **2) Note that I do not know if the actual values in D2 are correct, I have simply changed the only values given from suggestions to requirements.**	
110	6.2.5	BD	T	N	**Update clause to reflect reccomended CW min,max values per discussion at aug 95 mtg.** Make CW_Min=7, CW_Max = 255, bith values 0 relative and required for all implementations.	**1) While I support the changes to CW_min and CW_max discussed in Aug 95, I do not support the specific text provided in doc 95/207 as it includes parenthetical editorial comments that are not appropriate as part of Draft text.** **2) the text in 95/107 specifies specific values in sequence. This is in contradiction to the recommendation that my notes show the MAC group making in Aug which were a value for CW_min=7 and CW_Max=255, zero relative, required values. Therefore I do not consider 95/207 to satisfy this LB comment as that paper does not accurately reflect the**	**(1) Accept - the editorial comments will be removed** **(2) Reject - 95/207 was accepted by the group at the Nov.**

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
						Aug MAC recommendation.	
111	**6.2.5**	**BPh**	**T**	**N**	**Adopt text in document 95/207. Cwmin = 7, Cwmax = 255 adjust figure 6-5 to include CW values of 7 and 15.**	**provides better performance for the typical case scenario.**	
112	**6.2.5**	**BSi**	**T**	**N**	**Specify CWmin = 7, CWmax = 255, this gives good compromise between wasted time for few contending stations and stability when there are a large number of contending stations. Make these values mandatory in all implementations**	**Text says that 'Suggested Values' for CWmin and CWmax are 31 and 255, respectively. Next sentance says that these are constants and should be fixed in all MAC implementations - somewhat contradictory statements. CWmin = 31 is too large for efficient operation when small numbers of stations collide (wasted bandwidth). CWmax = 255 is fine for high load stability.**	
113	6.2.5	BTh	T	N	**change to specify exact values for CW. See text of document 95/207...**	I don't understand how the backoff algorithm calculation can be a suggestion. This is the basis of getting access to medium fairly. The numbers must be fixed for everyone. A vendor in a direct test situation against another vendors would look like he is better if he set the CW number smaller. On the other hand setting the CW number too small would cause may more collisions in large systems since there would be fewer slots in play. On the other hand setting the number too large will waste bandwidth since the average lowest slot selected for use in a backoff will be higher and most of the time the medium will not be used during the backoff.	
114	6.2.5	BTh	t	N	**need a definition of retry. See text of 95/207...**	Needed a more specific understanding of the use of the term retry.	
115	6.2.5	FMi	T	N	Incorporate changes from Clause 7 of document 95–222	See document 95–207. This vote	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					to complete the random backoff time specification. These changes include all the changes from document 95–207, plus specifications of a few more details.	favors adoption of 95–207 plus a few more details which this commenter feels need to be specified for proper interoperability of independently implemented instances of the random backoff mechanism.	
116	6.2.5	KJ	t	N	see document 95-207		
117	**6.2.5**	**RJa**	**T**	**N**	Need to specify CWmin and CWmax.	Cannot leave it as vendor dependent. 802.11 Lans from different vendors must operate together and the user should not have to specify parameters at this level to ensure equal performance.	
118	6.2.5	WR	t	N	Update clause to use values defined in Doc 95/207	Current values are only suggested as a place holder	
119	6.2.5	ZJ	T	N	Adopt text from submission 95/207	Current mechanism is non-optimal	
120	**6.2.5**	**DW**	**T**	**Y**	**Update this section to fix the Cwmin and Cwmax values to the values suggested in the figure 6-5. Change the last sentence into: "For a given PHY the Cwmin and Cwmax values should be fixed for all MAC implementations, because they effect the access fairness between stations." The values as suggested in doc 95/207 are not acceptable.**	**The simulations performed in doc 95/80 suggest that the values as currently suggested in the draft are a good compromise between collision probability, Throughput and delay. It should be understood that the collision probability is directly affecting the performance of BC/MC frames which do not get acked. It is also shown in doc 95/182 that for a buffered load model, the suggested values are already generating a relative high collision probability.The simulations that are the basis for the results of Tom Baumgartners results, and which are the basis for doc 95/207 are just snapshot results, and do not assume the effects of retransmissions, and bursty traffic patterns.**	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
121	6.2.5.	FMa	T	N	CWmin and CWmax values are "suggested" - this wording allows implementations to set CWmin arbitrarily low (e.g. Cwmin = 3) thereby allowing such a station to "win" contention more often than others that have a higher setting of CWmin - i.e. the backoff resolution would be UNFAIR. There is no mechanism for coordinating the CWmin values of all STA in order to restore fairness. Besides, I don't like the value of Cwmin = 31, especially for small numbers of STA in a BSS. All of these arguments suggest that the proper course is to create a mechanism for setting the CWmin values of all STA in a BSS to the same value. Perhaps this is best achieved by communicating this value in BEACONs from the AP. The AP may feel free to choose the CWmin value by any method. Good luck with ad-hoc setups.	CWmin not really specified	
122	6.2.5.	FMa	t	N	Note that CWmin value must never be set to "1" (i.e. need to specify a minimum CWmin value of "3")	If CWmin value is set to "1", then loser of first round automatically loses next round too - i.e. best he can do is tie = collision. (Winner may choose "0" next time and wins again, and will continue to do so as long as he chooses "0") (If winner chooses "1", then tie results.)	
123	6.2.5., 1.8.2.1.3., 12.4.6.8	FMa	T	N	aSlot_Time must be a minimum of RTS+SIFS+20usec = 36*8 + 20 + 20 = 328usec (FHSS) = 44*8 + 20 + 20 = 392usec (DSSS)	Backoff counter will be allowed to count during hidden node's RTS transmission, because SLOT time value is currently too short. I.e. SLOT time must be at least as long as RTS + SIFS + 20usec, otherwise, if hidden nodes are competing for the network, then winner drawing ZERO will start transmission, and loser, drawing ONE, will collide with CTS from AP, because he counts down backoff SLOT during RTS transmission time and then begins	Reject - the current system works. This might improve it, more simulations are required.

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
						retransmission..	
124	6.2.6.1	HC	e		If the medium is busy when a STA desires to initiate an RTS, Data, Poll, or~~and~~ Management MPDU transfer,		
125	**6.2.6.1**	**ws**	**e**		**5th paragraph - "Superframe" - is this a valid term**		
126	6.2.6.1	ZJ	e		Change "Contention Area" to "Contention Period"	No such thing as "Contention Area"	
127	**6.2.6.1**	**DW**	**E**		**The term Superframe is still used in paragraph 5. This should be deleted/changed.**		
128	6.2.6.1	GE	t		Add following sentence. If a STA receives a MA_UNITDATA.req during the DIFS period, it must consider the medium busy as well and enter the defer process as shown in figure 6-6.	Section 6.2.6.1 indicates that an async tranmission must wait the DIFS period before declaring the channel clear even though the PHY layer might indicate the channel clear. This is because a unit may receive a MA_UNITDATA.req just after a transmission has been completed. The MAC must keep track of the DIFS time and defer if a DATA.req is received during the DIFS period even though the PHY CCA indication migth be clear.	Reject - there is a fairness problem here, but this is not a deirable solution, it may introduce other unfairness problems.
129	6.2.6.1	Bth	E	N	**rewrite paragraphs 3 and 4 combining them and improving the readability...** A STA may transmit a pending MPDU when it is operating under either DCF access method or during the Contention Period under the PCF access method, and it detects the medium free for greater than or equal to a DIFS time. If a STA detects a busy medium when it desires to transmit an RTS, Data, PS-Poll, or Management MPDU, the Random Backoff Time algorithm shall be followed when the DCF is being used or during the Contention Period under the PCF access method.	The paragraphs are almost accurate but not concise. Contention Area is undefined; used Contention Period. Poll is not a frame; PS-Poll is a frame. An STA doesn't try to send more than one type of frame at a time so the proper word is "or" not "and".	
130	**6.2.6.1**	**BD**	**T**	**N**	If the medium is busy when a STA desires to initiate an RTS, Data, ~~Poll, and~~or Management MPDU transfer, and only a DCF is being used to control access, the Random Backoff Time algorithm shall be followed. Likewise, if the medium is busy when a STA desires to	**1) The condition in both sentences should be an "or" instead of an "and". 2) there is no Poll frame type in D2. I deleted the word, perhaps it should have been changed to PS-Poll or**	**Accept with modification:** If the medium is busy when a STA desires to initiate the initial frame of one of the frame exchanges described in 4.4, exclusive of the PCF period, the Random Backoff

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					initiate an RTS, Data, ~~Poll, and~~or Management MPDU transfer, and a Contention Period portion of a Superframe is active (See 6.3 PCF), the Random Backoff Time algorithm shall be followed.	**some other frame type?** **3) I thought we removed the concept of superframe - therefore the 2nd para still needs more work to be correct as it references a superframe.**	Time algorithm shall be followed. Likewise, if the medium is busy when a STA desires to initiate the initial frame of one of the frame exchanges described in 4.4, during the PCF period (See 6.3 PCF), the Random Backoff Time algorithm shall be followed.
131	6.2.6.1	ZJ	t	N	Change "has permission to" to "may"	Nobody is doing any permitting	accept
132	6.2.6.2	HC	e		Decrementing the Backoff Timer shall resume whenever the medium is detected to be free at the Tx_DIFS slot boundary as defined in 6.2.1~~13~~.	wrong subclause reference	
133	**6.2.6.2**	**SA**	**e**		**The reference to 6.2.13 should be replaced by 6.2.11**		
134	6.2.6.2	BTh	E		**change 2nd paragraph...** equation in 6.2.5, Random Backoff Time. The Backoff Timer shall decrement by slot_time amount after every slot_time... as defined in 6.2.1~~3~~1.	grammar requires comma slot time is 2 words Reference is to non-existant section; this is best reference I could find.	
135	**6.2.6.2**	**MB**	**e**		**add The backoff procedure ..... and finds the medium busy (Figure 6-7)**		
136	**6.2.6.2**	**MB**	**e**		**2nd paragraph, 4th sentence; .....slot boundary as defined in 6.2.~~13~~ 11**		
137	6.2.6.2	HC	t	N	1st sent: The backoff procedure shall be followed whenever a STA desires to transfer an MPDU, has waited the appropriate IFS, and finds the medium busy~~.~~	Clarification of the fact that the backoff period does not include the IFS, and that the backoff procedure begins if the medium becomes busy during the IFS that was started becuase the medium was free and the STA wanted to send.	Rejected - comment is wrong
138	6.2.6.2	HC	t	N	To begin t~~T~~he backoff procedure the STA shall ~~consists of~~ selecting a backoff time from the equation in subclause 6.2.5 Random Backoff Time. The STA shall defer until the medium becomes free, and a DIFS has passed with the medium remaining free. Then medium	The current wording is ambiguous, did not specify whether the Backoff_Timer was incremented before or after checking the medium, or whether the transmission commenced at the	Accept sentiment that current text is unclear. The suggested text is not correct. Use as the section is marked.

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					shall be sensed at the next Tx_DIFS slot boundary, as defined in subclause 6.2.11. If the medium is found to be free, the Backoff_Timer shall be decremented by slotttime. When the decrement causes the Backoff_Timer to become zero, the transmisison shall commence. When the decrement does not cause the Backoff_Timer to become zero, the medium shall be sensed again at the next Tx_DIFS boundary. Sensing of the medium at every Tx_DIFS boundary shall be repeated until either the Backoff_Timer becomes zero or the medium is sensed busy. When the medium is sensed busy the Backoff_Timer shall not be decremented. The STA shall defer until the medium has become free and a DIFS has expired, then at the next Tx_DIFS boundary shall begin sensing the medium again each Tx_DIFS boundary until either the medium is busy or the Backoff_Timer becomes zero. ~~The Backoff Timer shall decrement by slottime amount after every slottime, while the medium is free. The Backoff Timer shall be frozen while the medium is sensed busy. Decrementing the Backoff Timer shall resume whenever the medium is detected to be free at the Tx_DIFS slot boundary as defined in 6.2.11. Transmission shall commence whenever the Backoff Timer reaches zero.~~	decrement that takes the Backoff_Timer to zero or upon checking it at the next slot, or that the deferal on busy included a DIFS. Hopefully this is clearer - I made this technical in case I got it wrong.	
139	6.2.6.2	BD	T	N	The advantage of this approach is that stations that lost contention will defer again until after the next ??, and will then likely have a...	**There seems to be a word missing that is important to the sentence.**	
140	6.2.6.2	GE	T	X	Rewrite backoff procedure in 6.2.6.2 to reflect that in 6.5.2	Section 6.2.6.2 is inconsistent with section 6.5.2 which describes the backoff time. Section 6.5.2 says that a STA will defer until the DIFS period is completed and generate a random backoff period. At every retry, (I assume that means media access retry and not a retry due to no ACK) Section 6.2.6.2 says that the a random backoff is picked once an frozen will	

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						deferring until zero is reached. I also question the fairness statement. I beleive that this will increase collisions, not produce fairness.	
141	6.2.6.2, Fig. 6-7	SKy	t		Revise drawing to show the possibility of a station that has just finished transmission being given media access again.	Though the main point of the figure is well illustrated, adding this possibility will make the figure more general.	Rejected - such a drawing is necessary, but if the author would like to submit such a drawing it will be considerd.
142	6.2.6.2, Fig. 6-7	SKy	t		Revise drawing to show the possibility of a station that has just finished transmission being given media access again.	Though the main point of the figure is well illustrated, adding this possibility will make the figure more general.	Rejected - such a drawing is necessary, but if the author would like to submit such a drawing it will be considerd.
143	6.2.6.2.	FMa	e		change instances of "medium is sensed busy" to "medium is indicated as busy by ether the physical or by the virtual carrier sense mechanism"	Choice of wording "medium is sensed busy" implies the physical carrier sense, while leaving out the virtual carrier sense. I'd prefer a wording that makes it clear that both are used.	
144	6.2.6.3	BPh	t		adopt text in document 95/201	more consistent and correct description	Accept 95/201
145	6.2.6.3	BTh	T	N	**Rewrite paragraph 3 and 4 of this section...** If after an RTS is transmitted, ~~the CTS fails in any manner within a predetermined~~the CTS_Timeout ~~(T1)~~ expires, then a new RTS shall be generated while following the basic access rules for backoff. The CTS_Timeout value is the time required to transmit the CTS frame plus a SIFS interval. Since this pending transmission is a retransmission attempt, the CW shall be doubled as per the backoff rules. This process shall continue until the ~~aRTS_Retry_Counter reaches~~number of attempts exceeds an a~~RTS~~Short_Retry_~~Max~~ Limit~~limit~~. The same backoff mechanism shall be used when no ACK frame is received within a predetermined ACK_~~Window~~Timeout ~~(T3)~~ after a directed D~~ATA~~ata frame has been transmitted. The ACK_Timeout value is	Need to define the calculation of the Timeout variables. No need for retry counters to be MIB variables; they are just internal calculations. Change ACK_Window variable name to be consistent with the CTS_Timeout name. Add sentence to define the method of calculating the variable. Accepted style doesn't have Data in all caps. CW is always greater than 1, but that is not a helpful definition.	Accept 95/201

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					the time required to transmit the ACK frame plus a SIFS interval. Since this pending transmission is a retransmission attempt the CW will be ~~greater than one~~doubled as per the backoff rules. This process shall continue until the ~~aData_Retry_Counter~~number of attempts exceeds either the a~~Data~~Short_Retry_~~Max~~Limit ~~limit~~ if the Data frame is less than the aRTS_Threshold or the aLong_Retry_Limit if the Data frame is greater than or equal to the aRTS_Threshold.		
146	6.2.6.3	FMi	T	N	Incorporate changes from document 95–201 to improve description of RTS/CTS retry procedure and limits.	Provide missing information necessary for proper implementation of the RTS/CTS mechanism.	**Accept 95/201**
147	6.2.6.3	KJ	t	N	see document 95-201		**Accept 95/201**
148	6.2.6.3	**OB**	**T**	**N**	If after an RTS is transmitted, the CTS ~~fails in any manner within a predetermined CTS~~_Timeout expires~~(T1)~~, then a new RTS shall be generated while following the basic access rules for backoff. Since this pending transmission is a retransmission attempt, the CW shall be doubled as per the backoff rules. This process shall continue until the number of attempts~~aRTS_Retry_Counter~~ exceeds~~reaches~~ the~~an~~ a Short~~RTS~~_Retry_L~~Max~~ limit. The same backoff mechanism shall be used when no ACK frame is received within a predetermined ACK_Timeout~~Window (T3)~~ after a directed DATA frame has been transmitted. The ACK_Timeout value is the time required to transmit the ACK frame plus a SIFS interval. Since this pending transmission is a retransmission attempt the CW will be doubled~~greater than one~~ as per the backoff rules. This process shall continue until the number of attempts~~aData_Retry_Counter~~ exceeds~~reaches~~ the aLong~~Data~~_Retry_L~~Max~~ limit for DATA frames the length of which exceed aRTS_Threshold or aShort_Retry_Limit for DATA frames the length of	Clearer definition of desired actions.	**Accept 95/201**

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					which do not exceed aRTS_Threshold.		
149	6.2.6.3	ZJ	t	N	Define T1 and T3.		**Accept 95/201**
150	**6.2.6.3**	**TT**	**t**	**NO**	Delete last sentence of 1st paragraph: "It can however also be that CTS fails ..... Add after last paragraph: In each case the backoff timer is started a DIFS time after either the T1 or T3 timeouts.	This statement is misleading and adds no new information than the line above. Other nodes start their backoff timers relative to NAV ending, however we need to explicitly state when the transmitting node starts its backoff since it is not the same as a node receiving the RTS and or CTS.	**Reject deletion of sentance, feel that the sentance adds clarity.** **Second suggestion is addressed by changes made for comment #138**
151	**6.2.6.3**	**DW**	**T**	**Y**	**Update this section according to the text supplied in doc 95/201.** **In addition the defined retry limits must be given a value. Suggested values are: for Short_retry=8, and Long_retry=3.**	**This submission does properly distinguish the that there should be a retry limit for short frames, and a different one for long frames. Simulations should be be done to determine adequate retry limits, but the environment and criteria should be agreed upon.**	**Accept. 95/201 adopted, values requested added to clause 8.**
152	6.2.6.3, 8.4.2.2,	HCH C	T	N	**6.2.6.3 RTS/CTS Recovery Procedure and Retransmit Limits** Many circumstances may cause an error to occur in a RTS/CTS exchange. For instance, CTS may not be returned after the RTS transmission. This can happen due to a collision with another RTS or a DATA frame, or due to interference during the RTS or CTS frame. It can however also be that CTS fails to be returned because the remote station has an active carrier sense condition, indicating a busy	Data larger than aRTS_Threshold is not going to get between stations because any one of the RTS didn't make it, the CTS didn't make it, the DATA frame didn't make it, or the ACK didn't make it. Obvioudly, only the latter two apply to data shorter than aRTS_Threshold. It is true there may be different causes for an RTS or not to make it, than there may be for DATA to not make it to its destination. The reasons for the ACK to not make it back may be more similar	Rejected - text from 95/201 used.

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					medium time period. If ~~after~~ a STA transmits an RTS ~~is transmitted~~ and does not receive a ~~the~~ CTS from the destination STA within ~~fails in any manner within a~~ predetermined CTS_Timeout ~~,(T1), then a new RTS~~ the STA shall ~~be generated while~~retransmit the RTS following the basic access rules for backoff. Since this ~~pending transmission~~ is a retransmission attempt, the CW shall be modified~~doubled~~ as per the backoff rules. ~~This process shall continue until the aRTS_Retry_Counter reaches an aRTS_Retry_Max limit.~~ If, following a successfull RTS/CTS exchange, a STA transmits a directed DATA frame and does not receive an ACK within ACK_Timeout, the STA shall retransmit the RTS as in the procedure described above. If a STA transmits a directed DATA frame shorter than aRTS_Threshold (i.e. no preceding RTS/CTS was used), and does not receive an ACK within ACK_Timeout, the STA shall retransmit the DATA frame following the basic rules for backoff. Since this is a retransmission attempt, the CW shall be modifed as per the backoff rules. Each retransmission attempt shall be counted, whether the retransmission is of an RTS due to no CTS received, or of a DATA frame due to no ACK received. I.E. the transmission ateempt of an RTS associated with a DATA frame is considered a transmission attempt of that DATA. When aRetry_Max retransmissions have been made, the transmission of the DATA frame shall be considered to have failed, and no more retransmission attempts shall be made., ~~The same backoff mechanism shall be used when no~~	to those that casued the RTS/CTS to not work. So there is really no saying that the conditions that cause short frame failures apply only to the RTS/CTS failure, and not to the DATA/ACK failure. Basically, there can be a myriad of conditions that cause data to not get from STA to STA, and trying to account for each and give different retry limits for each possible cause is far more trouble than it is worth. The entire frame exchange, either RTS/CTS/DATA/ACK or just DATA/ACK, should be considered an attempt to send the data. Regardless of which step failed, it should be considered one try or retry, and there should be one Retry_Max to cover the whole thing.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					~~ACK frame is received within a predetermined ACK_Window (T3) after a directed DATA frame has been transmitted. Since the pending transmission is a retransmission attempt the CW will begreater than one as per the backoff rules. This process shall continue until the aData_Retry_Coutner reaches aData_Retry_Max limit.~~ **8.4.2.2.1 oMac** ... aACK_Time GET, a~~RTS~~_Retry_max GET-REPLACE, ~~aDATA_Retry_max GET-REPLACE~~ aMax_Frame_Length GET, ...		
153	6.2.6.3.	FMa	t		**Does the wording of the second paragraph imply that stations must wait for CS = CLEAR before sending CTS? I though that CS was not to be checked during SIFS gaps. Third sentence of 2nd paragraph should be deleted.**		**Reject - the current text is correct, the NAV is used before CTS can be sent. The word 'virtual' has been added for clarification.**
154	6.2.6.4	HC	E		In figure 6-8, T1 and T3 should be removed.	These numbers are undefined, wither remove or explain them.	
155	6.2.6.4	BTh	E	N	**add to 2nd paragraph...** end of the ACK frame. (See 4~~.~~.2, ~~RTS and CTS~~Format of Individual Frame ~~Structure~~Types.)	Incorrect reference title and ":" is incorrect style.	
156 157	6.2.6.4	HCH C	t	N	**6.2.6.4 Setting the NAV ~~Through Use of RTS/CTS Frames~~** In the absence of a PCF, reception of directed frames, other than PS-POLL, for which the receiving STA is not the destination STA, ~~RTS and CTS, Data and ACK frames are the events that~~ shall cause the receiving STA to set its ~~set the~~ NAV to a non-zero duration. Each frame contains a duration field in the MAC Header. When a STA receives a frame, other than PS-POLL, with a valid	There was no discussion anywhere of the use of NAV for DCF non RTS/CTS/DATA/ACK transactions such as presonse and request. Making this section more generic solves that. Did not exclude multicast and broadcast from NAV use. Did not specify that the NAV	Accepted with modifications, see the draft.

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					FCS, it shall update its NAV to be equal the duration field of the frame, when this value is greater than the current value of the NAV. When a STA changes its NAV due to reception of a frame, decrementing of the NAV shall not begin until the end of receipt of that frame is detected. The NAV stall indicate the bust status of the medium to 1 microsecond accuracy. Various conditions may reset the NAV. RTS and CTS frames contain a Duration field based on the medium occupancy time of the MPDU from the end of the RTS or CTS frame until the end of the ACK frame. (See 4: RTS and CTS Frame Structure.) ~~All STA receiving these frame types with a valid FCS field but with the exception of the station that is addressed shall interpret the duration field in these frames, and maintain the Net Allocation Vector (NAV). Stations receiving a valid frame should update their NAV with the information received in the Duration field, but only when the new NAV value is greater then the current NAV value.~~ ~~Maintenance of the NAV shall consist of an internal state accurate to 1 microsecond of the busy/free condition of the medium.~~ Figure 6-8 indicates the NAV for stations that can hear the RTS frame, and for ~~while~~ other stations which ~~may~~ only receive the CTS frame~~, resulting in the lower NAV bar as shown. Although the NAV effectively will "count-down" from a non-zero value, only the fact of whether the NAV is non-zero or not is necessary for correct protocol operation~~.	decrementing does not begin until after frame receipt ends if the NAV was changed by this frame. I didn't understand the purpose of the last sentance, so I suggested deleting it. Does that remove any meaning?	
158	**6.2.6.4**	**BD**	**T**	**N**	In the absence of a PCF, reception of RTS and CTS, Data and ACK frames are the events that shall set the NAV to a non-zero duration. Various conditions may reset the NAV.	**The sentence shown needs clarification as the English wording is ambiguous; is the condition desired:** **1) RTS and CTS and DATA and**	**Accepted with modification from #157**

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
						ACK? 2) (RTS and CTS) or (DATA and ACK) 3) RTS or CTS or DATA or ACK? 4) something else?	
159	6.2.6.4	ZJ	T	N	Modify text to indicate that the duration value should be passed up by the PHY since it was included in the PLCP header.	Duration information should be part of the PLCP header, not the MAC contents of the frame. Since units communicating at lower speeds cannot receive the MAC contents of a frame transmitted at higher speed, but all stations can receive the PLCP header for all frames (in all PHYs), it is logical to move Duration to where everyone in the BSS can receive it (I don't care if it violates layer purity).	
160	**6.2.6.4**	**TT**	**t**	**NO**	Correct figure 6-12 to show that T1 is from the end of the RTS to the end of the CTS. Delete second sentence: "Various conditions may reset the NAV". Add a NAV (Data) line to figure 6-12 showing that NAV is active from the end of the data frame to the end of the ACK. Change beginning of 2nd paragraph to read: RTS, CTS and Data frames....	Drawing shows timeout is a SIFS time after when end of CTS was expected. Other than counting down to zero, I'm not aware of any other condition that will reset the NAV. (If I'm wrong and there are some then they should be explicitly summarized here or in a new section immediately following this one.) As written it is implied that there is no NAV set in a data frame.	**Accept first comment, remove T1 and T3 from the drawing 6-8. 2nd comment accepted, clarification added. 3rd comment accept drawing 6-10 4th comment handled by changes from #138**
161	**6.2.6.4**	**MRo**	**T**	**X**	**Add the following: <u>"For PHY's that use bit insertion for bias suppression, the NAV must be increased to account for the longer duration of transmitted frames".</u>**	**missing**	**Reject - already specified in subclause 4.2.1.1 which specifies that this must be included in the calcualtion of the duration.**
162	6.2.6.5	GE	e		Short Interframe Space (SIFS) not (IFS)	by definition in the abbreviations	
163	**6.2.6.5**	**MB**	**e**		**The Short Interframe Space (IFS) (SIFS) is used to**		

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					provide an efficient MSDU delivery mechanism. Once a station has contended for the channel, it will maintain control of the channel until it has sent all the fragments of the MSDU, and received their corresponding ACKs, or until it failed to receive an ACK for a specific fragment or if the station will reach a dwell time boundary. After all fragments have been transmitted, the station will relinquish control of the channel. ~~**Once the station has contended for the channel, it will continue to send fragments until either all fragments of a MSDU have been sent, an Acknowledgment is not received, or the station can not send any additional fragments due to a dwell time boundary.**~~		
164	**6.2.6.5**	**ws**	**e**		**Paragraph 7 - "retransmitaccording"**	**typo**	
165	**6.2.6.5**	**MB**	**t**		**paragraph 11, second rule.** **When a MSDU has been successfully delivered, and want to transmit a subsequent MSDU, then it ~~should~~ must go through a backoff.**		**accept (with shall instead of must)**
166	6.2.6.5	BTh	E	N	**correct 1st paragraph, delete 2nd paragraph...** The Short Interframe Space (SIFS) ...received their corresponding A~~ck~~CKs, or until it failed to receive an A~~ck~~CK for a specific fragment, or the station can not send any additional fragments due to a dwell time boundary **change 3rd paragraph...** using the SIFS. **change Figure 6-9 title...** using SIFS **change 8th paragraph...** attempt to retransmit according to **change 10th paragraph...** , and, if the PHY is a FH type, there is enough time left... **change 12th paragraph...** releasing the channel<comma> as long as there is enough time left in the dwell time for a FH PHY.	For some strange reason missing "S" all over the place. Style for ACK is all upper case. Second paragraph is redundant to 1st paragraph except for what is added to first paragraph. typo	

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167	6.2.6.5	HCH C	T	N	**6.2.6.5. Control of the Medium~~Channel~~ via Short Interfame Space (SIFS) [1]** The Short Interframe Space (IFS) is used to provide an efficient MSDU delivery mechanism, particulary when an MSDU must be fragmented into multiple MPDUs.. Once a station has contended for the medium~~channel~~, it ~~will~~ maintains control ~~of the channel~~ until it has completed the frame exchange it started. Valid frame exchanges are described in subclause 4.4. By using a SIFS between transmission of frames within a frame exchange, the STAs concerned have medium access priority throughout the entire exchange.~~it has sent all the fragments of a MSDU, and received their corresponding Acks, or until it failed to receive an Ack for a specific fragment. After all fragments have been transmitted, the station will relinquish control of the channel.~~[2] Once the source STA has transmitted a frame which requires an ACK from the destination, it shall release the medium and wait receipt of the ACK frame from the destination STA. When the destination STA has transmitted an ACK frame neither source or destination STA shall have any priority access to the medium unless the exchange just completed was an MPDU/ACK where the MPDU was a fragment of an MSDU. In that case, the medium shall be reserved for a SIFS to allow the source STA to transmit an MPDU which contains another fragment of the same MSDU. [2] In the case of fragment MSDUs~~O~~nce the station has contended for the medium~~channel~~, it shall~~will~~ continue MPDU/ACK exchanges~~to send fragments~~ until either all fragments of the~~a~~ MSDU have been sent, an acknowledgment is not received, or it~~the station~~ can not send any additional fragments due to a dwell time boundary. After all fragments have been transmitted, the	This section confuses medium control and fragmentation. Many of the concepts and rules discussed apply to situations much more generic than fragmentation. Here is a re-write, which solves that problem and suggest many other things, which I have numbered in square brackets to tie with comments in this column where there are changes other than just organization and flow of text. [1] the MAC controls media access, not channel access. This subclause deals with medium control using the SIFS. [2] the description needs to be for all frame exchanges, not just fragmented MSDUs. [3] all of this is redundant. [4] pulls together all the information about fragmentation. [5] refer to the relevant related subclause rather than repeat information. [6] This used to say 'if no ACK, retransmit according to the backoff algorithm'. The following points: - if source STA has waiting SIFS and not got ACK, and start backoff then: (1) if backoff includes DIFS, then this STA is out of sync because other STAs	[1] [2] [3] Rejected because it is not redundant if [6] is rejected [4] [5] [6] Rejected - changed retranmssion mechanism.

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					station will relinquish control of the channel. [4] Figure 6-9 illustrates the transmission of a multiple fragment MSDU using the IFS. **figure** **Figure 6-9: Transmission of a Multiple Fragment MSDU using IFS** ~~The source station transmits a fragment then releases the channel and waits for an acknowledgment. When the source station releases the channel following its fragment, it will immediately monitor the channel for an acknowledgment frame from the destination station.~~ [3] ~~When the destination station has finished sending the acknowledgment, the SIFS following the acknowledgment is then reserved for the source station to continue (if necessary) with another fragment. The station sending the acknowledgment does not have permission to transmit on the channel immediately following the acknowledgment.~~ [3] The process of sending multiple fragments after contending for the medium~~channel~~ is defined as a fragment burst. Subclause 6.4 and 6.5 provide details of the fragmentation and reassembly mechanism. [5] ~~If the source station receives an acknowledgment but there is not enough time to transmit the next fragment and receive an acknowledgment due to an impending dwell boundary, it will contend for the channel at the beginning of the next dwell time.~~ [3] When a~~If the~~ source station has transmitted a frame which requires an ACK frame from the destination STA,	started DIFS at the end if its frame, while it starts DIFS after SIFS; (2) if backoff doesn't include DIFS, then this STA is out of sync because it waited SIFS while everyone else had to wait DIFS. - But all of that above is really irrelevant, because everyone who heard the source STA's transmission has set their NAV for the end of theACK, so unless the source STA waits the ACK time after the SIFS, before starting DIFS/backoff then it has the advantage. - the source STA will contend and retry, aRetry_Max times. Why not let it do that right now, using only a SIFS - this will waste a lot less bandwidth (later it has to do DIFS and backoff, now it only has to do SIFS). Particularly if it has done RTS/CTS to start with, because we know the destination is there. - retransmitting immediately after SIFS gives the source priority access. But as it is retransmitting, if it had to use the backoff mechanism, the backoff algorithm is designed to try to give it priority by doubling the CW. So, if you are going to give it priority, retransmitting immediately is simpler and less wastefull of bandwidth.	

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					and it has ~~does~~ not received the ACK, it shall retransmit the unacknowledged frame. The retransmission shall ocurr immediately at the point where the source decides the ACK has not been received - this is a SIFS following the orignal frame transmission. When the unacknowledged frame was an MPDU which was preceded by and RTS/CTS exchange, the RTS/CTS exchange shall not be repeated. ~~an acknowledgement frame it will attempt to retransmit according to the backoff algorithm. When the time arrives to retranmit the fragment, the source stations will contend for access in the contention window.~~ [6] ~~After a station contends for the channel to retransmit a fragment of a MSDU, it will start with the last fragment that was not acknowledged. The destination station will receive the fragments in order since the source sends them one at a time, in order. It is possible however, that the destination station may receive duplicate fragments. This will occur if the destination station sends an acknowledgment and the source does not receive it. The source will resend the same fragment after executing the backoff algorithm and contending for the channel.~~ [3] ~~A station will transmit after the SIFS only under the following conditions during a fragment burst:~~ [3] ~~The station has just received a fragment that requires acknowledging.~~ [3] ~~The source station has received an acknowledgment to a previous fragment, has more fragment(s) for the same MSDU to transmit, and there is enough time left in the dwell time to send the next fragment & receive an acknowledgment.~~ [3]			

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					~~The following rules also apply.~~ [3] ~~When a station has transmitted a frame other than a fragment, it shall not transmit on the channel following the acknowledgment for that frame, without going through a backoff.~~ [3] ~~When a MSDU has been succesfully delivered, and want to transmit a subsequent MSDU, then it should go through a backoff.~~ [3] ~~Only unacknowledged fragments are retransmitted.~~ [3] When a source station has transmitted a frame which~~If a multiple fragment MSDU~~ does not require an acknowledgment (for example,~~a~~ broadcast/multicast ~~packet transmitted by the Access Point~~), and that frame is an MPDU which is a fragment of an MSDU, the source station shall continue to~~will~~ transmit all fragments of the MSDU seperated by SIFS, ~~without releasing the channel~~ as long as there is enough time left in the dwell time. If there is not, the station shall~~will~~ transmit as many fragments as possible and recontend for the medium~~channel~~ during the next dwell time. ~~The spacing between fragments of a broadcast/multicast frame shall be equal to the SIFS period.~~		

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
						started DIFS at the end if its frame, while it starts DIFS after SIFS; (2) if backoff doesn't include DIFS, then this STA is out of sync because it waited SIFS while everyone else had to wait DIFS. - But all of that above is really irrelevant, because everyone who heard the source STA's transmission has set their NAV for the end of theACK, so unless the source STA waits the ACK time after the SIFS, before starting DIFS/backoff then it has the advantage. - the source STA will contend and retry, aRetry_Max times. Why not let it do that right now, using only a SIFS - this will waste a lot less bandwidth (later it has to do DIFS and backoff, now it only has to do SIFS). Particularly if it has done RTS/CTS to start with, because we know the destination is there. - retransmitting immediately after SIFS gives the source priority access. But as it is retransmitting, if it had to use the backoff mechanism, the backoff algorithm is designed to try to give it priority by doubling the CW. So, if you are going to give it priority, retransmitting immediately is simpler and less wastefull of bandwidth.	
168	**6.2.6.5**	**BA**	**T**	**N**	Delete last paragraph. Replace with:	The current approach to fragment non-ACKed packets will allow slightly	**Rejected - the PHY may not be able to transmit the entire**

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					MSDUs which do not require acknowledgment (i.e., broadcast/multicast MSDUs transmitted by an AP) shall not be fragmented.	more efficient use of the bandwidth since a long broadcast/multicast packet can be sent in two parts (before hop boundary and after hop boundary). I think it is more important that these messages be sent in a way to which maximizes their probability of correct reception. Since they are not ACKed, the message delivery probability will be higher if they are sent unfragmented. At threshold, this difference could be fairly significant since a receiver might be required to successfully detect and demodulate 3 or 4 separate bursts for a long message.	**MSDU at once.**
169	**6.2.6.5**	**BD**	**T**	**N**	It is possible however, that the destination station may receive duplicate fragments. This will occur if the destination station sends an acknowledgment and the source does not receive it. The source will resend the same fragment after executing the backoff algorithm and contending for the channel. It shall be the responsibility of the receiving station to discard duplicate fragments.	**Clarification.**	**Accept**
170	**6.2.6.5**	**BD**	**T**	**N**	...MSDU, then it shall~~should~~ go through a backoff.	**Correction.**	**Accept**
171	6.2.6.5	KJ	t	N	When a MSDU has been succesfully delivered, and the station has ~~want to transmit~~ a subsequent MSDU to transmit, then it ~~should~~ shall go through a backoff.	Just as in the previous rule above and as specified by 6.2.6.2	Accept
172	**6.2.6.5**	**RJa**	**T**	**N**	Delete last paragraph. Replace with: MSDUs which do not require acknowledgment (i.e., broadcast/multicast MSDUs transmitted by an AP) shall not be fragmented.	The current approach to fragment non-ACKed packets will allow slightly more efficient use of the bandwidth since a long broadcast/multicast packet can be sent in two parts (before hop	**Reject - see comment #168**

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
						boundary and after hop boundary). I think it is more important that these messages be sent in a way to which maximizes their probability of correct reception. Since they are not ACKed, the message delivery probability will be higher if they are sent unfragmented. At threshold, this difference could be fairly significant since a receiver might be required to successfully detect and demodulate 3 or 4 separate bursts for a long message.	
173	6.2.6.5	ZJ	t	N	Clarify whether it is mandatory that all fragments of an MSDU be sent in a burst.	Needs to be specified. My feeling is that it should be up to the implementation to figure out how many fragments it wants to send in a burst.	Reject - this is absolutely clear in th second paragraph.
174	6.2.6.6	HC	E		remove last paragraph ~~The source station must wait until the ACK timeout before attempting to contend for the channel after not receiving the acknowledgment.~~	This section is abouit RTS/CTS use. This paragraph simply repeats things that are defined elsewhere.	
175	6.2.6.6	BTh	E		**add box around RTS in Src line of Figure 6-10**	All other frames hava a box.	
176	**6.2.6.6**	**ws**	**e**		**"warrents"**	**spelling**	
177	**6.2.6.6**	**DW**	**E**		**Figure 6-10 should be updated to correctly show the NAV as is caused by the Duration field in the data frame (from the end of the last fragment till the end of the Ack following the next fragment.**		
178	6.2.6.6	HC	T	N	The following is a description of using RTS/CTS for the first fragment of a fragmented MSDU. RTS/CTS will also be used for retransmitted fragments if their size warrents it. The RTS/CTS frames define the duration of the first frame and acknowledgment. The duration field in the data frames define the duration to the end of the acknowledgement. ~~and~~ The duration field in theacknowledgment frames specifies the total duration of	The way it is: STA hears data fragment, sets NAV for duration of ACK, plus the DATA/ACK of next fragment. A lot of time wasted if the ACK lost. If DATA fragment duration had duration only up to the end of its ACK, STAs hearing it begin DIF/backoff	Reject - it is designed this way to mimic the RTS/CTS situation. The data and ack contain duration to lock out stations in their vacinity for the duration of the data.

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					the next fragment and acknowledgment. This is illustrated in Figure 6-10. **[fix pciture]** **Figure 6-10: RTS/CTS with Fragmented MSDU** Each frame contains information that defines the duration of the next transmission. The RTS, CTS and Fragment 1 will update the NAV to indicate busy until the end of ACK 1. ~~The CTS will also update the NAV to indicate busy until the end of ACK 1. Both Fragment 1 and~~ ACK 1 will update the NAV to indicate busy until the end of ACK 2. ~~This is done by using the duration field in the DATA and ACK frames.~~ This will continue until the last ~~Fragment and~~ ACK which will have the duration set to zero. Each Fragment and ACK acts as a virtual RTS and CTS, therefore no RTS/CTS frame needs to be generated even though subsequent fragments are larger the aRTS_Threshold. ~~In the case where an acknowledgment is not received by the source station, the NAV will be marked busy for next frame exchange. This is the worst case situation. This is shown in Figure 6-11. If the acknowledgment is not sent by the destination station, stations that can only hear the destination station will not update their NAV and be free to access the channel. All stations that hear the source will be free to access the channel after the NAV from Frame 1 has expired.~~ **delete figure** **~~Figure 6-11: RTS / CTS with Transmitter Priority with Missed Acknowledgment~~**	when the NAV clears at the intended end of the ACK. If the ACK fails they get to access the medium sooner. If theACK suceeds the next DATA fragment goes after only a SIFS, while they are still waiting a DIFS, so they will not interfere.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
179	6.2.6.6	HC	T	N	One of two things is required here. Either (1) hitting a dwell boundary needs to clear everyone's NAV, or (2) when DATA fragment and Ack are sent, STAs must calculate whether the next fragment/ACK are going to fit into the dwell, and not set their durations to include them if they aren't going to fit.	Following a dwell boundary STA's NAVs could come clear at some very screwy places. The source and destination STA of a fragment/ACK exchange just before the boundary are the only STAs with clear NAVs, and get a lot of priority access.	Reject - action at dwell boundary is unspecified. The implementation may tx over the boundary or calculate whether or not the transmit will fit.
180	**6.2.6.6**	**BA**	**T**	**N**	See section 6.2.6.6 attachament below	In the previuos letter ballot, my recommendation of redefining the duration field was adopted, see doc 95/69. However, the change was never made to the D2 text. I am including my proposed text and updated figures as an attachment.	
181	6.2.6.6	KJ	T	N	Each frame contains information that defines the duration of the next transmission. The RTS will update the NAV to indicate busy until the end of ACK 1. The CTS will also update the NAV to indicate busy until the end of ACK 1. Both Fragment 1 and ACK 1 will update the NAV to indicate busy until the end of ACK 2. This is done by using the duration field in the DATA and ACK frames. This will continue until the last Fragment <u>which has a duration of one ACK time plus one SIFS time</u> and <u>its</u> ACK which will have the duration set to zero. Each Fragment and ACK acts as a virtual RTS and CTS, therefore no RTS/CTS frame needs to be generated even though subsequent fragments are larger the aRTS_Threshold.	This reflects correctly the text in section 4.2.2.1	Accept
182	**6.2.6.6**	**RJa**	**T**	**N**	Figure 6-10 is incorrect. NAV (Fragment 1) should begin at the end of fragment 1 and continue until end of ack 2. NAV (Fragment 2) should begin at end of	I believe that this was accepted at an eariler meeting.	**Accept**

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					fragment 2 and continue till end of ack 3. NAV (Fragment 3) should begin at the end of fragment 3 and continue until the end of ack 3.		
183	6.2.7	HC	E		first 2 paragraphs: ~~Figure 6-11 shows the Directed MPDU transfer procedure with the use of RTS/CTS. In certain circumstances the DATA frames will be preceded with an RTS and CTS frame exchange that include duration information.~~ STA shall use an RTS/CTS exchange for directed frames only when the length of the MPDU is greater than the length threshold indicated by the RTS_Threshold attribute. ~~The RTS_Threshold attribute shall be set to a MPDU length threshold in each STA.~~	Remove redundant and extraneous verbage.	
184	**6.2.7**	**MB**	**e**		**Figure 6-~~11~~ 12 shows the .....**		
185	**6.2.7**	**RMr**	**E**		Values of RTS_Threshold ≥ MDPU_Maximum shall indicate that all MPDU shall be delivered without RTS/CTS.		
186	**6.2.7**	**RJa**	**T**		Third paragraph. ... The value 0 shall be used to indicate that no MPDU shall be delivered without the use of RTS/CTS. Values of RTS_Threshold ~~>~~≥ MPD~~D~~PU_Maximum shall indicate that no~~all~~ MPDUs ~~shall~~ will utilize~~be delivered with~~ RTS/CTS.	Doesn't make sense as is. RTS_Threshold = 0 should mean all use RTS/CTS. RTS/Threshold > MPDU_Maximum should mean no MPDUs use RTS/CTS	**Accept - fixed by doc 95/174**
187	6.2.7	HC	T	N	Last paragraph of subclause 6.2.7: The asynchronous payload frame (e.g. DATA) shall be transmitted after the end of the CTS frame and an SIFS gap period if the medium is free. If the medium is busy the transmissin of the MPDU failed and must be retried. ~~No regard shall be give to the busy or free status of the~~	If the medium is free after the SIFS it make no difference either way. If the medium is busy and the STA is able to sense that, then sending the Data guarentees both transactions will fail. If you don't transmit at least the	Rejected again - not enough time in a SIFS to sense the medium, don't want to make SIFS longer.

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					~~medium.~~	other guy will get his done. If you think that you will get false busy so much that this will be a problem, I suggest you have bigger problems than this!	
188	**6.2.7**	**BA**	**T**	**N**	Third paragraph. ... The value 0 shall be used to indicate that no MPDU shall be delivered without the use of RTS/CTS. Values of RTS_Threshold ≥ MPDU_Maximum shall indicate that no~~all~~ MPDUs ...	Doesn't make sense as is. RTS_Threshold = 0 should mean all use RTS/CTS. RTS/Threshold > MPDU_Maximum should mean no MPDUs use RTS/CTS	**Accept, but slightly different wording used.**
189	6.2.7	BTh	T	N	**change 4th paragraph...** ~~No regard shall be give to~~During the SIFS period the busy or free status of the medium shall be sensed. If the RTS/CTS exchange has worked, the medium should be free. However, in a wireless environment there will be times when another STA has not heard the RTS/CTS and will use the channel. To avoid collisions the originating STA should begin the basic access method again.	This is a collision AVOIDANCE protocol. The MAC should try to avoid collisions by using the CCA information before any transmission of a data frame.	Rejected for same reason as #187.
190	6.2.7	ZJ	t	N	Rephrase second sentence of second paragraph to indicate who is setting the RTS threshold and via what mechanism	Sentence does not make sense	Accept. The sentance is deleted because it clarified nothing and the firs sentance covers it.
191	6.2.7.1	DM	e		Change numbering to remove single subsections. There should always be more than 1 subsection.	If there is only one subsection then the subsection should become a section of the next higher level. The purpose of a subsection is to break a section down into more parts. If there is only one part then it doesn't warrant a subsection.	
192	**6.2.7.1**	**TT**	**t**	**NO**	Add a NAV line to figure 6-12 showing that NAV is active from the end of the data frame to the end of the ACK. Add markings to figure 6-12 showing timeout T3 as in figure 6-8. Add sentence:	As written it implied that there was no NAV set in a data frame. It was also not clear when a transmitting STA shall start its backoff for a subsequent transmission.	**(1) Declined - the NAV information is in Figure 6-10, it would be redundant here.** **(2) Declined - have not added T3 because it is well defined textually now as aACK_Timeout.**

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					The source STA shall start its backoff a DIFS time after either the end of the ACK or the end of the T3 timeout, as indicated in figure 6-12.		**(3) Accepted the need for a clarification, but we beleive he worded it poorly. See the section for the words we added**
193	**6.2.8**	**BA**	**T**		Append to second paragraph: "The Broadcast/Multicast message will be distributed onto the wireless medium. The station originating the message will receive the message as a Broadcast/Multicast message. Therefore all stations must filter out Broadcast/Multicast messages which contain their address as the source address."	The current approach will result in a STA which generates a broadcast/multicast message receiving that message when the AP transmits it. If this is not filtered out by the MAC, how will the higher level protocols deal with it? From my understanding, they won't like it.	**Accept**
194	**6.2.8**	**RJa**	**T**		The current approach will result in a STA which generates a broadcast/multicast message receiving that message when the AP transmits it. If this is not filtered out by the MAC, how will the higher level protocols deal with it? From my understanding, they won't like it.		**Accept - change implemented by comment 193 resolution.**
195	6.2.8	HC	t	N	first paragraph: In the absense of a PCF, when Broadcast or Multicast MPDUs are transferred from an STA with the To_DS bit clear ~~from an AP to a STA, or from one STA to other STA's~~, only the basic access mechanism shall be used. Regardless of the length of the frame, no RTS/CTS exchange shall be used. In addition, no ACK shall be transmitted by any of the receipients of the frame.	No need to redefine the To_DS bit, and have the reader have to go and figure out how to determine STA-AP or STA-STA when we could just tell him.	Accept
196	6.2.8	ZJ	t	N	Add to third paragraph: "and may be bridged through a portal function to other stations operating on non-802.11 LANs"	The standard currently does not describe a way of talking ***through*** an AP to a non-802.11 station, even though that is clearly the point of an AP.	Declined - this adds no clarity, and is not specified for any other type of data anywhere else in the document. We are not defining or assuming anything about Portals.
197	**6.2.8.**	**FMa**	**t**		**Broadcast/multicast are almost guaranteed to be NOT delivered, since the time following a beacon is likely to be flooded with asynch upbound traffic (in the**	**Isn't this a serious problem?**	

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					absence of a CF period). A possible solution to make broadcast go from almost guaranteed failed delivery (assuming a few STA with traffic to send) to "pretty good" delivery is to require the use of the PIFS to send broadcast/multicast (i.e. force an "unannounced" CF period after every beacon that has broadcast/multicast to be sent) - this would make PIFS capability a requirement of APs. An alternative is that a *portion* of the PCF could be required - i.e. AP would set a PCF period, and would only use it for multicast traffic. If there was no multicast, then it would send CF-end. Broadcast/multicast are now only lost by adjacent interfering BSS's, other ISM devices and noise sources. Another option is to turn off all other TIM bits when SID=0 is set. This prevents most PS-POLL traffic from interfering with the multicasts, but does not prevent asynchronous up-traffic from interfering. Another option is for the AP to choose at random, the address of an associated STA and send the RTS for a multicast frame to that STA. The DATA frame would then contain the multicast address and would be received by all appropriate STA - no ACK would be sent, but at least the NAVs of STA would prevent the majority of collisions. Alternatively, an ACK could be generated by the lucky STA that was randomly selected - although this doesn't really prove that all STA got the frame.		
198	**6.2.9**	**BA**	**E**		Change "To AP" to "To DS"	Consistency	
199	**6.2.9**	**BSi**	**e**		**Change ToAP to ToDS**	**ToAP bit now named ToDS**	
200	**6.2.9**	**RJa**	**E**		Change "To AP" to "To DS"	Consistency	
201	6.2.9	HC	t	N	**6.2.9 ACK Procedure** An ACK frame shall be generated as shown in the frame exchanges listed in subclause 4.4.	[1] No To_AP bit [2] It's not as simple as just ACK management or data frames (at least because of PS-POLL which gets ack	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					Upon successful reception of a ~~data or management~~ frame with the To_DS~~ToAP~~ bit set, of a type which requires acknowledgement, an AP shall always generate an ACK frame. An ACK frame shall be transmitted by the destination STA which is not an AP whenever it successfully receives a unicast ~~data~~ frame ~~or management~~ of a type which requries acknowledgement, but not if it receives a broadcast or multicast ~~data~~ frame of such type. The transmission of the ACK frame shall commence after an SIFS period without regard to the busy/free state of the medium. ~~The Source STA shall wait an Ack_timeout amount of time without receiving an Ack frame before concluding that the MPDU failed.~~ This policy induces some probability that a frame ~~in a neighboring BSA (using the same channel)~~ could be corrupted by the generated ACK. However if no ACK is returned because a busy medium was detected, then it is guaranteed that the frame would be interpreted as in error due to the ACK timeout, resulting in a retransmission. The Source STA shall wait an Ack_timeout amount of time without receiving an Ack frame before concluding that the MPDU failed.	sometimes and data other times) [3] Not just neighboring BSA. More likely a STA which is hidden from the source but not the destination in transfer of data which is shorter than aRTS_Threshold. [4] Move the last paragraph up - as it is it appears that the policy of waiting a ACK_Timeout is what the last paragraph refer to.	
202	6.2.9	HC	T	N	The transmission of the ACK frame shall commence after an SIFS period if the medium is free. If the medium is busy the transmissin of the MPDU failed and must be retried.~~without regard to the busy/free state of the medium.~~	If the medium is free after the SIFS it make no difference either way. If the medium is busy and the STA is able to sense that, then sending the ACK guarentees both transactions will fail. If you don't transmit at least the other guy will get his done. If you think that you will get false busy	Rejected again - as previous comment

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						so much that this will be a problem, I suggest you have bigger problems than this!	
203	**6.2.9**	**BD**	**T**	**N**	Upon successful reception of a data or management frame with the To_DS~~AP~~ bit set, an AP shall always... This policy induces some probability that a pending frame in a neighboring BSS~~A~~ (using the same channel)	**minor corrections.**	**Accept - with the changes made from comment 201**
204	6.2.9	BTh	t	N	**change 1st paragraph...** with the To~~AP~~_DS bit set... An ACK frame shall be transmitted by the destination STA ~~which is not an AP~~ whenever it successfully receives a unicast data frame or management frame, but, except if the STA is an AP, not if it receives a broadcast or multicast data frame.	No such thing as ToAP bit. The sentence as written was not correct. The AP exception applies only for broadcast and multicast as re-written.	**Accept - with the changes made from comment 201**
205	6.2.9	ZJ	t	N	Define Ack_Timeout somewhere.	Should be in the MIB.	Accept
206	6.2.9	ZJ	t	N	Rephrase first paragraph to agree with current mechanism for determining whether the AP should ACK frames.	There is no such thing as a ToAP bit.	Accept - with the changes made from comment 201
207	6.2.x	HC	T	N	Insert new section: 6.2.x Operation with the To_DS Bit When a STA which is not an AP receives any frame with the To_DS bit set, it shall consider that it is not the destination for that frame, even if the destination address is the address of the receiving STA or is broadcast/multicast. The STA shall use the duration information in the frame up updates its NAV.	Especially with broadcast it must be pointed out that this is true, otherwise STAs can receive the same broadcast twice. Also, STA's must be sure to use the virtual carrier sense information from these frames.	Reject - see table 4-5, the use of the address fields changes according to the to_DS bit and takes care of this
208	6.3	BTh	e		**Change twice...** (CF-~~p~~Poll) **change...**	Sometimes MAC generated stuff doesn't translate to PC too well. Also some typos.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					~~<odd capital O character>~~"piggyback"~~<odd capital O character>~~ ~~<odd capital O character>~~"AP"~~<odd capital O character>~~ **add spaces...** in 6.3.3.3. As shown by this scheme. In active **correct...** a PC<hyphen>~~<hyphen>~~~~<hyphen>~~capable AP a non<hyphen>~~<hyphen>~~zero value.		
209	**6.3**	**ws**	**e**		**Paragraph one - piggyback - wierd letters around it**		
210	**6.3**	**ws**	**e**		**Paragraph two - AP - wired letters around it.**		
211	**6.3**	**DW**	**e**		**Last sentence first paragraph, replace ".... those stations." by ".... non-CF-Aware stations.**	**Current text is confusing.**	
212	6.3	ZJ	E	N	Fix Macintosh character-set weirdness.	All the quotation marks come out as O with circumflexes in my printout	
213	6.3	HC	T	N	change last half of second paragraph either way: An active Point Coordinator shall~~must~~ be located at an AP, which restricts PCF operation to infrastructure networks. ~~However, there is no requirement that a distribution system be attached to this AP, which permits a station capable of AP and PC functionality to be designated as the ÒAPÓ in an isolated BSS.~~ PCF is activated at a PC---capable AP by setting the aCFP_Max_Duration managed object to a non--zero value. OR An active Point Coordinator need not be ~~must~~ be located at an AP, which restricts PCF operation to infrastructure networks. ~~However, there is no requirement that a distribution system be attached to this AP, which permits a station capable of AP and PC functionality to be designated as the ÒAPÓ in an isolated BSS.~~ PCF is activated at a PC-capable STA~~AP~~ by setting the aCFP_Max_Duration managed object to a non-zero	The definition of an AP, according to subclause 1.1 is "any entity that has station functionality and provides access to the distribution services". I beleive the first is required because beffering broadcast and mulitcast for tranmission after a DTIM, is described as required when there are power save STAs *associated with* the PC - so the PC must be an AP.	Accept: first option.

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					value.		
214	6.3	HC	t	N	third sentance, first paragraph: The operating characteristics of the PCF are such that all stations are able to operate properly in the presence of a BSS in which a Point Coordinator is operating, and, if associated with a point-coordinated BSS, are able to receive allData and management frames sent under PCF control..	Control frames too, especially since the CF-End is a control frame	Accept
215	6.3	HC	T	N	Don't have any suggested text, because I don't know the answers to the questions to the right.	Is RTS_Threshold ignored during the CFP?	Accept - the PC ignores it, stations may still use it. Added a sentance that says you don't use RTS/CTS in the CFP.
216	6.3	HC	T	N	General, No text, only a question.	How is retransmission of CF-Polls handled? This needs to be specified.	Reject - figure 6-17 and 6.3.3.1 explains it well enough.
217	**6.3**	**SKy**	**t**	N	An active Point Coordinator must be located at an AP, which restricts PCF operation to infrastructure networks. However, there is no requirement that a distribution system be attached to this AP, which permits a station capable of AP and PC functionality to be designated as the ÒAPÓ in an isolated (not independent) BSS.	**The "isolated" BSS here can cause confusion with an Independent BSS. An AP which is not physically attached to a Distribution System still possesses and thus can provide the DS Service function.**	**Accepted in spirit, handled by response to comment 213**
218	**6.3**	**BD**	**T**	N	An active Point Coordinator shallmust be located at an AP, which restricts PCF operation to infrastructure networks. However, there is no requirement that a distribution system be attached to this AP, which permits a station capable of AP and PCF functionality to be designated as the "ÒAP"Ó for the in an isolated BSS, technically creating an ESS (with a degenerate DS). PCF is activated at a PCF---capable AP by setting the aCFP_Max_Duration managed object to a non--zero value.	**Technical clarification.**	**Accepted in spirit, handled by response to comment 213**
219	6.3	FMi	t	N	Incorporate changes from Clause 8 of document 95–222, which updates some PCF functions for consistency with	Consistency, especially with the MAC State Machines, power save mode, and	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					other changes to the MAC, clarifying some ambiguous issues regarding the interaction of PCF and DCF, backoffs, retries, and power save mode. NOTE: This update starts from the "correct" 6.3, as updated by 95–174. Accordingly, if this recommendation is adopted, there is no need to separately apply the updates from 95–174 and the updates from Clause 8 of 95–222.	the removal of the scattered vestiges of connection services and time–bounded services (without removing the mechanisms to support connections and TBS in the future).	
220	6.3	SKy	t	N	An active Point Coordinator must be located at an AP, which restricts PCF operation to infrastructure networks. However, there is no requirement that a distribution system be attached to this AP, which permits a station capable of AP and PC functionality to be designated as the ÒAPÓ in an isolated (not independent) BSS.	**The "isolated" BSS here can cause confusion with an Independent BSS. An AP which is not physically attached to a Distribution System still possesses and thus can provide the DS Service function.**	**Accepted in spirit, handled by response to comment 213**
221	6.3	Smr	T	N	Removeal of section 6.3	The definitions of two MACs defined in the standard conflicts with 802.11 PAR in the need to develop a single MAC to operate over multiple PHYs. The need for Time Bound services is in the 802.11 PAR. Since no connection is made in the standard from any Time Bounded services to the PCF functionality, the need for a second MAC is not justified.	**Declined - there are not two MACs. The PCF is a set of frame exchanges which execute by DCF rules.** **The PCF features are added to the DCF for optional use by implementations which find they have need for contention free data transfer.** **The PAR requires support of "voice", which can be accomplished using the DCF or PCF, it is up to the implementer.**
222	6.3.1	BTh	e		**add space...** controls frame transfer,_as shown in **change...** ~~<odd-capital-O-character>~~"DTIM"~~<odd-capital-O-character>~~ **change 3 times...**	typos Sometimes MAC generated stuff doesn't translate to PC too well. The underscore seems to be more consistent with the style.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					CFP~~<hyphen>~~<underscore>Rate		
223	**6.3.1**	**ws**	**e**		**Paragraph one - DTIM with wierd letters around it**		
224	**6.3.1**	**RMr**	**t**		The PCF Element in all beacons at the start of, or within, a CFP contain a non-zero value in the CFP_Dur_Remaining field. This value, in units of kmicroseconds~~milliseconds~~, specifies the maximum time from the transmission of this beacon to the end of this CFP.	**Changed for consistency with 4.3.2.5.**	**Accept**
225	6.3.1	ZJ	e	N	Replace "PCF Element" with "CF Parameter Set Element" throughout	No such thing as a PCF Element.	
226	6.3.1	HC	t	N	paragraph before figure 6-25, 4th sentance: This value, in units of 1024 microseconds (Kμsec)~~milliseconds~~, specifies the maximum time from the transmission of this beacon to the end of this CFP.	mismatched unit	Accept with resolution of comment 224
227	6.3.1	HC	t	N	first sentance after figure 6-14: The PC generates CFPs at the **Contention-Free Repetition Rate** (CFP-Rate), which is defined as a number of beacon intervals, but shall always be an integral number of DTIM intervals, as defined by aDTIM_Interval.	corresponds to a change I specified in clause 8, because subclause 8.2.1.4 refers to DTIM_Interval which was not defined	Accept by changing "DTIM Interval" to aDTIM_Intervals
228	6.3.1	HC	t	N	last paragraph, second sentance: In the case of a busy medium due to DCF traffic, the beacon will be delayed for the time requried to complete the current DCF frame exchange. The longest delay will ocur if the current frame exchange is an MSDU which is larger than both aRTS_Threshold and aFrag_Threshold.~~the upper bound on this delay is the maximum RTS + CTS + max_MPDU + Ack duration.~~	The longest delay to a beacon from the target beacon time can include a fagmented MSDU.	Accept with modifications. see text

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					Figure 6-16 needs fixing.		
229	6.3.1, 6.3.2	HC	E		replace CF Parameter Set~~PCF Element~~	correct syntax	
230	6.3.2	BTh	e		**change...** 6.3.2. PCF Access Procedure ...preventing non-polled transmissions ~~m~~by stations which received the beacon, whether or not they are CF-~~a~~Aware... **change 2 places in last 2 sentences...** Ack~~k~~CK	typo Style says it is CF-Aware. Style says it is ACK.	
231	**6.3.2**	**MB**	**e**		**4th sentence. .....preventing non-polled transmissions ~~my~~ by stations which receive.....**		
232	6.3.2.	HC	E		fix spelling and remove last two sentances: This prevents most contention by preventing non–polled transmissions b~~m~~y stations which received the beacon, whether or not they are CF–aware. ~~Acknowledgement of frames sent during the Contention Free Period may be accomplished using Data+CF-Ack, CF-Ack, Data+CF-Poll+CF-Ack (only on frames transmitted by the PC), or CF-Ack+CF-Poll (only on frames transmitted by the PC) frames in cases where a data (or null) frame immediately follows the frame being acknowledged, thereby avoiding the overhead of separate Ack frames. Stations may also acknowldege frames during the Contention Free Period using the DCF Ack mechanism.~~	[1] Spelling error [2] The general introduction to 6.3.2 is suffient without these. They detail one specifc part of the information to come, and don't really make a great deal of sense without having read the information to come.	
233	6.3.2.1	BTh	e		**change...** CFP~~<hyphen>~~<underscore>Rate Ack~~k~~CK	Style consistency	
234	6.3.2.1	HC	t	N	first paragraph: At the nominal beginning of each CFP, the PC shall sense the medium. When the medium is free (both CCA and NAV) for one PIFS interval, the PC shall transmit a	'as specified above' didn't quit cover it. This section is supposed to be explaining the fundamental access procedure.	Accept the intent, modify text to remove description of of fields because this is repetition of etxt in clause 4.

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					beacon frame containing a CF Parameter Set~~PCF Element~~ with CFP_-Rate and CFP_Dur_Remaining fields, and ~~set as specified above~~. a~~-A~~ DTIM element~~-is also required in this beacon frame~~. The CFP_Rate field shall contain the number of beacon intervals until the next CFP. The CF_Dur_Remaining shall contain the length, in Kμsec, of the maximum duration of CFP whcih may be generated by this PC. The DTIM element shall describe for which STA the PC has traffic buffered. Using the information in the DTIM, CF-aware STA shall determine whether or not the PC has traffic buffered for them.		
235	6.3.2.1	HC	T	N	After the initial beacon frame, the PC shall waits for one SIFS interval then transmitone of the following:~~s either a~~ Data frame, a CF-Poll frame, a Data+CF-Poll frame, or a CF–End frame. If thea ~~null~~ CFP is null, i.e. there is no traffic buffered and no polls to send at the PC,~~desired~~, a CF–End frame shall be transmitted immediately after the initial beacon.	This behavior cannot be left to the discretion of the implementer. CF-aware STA are expecting a CF as they were to in the last CFP beacon. They must be informed that they are still in sync, the next CFP is expected, but there was nothing to do this time.	Accept
236	6.3.2.2	BTh	e		**change...** This setting of the NAV also ~~minimizes eliminates~~reduces the risk of hidden	Minimizes might be correct but both are not and reduces is really the absolutely correct word.	Accept
237	**6.3.2.2**	**MB**	**e**		**Define TBTT in 1st paragraph, 1st sentence.....PCF element in beacons) at each Target Beacon Transmission Time (TBTT) .....** **1st paragraph last sentence.** **This setting of the NAV also minimizes ~~eliminates~~ the risk of hidden.....**		
238	**6.3.2.2**	**ws**	**e**		**Paragraph one - "minimizes eliminates" should read "minimizes"**		
239	**6.3.2.2**	**DW**	**e**		**Delete ".. eliminates.." in the last sentence of the first paragraph.**	**The probability is minimized rather then eliminated, because hidden stations can still cause problems.**	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
240	**6.3.2.2**	**DW**	**T**		**Last paragraph, reset NAV. Is it intentionally that the NAV is only reset in other stations of the same BSS, and not in other BSSs.**		**Accept - yes it is intentional**
241	6.3.2.2	HC	T	N	Don't know how to put this into suggested text.	What if STA is in the middle of some frame exchange and the TBTT expires? Does the STA have to remember that until the end of the exchange (checking the NAV would be the equivalent of sensing the carrier which is not supposed to be done in the middle of a frame exchange), and then update the NAV with some kind of adjusted CF_Max_Duration?	Declined: there is no problem created.
242	6.3.2.2	HC	T	N	last paragraph: The PC shall transmit a CF–End or CF-End+Ack frame at the end of each CF-Period. If a STA receives~~Receipt of~~ either of these frames ~~shall reset the NAV of all stations in the BSS~~ from the PC which is in the BSS for which the TBTT was the cause of setting the NAV, it shall clear the NAV. If a STA receives either of these frames from the PC which sent the beacon which contained the CF_Rem_Duration to which the NAV was set, regardless of BSS, it shall clear the NAV. When a STA receives a beacon frame which starts a CF Period, it shall compare the CF_Rem_Duration in that beacon frame to the current value of the NAV. If the NAV is already set to busy for longer than CF_Rem_Duration, the NAV shall not be changed. A STA shall not clear its NAV on receipt of a CF-End or CF-End+Ack frame from any source but the PC of the BSS which caused the NAV to be set.	If the NAV is going to be set by CF Periods in other BSSs, then STAs which must match up CF-Ends with the BSS which actually caused their NAV to be set. For example, if I get a beacon from BSS 1 that says 2 msec CF Period, then a beacon from BSS 2 that says 10 msec CF Period, I better not clear the NAV on the CF-End from BSS 1. Also, if I get a beacon from BSS 1 that says 10 msec, then a beacon from BSS that says 1 msec, I must not change the NAV due the the second beacon. I must also not change the NAV when the CF-End from BSS 2 arrives.	Reject - the NAV is not set by the CF information from anothr BSS.

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
243	6.3.2.2		T	N	Don't have any suggested text, because I don't know the answers to the questions to the right.	What does non CF-aware mean? Does non-CF-aware STA know enough to preset its NAV at TBTT (which is what this subclause says)? Does a non-CF-aware STA know enough to interpret the CF Parameter Set in a beacon and set its NAV according to CF_Rem_Duration? If either or both of the above is true, when a non-CF-aware STA is sent data by the PC, it ignore its NAV and responds with an ACK. What if the PC sends it an RTS, does it ignore the Nav and send a CTS? If either or both of the above is true, it should also be requried to understand CF-End and CF_End+Ack to allow it to clear its NAV in a timely manner.	Accept - the annswer is you don't respond to polls and don'thave to do pigy-backing if you are non-CF Aware.
244	**6.3.2.2**	**BD**	**T**	**N**	This setting of the NAV also minimizes ~~eliminates~~ the risk of hidden stations sensing a DIFS gap during the CFP and possibly corrupting a transmission in progress.	**Correction.**	**Accepted in spirit by response to comment 236**
245	**6.3.2.2 6.3.3.4**	**DW**	**T**	**Y**	**The length of the CFP_Max_Duration needs to be limited to prevent that a PCF can claim the medium, and delay Contention period traffic so long that higher layers will timeout and start retransmissions.**	**The CFP_Max_Duration needs to be limited so that stations that only operate in the Contention period have a high probability that they can transfer a frame within the timeout periods that are used at higher layers. A limitation to approx. 200 msec is assumed to achieve that goal. The maximum of 255 msec as yielded by a one octet range migth be acceptable.**	**Reject - we make no assumptions about upper layers. Implementations should ensure that they function in their intended environment.**

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246	6.3.3	MRo	e		typo in transfer for caption of figure 6-17.		
247	6.3.3.		t	N	The figure should reflect that: (1) the NAV was set to CF_Max_Duration at the TBTT. In this figure it seems to be in the PIFS - that's not possible is it? The PIFS starts at the TBTT if the medium is free then. Or does the PC start a PIFS at TBTT minus PFS? (2) on receipt of the beacon the NAV is changed to CF_Rem_Duration.	figure not accurate	Reject - the figure illustrates the case here the beacon went out exactly at TBTT. Will change figure to show this.
248	6.3.3.1	HC	e		The ~~the~~ CFP ends when the CFP_Max_Duration time has elapsed since the last Beacon or when the PC has no further frames to transmit nor stations to poll.	duplicated word	
249	6.3.3.1	BTh	e		**in 1st paragraph delete...** which starts-~~of~~ the CFP **in this section change Ack to ACK 4 times...** These stations acknowledge receipt with A~~ck~~CK frames after an~~d~~ SIFS gap... ...frame by sending an A~~ck~~CK frame after a SIFS gap. station does not return the A~~ck~~CK frame... CF-Ack (no data) or an A~~ck~~CK frame.	incorrect, unnecessary word ACK is correct style typo	
250	6.3.3.1	MB	e		**2nd paragraph, 2nd sentence** **These stations acknowledge receipt with ACK frames after ~~and~~ a SIFS gap, as with the DCF** **last paragraph, first sentence** **The ~~the~~ CFP ends .....**		
251	6.3.3.1	ws	e		Last paragraph - "The the"	double word	
252	6.3.3.1	DW	E		Delete "..(CCA only, not NAV).." in the first sentence. This frase should be moved to the next sentense after "...PIFS gap".	The intend is that if a response is expected, then the PC will monitor the medium (CCA only, not NAV)	

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					An alternative is that we assume that in the PC the NAV is cleared at the start of the CFP.	**for PIFS, after which it concludes that the expected response did not come in, so that it can proceed with the next frame in line.**	
253	**6.3.3.1**	**RMr**	**t**		**Middle of fourth paragraph from the end:** The PC may use the CF-Ack subtypes to acknowledge a received frame even if the Data frame sent with the CF-Ack subtype is addressed to a different station than the one being acknowledged.This can only occure if the acknowledged frame/fragment was marked as "Last fragment" in the frame control.	**Clarify behavour of PC when receiving fragmented frames, during CFP.**	
254	6.3.3.1	HC	T	N	Modify the frame type descriptions: Data, used to send data from the PC when the addressed recipient is not being polled and there is nothing to acknowledge; Data+CF-Ack, used to send data from the PC when the addressed recipient is not being polled and the PC needs to acknowledge the receipt of a frame received from a CF-Aware station an SIFS interval before starting this transmission; Data+CF-Poll, used to send data from the PC when the addressed recipient is the next station to be permitted to transmit during this CFP and there is nothing to acknowledge; Data+CF-Ack+CF-Poll, used to send data from the PC when the addressed recipient is the next station to be permitted to transmit during this CFP and the PC needs to acknowledge the receipt of a frame received from a Cf-Aware station an SIFS interval before starting this transmission;	CF-Poll, CF-Poll+CF-Ack, and CF-Ack all state that they can only be used when either there is no more buffered data for the STA (or CF-Ack if it is the end of the CFP). I don't think we should palce this restriction on the implementation. If I have 3 MSDUs buffered for a STA, I should be allowed to only send one of them this CFP. I may want to be most fair and service as many different STAs as possible rather than give all my time to one of them. Also, I may wish to have only one queue, not one queue for each STA for which I have anything buffered. Then I could just walk down the queue. It is less efficient use of bandwidth (but maybe better use of memory and processing time), but I should not be precluded from building my implementation that way. Also, editorial changes to complete specification and remove unecessary	Accept

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					CF-Poll ~~(no data)~~, used when the PC is not sending data to the addressed recipient ~~has no pending frames buffered at the AP~~, but the addressed recipient is the next station to be permitted to transmit during this CFP and there is nothing to acknowledge; CF-Ack+CF-Poll ~~(no data)~~, used when the PC is not sending data to the addressed recipient ~~has no pending frames buffered at the AP~~, but the addressed recipient is the next station to be permitted to transmit during this CFP and the PC needs to acknowledge the receipt of a frame from a Cf-Aware station an SIFS interval before starting this transmission; CF-Ack ~~(no data)~~, used when the PC is not sending data to, or polling, the addressed recipient ~~has no pending frames buffered at the AP or insufficient time remains in the CFP to send the next pending frame~~, but the PC needs to acknowledge receipt ofa frame from a CF-Aware station an SIFS interval before starting this transmission ~~(useful when the next transmission by the PC is a management frame, such as a beacon)~~; or any management frame that is appropriate for the PC~~AP~~ to send under the rules for that frame type.	repetition. In the case of CF-Ack, suggested removing the helpfull hint. The paragraph could explain all the cases where this could be used, but I don't think it's necessary. The point is that the PC doesn't want to send data to the STA or poll it anymore. This can be because it wants to do a management frame, it wants to talk to some other STA now, or it is the end of the CFP.	
255	6.3.3.1	HC	t	N	first paragraph after frame list: The PC may transmit Data or management frames to non-CF-Aware~~, non-Power Save~~ stations during the CFP.	CFP is only allowed after a beacon with a DTIM. Power save stations must be awake for DTIMs, so any station can be sent data during the CFP.	Declined - this is incorrect.
256	6.3.3.2	HC	T	N	The PC shall interpret the duration field of the frame sent by the STA to which the CF-Poll was sent, and~~The PC may~~ shall resume transmitting ~~as soon as~~ a PIFS ~~gap~~ after the expected time for the Ack frame if, during the PIFS, the PC has not received any frame from the STA	For the PC to know when it should start its post-Ack PIFS it must interpret duration information in frames (which could be other than Data/Ack) it can see from the STA to which the CF-Poll	Reject - would take a complex change to fix an unusual problem which will not ocur often

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					to which the CF-Poll was sent. If another frame was sent by this STA (to any destination) the PC shall again use the duration field in that frame and wait a PIFS after the expected ACK. This shall repeat until the PC pass a PIFS without receiving any frame from the STA to which the CF-Poll was sent. Frames received by the PC, during the time it is waiting for the STA to which the CF-Poll was sent, from any STA other than that STA, shall be ignored. ~~(the PC cannot resume after an SIFS gap because the station-to-station frame may be fragmented)~~.	was sent. But the PC must listen only to the Sta to whcih CF-Poll was sent, otherwise it is in danger of letting someone block out its CFP. If the PC hears a frame while it is waiting the duration or PIFS for the STA-STA exchange to complete it must ignore that and transmit right over it if necessary (just as it would do if the STA-STA exchange was not going on - it doe snot do carrier sense in the CFP).	
257	6.3.3.3	BTh	e		**change...** and their CFP~~<hyphen>~~<underscore>Rates... ...the PC shall use a random backoff delay (~~over~~with CW in the range of 1 to CW_min)	Style consistency Original text not explicit as to what the range 1 to CWmin was for.	
258	6.3.3.3	DW	T		**I think that aMedium_Occupancy_limit should be a constant defined in the MAC, rather then a variable. A limit of 200 msec or Kusec is suggested.**	**The actual used value is already defined by CFP_Max_Duration, which just needs to be limited.**	**Reject - same rejection as comment 245.**
259	6.3.3.3	HC	t	N	To further reduce the susceptibility to inter-PCF collisions, the PC shall require the medium be free for a DIFS plus a random (over range of 1 to CW_min) number of slot times once every aMedium_Occupancy_Limit milliseconds during the CFP.	A DIFS plus a random number of slots is the period for which the DCF STA need to see the medium free before it will transmit.	Accept - modified to be PIFS instead of DIFS
260	6.3.3.4	HC	E		second paragraph: The minimum value for aCFP_Max_Duration, ~~if the PCF is going to be used,~~ is two times aMax_MPDU plus the time required to send the initial Beacon frame and the CF-End frame of the CFP. This allows sufficient time for the AP to send one Data frame to a station, while polling that station, and for the polled station to respond with one Data frame.	remove the phrase "if the PCF is going to be used", it is redundant.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
261	6.3.3.4	BTh	e		change... RTS/CTS amd A~~ck~~CK frames	Style consistency	
262	6.3.3.4	HC	T	N	third paragraph: The maximum value for aCFP_Max_Duration shall be calculated according to the following formula:~~is the duration of aCFP_Rate minus aMax_MPDU plus the time required for the RTS/CTS and Ack frames associated with this MSDU when operating with default size contention window. This allows sufficient time to send at least one contention based Data frame.~~ (aCFP_Rate*aBeacon_Period) - (aDIFS+(aSlot_Time*aCW_max)) This allows sufficient time for any DCF STA to seize the medium between CFPs. If a DCF STA does seize the medium, by the PCF rules the PC must defer beacon transmission until the frame exchange is complete.	The purpose of the maximum CF_Max_Duration is to make sure that the PCF doesn't lock out the DCF entirely. The PC need only free the medium for as long as it would take some DCF station to seize it. Between CCA and the NAV, the PC will defer ceacon transmission until the DCF stations have finsihed their frame exchange. This way, if there are no DCF only stations the PC looses a minimum amount of time.	
263	6.3.3.4	ZJ	T	N	Define a limit to how long the CFP can be. I suggest less than 5 DTIM intervals	Ridiculously long CFPs can effectively squeeze out non-CF-aware traffic	
264	6.3.3.4, 8.4.4.2	HCH C	T	N	second paragraph: The minimum value for aCFP_Max_Duration, ~~if the PCF is going to be used, is two times aMax_MPDU plus the time required to send the initial Beacon frame and the CF-End frame of the CFP. This allows sufficient time for the AP to send one Data frame to a station, while polling that station, and for the polled station to respond with one Data frame.~~shall be calcualted using the following formula: aRTS_Time+aSIFS+aCTS_Time+ ((aSIFS+aFragmentation_Threshold+ aSIFS+aACK_Time) *(aMax_MSDU/aFragmentation_Threshold))	This paragraph addresses minimum CF_Max_duration as if its purpose is to make sure implementations are built which ensure a certain amount of CF traffic may pass. I don't beleive this should be so. If I want to build an implementation where the CF_Max_Duration only allows one data transfer, or even small number of small MPDUs, I should be allowed to. Given that, then it seems the point of a minimum CF_Max_Duration is to make sure that stations which set their NAVs to CF_Max_Duration at TBTT	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					+aPIFS This ensures that when a STA sets its NAV to CF_Max_Duration at TBTT, that NAV does not come clear before the PC gets a chance to access the medium to send the beacon containg the CF_Rem_Duration which changes that NAV to the actual PCF duration. If adopted, the above change also requies the addition to aRTS_Time to the lists in subclauses 8.4.1.2.2, 8.4.2.2.1 and 8.4.3.2.2, and definition as follows: 8.4.4.2.x aRTS_Time RTS_Time ATTRIBUTE WITH APPROPRIATE SYNTAX integer; BEHAVIOUR DEFINED AS "This attribute indicates the length of time it takes to transmit a RTS frame."; REGISTERED AS { iso(1) member-body(2) us(840) ieee802dot11(10036) MAC(1) attribute(7) rts_time(33) };	do not clear them before the beacon containing CF_Dur_Remaining is actually sent.	
265	6.3.3.5	BTh	e		**Change CF-aware three times...** CF-aAware **change in 1st paragraph...** as wi~~l~~th all ACK frames.	Style consistency typo	
266	**6.3.3.5**	**BSi**	**t**	**N**	**The text in this section describes how management frames may be sent by a station in response to Data+CF-Poll. It is not described how the management frame carries an implicit ACK in this instance.**	**A management frame cannot carry an implicit ACK in the current specification.**	
267	6.3.4	HC	E		Remove section 6.3.4	I don't see what its there for, there a lots of things we don't do, we don't list	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
						them all.	
268	6.3.4	BTh	e		**add...** contention period, and connection-oriented traffic	typo	
269	6.3.5	BTh	e		**change...** and Probe Response management frames (which are sent from APs~~<comma>~~<period> (any such frames...	Text wasn't a sentence.	
270	**6.3.5 6.3.5.2**	**DW**	**T**	**Y**	**The Capability bit definitions seem incomplete. According to 6.3.5.2, a station must be able to say: - I want to be on Polling list as long as associated. - I never want to be on polling list (but CF-Aware) - I am capable to react on Polls, so dynamic polling list is possible. All the above are CF-Aware, while 3 other configurations need to be possible. It is suggested to code this in an extra bit.**	**The distinction in bitdefinitions between AP and Station is correct.**	
271	**6.3.5.1**	**MB**	**e**		**Don't understand the first sentence.**		
272	**6.3.5.1**	**ws**	**e**		**first paragraph - "station during each station begins when" should read "station when there"**	**extra words**	
273	**6.3.5.1**	**DW**	**E**		**Clarify the first sentence. Seems some text is missing.**		
274	6.3.5.1	BTh	E	N	**change...** at least one station during ~~each station begins~~a CFP when there are entries in the polling list. Stations using time-bounded service shall be polled first if required to meet their service requirements. The PCF shall...	Sentence didn't make any sense. The time-bounded service stations need priority in polling to make sure they get their data delivery timing satisfied.	
275	6.3.5.1	HC	T	N	~~The PC shall send a CF-Poll to at least one station during each station begins when there are entries in the polling list.~~ The PCF shall issue polls to stations who are ~~se entries~~ on the polling list ~~are for reasons other than time-bounded service connections~~ in order by ascending SID value. If there is insufficient time to send CF-Polls to all such entries on the polling list during a particular CFP, the polling shall commences with the next such entry during the next CFP. ~~If the DTIM at the beginning of a CFP indicated traffic for any CF-Aware stations using~~	[1] Remove the first sentance because it isn't a sentance. [2] Remove references to time bounded connections. [3] Do not give priority to power save stations. This is blatently unfair access - if I was a STA manufacturer I would make sure that my STA reported that it	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					~~power save mode, that buffered traffic, and polling of those stations occurs, in order by ascending SID, prior to polling of or frame delivery to non-power-save stations on the polling list.~~ ~~While time remains in the CFP, the PC may generate one or more CF-Polls to *any* stations on the polling list.~~ ~~While time remains in the CFP, the PC *may* send Data or Management frames to *any* stations.~~ In order to gain maximum efficiency from the contention free period, and the ability to piggyback acknowledgements on successor Data frames in the opposite direction, the PC should generally use Data+CF-Poll and Data+CF-Ack+CF-Poll types for each data frame transmitted while sufficient time for the potential response to the CF-Poll remains in the CFP. The PC may send multiple frames (with or without CF-Polls) to the same station during a single CFP, and may send multiple CF-Polls to a station ~~in cases where time is available and the station indicates that More frames are available in the frame control field of a transmission in response to a CF-Poll~~.	was PS so it got better service. This allows a few STAs to hog the bandwidth. Leave it to the implementer to determine how to service his poll list versus downward traffic. [4] There is no 'More' indication anywhere. The PC can certainly do this, but it will have to determine under what circumstances any way it can.	
276	6.3.5.1	KJ	t	N	in the last paragraph, how are more frames indicated since it seems we have eliminated the "more" bit from the control field? Either replace the reserved bit in the control field with a more bit or eliminate the function of indicating more frames are buffered.		
277	6.3.5.1	ZJ	t	N	Add text to explain that the polling list is a temporary subset of associated CF-aware stations, and that it may or may not include stations for whom traffic is currently buffered in the AP (need to change text in 4.3.2.1 if the AP will set TIM bits to indicate that STA will be on the	Polling list is never actually explained in sufficient detail to be comprehensible to mere mortals.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					polling list even though they have no traffic buffered).		
278	6.3.5.1	ZJ	t	N	Modify text to allow AP to process polling list round-robin.	It sounds like it starts over with the smallest number each CFP. If the CFP is not long enough to poll everyone, nodes with higher SIDs will get starved.	
279	6.3.5.2	BTh	e		**in 3rd paragraph change CF-aware 3 times...** CF-aAware	Consistency	
280	**6.3.5.2**	**DW**	**E**		**The aPoll_Inactivity is not in MIB. Needs to be defined.**		
281	6.3.5.2	HC	T	N	A station shall indicates its CF-Awareness during the Association process. If a station desires to change the PCF's record of CF-Awareness, that station shall~~must~~ perform a Reassociation. During Association, a CF-Aware station may also request to be placed on the polling list for the duration of its association~~, or to never be placed on the polling list. The later is useful for CF-Aware stations that normally use Power Save Mode, permitting them to receive buffered traffic during the CFP (since they have to be awake to receive the DTIM that initiated the CFP), but not requiring them to stay awake to receive CF-Polls when they have no traffic to send~~. If a station desires to be removed from the polling list, that station shall perform a Reassociation. ~~Stations that establish connections are automatically placed on the polling list for the duration of each connection. Note that ony CF-Aware stations may establish connections, and that connection-based services are only available when a PC is operating in the BSS.~~ CF-Aware stations that are not on the polling list ~~due to a static request during Association, and are not excluded from the polling list due to a static request during Association,~~ may be dynamically placed on and removed from the polling list by the PC.~~ The PC monitors CF-aware station activity during both the Contention Free~~	[1] Change the first paragraph to match the bits that were defined in 6.3.5 in the capability field. There is no way to indicate *never* put me on the polling list. [2] Remove paragraph 2 because it is connection stuff. [3] I support the ability of the PC to take CF-Aware STAs on and off the polling list. All CF-Aware stations should be able to support being polled (especially since they do not have the capability fields necessary to specify never poll me). But let the implementation decide on what criteria to put STA on and take them off the polling list. If it is not up to the implementation, then a lot better specification is requried here, including the MIB variables to be used.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					~~period and the contention period. When a CF-aware station placed on the polling list dynamically has not transmitted a Data frame in response to the number of successive CF-Polls indicated in aPoll_Inactivity, then the PCF may delete that station from the polling list. When a CF-aware station not on the polling list, but not excluded from the polling list, has transmitted any Data frames during the previous contention period, then the PC may add that station to the polling list. This is illustrated in Figure 6-19.~~ ~~Figure 6-19.~~		
282	6.3.5.2	ZJ	t	N	Delete second paragraph	Connection stuff is not part of this standard yet	
283	6.3.5.2.	RMr	t		~~Stations that establish connections are automatically placed on the polling list for the duration of each connection. Note that ony CF-Aware stations may establish connections, and that connection based services are only available when a PC is operating in the BSS.~~	**Connections were removed from the draft.**	
284	**6.4**	**ws**	**e**		**last paragraph - "_Lifetime than" should be "_Lifetime then"**	**wrong word**	
285	**6.4**	**BA**	**T**		Last paragraph. Wouldn't it be easier to say if a fragment is transmitted unsuccessfully up to the maximum number of retries that further fragments are not transmitted? Better than another timer.		
286	**6.4**	**RJa**	**T**		Last paragraph. Wouldn't it be easier to say if a fragment is transmitted unsuccessfully up to the maximum number of retries that further fragments are not transmitted? Better than another timer.		
287	**6.4**	**DW**	**T**		**Delete aMax_MSDU_lifetime and associated timer stuff.**	**Why do we need an additional Max_Transmit_MSDU_lifetime, while we already have a retry mechanism limit. We need such a mechanism in the Receiver to cleanup unfinished frames that will**	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
						never be completed, but not in the transmitter.	
288	6.4	SA	T	N	**Remove the possibility of varying fragment sizes. Agrred text included in doc 95/206**		
289	6.4	BA	T	N	First paragraph. The MAC may fragment and reassemble directed MSDUs (including multicast/broadcast packets transmitted with the To DS bit set)., ~~directed and multicast/broadcast~~...	The current approach to fragment non-ACKed packets will allow slightly more efficient use of the bandwidth since a long broadcast/multicast packet can be sent in two parts (before hop boundary and after hop boundary). I think it is more important that these messages be sent in a way to which maximizes their probability of correct reception. Since they are not ACKed, the message delivery probability will be higher if they are sent unfragmented. At threshold, this difference could be fairly significant since a receiver might be required to successfully detect and demodulate 3 or 4 separate bursts for a long message.	
290	6.4	BD	T	N	The payload of a fragment shall be an even number of octets for all fragments except the last. The payload of a fragment shall never be larger than aFragment_Payload (including IV and ICV if WEP was~~is~~ invoked for the MSPDU For purposes of this sub-clause the term MSDU shall be assumed to refer to the MSDU passed into the MAC as possibly expanded by WEP.). However, it may be less than aFragment_Payload (for the last fragment). When data is to be transmitted, the number of octets in the payload of the fragment shall be determined by aFragment_Payload.~~based on the time at which the fragment is to be transmitted for the first time.~~ Once a fragment is transmitted for the first time, its contents shall be fixed until it is successfully delivered to the	**1) WEP shall be applied to an MSDU instead of an MPDU - I support doc 95/196 and related discussion in Aug 95 mtg.** **Remove the dwell time vs fragment optimization attempt.** **2) The complexity of attempting to pre-calculate the remaining time within a dwell boundary in order to try and cram in a few bytes before a hop is a losing proposition. While one is trying to figure this out, time is slipping away. The calculation has to include leave time for the receiving**	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					immediate receiving station. The number of data octets in the payload of a fragment shall depend on the values of the following three variables at the instant the fragment is assembled to be transmitted for the first time: a) aFragment_Payload ~~b) The time remaining in the current dwell time.~~ b~~e~~) The number of octets in the MSDU that have not yet been transmitted for the first time. Since the control of the channel will be lost at a dwell time boundary and the station will have to contend for the channel after the dwell boundary, it is required that the acknowledgment of a fragment be transmitted before the stations cross the dwell time boundary. Hence, if there is not enough time remaining in the dwell time to transmit a fragment with an aFragment_Payload payload, the fragment shall not be transmitted.~~number of octets in the payload may be reduced to the maximum number of octets that will allow the fragment plus the MAC acknowledgment to fit within the time remaining in the dwell time.~~ This is shown in Figure 6-21 for an MSDU of 12500 octets. <Change figure 6-21 as follows: delete frag 2 and ack 2; change frag/ack 3 to 2; change frag/ack 4 to 3 > Referring to Figure 6-21, a 12500 octet MSDU is fragmented into three~~four~~ fragments with aFragment_Payload set at 500 octets. There is enough time left in the dwell to send one~~two~~ fragment~~s~~, one of 500 octets~~ and a second of 300 octets~~. After the dwell	**station to get the Ack back to you before the dwell boundary - not something that is easy (possible?) to figure out. Now add to this the additional complexity of deciding whether to use RTS/CTS or not, guessing at what's happening at the receiving end, choice of data rates to send the frame at etc. - yech. I assert that the calculation is not worth the effort.** **4) I conclude that the frill of attempting to utilize time quantum smaller than that needed for an MPDU is not worth the complexity.** **5) At the receiving end, it requires a STA to do some complex buffering since every fragment could be a different size when received. This complexity is required of every station even if no stations ever choose to attempt the dwell time optimization. If the optimization frill were dispensed with, only the last fragment would be a different size - much simpler.** **6) The text changes shown at the left are those required to remove this frill from the fragmentation description.** **7) NOTE: doc 95/206 attempts to make similar alterations to those I have detailed. Doc 95/206 while similar in spirit is different in significant details and I would not consider 95/206 as satisfying this LB comment.**	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					boundary, the rest of the MSDU is sent, one 500 octet fragment and one 200 octet fragment. ~~A station may elect not to adjust the size of the payload when approaching a dwell boundary. In this case, the station must wait until after the next dwell boundary to create and transmit a fragment with a aFragment_Payload octet payload (provided there are at least aFragment_Payload more octets remaining in the MSDU).~~ A station must be capable of receiving fragments of varying size for a the last fragment of a single MSDU. If a fragment requires retransmission, its contents and length shall remain fixed for the lifetime of the MSDU at that station. In other words, after a fragment is transmitted once, contents and~~or~~ length of that fragment are not allowed to fluctuate to accommodate the dwell time boundaries. ~~Let the fragmentation set refer to the contents and length of each of the fragments that make up the MSDU. The fragmentation set is created at a station as soon as the fragments are attempted for the first time. The fragmentation set remains fixed for the lifetime of the packet at the transmitting station. This is shown in Figure 6-22.~~ <Delete figure 6-22; no longer needed> ~~In the example shown in Figure 6-22, the same 1500 octet MSDU is fragmented at the same point in the dwell time as in Figure 6-21 but the ACK for the second fragment is missed. After the dwell boundary, the fragment is retransmitted and the fragment size remains 300 octets.~~		
291	6.4	FMi	T	N	Incorporate changes from document 95–206 to require fragmentation to use a uniform size for all fragments of an MSDU other than the final fragment, thereby limiting	Simplicity and removal of functions unique to a single PHY from the MAC. The reason that fragmentation, which	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					fragmentation to the function of reducing maximum MPDU size based on PHY constraints, and removing the function of attempting to use fragmention to optimize FH medium usage prior to dwell boundaries. NOTE: This change and the change to the same section from document 95–196 do not interact — since completely different paragraphs are affected	SEVERELY complicates the MAC, was included at all is to accommodate limits on maximum MPDU length (actually PHPDU length) beyond which physical characteristics of the media are likely to degrade frame error rates to unacceptable levels. The added complexity of using fragmentation for dwell boundary optimization is not justifiable. The MAC is complicated for the beneift of a single PHY, yet it is unclear that the purported benefits of dwell optimization are even achievable, because the decision to fragment must be made before the exact amount of time remaining (with actual IFS turnarounds, deferrals, etc.) is known. Furthermore, by requiring all fragments to be of equal, even length (except the final fragment, which may be shorter), memory managment at receiving stations is simplified, because the size of the buffers needed for each fragment of the MSDU is known when the first fragment is received. This can also reduce the overhead for reassembly, especially when WEP is in use.	
292	6.4	FMi	T	N	Incorporate the change listed for Clause 6 from document 95–196, which restores WEP to operating on MSDUs rather than MPDUs. NOTE: This change and the change to the same section from document 95–206 do not interact — since completely different paragraphs are affected.	See document 95–187 for the reasons WEP should be applied to MSDUs.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
293	6.4	KJ	t	N	see document 95-196	NOTE: this affects comment on section 4.2.2.1	
294	**6.4**	**RJa**	**T**	**N**	First paragraph. The MAC may fragment and reassemble directed MSDUs (including multicast/broadcast packets transmitted with the To DS bit set)., ~~directed and multicast/broadcast~~...	The current approach to fragment non-ACKed packets will allow slightly more efficient use of the bandwidth since a long broadcast/multicast packet can be sent in two parts (before hop boundary and after hop boundary). I think it is more important that these messages be sent in a way to which maximizes their probability of correct reception. Since they are not ACKed, the message delivery probability will be higher if they are sent unfragmented. At threshold, this difference could be fairly significant since a receiver might be required to successfully detect and demodulate 3 or 4 separate bursts for a long message.	
295	6.4	ZJ	T	N	Adopt text from submission 95/206	Dwell-time fragmentation hacking is icky	
296	**6.4**	**DW**	**T**	**Y**	**Implement the changes as documented in document 95/206. The second to last paragraph In this document needs to remain, so should not be deleted, and need to be generalized so that it does address both the transmission and retransmission of a fragment**	**Complexity of variable sizing is not justified for a small performance optimization which in addition also only applies to one specific PHY.**	
297	**6.4**	**DW**	**T**	**Y**	**A distinction should be made for the amount of simultaneous receptions of incomplete fragmented frames between an AP and a Station. 6 MSDU's is a good number for an AP. 3 MSDU's are sufficient for a Station.**	**It should be recognised that it is much more realistic for an AP to have multiple unfinished fragmented MSDUs pending then in a Station. In addition under normal sircomstances an MSDU will be finished before the next is transmitted by any other station, as long as no fragments are in error. That is when other stations may regain acces to the medium to**	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
						send out their fragment burst. So it will be rare that a total of 6 unfinished MSDUs are outstanding. In a IS station the AP will always finish the burst it was working on before transmitting the next frame to the same station. In ad-hoc there are more simultaneous sources, so more MSDUs may be outstanding.	
298	6.5	BTh	t	N	**change penultimate paragraph...** The destination station will maintain a ~~aReceive_MSDU_T~~timer ~~attribute~~ for each MSDU being received. The~~re is also an~~ attribute, aMax_Receive_MSDU-Lifetime, ~~that~~ specifies the maximum amount of time allowed to receive a MSDU. The ~~aReceive_MSDU_T~~timer starts on the reception of the first fragment of the MSDU. If the ~~aReceive_MSDU_T~~timer exceeds aMax_Receive_MSDU_Lifetime tha~~e~~n all received framents are discarded by the destination station.	There is no need for a MIB variable for the internal MAC MSDU timer. This is just an internal counter. typo	
299	**6.5**	**FMa**	**t**	**N**	**Change "will" to "may" in the first sentence of the second from the last paragraph of the section.**	**the text indicates that the "destination station will maintain a aReceive_MSDU_Timer attribute for each MSDU being received." For an AP, this could mean maintaining quite a few timers. The term "will" implies "must" and therefore it might be difficult to be compliant in this area.**	
300	**6.6**	**KD**	**T**		Multirate Support The following set of rules must be followed by all the stations to ensure coexistence and interoperability on MultiRate Capable PHYs. ~~All Control Frames (RTS, CTS and ACK) are transmitted on the STATION_BASIC_RATE (which as specified~~	Although implementations need not be defined, the standard should include the basic mechanisms to allow all multi-rate compliant devices to determine when it can switch to higher rates. The customer should be able to install a 2 Mbps capable radio into an existing 2 Mbps capable WLAN made by a different manufacturer and have	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					~~before belongs to the ESS_BASIC_RATE) so they will be understood by all the stations in the ESS.~~ ~~All Multicast and Broadcast Frames are transmitted on the STATION_BASIC_RATE, regardless of their type.~~ ~~Unicast Data and/or Management Frames are sent on any available transmit rate. The algorithm for selecting this rate is implementation dependent and is beyond the scope of this standard.~~ Management Frames are sent at the ESS_BASIC_RATE to enable stations to determine its compatibility and associate or decline association. All other frames are sent at the BSS_RATE. A BSS associated with a particular AP will have a BSS_RATE defined by a management entity. A station attempting to enter the BSS must determine if it is capable of communicating at the BSS_RATE before associating.	it provide a higher throughput. The current text does not provide any general algorithm nor the mechanisms to enable it to do so. The one dynamic switching method proposed had a patent infringement issue which the committee chose not to tackle. In addition, these dynamic switching algorithms have been shown to have minimal throughput increases due to the overhead. In light of these problems, the only alternative that can be sufficiently defined for the standard is the non-dynamic, management-defined method of one rate per BSS. The text defines the basic method with mechanisms for roaming and CSMA protocol with non-multiple rate units.	
301	**6.6**	**SA**	**T**	**N**	**Remove multirate support or make it compulsory.**	**Multirate support only makes sense if it is comulsory. Otherwise it would break some of the other functionality of the MAC, such as the ability to support a virtual carrier during fragment bursts.**	
302	**6.6**	**BD**	**T**	**N**	**Complete this section by adding sufficient text to avoid the potential problems mentioned to the right.**	**The section does not specify how a data rate is chosen for Unicast data and/or management frames. The algorithm is explicitly left as implementation dependent. I believe this to be unacceptable. Without specification of the alg there will be interoperability problems (some of which are called out in D2 state machine text in sec 6). What good is a Beacon or probe**	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
						response frame that is sent at a rate that can not be understood by the station which probed? No mention is made of non-unicast data frames - how are their rate determined? Why is the alg for rate implementation dependent when at the same time the draft attempts to put rate information in a capability information field? All this is indication that the multirate ability is not sufficiently specified yet. I see two alternative (either of which are acceptable to me): **1) complete specification of the details of multi-rate operation to a sufficient degree that there are not potential interoperability problems, or** **2) remove the incomplete multi-rate abilities from the draft.**	
303	6.6	BTh	t	N	**change Fragment_Payload 7 times...** aFragment_~~Payload~~Threshold **change...** b) The time remaining in the current dwell time for a FH PHY **add...** the Sequence Number will remain the same... ...lowest Fragment Number to highest **change last paragraph...** The source station will maintain a ~~aTransmit_MSDU_T~~timer ~~attribute~~ for each MSDU being transmitted. The~~re is also an~~ attribute, aMax_Transmit_MSDU_Lifetime, ~~that~~ specifies the maximum amount of time allowed to transmit a MSDU. The ~~aTransmit_MSDU_T~~timer starts on the attempt to	Name of MIB variable was changed to Fragment_Threshold. Added FH PHY for clarity. typos There is no need for a MIB variable for the internal MAC MSDU timer. This is just an internal counter.	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					transmit the first fragment of the MSDU. If the ~~aTransmit_MSDU_T~~timer exceeds aMax_Transmit_MSDU_Lifetime thaen all remaining fragments are discarded by the source station and no attempt is made to complete transmission of the MSDU>		
304	**6.6**	**RJa**	**T**	**N**	Need to add the basic rate information to the probe response and beacon messages so that a new station can determine how to operate in a multirate network.		
305	6.6	WR	T	N	The text provide for multirate support is not very clear. Multirate support be better defined or eliminated.	It is sometimes impossible for a STA that receives a frame to update its NAV since it can not receive the frame.	
306	6.6	ZJ	T	N	Delete requirement that control frames be sent at the basic rate. Putting the Duration information into the PLCP header where everyone can hear it solves the problem more cleanly.	Duration information should be part of the PLCP header, not the MAC contents of the frame. Since units communicating at lower speeds cannot receive the MAC contents of a frame transmitted at higher speed, but all stations can receive the PLCP header for all frames (in all PHYs), it is logical to move Duration to where everyone in the BSS can receive it (I don't care if it violates layer purity).	
307	6.6	GE	T	X	Remove multirate support for FHSS PHY.	This feature is designed to allow proprietary implementations to manipulate this standard. Coexistence of single rate and multirate STA have not been proven. I will not allow a vendor to call his system compliant when there is no facility in the protocol to verify the operation of this feature. I will change my vote when a mechanism has been described to allow units supporting multirate capabilities to inoperate. My definition of interoperation is that not only do they exchange data, but their effect on through put and performance is constant.	
308	**6.6**	MRo	**T**	**X**	**Eliminate the word interoperability from the first sentence**	**Without a defined algorithm for rate switching, all we have ensured is**	

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					The following set of rules must be followed by all the stations to ensure coexistence and ~~interoperability~~ on MultiRate Capable PHYs.	**coexistence of a bunch of proprietary solutions. Tell it like it is!**	
309	**6.7**	**HDa**	**e**	**N**	6–xx	**Update figures titles and references in text.**	
310	6.7	**BD**	**T**	N	MAC operation at all stations is described by six communicating state machines. A seventh state machine is used at APs to provide distribution services. All of these state machines may operate concurrently. The functions of these state machines are summarized below and detailed in the remainder of this clause. In case of conflict between the state machines of this subclause and text in other clauses, the text shall take precedence over the state machines.	**The state machines are an attempt to add additional clarification to the MAC operation. However, the MAC operation as decided by 802.11 members is represented by text in the various clauses. This additional statement, makes the precedence clear in case of conflict.**	
311	**6.7**	**BSi**	**T**	**N**	**Add somewhere: these state machines are informative only. In case of discrepancy with the textual specification, the latter shall take precidence.**	**Two forms of specification: text, state machines - need to define what status each has.**	
312	6.7	FMi	T	N	Replace clause 6.7 with the updated MAC State Machines from document 95–199.	Correction of numerous errors, inclusion of several omitted functions, many improvements to better match recent MAC changes, removal of the "known limitations" sections, and provision of the missing MAC Management Service state machine.	
313	**6.7**	**vj**	**T**	**N**	**update MAC state machines**	**need correction per doc 95/014r2**	
314	6.7	ZJ	T	N	Delete this section. Move it to an informative annex.	It is pointless to have hundreds of pages of text plus state machines that may not agree. The text should rule, and the state machine should just be there to clarify how it all fits together and to convince everyone in the MAC group that we didn't leave anything out.	
315	**6.7**	**BPh**	**T,E**	**N**	**The entire clause about state machines should be moved to an informative annex.**	**The state machines are a more formal description of the concepts**	

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						described in the text. The text will take precedence when there is a discrepancy between the two descriptions.. The text is what we voted on. The state machines were added at the last minute and will always be out of synch with the text. The state machines also identify those areas where the standard is unclear and the implementor must make some choices. Again this is appropriate for an annex, but not in the main body of the standard.	
316	6.7	DW	T	Y	The following are a number of State MAchine comments already discussed with Michael Fischer (not exhoustive). - Rx-Timeout mechanism is not included in CSM. - !F_Mbusy in transition C3:1a should be NAV=0 only. - Random Backoff in Tx when previous frame is just transmitted by this station is not implemented. - Reset NAV when Medium not busy after CTS_Timeout after received RTS in third party stations is not implemented. - No Power Management bit maintenance. - Do not agree with UdpNAV statement in transition R4:1b. Only implement NAV update to protect an Ack. -The More bit is not sufficiently handled. -Transition M1:1j should not be done for SID=0 -Transition M1:1p should not do PS-Poll for BC/MC. - Do we need T_Awake in M11:11d?		
317	6.7.1	MB	e		part 5, next to last sentence. ~~The~~ eEach of these queues has a corresponding flag....		
318	6.7.1	ws	e		first paragraph - "nor to all use a uniform"	poor wording	
319	6.7.2.4	MB	e		MovePSframes description. 1st sentence.....with the		

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					appropriate addresses and moves those frames.... **PsMode(macAddr) last sentence.....may implement a this function to always return 1**		
320	**6.7.3.4 6.7.4.4 6.7.5.4 6.7.6.4 6.7.7.4 6.7.8.4 6.7.9.4**	**BD**	**T**	**N**	**Eliminate known deficiencies of the state machines and the clauses which call them out.**	**Mike Fischer is to be commended for the effort which went into creating the state machines which are in D2. I particularly welcome the honesty which included sections that call out know deficiencies of the state machines. These are excellent editorial notes which point out where more work is needed. Of course these deficiencies must be corrected before the draft is sent to sponsor ballot and the clauses which describe the known deficiencies will have to be removed (since they will no longer be relevant) - it would be very embarrassing to forward a standard which called out known problems in the standard... even though this was one of the reasons for including them in the D2 draft, I am still bound to vote NO knowing that the state machines have known identified flaws...<grin>**	
321	**6.7.4.3**	**EG**	**E**		remove section	**this section references a paper and discusses future need for re-evaluation. It's not appropriate for such a paragraph to be included in the draft.**	
322	**6.7.5.3**	**SA**	**T**	**N**	**There should be DS1:5, similar to DS2:5**	**There appears to be no reason to preclude an AP from forwarding frames from the wired medium to another AP on the wired medium.**	
323	6.7.6	DM	T	N	MAC needs to be capable of servicing more than 1 MSDU	802.11 should provide for MSDU reordering.	

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					simultaneously. This topic is too complicated for simple text inclusion and should be discussed in committee.	This would allow allow for the situation where one MPDU of an MSDU is in back-off due to poor coverage by the destination station while another MPDU of another MSDU is forwarded to a station that is in good coverage. This is critical for infrastructure systems. If this is not defined then all traffic to a BSA from an AP will be held back due to marginal coverage to one of the STAs.The end result is unacceptable 802.11 performance since there will always be devices in the fringe of the BSA. MSDU reordering should not be allowed on a per destination basis since this could cause incompatibilities with existing NOS'.	
324	6.7.6	WR	T	N	The MAC must be able to handle more than one outstanding transmit frame.	This is very important in an infrastructure based system. If an AP is trying to transmit a frame to a STA in poor coverage and it has to backoff and retry, the MAC must be able to transmit another frame.	
325	**6.7.6.3**	**MB**	**e**		**State C1:1d First sentence .... delayed due to a medium bushy condition this...**		
326	**6.7.6.3**	**SA**	**t**	**N**	**remove ", or no-decryptable WEP frame" in C1:1a**	**If WEP encryption is at the MSDU level, it is not know whether an MPDU is non-decryptable.**	
327	**6.7.6.3**	**SA**	**t**	**N**	**I think that the state C2 has to be traversed in C1:3**	**In C1:3 the contention "There is no need to traverse state C2 in this situation, because ..." is false, becasue a station could have become disassociated without it's knowledge and its connection ID reassigned.**	
328	**6.7.6.3**	**SA**	**t**	**N**	**In C3:1a, remove "and the medium is not busy ..."**	**Upon reception of an RTS, my understanding from the text was that the transmission of the CTS was unconditional.**	
329	**6.7.7.3**	**BSi**	**E**		**Perhaps need to add a note here (or in section 5): Since a station may pre-authenticate with potentially many APs, each AP may have many times the number of associated stations authenticated with it. This implies the presence of a potentially large database.**	**Clarity.**	

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
					There must therefore be some mechanism for ageing and reusing authentication resources. If the AP decides that an authentication record of an unassociated station is to be reused, it has no way of notifying the station. Thus stations that have preauthenticated with APs must be prepared to have their authentication status silently dropped - the status code not authenticated would be given to an association request.		
330	6.7.7.3	EG	E		M2:2d, Detect activity on new channel: If media activity is detected (CCA only) by an active scanning station while awaiting activity indication (probe timer 1 running), this transition is taken to stop probe timer 1 and start probe timer 2, since there is a presumption ~~than poll~~ that probe responses might be received.	I believe we're probing here, not polling.	
331	6.7.7.3	SA	t		Specify awake interval.		
332	6.7.7.3	EG	t		"M1:1h, Process beacon from other BSS: If a beacon from a different BSS is received, this transition is taken to update the NAV (only if a non–null CF period is indicated in the beacon), and to update the list of known APs (only if the beacon is from an infrastructure BSS within the station's ESS)."	only update AP list for those AP's within your ESS	
333	6.7.7.3	SA	t	N	In State M1 description, remove "the use of power save mode, which is only possible by stations associated with an infrastructure BSS".	Power saving is possible in an IBSS and is being added as per doc 95/137r2.	
334	6.7.7.3	SA	t	N	Must allow multiple PS-Polls in a beacon interval.	A PS-Poll must be sent to receive each buffered frame according to the draft text.	
335	6.7.7.3	SA	t	N	In M1:1r, remove ", and to enter SCAN mode to find another BSS"	I may not wish to scan. I may already have a list of known APs that I wish to try first.	
336	6.7.7.3	BSi	t	N	Particular IFS time is important in M1:1e	Second sentance of M1:1e is not true. Transmission of the beacon could	

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						occur immediately if the random backoff value chosen is 0.	
337	6.7.8.3	SA	e		The description in T1:2b is only true if encryption is at the MPDU level.		
338	6.7.9.3	SA	e		The description of R8:9a is based on MPDU level encryption.		
339	6.7.9.3	MB	e		State R1:0 Go to sleep: ŦWhen the F_Awake.....		
340	6.7.9.3	SA	t	N	The text for R3:1b implies that carrier dropout should be used to terminate a frame reception and treat the medium as idle. I think the medium must remain busy until the end of the frame, which is determined by the length field in the PLCP header.		
341	6.7.9.3	SA	T	N	The description for transition R4:1b has to be fixed.	NAV does not guarantee no collisions, it just reduces the likelyhood.	
342	6.7.9.3	SA	t	N	In R8:9b the received frame shall be discarded if WEP is enabled at the receiving STA.	If a station has WEP enabled, non-encrypted frames should not be passed up to the LLC.	
343	6.7.9.3	BSi	T	N	Delete all reference to updating NAV based on PLCPlength.	Length provides only partial information. Poor protocol layering.	
344	Fig 6-4	MB	e		Figure 6-4 and 6-6 are the same figure. One should be deleted as redundant		

6.2.6.6 RTS/CTS Usage with Fragmentation

Seq. #	Section number	your ini-tials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal

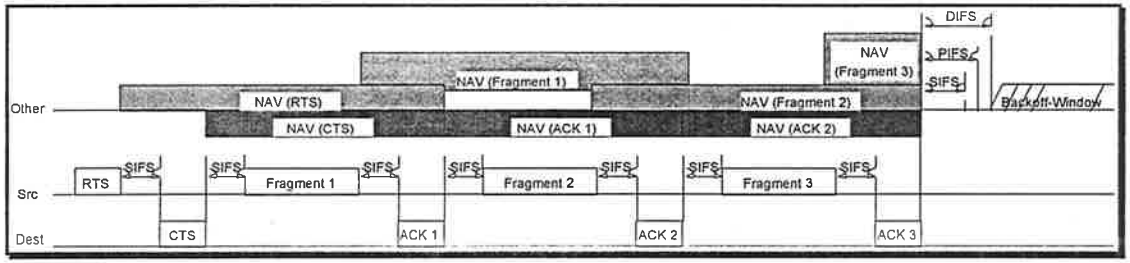

Figure 6-10: RTS/CTS with Fragmented MSDU

Each frame contains information that defines the duration of the next transmission. The RTS will update the NAV to indicate busy until the end of ACK 1. The CTS will also update the NAV to indicate busy until the end of ACK 1. Both Fragment 1 and ACK 1 will update the NAV, immediately after each frame is received, to indicate busy until the end of ACK 2. This is done by using the duration field in the DATA and ACK frames. This will continue until the last Fragment and ACK which will have the duration set to a SIFS+ACK time and Zero respectively. Each Fragment and ACK acts as a virtual RTS and CTS, therefore no RTS/CTS frame needs to be generated even though subsequent fragments are larger the aRTS_Threshold.