Decision Record

for the

Proposed Revisions

to

Section 7.1, 7.2, and 7.3 of P802.11/D1.1

Many authors participated in the creation of these proposed changes.

Abstract: This paper presents the decision record for the proposed changes to sections 7.1, 7.2, and 7.3 to address a large number of letter ballot comments..

Action: None.

7.2	McDonald		Seems that since beacons are short and not very frequent, that they should be transmitted at their prescribed times without a CCA approval. Within a given BSS there will not be a problem of interference.	Transmitting beacons at variable times is a sever burden on sync issues and makes battery saving or power management very difficult. I see very little lost in allowing the beacons to be transmitted at the same point in each dwell without regard to CCA approval, and a whole lot to be gained.

Not accepted. Deferral is required because the environment is not know. Interference is not only an issue within a BSS, it is an issue among BSSs, also. This is particularly true when using a single channel PHY.

7.2	bdobyns	T	Power management not possible without beacons. PHY which are single channel cannot implement power management because of PCF restriction in section 5.3 Standard must permit power management for single channel PHY.	

Not accepted. The same restrictions do not apply to PCF and Beacons. The current power management scheme does allow management on a single channel PHY. Beacon intervals may be managed such that they precess and minimize collisions. The aBeacon_Interval provides the mechanism for this. The policy for setting the Baecon interval is outside the scope of this standard.

7.2	bdobyns	T	Four power management modes is too many. CAM and (only one of either) PSP or PSNP is sufficient.	The distinction between CAM and TAM is too slight. The distinction between PSP and PSNP is too slight.

Accepted. Reduced number of modes by eliminating TAM and PSNP.

A station shall remain in its current power management mode until it informs the AP of a power management mode change via a successful frame exchange. Power management mode shall not change during any single frame exchange sequence, as described in section 4.3.
Also requires change to Table 4-3.

7.2	David Bagby	T	simplify power management. There is too much complexity in this section for little functionality. All power save modes must be equally useful and operational in ESS and IBSS cases. The PSP mode is 95% of the useful functionality and operates in both ESS and IBSS. PNSP is bad - it essentially makes ever other station waste power for the benefit of the one using PSNP - not acceptable from a system point of view. mode shall be removed. TAM is dependent on AP, hence ESS only for operation - mode to be removed. these changes will result in two poser save states CAM and PSP. simplicity says rename these to "Power save off" and "power save on". rewrite section 7.2 to reflect these changes before I could vote for sponsor ballot.	See imbeded comments and annotations

Adopted! See above.

7.2.1.1	A. Bolea	T		We should allow stations to inform the AP and other stations in Ad-Hoc networks of a change in Power Savings Mode using a NULL Frame type.

Partially adopted for infrastructure networks. Ad hoc is not dealt with in this paragraph.

7.2.1.1	Bob O'Hara	T	Define MACMGT_Listen_Intervalin the MIB	not defined
7.2.1.1	Rick White	T	MACMGT_Listen_Interval must be defined.	Not defined.

Adopted as aListen_interval. Text to be created for MIB entry.

7.2.1.1	C. Heide	t	remove PSP mode OR limit the number of STAs allowed to use PSP in one BSS or add to the TIM a restriction as to how many or which STAs can poll this time.	encouraging many STA to attempt to transmit at the same time in a CSMA based network will induces large amounts of collision, especially in a wireless network.

7.2.1.1	C. Thomas Baumgartner	t	What number of STA's in a BSS constitutes a reasonable number to operate in Power Save Polling manner? We need to give the world some idea.	MUST do simulation of protocol to determine where it breaks down at Power Save Polling operation and all the other points when many STA's are supposed to take the same action quasi-simultaneously. This might be the worst case because I expect all the STA's in large network could be in power saving mode.

Adopted. Transmission of Probe frames shall be randomized if there is more than one bit set in the TIM.
Text will go into section 7.2.1.7.

7.2.1.I	Renfro	T		Should allow Poll-Ack to keep station awake so that data for PSP stations can be buffered off line (e.g., not where it is available within SIFS time).

This action is already allowable. See section 4.3.

7.2.1.1	Rick White	T	MACMGT_Listen_Interval must be defined.	Not defined.

Adopted. Should be defined in the MIB section

7.2.1.2	C. Heide	e	the bracketed phrase in "Doze", replace "like" with "such as"	slang
7.2.1.2	Geiger	E	MACMGT_Power_Management_Mode	Missing form MIB
7.2.1.2	Rick White	E	Change MACMGT_Power_Management_Mode to aPower_Mgt_State.	
7.2.1.2 7.2.1.3 General	Wim Diepstraten	E	Suggest to add the following text to the second last sentence prior to the mode list: "*.....Power-Save-Polling* mode, **and can dynamically switch to TAM mode on network activity.** Add to CAM explanation: "This mode is fixed for the duration of an association." Add to the TAM explanation: "Stations can dynamically switch between the TAM mode and any of the Power Save modes without requireing a reassociation. Section references are not correct. Please update.	The consept of dynamic switching between the TAM mode and the Power Save modes is not very clear, while it is essential for the throughput performance of a station using Power Saving.
7.2.1.2	Bob O'Hara	T	Delete TAM mode	this mode is identical to CAM for a limited time. The additional overhead and complexity is not needed for no additional benefit.

Adopted. TAM mode deleted

7.2.1.2	Bob O'Hara	T	Define limits on when transitions between power management states may occur and minimum times that a station must remain in particular states.	not defined

Adopted. Last sentence of section 7.2.1.1

7.2.1.2	Bob O'Hara	T	Delete PSNP mode	There is no apparent gain to having two power saving modes for the added complexity and overhead. PSNP is simply PSP where the station does not transmit Polls for lengthy periods of time.

Adopted

7.2.1.2	Bob O'Hara	T	Define a mechanism to inform the AP of transitions between states.	not defined
7.2.1.2	Gegier	T	There is no need to have a Transmit, awake and Doze state. Change to AWAKE or STANDBY	MAC Management can surely determine whether the PHY is in AWAKE or STANDBY but only the MAC controls the transition between Receive and Transmit. This is not a Power Management Function.

Adopted. Now simply have Power Save on or Active

7.2.1.2	John Hayes	T	AP buffers frames when STA is in Doze state.	Section 7.2.1.9 describes sending buffered frames.
7.2.1.2	Renfro	T		Why define TAM? Not useful unless everyone knows when a station switches to TAM and how long it will stay there.
7.2.1.2	Rick White	T	Remove Temporary-Active-Mode.	Appears to have no real advantage over other states.

Adopted. No more TAM.

7.2.1.2	Rick White	T	Need a state transition table to show how and what a station does when it transitions from one state to another.	Picture is worth a thousand words.
7.2.1.2	Tim Phipps	T	*Add to end of section:* "Individual frames cannot distinguish between TAM and CAM mode. The AP may assume a station is in either TAM or CAM mode depending on the history of its communication with that station".	An AP may behave differently when a communication fails with a CAM versus a TAM station. It may infer a station is TAM if it has seen that station in one of the power-saving modes at some other time.

Adopted. Eliminated TAM. No transition occurs.

7.2.1.2.	Mahany	E	[awake] and [doze] should be replaced with [operational or active] and [standby], or other less euphemistic terminology.	Clarity

Adopted. Power Save ON. And Power Save Off.

7.2.1.2.	Mahany	E	Change first sentence to: The TSF timer has a resolution of 1 usec.	

Wrong section and editorial.

7.2.1.2. (c)	Mahany	E	2.54 GHz should be 2.4 GHz or 2.45 GHz.	Whichever description is used should be used consistently throughout the draft.
7.2.1.3	A. Bolea	E	Reorder 2nd and 3rd sentences.	

Adopted. Sentences reordered.

7.2.1.3	Greg Ennis	E	Change "Section 6.3" to "Section 7.3"	7.3 is proper reference
7.2.1.3	Rick White	T	The virtual bit map does not define any indication of broadcast/multicast traffic. This must be corrected.	A DTIM must of an indication of broadcast / multicast in order to provide more power savings for STAs that do not have any buffered directed frames.

Adopted. Entry 0 in the TIM is used to indicated Multicast traffic pending.

7.2.1.4	A. Bolea	E		In Figure 7-5, for first PSP station it is not clear why it is shown waking up at irregular TIM intervals. Also why is PSNP station waking up prior to last DTIM?
7.2.1.4	Geiger	E	MACMGT_DTIM_Interval	Missing form MIB

7.2.1.4	bdobyns	T	Buffering Broadcast/Multicast for transmission after a DTIM greatly increases the risk of out of sequence or duplicate packets. This is emphatically not wise. A CAM or TAM station may hear the broadcast/multicast twice (once unbuffered, and once buffered) - especially if the volume of traffic exceeds it's duplicate reject cache. A PSNP or PSP station may receive the broadcast or multicast before a unicast frame after a DTIM, even though the unicast frame was received by the AP first.	Upper layer protocol stacks vary in sensitivity to out-of-sequence and duplicate frame errors. IPX is extremely tolerant of this type of error NetBeui[tm] in particular can crash (and bring down Windows[tm]) when it receives a very small number (less than ten) out of sequence and/or duplicate frames.

Rejected. Not concerned about possible misordering. Real protocols will deal with it.

7.2.1.4	Bob O'Hara	T	Define explicitly how APs shall handle broadcasts and multicasts.	AP handling of Bcst/Mcst is ambiguous, send upon arrival and also store for DTIM? or only Store for DTIM and send only once? For stations in long power save periods, why should throughput to CAM station suffer?

Adopted. Clarified multicast handling.

7.2.1.4	Bob O'Hara	T	Define MACMGT_DTIM_Interval in the MIB	not defined

Adopted will be defined in the MIB.

7.2.1.4	C. Heide	t	figure 7-5 needs enhanced description.	what is the raised area on each station's line, receiver on? why didn't the bottom STA come awake for TIMs? What's going on between the first STA and AP at the end of line? For what station is that checkered buffered frame in the middle? Why didn't any STA come awake to look for that fourth TIM?
7.2.1.4	Renfro	T		DTIM information must also include PSP stations in case they happen to always wakeup on DTIM.
7.2.1.4	Rick White	T	MACMGT_DTIM_Interval must be defined in the MIB.	Not defined.

Adopted.

7.2.1.4	Rick White	T	There is no indication what interframe space the AP uses to send buffered traffic. This must be defined.	

Adopted. Using normal frame transmission rules.

7.2.1.4	Rick White	T	There is no indication of how the Power Savings mode inter-works with Contention free, This must be defined.	It is not discussed how the contention-free works with TIMs and DTIMs. Since the AP is most likely to be the Point Coordinator, how does it handle PCF function and power savings functions.

Adopted. If a station is participating in th PCF polling list, it must be awake to receive each Beacon. When a station is sleeping, it should not be on the poll list. When a station wakes up and sees itself in the TIM, it should wait till the end of the CF period and add itself to the polling list. Its buffered frames will be deliveredin the next CF period. Ftext to be added to 7.2.1.8.

7.2.1.5	C. Heide	e	to step (e) add "until following the next DTIM"	clarification

Adopted, though I think you must have meant item (d) (i.e. when bdcast/multicasts get buffered until)

7.2.1.5	A. Bolea	T		It is not clear whether the AP must respond to a POLL within a SIFS time with a DATA message or if it can respond with an ACK and then send the DATA message using a normal access with a DIFS. I see no reason why it should be forced to respond with DATA within a SIFS time! If the purpose of this is to reduce power, it can be achieved by stretching the sleep period of the station.

Adopted (see 4.3). The AP may EITHER send an ACK or the desired DATA with SIFS timing. Text to be added to 7.2.1.5f clarify.

7.2.1.5	A. Bolea	T		I don't see how the station can negotiate the aging of messages with the AP at association time. This sentence in item g should be deleted.

Adopted. Aging will be controlled as the AP sees fit.

7.2.1.5	Bob O'Hara	T	Revise item 6. based on result of comment on 7.2.1.4	Why should CAM stations suffer reduced throughput because of stations in power save mode?

Rejected. The mechanism only slows bdcasts coming in the the STA, so it should not be too troublesome. Tough.

7.2.1.5	Bob O'Hara	T	Delete the second sentence of item 7.	This is outside the scope of the standard.

Adopted.

7.2.1.5	C. Heide	t	power management mode changes when indicated in frames to the AP, would only be done in frames that require ACK.	if not ack'ed the STA cannot know if the AP received the indication of mode change, and changing modes could be dangerous without informing the AP.

Adopted. Text added to various sections to require this.

7.2.1.5	C. Heide	t	clarify when STAs send broadcast in an infrastructure network such that the you are assured all other STAs are awake?	clarification

Adopted. The mechanism already attempts to maximize the likelihood that bdcasts will be sent when PS STA are awake.

7.2.1.5	C. Thomas Baumgartner	t	Since only the AP's keep good track of each STA's power management status and buffer frames for each STA according to that status and since it is reasonalbe to expect lots of STA's to use power saving mode, it seems prudent to have all STA's send all Data to AP's when there are AP's in BSS and have AP's resend to destination even if destination STA is in same BSS.	This will simplify STA state machine and provide better operation when STA's use power saving mode which should be most of time. Would also apply to broadcast originating from an STA which is not an AP.

Rejected. STA can make the decision on its own as to whether it makes more sense to attempt direct xmission or to have AP figure it out.

7.2.1.5	C. Thomas Baumgartner	t	Change last sentence of paragraph to "Stations can dynamically change modes, and shall indicate this in any frame transmitted to AP that is a frame type requiring the AP to ACK. This assures that the change of mode is received by the AP. Following is the AP operation:"	If not ACK type frames then no assurance that AP knows STA power saving mode. List needed introduction.

Already adopted.

7.2.1.5	C. Thomas Baumgartner	t	Need to define how the aging parameter is negotiated between AP and STA.	No frame format has been defined for this purpose.

Rejected. Aging is no longer part of the standard. AP implementation issue.

7.2.1.5	Geiger	T	h) Whenever an AP is informed that a station changes to the TAM mode, Should read, changes form a power saving mode to the CAM or TAM mode,	I am assuming that if the change is from the CAM mode to the TAM mode, no buffer frames will exist. Also this isn't limited to the TAM mode but should also include the CAM mode.

There is no longer a TAM, so this is no longer a issue.

7.2.1.5	Greg Ennis	T	paragraph 1, replace "per station" with "for each currently associated station"	these are the only relevant stations

Adopted.

7.2.1.5	Greg Ennis	T	item d), add "unless there are no stations currently in a power save mode, in which case they need not be buffered".	no need to buffer broadcast frames unless some stations may be asleep

Adopted.

7.2.1.5	Greg Ennis	T	add the following: "i): the AP shall set the More bit in a transmitted data frame to 1 if there are more buffered frames for that destination; otherwise the More bit shall be set to 0."	need description of More bit

Rejected. Table 4-3 in section 4.1.2.1.7 already describes how stations communicate presence of buffered traffic.

7.2.1.5	John Hayes	T	a) Frames destined to PSNP, PSP and TAM STA's in Doze state shall be temporarily buffered in the AP. b) Frames destined to CAM or TAM STAs in Awake state shall be directly transmitted.	Section 7.2.1.9 describes sending buffered frames.

Rejected. The AP has no way to know whether a STA is in Doze state or not until it hears from it.

7.2.1.5	Renfro	T		Best way to implement aging function is for AP to inform stations what the maximum allowable sleep time is (in beacon periods). This can be done either as part of association message or as another field in beacon and probe response messages.

Rejected. Aging is implementation-dependent.

7.2.1.5	Rick White	T	The aging function to delete pending traffic must be defined.	Referenced but not defined.

Rejected. Aging is implementation-dependent.

7.2.1.5	Tim Phipps	T	*Add after point "*h)*":* i) When an AP is notified by a station of a transition from TAM to one of the power-saving modes, it shall move frames in its ASYNCH buffer which are destined for that station to its temporary PSNP or PSP buffer, preserving the relative order of those frames.	It is possible for this condition to arise. Failure to do this will cause the buffered frames to be transmitted while the destination is probably asleep.

Rejected. The details of buffering are implementation-dependent. Stations are required (7.2.1.6c/7.2.1.7c) to stay awake for pending buffered traffic.

7.2.1.5.	Fischerma:Access Point Operation	T	Does not address question of queueing ordering.	Does not specify frame ordering. I.e. buffered frames for this station that has just entered TAM mode versus buffered frames for a second station that enters TAM mode versus frames that just arrive and need to be forwarded while the buffered frames are being sent out but have not yet all exited the buffer.

Rejected. ISO 10039 says frame reordering is implentation-dependent, and not required.

7.2.1.6	Bob O'Hara	T	Update to reflect change in "More" functionality	out of date

(There is no PSNP Mode of operation anymore)

7.2.1.6	Rick White	T	Does not indicate what interframe space is used for a poll. This must be defined	

(There is no PSNP Mode of operation anymore)

7.2.1.6 and 7.2.1.7	Tim Phipps	E	*Replace:* "The More bit.. data is pending", *with:* "the power management field indicates more frames are pending"	The more bit has been removed.

7.2.1.7	Jim Panian	E	Require all stations to be capable of participating in PCF data transfers during the contention-free period.	For an access point-based network, can TIMs, DTIMs and frames destined to stations in TAM, PSNP, and PSP modes be sent during both the contention-free and contention portions of the superframe? Since the definition of CAM states that a "station can receive frames at any time", does this imply that all CAM stations must be able to support receiving data from the point coordination function?

7.2.1.7	A. Bolea	T		If the PSP station sees the "More" bit it should stay awake until it sees a frame without the "More" bit. There is no reason for it to Poll the AP for more data!

Rejected. STA may need to go back to sleep before buffered traffic is finished. We do not want to require staying awake indefinitely.

7.2.1.7	Bob O'Hara	T	Update to reflect change in "More" functionality	out of date

Adopted.

7.2.1.7	C. Thomas Baumgartner	t	Add to description of poll that it uses automatic deferral and backoff	Surely, this requires automatic backoff like all the other instances where there might be many STA's wanting to take the same action at the same time because of the synchronization that has been added (to what should be an asynchronous protocol)

Adopted. Addressed by text in section 7.2.1.7b

7.2.1.7	Renfro	T		In item c). If 'More' Bit is set, why have station poll for additional data? Best to have AP to respond to poll by transmitting all frames stored for that particular station.

Rejected. Same as above.

7.2.1.7	Rick White	T	MACMGT_Transmit_Holdover must be defined in the MIB	Not defined.

Rejected. TAM no longer exists.

7.2.1.8	C. Heide	t	remove the last paragraph.	why force the implementer to change states at a particular time? If an implementer wants to sacrifice throughput for power by buffering up transmissions or something like that, why not let him?

Adopted. It's up to the MAC layer to decide its policy for waking/dozing.

7.2.1.8	Greg Ennis	T	Replace section with "Stations operating in the PSP and PSNP mode shall follow normal transmission rules as defined in Section 5."	There need be no special description of "doze" state or powering on transceivers - this is an implementation issue and has no bearing on interoperability across the airwaves, hence should not be in the specification.

Adopted. In fact, the section has been removed becuse it is an over-constraint on implementation.

7.2.1.9	Geiger	E	MACMGT_Transmit_Holdover	Missing form MIB

This section has been deleted since TAM no longer exists.

7.2.1.9	A. Bolea	T		Does NULL frame mean NULL frame type or DATA Frame without any data in its body?

(Yes it does, though this section has been deleted)

7.2.1.9	Bob O'Hara	T	Define MACMGT_Transmit_holdover in the MIB	not defined

TAM no longer exists.

7.2.1.9	Renfro	T		Delete TAM mode. Same performance can be achieved by station switching to CAM mode and back to power savings mode. Station should always inform AP (and other stations in Ad Hoc network) of change in power savings mode using null messages.

Adopted

7.2.1.9	Tim Phipps	T	*Remove:* "Unless another data frame is scheduled for transmission".	This case never arises, because if a frame is scheduled for transmission, the station will leave its power-saving mode, and enter TAM.

No longer meaningful. STA can change to PS mode whenever it likes as long as it informs the AP.

7.2.1.9	Wim Diepstraten	T	Change "MACMGT_Transmit_Holdover" into "aNoActivity_Holdover". Add a bullet : f) The NULL frame will be Acked to assure that the AP has received the mode change notification.	Stations should be able to dynamically switch between the TAM and Power Save modes upon either Tx or Addressed RX activity.

Effectively adopted by other changes.

7.2.1.9.cd	Fischerma:Stations operating in the TAM mode	T	Does not address question of queueing ordering.	Does not specify frame ordering. I.e. buffered frames for this station that has just entered TAM mode versus buffered frames for a second station that enters TAM mode versus frames that just arrive and need to be forwarded while the buffered frames are being sent out but have not yet all exited the buffer.

See comment about frame ordering above.

7.2.2	Jim Panian	T	Specify that PSP does not apply to the ad-hoc case.	Is the PSP power savings mode supported in the ad-hoc case?

********** (see below) **********

7.2.2.1	C. Heide	e	second paragraph, first sentence, remove "then"	grammar

7.2.2.1	Geiger	E	MACMGT_Listen_Interval	Missing from MIB

7.2.2.1	A. Bolea	T		A station can announce its power savings state by transmitting a NULL Message type as a broadcast message to the entire Ad-Hoc network.

7.2.2.1	Bob O'Hara	T	Define "short frame"	not defined

7.2.2.1	C. Heide	t	define "short frame"	clarification

7.2.2.1	C. Thomas Baumgartner	t	Need to define short frame in second paragraph	If I were implementor I would always send frame unless there is a specific requirement placed by spec
7.2.2.1	Gegier	T	I don't believe that all the problems which come up with ad hoc networks are addressed here. First there may be multiple stations wanting to send ATIMs during the ATIM interval. This might also cause collisions. These problems also exist with several stations with in an BSS that can communicate without the help of the AP. These issues don't seemed to be addressed here	Explain what happens when several stations have ATIMs to send
7.2.2.1	Renfro	T		When is ATIM window? I suggest that it be after a beacon for a predetermined amount of time (awake_Window).
7.2.2.1	Tim Phipps	T	*"In the case that a **short frame...**".* *Surely this requires a MIB variable to define the threshold.*	
7.2.2.1 and 7.2.2.3	Tim Phipps	E	*Move the para:* "The estimated power .. deemed relevant", *to section 7.2.2.3 after the para:* "Each station ... stations."	This para is specific to Frame transmission.
7.2.2.1.	Fischerma:Basic Approach (Power management in an ad-hoc network)	T	committee shall provide text	Text mentions a "predetermined window" in which all ad-hoc stations are scheduled to be awake. Text does not indicate mechanism for establishing this window.
7.2.2.2	A. Bolea	T		ATIMs should be transmitted after the beacon, not before as shown in figure 7-6.
7.2.2.3	Geiger	E	TSF Timer s/b TSFTIMER	consistency

7.2.2.3	Jim Panian	T	A source station that determines that a destination station is in CAM mode transmits the frame using the normal CSMA/CA transmit rules. If no ACK is returned, the source station retries the transmission assuming that the destination station is not operating in the CAM or TAM mode.	The text states for ad-hoc power management that "Each station shall monitor the power-management status of the other stations with which it needs to exchange frames. This is determined by examining the power-management bits within the frames generated by other stations." What if a station A changes its power management state and indicates it during a frame to station B while station C is sleeping. How is the sleeping station C supposed to know that station A changed state?

7.2.2.3	A. Bolea	T		Why would data be sent when the awake period has elapsed?

(The term "awake-interval" was confusing -- the text meant the mandatory period where everyone's awake for ATIM exchange)

7.2.2.3	C. Heide	t	first paragraph, first remove, replace "with which it needs to exchange frames" with "of all other STAs in the BSS."	that is the only way this makes any sense. There is no way for a STA to know which other STAs it is going to have to converse with in the future and monitor their traffic only.

7.2.2.3	C. Heide	t	clarify ATIM operation	many STAs will be trying to send an ATIM "before" the beacon. What is the interval? How are any of them going to get through in that interval?

7.2.2.3	C. Thomas Baumgartner	t	Add to description of ATIM that it uses automatic deferral and backoff. Add discussion of how the ATIM collisions and backoff can delay beacon.	Surely, this requires automatic backoff like all the other instances where there might be many STA's wanting to take the same action at the same time because of the synchronization that has been added (to what should be an asynchronous protocol). This need simulation to determine how many STA's wanting to send ATIM's at same time will clog up system.

7.2.2.3	C. Thomas Baumgartner	t	change d) to "After the Beacon frame the Data frame shall be sent and ACKed according to normal CSMA/CA rules."	We don't want to try to squeeze more into the time before the Beacon.

7.2.2.3	John Hayes	T	TBD	Section 7.2.1.9 describes sending buffered frames.

7.2.2.3	Rick White	T	Resolve editors comment dealing with randomization of ATIMs.	

7.2.4???	Greg Ennis	T	add "aListen_Interval, aListen_Interval ATTRIBUTE WITH APPROPRIATE SYNTAX integer; BEHAVIOUR DEFINED AS "This attribute specifies the number of Beacon intervals which may pass before the station awakens and listens for the next beacon"; REGISTERED AS ..."	for PSP stations

(Wrong section, evidently this is 7.4.xx)

7.2.4???	Greg Ennis	T	add "aCurrentlyAssociated, aCurrentlyAssociated ATTRIBUTE WITH APPROPRIATE SYNTAX set of MAC-ID; BEHAVIOUR DEFINED AS "This attribute shows the stations which are currently associated with this AP", ...	useful management information

(Wrong section, evidently this is 7.4.xx)

7.2.4???	Greg Ennis	T	add "aWirelessAP, aWirelessAP ATTRIBUTE WITH APPROPRIATE SYNTAX boolean; BEHAVIOUR DEFINED AS "This attribute specifies that the station is acting as a wireless AP"	useful management information

(Wrong section, evidently this is 7.4.xx)

7.2.xxx	Greg Smith		Needs clarification	What do ATIMs do that RTS does not

7.2.xxx	Greg Smith	E	Needs clarification	Does not show ACK's in fig 7-5 nor explain where retries occur

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The decision, based on Letter Ballot comments, to remove PSNP impacts Ad Hoc Power Management because it is a non-polling mechanism. Thef working group determined that the most appropriate way to deal with these comments was to remove the Ad Hoc Power Management mechanism, since addressing all the comments and arriving at a workable technique was not feasible within the time constraints of the meeting. The most effective method of coming up with an Ad Hoc Power Management mechanism -- if anyone feels that such a mechanism even needs to exist -- is to delete section 7.2.2 and await Letter Ballot comments that provide a workable mechanism.

7.3	David Bagby	T	**1. Association** Ok, nice to have such a section, but why here? seems better in sec 2 or 4? do we also need one for Auth etc.? would seem to flow after state diagram in sec 2. This section defines how a station associates with an access point. This seems to fit here.	See imbeded comments and annotations
7.3	Renfro	T	Accespted	Add case for Association Denied response to both station procedures and AP procedures.
7.3	Rick White	T	This section needs a considerable amount of detail to define how a station determines with which AP to associate. The station choice of access point to asscociate to is implemantation dependent.	This section does not address how a station makes a determination on which AP to try to associate.
7.3	Rick White	T	The timers must be defined in the MIB. Accepted	Not defined.
7.3	Rick White	T	It is not defined how an AP informs other APs regarding a new association. ACCEPTED - changes shall to may plus other comments	

7.3.1	Iwen Yao	E Approve		In the part d) of the Station Procedures, it stated 'The station shall accept the new MIB values passed to it ...' It sounds very general, I thought what required to pass along are a small number of relevent parameters such as AP MAC_Address, etc. but not the entire MIB. Please clarify.
7.3.1	Bob O'Hara	T	Update the procedure to use the defined frame types Accepted	out of date
7.3.1	C. Heide	t	explain - what is a "Previous AP Address Element" Shall Defined in Section 4	clarification
7.3.1	C. Thomas Baumgartner	t	in a) define Previous AP Address Shall be defined in Section 4	I don't know what it is and I don't know why it is needed.
7.3.1	David Bagby	T	**2. Station Procedures** A station shall associate with an access point via the following procedure: a) The station shall transmit a frame of type Association Request to initiate an association. ~~including the Associate element and the Previous AP Address element. This is transmitted using normal CSMA/CA procedures and requires an acknowledgment. The station shall start timer AWAIT_ASSO_RESPONSE with value MAC.await_asso_response_timeout.~~ b) If no acknowledgment is received, the association attempt has failed. The station shall scan for a different access point with which to attempt association. ~~c) If the AWAIT_ASSO_RESPONSE timer expires, the association attempt has failed. The station shall scan for a different access point with which to attempt association.~~ ~~d~~c) If a Association Response~~ESPONSE~~ frame is received, ~~with the Associate element,~~ the station shall check the Status Value and Error Indicators to determine the association result. ~~cancel timer AWAIT_ASSO_RESPONSE.~~ The station shall accept the new MIB values passed to it ~~as elements~~ within the Association Response~~ESPONSE~~ frame. ~~The station is now associated with the access point.~~ ACCEPTED	See imbeded comments and annotations
7.3.1	Tom T.	T	Add to Section 4.4: Previous AP Address and Associate elements.	

7.3.1.	P. Brenner	E	Update the paragraph according to the actual frame formats	There is no such: "frame of type REQUEST including the Associate element".
7.3.2	A. Bolea	T		AP needs to have an aging function so that stations which are no longer on the network may be disassociated. Before disassociating a station, the AP should send out a NULL message to see if the station is still there(it may not have any traffic to send but it is still synchronized to the AP). If no ACK response is received, then the station can be disassociated.
7.3.2	Bob O'Hara	T	Update the procedure to use the defined frame types Accepted	out of date
7.3.2	C. Heide	t	correct contents of association response frame Accepted	conflict with section 4.2.3.5
7.3.2	C. Heide	t	remove step (c) Redefined as Distribution System	that is beyond the scope of this standard. As we are not specifying the DS, we should not specify how implementers must use it.
7.3.2	C. Thomas Baumgartner	t	Define how AP informs other AP's about a new STA association Redefined as Distribution System	This is an interoperability issue so must be defined exactly.
7.3.2	David Bagby	T	**3. Access Point Procedures** An access point shall operate as follows in order to support the association of stations. a) Whenever an Association Request~~REQUEST~~ frame ~~with an Associate element~~ is received from a station, the access point shall assign a Station ID to the station and shall transmit an Association Response~~RESPONSE~~ frame ~~with an Associate element~~ back to the station. ~~The RESPONSE frame shall include the *Timestamp, Station ID, DTIM Period,* and *Beacon Interval* elements.~~ b) When the RESPONSE frame is acknowledged by the station, the station is considered to be associated with this access point. c) The AP shall inform the Distribution System of ~~other access points regarding~~ the new association.	See imbeded comments and annotations
7.3.2	Geiger	T	b) RESPONSE frames should also include the hop Set, PATTERN and INDEX element for the FHSS PHY Fixed in other ways in Beacon's and Probe Response	This allows the join node to get the same hop sequence as the other stations in the logical LAN

7.3.2	Wim Diepstraten	T	bullit item b and c should be exchanged in sequence. Declined. the association completion in step B must complete before step c can occur.	An AP should first inform the other AP and the Distribution Service about the new association, before the association is confirmed to that station by the Association Response.
7.3.2.	P. Brenner	E	Update the paragraph according to the actual frame formats Accepted	There is no such: "frame of type REQUEST including the Associate element".