Collected Letter Ballot Comment Resolutions

for

Section 7 of P802.11/D1

(MAC Layer Management Entity)

Many authors participated in the creation of the proposed text for Section 8 of D2, as well as in the creation of a number of documents that describe how all the letter ballot comments were resolved. At each meeting, the MAC group split into smaller working groups to address letter ballot comments on individual parts of Section 8 (D1.2-numbering). I have here collected all the comment resolutions for the entire section (which we are dutifully calling Section 8 now). This document is based on P802.11-95/18-7, and subsumes a number of other documents. As far as I know, I have included correct comment resolutions (copied-and-pasted from the Microsoft Word documents used by the groups as they were working), as obtained from the working groups that resolved the comments. There were a small number of comments, the text of whose resolution I did not receive. For these comments, I have referenced D1.2 Section 8 to determine how the comments were, in fact, resolved. The differences in wording/style/grammar/spelling reflect the source material used to prepare this document.

Note that only technical comments were explicitly addressed. Editorial comments, insofar as they are still relevant to the revised text, have been resolved by the editor.

Abstract: This paper presents the decision record for the proposed changes to section 7 of draft D1 (now Section 8 of D1.2) to address all of the letter ballot comments received.

Action: None.

Collected letter ballot comment resolutions for Section 7 of IEEE 802.11 draft standard D1

7	McKown	E	many sections apply only to the FH PHY; only 7.1.5 is so labeled	consistency, honesty
7 7.1.2.3 7.1.3.1	Wim Diepstraten	E	In general the MIB naming needs to be updated. Also refernces to section 6.x needs to be updated. Change NID into BSSID where appropriate. The algorithm in 7.1.2.4 is missing. In 7.1.3.2 change BSSID into ESSID. Change "will into "can" in the last sentence. Change NID into "a Broadcast BSSID (A1)" The content of the Probe Response should be updated to be consistent with section 4.2.3.	
7, 4, 5, 6,	MLT	T	specific timings or time ranges should be defined for all intervals referenced in this chapter	

Accepted. Being addressed as a procedural technique as we go through the section.

7.	Bob O'Hara	T	Overview, organization, hierarchy, and state machine (or other formal operational definition) must be written	Management is insufficiently specified.

Rejected. The text being prepared for D2 will adequately define management without the addition of formal descriptions of operation.

7.1	Lewis	E	provide an introduction to Beacon concept and the utility it serves? i.e. operational need for all STAs to sync to common clock	
7.1	Mahany	E	"Infrastructure Network" Appears Here, Replace with ESS for Consistency	Infrastructure Network not used elsewhere in draft
7.1	Mahany	E	Replace "Nodes" with "Stations"	Term Node not used or defined previously
7.1	Mahany	E	Provide Introduction to Beacons in introductory paragraph.	This reads poorly if the reader has no prior knowledge of their function.
7.1	C. Heide	t	throughout the section - define NID, and add it to the frame formats in section 4	acronym undefined

NID is an obsolete concept and will be replaced with correct, up to date terms.

7.1.1	Renfro	T		To handle variations in implementation, should add text to indicate that local timer should define time 'at the air interface'. This will compensate for variations in nominal transmit and receive delay through the hardware.

Rejected. There is no at-the-air interface for the MAC.

7.1.1.1	Geiger	E	MACMGT_Beacon_Interval. Is this the same and the Beacon_Period in MIB?	If it is then make these the same.
7.1.1.1	Bob O'Hara	T	MACMGT_Beacon_Interval must be defined	Management is insufficiently specified.

Adopted. This is the same as aBeacon_Period in the MIB. The name of aBeacon_period will be changed to aBeacon_Interval. Change 7.4.4.1.18 to indicate "nominal" transmission times.

7.1.1.1	C. Thomas Baumgartner	t	Need to define what happens when there are 2 AP's in a BSS.	I haven't seen anywhere that there can't be 2 AP's in a BSS. In that case there will be conflicting synchronization information.

Adopted. It is implicit that there is only one AP per BSS because the BSSID is the MAC address of the AP. This should be dealt with explicitly in section 2.

7.1.1.1	McDonald	t	Specify acceptable tolerance between the timing of "other stations" with respect to the AP both at reset after receipt of beacon and before reset.	This is an important aspect of the total timing tolerance issue especially for Frequency Hop systems.

Accepted. 8.1.2 and 8.1.2.3 text modified to define the field relative to when the TSF field itself is passed to the PHY, adjusted for PHY transmit- and receive delays.

7.1.1.1	Rick White	T	Terminology used for time stamps must be consistent between this section and the frame format section.	

Accepted. This is an editorial comment.

7.1.1.1	Rick White	T	Terminology used for beacon intervals must be consistent between this section and the MIB section.	

Resolved in previous comments.

7.1.1.2	Bob O'Hara	E	delete "NOTE:" and "synchronized" in last paragraph	

7.1.1.2	McDonald	e	Is the second paragraph of this section the algorithm? If so, is this stabile/will it converge?	Need to have a stable timing reference It seems to me that this is not stable. If two units have a time reference more that one dwell period apart and can not hear each other then what does a unit in the middle that can hear both do? Should there be an averaging period defined?
7.1.1.2	Tim Phipps	T	The Timing Synchronization Function in an ad hoc network is implemented via a distributed algorithm that is performed by all of the members of the BSS. All stations in the BSS shall transmit Beacons according to an algorithm to be specified below. Stations receiving a Beacon from another station in the same BSS shall adjust their Synchronization Timers towards the Beacon's time-stamp value in a manner to be specified below. Timing synchronization shall be maintained in an ad hoc network by adjusting a synchronised timing reference to be the average of itself and any time stamp received from another station within the same ad hoc network. NOTE: The timers for all synchronised stations in a BSS will typically converge to the same value over a short period of time. **It is permitted that a station within an ad-hoc BSS may scan for a better BSS within the same ESS. Within an ad-hoc network, all beacons and probe-responses carry an extended TSF time element. A station receiving such a frame from another BSS with the same ESS ID will compare the extended TSF time with its own extended TSF time. If the extended TSF time of the received frame is later than its own extended TSF time, it will adopt the BSS-ID, hop parameters and extended TSF time contained in that received frame.**	Paper 94/281, motion 24 forces us to adopt the changes proposed in paper 94/240. This permits BSSs started separately, with the same ESS ID to merge. They will eventually adopt the BSS ID of the first station to start with the common ESS ID. Note, this "adopt if older" applies only in the case of determining a better BSS, not in maintaining synchronisation within a BSS, in which case the simpler "average" algorithm is used.

Rejected. Altrnative algorithm has been selected.

7.1.2	C. Thomas Baumgartner	e	replace Clause XXX with proper reference--assume 7.1.2.2	need proper reference
7.1.2	Geiger	E	MACMGT_Beacon_Interval. Is this the same and the Beacon_Period in MIB?	If it is then make these the same.
7.1.2	Greg Ennis	E	At end of section, the reference to "Section 6.2" should be "Section 7.2"	7.2 is the proper section
7.1.2	Miceli	E	Clause XXX needs definition	incomplete
7.1.2	A. Bolea	T		Clause XXX is not specified.

Accepted.

7.1.2	A. Bolea	T		A free running timer which rolls when its count reaches TFSTIMERMOD is not the most efficient way of implementing a station timer. Hop and Beacon strobes need to be generated from this timer. In addition, such a general timer leads to hop and beacon strobes which are not aligned causing many implementation problems. I recommend the following timer scheme: Timer= Counter1,Counter2 Where Counter1 represents a hop dwell time in FH PHYs or any convenient interval in other PHYs. This would require 19bits. Counter2 counts the number of hops. At a minimum this would be 7 bits. From counter1 beacons strobes could be generated. The Beacon Interval would always be an integer number of Hops. Minimum is one hop per beacon. From the beacon strobes, the wakeup times could be specified. That is the stations always wake up at an integer number of beacon intervals, which is always aligned with hop boundaries.

Rejected. The new TSFTIMER will not roll over during expected lifetime of any LAN.

7.1.2	Bob O'Hara	T	TSFTIMERMOD must be defined	Management is insufficiently specified.

Accepted (management is now better specified; TSFTIMERMOD is gone).

7.1.2	Bob O'Hara	T	Clause XXX mudt be defined	Management is insufficiently specified.

Accepted.

7.1.2	Geiger	T	Fix Clause XXX	This definition is missing

Accepted.

7.1.2	Greg Ennis	T	Remove last sentence	missing a single beacon should not cause the station to take any special action

Accepted.

7.1.2	Greg Ennis	T	Add the following: "A station sending a beacon shall set the value of the beacon's timestamp so that it equals the value of the station's TSF timer at the time that the first MAC bit of the beacon is transmitted into the airwaves."	First bit of MAC frame is the reference point for timestamp, and transmitter must compensate for delays through the local PHY components.

Adopted with the following change: replace "into the airwaves" with "to the PHY."

7.1.2	McDonald	t	Clause xxx need to be defined How long is MACMGT_Beacon relative to a dwell period of a frequency hopper? Should we have one beacon per dwell?	Can not judge this section without clause xxx

Accepted.

7.1.2	Renfro	T		Clause XXX needs to be specified.

Adopted. Delete last sentence of 7.1.2.

7.1.2	Renfro	T		Current timing approach allows virtually any relationship between beacon and hop timing. This results in more complex hardware implementations if all combinations in allowable ranges must be supported. Without loss of performance, a better approach to timing would define the relationship between hop time, beacon time and wakeup time. Base period counter (19 bits) - Counts hop dwell time for FH or convenient number for DS/IR, Extended counter (TBD bits) - Driven by Base period counter and counts hops (1 - 79). Beacon counter (TBD bits) - Driven by Base period counter and counts number of base periods between beacons (i.e., Beacon strobe once every N hops). Wakeup counter (TBD bits) - Driven by Beacon counter and counts beacon intervals between wakeups (1 for Ad Hoc, N for Infrastructure). The timestamp would be a concatenation of the Base period counter and the Extended counter. This approach aligns beacon strobes and wakeup times with hop boundaries and simplifies the hardware.

Rejected. Another mechanism was selected.

7.1.2	Rick White	T	TSFTIMERMOD must be defined and is not contained in the MIB.	Not defined.

Accepted.

7.1.2	Rick White	T	What is Clause XXX? This must be defined.	Not defined.

Accepted.

7.1.2.1	Bob O'Hara	E	delete "NOTE:", replace "a Beacon" with "an individual Beacon", replace "will" with "shall" in the last paragraph.	
7.1.2.1	Geiger	E	MACMGT_Beacon_Interval	Same as above
7.1.2.1	A. Bolea	T		The beacon needs to be delayed from the TBTT(beacon strobes) by an amount large enough to allow waking station oscillators to settle out. The maximum settling time should be specified in this standard. If we don't do this an AP could transmit beacons and all waking stations would miss them!

Rejected. Standard states when STAs must be able to receive, so it is up to implementation to start its oscillators (or whatever) early enough to hear beacons.

7.1.2.1	Geiger	T	Time Stamp appear to only be sent in Beacons. Is this the best way.	Why not send Time Stamp elements in data frames and other management frames. Then only send Beacons when there is no activity for long periods of time on the medium

Do not adopt. Beacons go out for many reasons other than timer sync. Recommended solution adds unacceptable overhead to other frames.

7.1.2.1	McDonald	t	We need a high inertia timing system	In this system it sounds like the timing is set frame by frame. If so, this is not high inertia and there will be problems if the channel is lost for a short period of time causing some beacons to be lost

Do not adopt. The system has sufficient inertia in the absence of beacons (limited by oscillator accuracy).

7.1.2.1	McDonald	t	Beacons, if transmitted should be transmitted only at steady rate	A steady pace of beacon transmission is required for good battery saving or power management.

Accepted. Beacons are transmitted at a steady rate.

7.1.2.1	Renfro	T		TBTT should be delayed from beacon strobe by an amount of time equal to the maximum timing error + maximum wakeup time. This ensures that all stations have time to wakeup and settle to within specified receive performance before the beacon is transmitted. From an implementation perspective, it is easier to keep beacon, hop and wakeup strobes aligned in time and delay TBTT from the strobe. It is also necessary that all PHYs specify a maximum wakeup time.

Not adopted. This is putting implementation specific material in the standard. If it takes you fifteen minutes to get out of bed after the alarm goes off, set the alarm fifteen minutes early.

7.1.2.1	Rick White	T	Beacons must be transmitted without sensing the medium.	There is no reason that any other station in the BSS should be transmitting. Note: Superframe stretching must be removed. If Beacons are not transmitted at fixed times, this will lead to problems with synchronization and power management. With frequency hopping systems, beacons are very important in order to maintain hopping synchronization. It the beacons are not generated at fixed times, this will lead to problems with hop synchronization and wasted bandwidth.

Do not adopt. Beacons may be sent after deferral without affecting synchronization because of the included timestamp. This will cause only minimal pain to power managed stations.

7.1.2.1	Rick White	T	The relationship between dwells and beacons must be defined for frequency hopping PHYs.	For a frequency hopping systems the beacons should probably be sent as the first frame in a new dwell period.

Rejected. There is no mandatory relationship between beacons and dwell; implementer may choose to do this.

7.1.2.1	Tim Phipps	T	The access point shall define the timing for the entire BSS by transmitting Beacons according to the MACMGT_Beacon_Interval parameter within the AP. This defines a series of Target Beacon Transmission Times (TBTTs) exactly MACMGT_Beacon_Interval time units apart, **time zero is defined to be a TBTT**. At each TBTT, the AP shall schedule a Beacon as the next frame for transmission. If the medium is sensed to be unavailable, the AP shall delay the actual transmission of a Beacon according to the CSMA medium access rules specified in Section 5. NOTE: Though the transmission of a Beacon may be delayed because of CSMA deferrals, subsequent Beacons will be scheduled at the nominal beacon interval. This is shown in Figure 7-1	Stations must know when to expect a beacon. The most practical way to know when a beacon will occur is to make the TBTT a function of the TSF timer and the beacon interval, with a fixed (zero) offset.
7.1.2.2	A. Bolea	E	"Section 6.2 " should be "Section 7.2"	
7.1.2.2	Bob O'Hara	E	replace 6.2 with 7.2	
7.1.2.2	C. Thomas Baumgartner	e	refers to details in 6.2 which is blank	can't tell if the information being referred to is going to be there since now blank

7.1.2.2	Bob O'Hara	T	Replace the algorithm described with "1) save the timestamp from the most recently received Beacon, 2) calculate a random delay, 3) wait for the period of the random delay, 4) if no Beacon has arrived during the delay period, send one, go to step 1, otherwise 5) go to step 2"	Current algorithm is overly complex and requires a cancellation mechanism needed by no other MAC service requester.

Rejected. Mechanism has been revised, but differently.

7.1.2.2	C. Heide	t	define how STAs get their beacon intervals in sync.	the length of a beacon interval is a management parameter, but how do all STAs get to have their beacon interval starting at the same time?

Adopted. An algorithm is defined below that defines synchronization of beacon intervals.

7.1.2.2	C. Heide	t	remove ad hoc beacon generation	this mechanism encourages STAs to all try to transmit as close as possible to the same time. This is a bad thing to do in a CSMA based network, particularly a wireless one.

Not adopted. Other changes adopted, fix this anyway.

7.1.2.2	Geiger	T	Section 6.2 contains no information on Awake periods of stations that are operating in a low power mode	This needs to be resolved.

Accepted. Ad Hoc Power Management was removed so the Awake period is all of the time.

7.1.2.2	McDonald	t	If one unit in the ad hoc BSS became the effective AP for at least the purpose of sync, then the issue of sync stability would become simpler. For the reason stated to the right, I fear that the ad hoc sync system may not be stable.	If one would assume that this process is stable, then one would conclude that all units would reach the point where they would be transmitting their beacons at the same time. If this happened, then there would be "I5 in the fog" and no unit would receive a beacon and therefore the sync system is unstable.

Not adopted. The timer synchronization algorithm described below provides the needed stability. Randomization of beacon transmission addresses this problem.

7.1.2.2	McDonald	t	Complete section 6.2	Cannot complete judgment of 7.1.2.2 without 6.2

Editorial mistake. Proper reference is to 7.2.

7.1.2.2	Renfro	T		May be desireable to use CWmax when determining RB for beacon transmission. This makes it possible to use a smaller CWmin for data transmission when not every station in the network is going to contend for the channel at the same time. Also, should state that station only cancels transmission of beacon if it receives beacon from another station in the same BSS.

Rejected. New algorithm does not require this.

7.1.2.2	Renfro	T		In a very busy network, will the awake period be stretched if beacon transmission is delayed too long? Need to specify.

Not adopted. This decision is implementation dependent as to how long a station wants to wait for beacons. The trade-off between power consumption and data transfer reliability should be a manufacturer's decision.

7.1.2.2	Rick White	T	In an ad hoc network, a beacon master must be elected. An algorithm to elect a beacon master must be generated.	This is extremely important in a frequency hopping system in order to maintain hopping synchronization. Again, the beacons must be sent at fixed intervals.

Not adopted. This assumes that everyone in an ad hoc network can hear the beacon master.

7.1.2.2	Tim Phipps	T	Beacon generation in an ad hoc network is distributed. All members of the BSS participate in Beacon generation. Each station shall maintain its own TSF timer which is used for MACMGT_Beacon_Interval timing. **This defines a series of Target Beacon Transmission Times (TBTTs) exactly MACMGT_Beacon_Interval time units apart, time zero is defined to be a TBTT. At each TBTT** the station shall schedule a Beacon transmission to occur after a random delay. If a Beacon is received from another station during this delay period, the transmission is cancelled.	Stations must know when to expect a beacon. The most practical way to know when a beacon will occur is to make the TBTT a function of the TSF timer and the beacon interval, with a fixed (zero) offset.

Adopted.

7.1.2.2.	Fischerma:Beacon Generation in Ad Hoc Networks	E	Reference to section 6.2. is incorrect - I don't know what the correct reference is.	
7.1.2.3	Bob O'Hara	E	replace the first sentence and Timestamp and Beacon Interval paragraphs with "A synchronization Beacon contains a frame header and the information elements as decribed in section 4.4"	
7.1.2.3	Bob O'Hara	E	replace 6.2 with 7.2	
7.1.2.3	C. Thomas Baumgartner	e	refers to details in 6.2 which is blank	can't tell if the information being referred to is going to be there since now blank
7.1.2.3	Geiger	E	Reference to section 6.2 regarding elements required in a beacon are missing	Fix section 6
7.1.2.3	Greg Smith	E	NID might be BSSID + SA	NID is no longer defined
7.1.2.3	Greg Smith	E	Beacon elements	6.2 defines nothing
7.1.2.3	Jim Panian	E	Specify that stations wake up to receive beacons even if they are in a power saving state.	How is the beacon interval set and used by stations? What if the value changes and a sleeping station does not catch the change? How does it become re-synchronized?
7.1.2.3	Rick White	E	Change NID to BSS ID.	It is defined as microsecond but how many, 1, 10, 53, etc.?
7.1.2.3	Simon Black	E	Remove this section or add a reference to section 4.2.3.1 where the contents of a BEACON management frame are defined. This also removes the reference to NID which is also in this section.	Beacon frames already defined in management frames in section 4.2.3.1
7.1.2.3	Okada	E Approve	Beacon interval - 24 bit field containing the time in microseconds between Beacons. However, in 4.4.1, Beacon interval's element-specific field lingth is one octet in milliseconds.	Which is right, a 24 bit field in microseconds or one octet in milliseconds?
7.1.2.3	A. Bolea	T		Timestamp and Beacon Interval should be defined to match the definitions given above in section 7.1.2 remarks. In addition, the sync flag was eliminated at the last meeting. Reference to section 6.2 is incorrect. It should be section 4.2.3.1 . Beacons are sent to the broadcast destination with a specific BSSID, not an NID.

Comment is editorial in nature.

7.1.2.3	bdobyns	T	<last paragraph> NID not defined anywhere else. (should have been in Section 4) Section 6.2 has nothing to do with this, delete reference.	Maybe you want BSSID instead?

Accepted.

7.1.2.3	C. Thomas Baumgartner	t	Need to define what happens when there are 2 AP's in a BSS.	I haven't seen anywhere that there can't be 2 AP's in a BSS. In that case there will be conflicting synchronization information.

Adopted. It is implicit that there is only one AP per BSS because the BSSID is the MAC address of the AP. This should be dealt with explicitly in section 2.

7.1.2.3	C. Thomas Baumgartner	t	Need definitin of NID. I assume that it is Network ID that has been referred to earlier. Don't know what that is or where it is specified.	Network ID field not specified in section 4 frame formats

Accepted. NID is gone.

7.1.2.3	Geiger	T	The description of the Timestamp field is inconsistent with the description of the Short TSF and Long TSF fields described in the element definitions	Change this to be consistent

Corrected.

7.1.2.3	Greg Ennis	T	remove entire section	Beacon content should be covered in Section 4 and should not be repeated here

Accepted.

7.1.2.3	McDonald	t	Set max. interval	For stable inertia system, the max. beacon interval must be short enough to allow for clock tolerance issues and missing a reasonable number of beacons

Rejected. This is a system-configuration issue, and PHY-dependent.

7.1.2.3	Renfro	T		Delete reference to sync flag. Refer to previous section for definition of beacon frame.

Accepted.

7.1.2.3	Tim Phipps	T	*Remove this section.*	The contents of a beacon are defined elsewhere. The detail in this section is obsolete and wrong.

Accepted.

7.1.2.3	Tim Phipps	T	*Delete this section*	The contents of this section are no longer accurate. Even, if they were accurate they would be duplicated elsewhere in the standard.

Adopted, Replace section with definition of addressing for beacon frames in section 4.

7.1.2.3	Tom T.	T	Change 'Timestamp' to 'Short Time Stamp'. Change NID to ESS ID. "certain circumstances" - These other circumstances must be defined here or referenced to where they are defined.	There is no element defined that is simply 'Timestamp'. NID is not a defined element.

Not adopted, because section was deleted.

7.1.2.4	Bob O'Hara	E	replace "Beacon BSS " with "Beacon frame"	
7.1.2.4	Dean Kawaguchi	E	Synchronization Timer Accuracy ... The timestamp value in the Beacon frame is the value of the free-running synchronization timer at the instant ~~that the Start Frame Delimiter (SFD)~~ between the last bit of the PLCP header and the first bit of the MPDU/PSDU is transmitted.	The MPDU starts immediately after the last bit of the PLCP header, not after the SFD.
7.1.2.4	Gegier	E	It might be nice to indicate in the transmit state machine that the Time stamp is determined relative to the SFD indication from the PHY in the formation of Beacon Frames	Fix transmit state machine diagram
7.1.2.4	Simon Black	E	Remove the final sentance: 'Upon receiving a BEACON BSS with a valid CRC and BSS-ID, a station shall update its TSF timer according to the folowing algorithm:'	The algorithm is already defined in sections 7.1.1

7.1.2.4	Stuart Kerry	E	Synchronization Timer Accuracy ... The timestamp value in the Beacon frame is the value of the free-running synchronization timer at the instant ~~that the Start Frame Delimiter (SFD)~~ between the last bit of the PLCP header and the first bit of the MPDU/PSDU is transmitted.	The MPDU starts immediately after the last bit of the PLCP header, not after the SFD.
7.1.2.4	Tom T.	E	Change last line to read: 'according to the algorithms described in Section 7.1.4.	
7.1.2.4	A. Bolea	T		Change references to "free-running" timer. The algorithm for updating the station timer is missing. We agreed to have it be the average between the local station time and the time in the beacon.

Adopt "free-running" deletions. Algorithm addressed in other comments.

7.1.2.4	bdobyns	T	Specify Beacon update algorithm. Algorithm should permit error tolerance such that it is possible to achieve MACMGT_Sync_State = Synchronized	

Accepted.

7.1.2.4	Bob O'Hara	T	replace first sentece with "The TSF timer shall have a minimum resolution of 100 bit times."	See comment for section 4.1.2.2

Rejected (minimum timer resolution has been set to one microsecond).

7.1.2.4	Bob O'Hara	T	Define the algorithm for TSF timer update.	Not defined

Accepted.

7.1.2.4	C. Heide	t	add the algorithm referred to here	missing text

Accepted.

7.1.2.4	C. Thomas Baumgartner	t	Need algorithm	Can't implement compliant MAC without algorithm

OK, OK.

7.1.2.4	David Bagby	T	sync algorithm must be defined for both infrastructure and ad hoc[DB1]	See imbeded comments and annotations

Accepted.

7.1.2.4	Greg Ennis	T	replace "Start Frame Delimiter (SFD) is transmitted" with "first bit of the MAC frame is transmitted by the transmitting antenna".	Two issues here: 1) there is no SFD at the beginning of the MAC frame, and 2) the transmitting station should compensate for the delays through its local PHY components when placing the timestamp in the frame.

(Resolved already) Replace "by the transmitting antenna" with "to the PHY".

7.1.2.4	Greg Ennis	T	after "algorithm:" add the following text: "The received timestamp value isadjusted by adding an amount equal to the receiving station's delay through its local PHY components plus the time since the first MAC bit was received at the MAC/PHY interface. In the case of an infrastructure BSS, the station's TSF timer is then set to the adjusted value of the timestamp. In the case of an ad hoc BSS, the station's TSF timer is set to the average of t its current value and the adjusted value of the timestamp.	Algorithm needs to be specified.

Accepted.

7.1.2.4	McDonald	t	Define and make tight resolution . Note that there are analog delays involved	Resolution is a major issue in that it adds to the SIFS and DIDF and Contention Window periods. The amount that it adds is a function of the system design but should be enough to allow min to max variation.

Accepted.

7.1.2.4	McDonald	t	Once we have made an another pass at the timing issues we need to have a thorough review of all timing issues including tolerances.	

Accepted. Thorough review has taken place.

7.1.2.4	McKown	T	TSF timer resolution unspecified; also update algo	oversight

Accepted.

7.1.2.4	Renfro	T		Value of beacon should be time at which first symbol of MAC frame (i.e., Frame Control Field) is transmitted over the air. I believe reference to SFD is incorrect. Also, need to add algorithm for updating TSF timer.

Fixed.

7.1.2.4	Rick White	T	Must define resolution of the TSF Timer.	

Accepted.

7.1.2.4	Rick White	T	For a frequency hopping PHY, the Start Frame delimiter is not the byte before the first byte of the MAC header. The timestamp value in the beacon should be the time at which the first byte in the MAC header is transmitted.	

Adopted as a result of other comments.

7.1.2.4	Rick White	T	The algorithm for updating the TSF timer must be defined.	Not defined.

Adopted.

7.1.2.4	Tim Phipps	T	**Delete the following:** Upon receiving a Beacon BSS with a valid CRC and BSS-ID, a Station shall update its TSF timer according to the following algorithm:	The necessary algorithms are described in sections 7.1.1.1 and 7.1.1.2.

Not adopted. Sections referred to contain only general information. Specific definition is gfiven here.

7.1.3	C. Heide	e	last sentence, replace "values" with "value".	grammar
7.1.3	C. Thomas Baumgartner	e	The name should be changed to distinguish timer synch from whatever this synchronization is--not sure what to call it.	Coming as it does right after timer synchronization it is confusing as written.
7.1.3	Geiger	E	MACMGT_Scan_Mode, MACMGT_Scan_State, missing from MIB. It also might be appropriate here to define what SCAN actually means.	Add to MIB Scan is the process of identifying all the WLANs present is a given geographical area
7.1.3	Bob O'Hara	T	Define the concept of "scan"	not defined

Accepted.

7.1.3	Bob O'Hara	T	Define MACMGT_Scan_State in the MIB	not defined

Accepted.

7.1.3	Bob O'Hara	T	Define MACMGT_Scan_Mode in the MIB	not defined

Accepted.

7.1.3	C. Thomas Baumgartner	t	This section must justify why Probes are required since there are regular beacons that a scanning station could hear.	I assume that a probe will spead up the scan. Has this been simulated so we can see if the complexity is justified by enough performance improvement?

Not adopted. Justification is not required in a standard, only definition. However, Probes will, on average give a benefit of 1/2 Beacon Interval per channel scanned.

7.1.3	McDonald	t	Complete sections as indicated by the editor's note	

Adopted. Algorithms are in 7.1.2.4.

7.1.3	Renfro	T		It is not necessary for the standard to specify that both acquisition techniques should be implemented. If a vendor does not wish to acquire the network using passive scanning it will not impact interoperability. Should not specify how station acquires network only that it support tools needed for other station to acquire (e.g., probe responses, beacons, ...).

Accepted.

7.1.3	Rick White	T	Most define MACMGT_Scan_State and MACMGT_Scan_Mode in the MIB.	Not defined.

Adopted only definition of scan mode. Replace "MACMGT_" with "a" and create MIB text.

7.1.3.1	Tim Phipps	E	*Should say* "ESS ID" *not* "BSS ID".	A station scans for an ESS ID not a BSS ID.
7.1.3.1	A. Bolea	T		Should the standard be specifying how passive scanning works. Since passive scanning is a function local to a station we should allow implementors to come up with their own scheme.

Accepted. aPassive_Scan_Duration can be any value.

7.1.3.1	Bob O'Hara	T	Define MACMGT_Passive_Scan_Duration in the MIB	not defined

Accepted. aPassive_Scan_Duration added to MIB

7.1.3.1	Renfro	T		As defined, passive scanning will work well for DS network. For FH network, a station acquiring using passive scanning will stay on only a single (or very few) of the frequency channels.

Rejected. Passive scanning will work on a suitably-configured subset of FH systems, and details are not specified here.

7.1.3.1	Rick White	T	Must define what "the correct BSS-ID" means.	Not defined.

Adopted (BSS should be ESS), text: "the ESSID matching that for which the search is being conducted."

7.1.3.1	Rick White	T	For a Frequency Hopping PHY, a Passive scanning algorithm must be defined.	This will allow a hopper to achieve synchronization as quickly as possible. If an algorithm is not defined, it could take a very long time before a STA synchronizes, if ever.

Rejected. Many equally-appropriate approaches exist, and do not affect interoperability.

7.1.3.2	Bob O'Hara	E	Delete "are" before "shall"	
7.1.3.2	C. Heide	e	first sentence second paragraph remove "are"	grammar
7.1.3.2	Geiger	E	Is an NID the same as an SID Node vs. Station	Define NID
7.1.3.2	Miceli	E	"Probe responses shall be sent..."	eliminate the word "are"
7.1.3.2	Simon Black	E	Remove the definition of Probe Rsponse (add a reference to 4.2.3.9 if required). Again there is no NID, the probe resonse carris the BSS-ID.	Editorials. Must only fdefine things in one place in the standard. I suspect there are more cases of this that I've spotted.
7.1.3.2	A. Bolea	T		Correct all references to NID.

Accepted.

7.1.3.2	bdobyns	T	NID not defined (should have been in Section 4)	Maybe you want BSSID instead?

Corrected.

7.1.3.2	Bob O'Hara	T	Insert "If a station's MACMGT_Scan_Mode variable is ACTIVE," before the start of the first sentence	A station should not be continuously sending Probes.

Accepted, with different text to accomplish same goal.

7.1.3.2	Bob O'Hara	T	Update this section to reflect the correct information elements as described in section 4	out of date

Accepted.

7.1.3.2	C. Heide	t	fix to match probe response contents described in section 4.2.3.9	inconsistent information

Accepted.

7.1.3.2	C. Heide	t	add some justification for active scanning - what are the PHY parameters that add together to give some idea of how long it might take to acquire synchronization using passive scanning?	with the possibility of active scanning not working due to hidden nodes (i.e. if the AP is conversation with a node hidden from the scanner it cannot respond to the probe) making it possible that active scanning could take a long time, justification is need for how much fast it might be to use active scanning vs passive scanning.

Not adopted. A standard is a document for definition, not justification. This discussion of passive scanning belongs in the Informative annex..

7.1.3.2	C. Thomas Baumgartner	t	Change 1st sentence so make sense. What is a NID and where does the ESSID come from? 4.2.3.8 says that Probe Reqest will include supported rates--nothing about NID and ESS ID.	Maybe just my lack of knowledge but don't understand this sentence at all. Seems to be in conflict with 4.2.3.8

Adopted. It makes sense now.

7.1.3.2	C. Thomas Baumgartner	t	4.2.3.9 defines contents of Probe Response and they don't match with this paragraph.	Seems in conflict with 4.2.3.9

7.1.3.2	Greg Ennis	T	Replace the entire section with "Active scanning involves the generation of Probe frames and the subsequent processing of received Probe Response Frames. The details of the active scanning procedures are described in Sections 7.1.3.3, 7.1.3.4, and 7.1.3.5."	Current section does not say what active scanning is and describes Probe format (which should be covered solely in Section 4).

Adopted.

7.1.3.2	Renfro	T		Is there still a NID? For infrastructure nets, use broadcast BSS ID, for Ad Hoc nets, use specific BSS ID.

No, there isn't.

7.1.3.2	Rick White	T	NID is no longer used. This section must be rewritten.	

Accepted.

7.1.3.2	Tim Phipps	T	*Remove:* "Source NID .. Probe".	There is no NID. The probe response carries the BSS-ID.
7.1.3.2	Tom T.	T E	Change 'Timestamp' to 'Short Time Stamp', in list of elements. Change 'Source NID' to ESS ID. Delete description of Source NID. remove word 'are' in second sentence.	There is no element defined that is simply 'Timestamp'. NID is not a defined element. ESS ID is defined elsewhere.

Adopted as a result of adopting Greg's comment.

7.1.3.3	Bob O'Hara	E	replace "hetwork" with "network"	
7.1.3.3	C. Heide	e	replace last sentence with "The probes responses shall be sent by the station sent the last beacon. In an infrastructure network this is always the AP."	ad hoc is not a special case here.
7.1.3.3	Mahany	E	Provide reference to section that describes how one station is guaranteed to be awake in this case.	Clarity
7.1.3.3	Renfro	E	Add '(i.e., when a station transmits a beacon in an Ad Hoc network, it stays awake to respond to probes until a beacon is received from another station.)'	
7.1.3.3	Bob O'Hara	T	Define a mechanism to ensure one station is awake to respond to Probes.	no mechanism is defined to implement the required functionality

Accepted.

7.1.3.3	Bob O'Hara	T	Revise the mechanism for Probe Responses so that a random delay is introduced in the management state machine and not on the MAC state machine.	This is the only requester of MAC services that requires backoff to be performed prior to initial transmission. Changin the mechanism for submitting Probe Responses for transmission will remove unnecessary complexity from the MAC.

Adopted. Replace first paragraph and list with: "Stations receiving probes shall respond with a probe response only if the ESSID is the broadcast ESSID or if the ESSID matches the specific ESSID of the station. Probe responses shall be sent as directed messages to the address of the station that generated the probe. The probe response shall be sent using normal frame transmission rules. An access point shall respond to all probes. In an ad hoc network, the station that generated the last beacon shall repond to a probe."

7.1.3.3	C. Thomas Baumgartner	t	Add "In an infrastructure network the AP's are always awake."	Since we say how this is taken care of in ad-hoc should say how taken care of in infrastructure case

This is implied by the new text.

7.1.3.3	Geiger	T	There must always be a station awake to respond to a probe. Where is this discussed for ad hoc networks	This process is not defined in the Standard, in other words, what station has the honor of this function or is it distributed?

Adopted. Change the final sentence of the section to read: "The station that sent the most recent beacon shall remain awake and shall be the only station to respond to Probes until a beacon frame is received. If the station is an access point, it shall always respond to probes."

7.1.3.3 - 7.1.3.5	C. Heide	T	change section numbers to 7.1.3.2.1 - 7.1.3.2.3	these sections should be sub-section to "7.1.3.2 Active Scanning"

Adopted.

7.1.3.3.	Fischerma:Sending a Probe Response	T	Last paragraph of this section: In a network there shall be at least one node that is awake at any given time to respond to probes unless all nodes in the network are battery-powered, in which case, there may be periods of time during which no node is awake to respond to probes. Therefore, probes should be sent at frequent intervals for a period of TBS seconds before abondoning the scanning procedure. In an ad hoc network, probe responses shall be sent by the station that sent the last beacon.	The burden of remaining powered up and draining valuable battery resource should be placed onto the station desiring to enter the network, since this is more power efficient and except for the rare case of roaming through a field of battery-only powered BSS's, the scanning prcedure will still produce a quick response, since newtorks with some non-battery powered nodes are still required to remain powered up at all times, and these will represent the overwhelming majority of BSS's through which mobile users will roam.

Not adopted due to adoption of alternative.

7.1.3.4	Geiger	E	I assume that receive energy is another way of describing the state of the channel. Replace receive energy with if the CCA state is busy. It might also be appropriate to use CCA clear instead of hear nothing.	Receive energy can be mistaken for RSSI unless that is what is meant here and if it is, I then think this is a technical error.
7.1.3.4	Mahany	E	In the algorithm, indent (d) scan next channel	
7.1.3.4	Okada	E Approve	Where is T2 from?	
7.1.3.4	bdobyns	T	What is the duration of the various timers T1, T2? These values should be in MAC MIB	

Accepted (they are now in the MIB).

7.1.3.4	Bob O'Hara	T	Define MACMGT_Sync_State in the MIB	not defined

Rejected. Revised algorithm no longer has sync-state.

7.1.3.4	Bob O'Hara	T	Eliminate step c) and the conditional start of step d)	Reduces the complexity of scanning at a minimal cost in time lost. Relying on energy sensing will result in a large proportion of false positives in the current bands.

Not adopted.

7.1.3.4	Bob O'Hara	T	Define timer(s) used in Probe process	not defined

Adopted.

7.1.3.4	C. Thomas Baumgartner	t	Where does STA get the ESS ID for its probe?	Presume if STA heard something going on it will achieve sync without a probe

Accepted. MIB variable exists.

7.1.3.4	C. Thomas Baumgartner	t	T2 missing from Figure 7-3 Change Figure 7-3 to "G3=DIFS"	Can't tell without drawing what T2 timer does. I believe that drawing show G3 as DIFS

Adopted.

7.1.3.4	C. Thomas Baumgartner	t	change f) to "If desired AP not found clear NAV..."	Don't take this action if object of scan has been found.

Rejected. Scanning may continue as long as STA desires (it may be looking for more than 1 AP).

7.1.3.4	Lewis	T	Define the selection mechanism a STA uses to select the AP when multiple Probe responses are received.	

Not adopted. The mechanism requested does not affect interoperability and may safely be left to the implementor.

7.1.3.4	Mahany	T	Value and Role of T2 are not clear. It is not defined in the figure. Define	Not sufficient for implementation without this info.

Accepted.

7.1.3.4	Mahany	T	Revise Algorithm. DS and FH PHY's do not produce indication of energy.	

New algorithm uses CCA, which the PHY groups are still working on.

7.1.3.4	Mahany	T	Revise Algorithm to have Probing station passively monitor the channel for a period of time prior to sending probe. CSMA must be conducted for a period = aMPDU_Max prior to sending a probe.	Probing stations have a high probabilty of interfering with ongoing communications. This will occur due to hidden terminal effects. It will also occur frequently in FH systems due to poor reliability in CCA for frames in progress.

Accepted.

7.1.3.4	Marvin Sojka	T	In action d, "receive energy" should be replace with "clear channel assestment becomes false".	

Accepted.

7.1.3.4	Renfro	T		Need to define T2 timer and show in figure 7-3.

Accepted.

7.1.3.4	Rick White	T	The scanning algorithm defined must be more specific as far as frequency hopping PHYs are concerned.	Its possible that a STA may never find an AP depending how it scans the channels. The scanning algorithm defined must be more specific as far as frequency hopping PHYs are concerned. Its possible that a STA may never find an AP depending how it scans the channels.

Adopted.

7.1.3.4	Rick White	T	The timer values must be defined in the MIB.	Not defined.

Adopted.

7.1.3.4	Tim Phipps	T	*Remove:* "Specific ESSID".	Probes do not carry ESSID, only probe responses.

Not adopted. ESSID is required in Probes. Probe description in section 4 must be adjusted.

7.1.3.4 - 7.1.3.5	C. Heide	t	remove section 7.1.3.4; change title of 7.1.3.5 to "Scanning for an Existing Network"	there should be no difference between scanning for an ad hoc and scanning for an infrastucture network. In both cases more than one station can respond to probes. In either case the second probe response should be sent if the BSS of the second sender differs from the BSS in the first response, and not sent if it doesn't.

Adopted.

7.1.3.4 - 7.1.3.5	C. Heide	t	step f add "if desired ESS not found."	have to stop scanning sometime.

Rejected. Scanning is controlled by upper layers, not MAC layer.

7.1.3.5	Bob O'Hara	E	Update references to NID.	out of date
7.1.3.5	Geiger	E	Same CCA comments regarding section 7.1.3.4. NID appears in this section as well, I believe it should read SID	Clarity
7.1.3.5	Greg Ennis	E	Paragraph immediately following the figure: replace "media" by "medium"	Singular is medium.
7.1.3.5	A. Bolea	T		Correct all references to NID.

Adopted.

7.1.3.5	bdobyns	T	What is the duration of the various timers T1, T2? These values should be in MAC MIB	

Rejected. Same as infrastructure mode (section deleted).

7.1.3.5	bdobyns	T	<last paragraph> NID not defined (should have been in Section 4)	

Adopted.

7.1.3.5	Bob O'Hara	T	Use same process as 7.1.3.4 (revised)	same reasons

Adopted.

7.1.3.5	Bob O'Hara	T	Define timer(s) used in Probe process	not defined

Rejected. Same as infrastructure mode (section deleted).

7.1.3.5	C. Heide	t	figure 7-4 change to "G3 = SIFS"	probe responses should not have a low priority in an ad hoc network

Not adopted. SIFS is used only in interlocked frame exchanges.

7.1.3.5	C. Thomas Baumgartner	t	change 1st sentence to "An new station attempting to join an existing ad hoc network using active scanning would use the following procedure:"	The sentence currently says that a new station MUST use active scanning

Adopted.

7.1.3.5	C. Thomas Baumgartner	t	Where does STA get the BSS ID and ESS ID for its probe?	Presume if STA heard something going on it will achieve sync without a probe

Rejected. Same as infrastructure mode (section deleted).

7.1.3.5	C. Thomas Baumgartner	t	change f) to "If desired network not found clear NAV..."	Don't take this action if object of scan has been found

Rejected. Same as infrastructure mode (section deleted).

7.1.3.5	C. Thomas Baumgartner	t	T2 missing from Figure 7-3	Can't tell without drawing what T2 timer does.

Adopted.

7.1.3.5	C. Thomas Baumgartner	t	What is a NID?	Uses term not defined.

Adopted.

7.1.3.5	Lewis	T	Define T2 time	

Rejected. Same as infrastructure mode (section deleted).

7.1.3.5	Mahany	T	Role of T2 is not clear. It is not defined in the figure. Define Value	Not sufficient for implementation without this info.

Rejected. Same as infrastructure mode (section deleted).

7.1.3.5	Marvin Sojka	T	in action d, "receive energy" should be replace with "clear channel assestment becomes false".	

Adopted.

7.1.3.5	Renfro	T		No need to retransmit probe response message if T1 has expired. If probing station successfully received probe response but ack failed, probing station has necessary information. If probing station did not receive probe response, it will go to another channel after T1. Also, delete reference to NID.

Not adopted. Mechanism specified for leaving a channel when scanning uses T2, not T1.

7.1.3.5	Rick White	T	The scanning algorithm defined must be more specific as far as frequency hopping PHYs are concerned.	It's possible that a STA may never find an ad hoc network depending how it scans the channels.

Adopted.

7.1.3.5	Rick White	T	The timer values must be defined in the MIB.	Not defined.

Adopted.

7.1.3.5	Tim Phipps	T	*Remove:* "Specific ESSID". *Replace:* "Specific BSSID" *with* "Broadcast BSSID". *Remove the para:* "Whenever a responding ... and NID".	Probes do not carry ESSID. The BSSID is not known in advance, so probes must always be sent to the broadcast BSSID. Section 7.1.3.3 : "In a network ... last beacon" ensures that there will be at least one, but usually only one station which responds to probes. The scanning process is robust with respect to receiving multiple probe responses. There is therefore no need to define the cancellation process. Furthermore, cancellation as described carries significant implementation costs.

Reject the portion regarding ESSID, adopt the remainder.

7.1.3.6	C. Heide	e	last sentence replace step "1" with "a"	
7.1.3.6	C. Thomas Baumgartner	e	Change last letter from 1 to "a"	incorrect reference
7.1.3.6	A. Bolea	T		Item a: What kind of scan is being specified? Algorithm states to scan, and if something is heard, then Join network. If something is heard as a result of scanning, then why go back into joining network? How is this algorithm different than trying to join a network for some period of time and if nothing is heard then start the network? Sync variable has been eliminated.

Rejected. Policy for joining networks is not specified in the MAC definition.

7.1.3.6	bdobyns	T	What is the duration of the various timers T5, T3? These values should be in MAC MIB	

Adopted.

7.1.3.6	Bob O'Hara	T	Define timer(s) used in Probe process	not defined

Adopted.

7.1.3.6	C. Heide	t	explain how a newly sync'ed STA knows when an "expected" Beacon interval is to begin.	the probe response contains the length of the beacon interval, but how does the STA know when the next one is supposed to start?

Adopted. Text to be provided in sections on power management.

7.1.3.6	C. Thomas Baumgartner	t	Where are these times T1, T2, T3, (presumably) T4, T5 defined?	Need specific times for compliance

Adopted.

7.1.3.6	C. Thomas Baumgartner	t	If stating a new network how can there be a specific BSS ID?	I don't understand

The new text is somewhat more clear on the point.

7.1.3.6	C. Thomas Baumgartner	t	Reference to JoinNet is not specific enough to understand	I don't understand the reference to process describe above.

The new text is somewhat more clear.

7.1.3.6	Geiger	T	There are several timers described in this section, T1, T2, T3, and T5. The time these timers are monitoring are not specified.	Specify Times by providing MIB variables.

The new text is somewhat more clear.

7.1.3.6	Geiger	T	What is the JoinNet and StartNet functions.	I haven't seen this described anywhere yet. Is JoinNet another word for Association?

The new text is somewhat more clear.

7.1.3.6	Lewis	T	Define T5 time	

Accepted (T5 is gone).

7.1.3.6	Mahany	T	Role of T5 is not clear. It is not defined in the figure. Define Value	Not sufficient for implementation without this info.

The new text is somewhat more clear.

7.1.3.6	Renfro	T		Not necessary to define T3. As currently stated, if a station starts an Ad Hoc network and nobody joins, it will be the only station transmitting beacons and will, therefore, stay on forever..... Also, delete reference to 'synced'

Change the title to "Initializing or synchronizing with a BSS"
replace algorithm with the following:
An access point shall select a BSSID, select channel synchronization information, select a beacon interval initialize its TSF timer and begin transmitting beacons.

Stations which are not access points shall:
a) Scan for the presence of an existing BSS with a specific ESSID
b) If a BSS with the specific ESSID is found, adopt the BSSID, channel synchronization information, TSF timer value of the BSS.
Else if the ESSID designates an ad hoc network, select an ad hoc BSSID, select channel synchronization, select a beacon interval, initialize and start the TSF timer, and begin transmitting beacons.
Else indicate failure to find a network matching the ESSID.

The definition of ESSID must be modified to include an indication of ad hoc vs infrastructure.

7.1.3.6	Rick White	T	The timer values must be defined in the MIB.	Not defined.

Adopted.

7.1.4	Geiger	E	MACMGT_Weight, MACMGT_Sync_State. Rather than use a 1 or 0 to indicate SYNC or unsync'ed, why not just define the variable with SYNC or UNSYNC and forget the 1 or zero. This is consistent with SCAN MODE of ACTIVE or PASSIVE, SCAN or NOT SCAN, etc.	This is missing from MIB
7.1.4	Wim Diepstraten	E	Delete the ".... Weigth" from paragraph 2. Delete the last section.	I thought the Weigth consept was deleted from the standard.
7.1.4	A. Bolea	T		Weight and Sync variables have been eliminated. Time adjustment algorithm has been changed. When joining a network, adopt probe response or beacon time. After that, change time to be average of local time and message time. Coalescing procedure is missing!

Accepted. Coalescing procedure has been defined.

7.1.4	Bob O'Hara	T	Define MACMGT_Weight in MIB	not defined

Accepted.

7.1.4	Bob O'Hara	T	Define AdjustTimer	not defined

Accepted.

7.1.4	Bob O'Hara	T	Define or delete Coalesce operation	not defined

Accepted.

7.1.4	C. Thomas Baumgartner	t	Add definition of AdjustTimer algorithm and Coalesce operation.	This section describes operations that are basic to MAC. Can't have interoperability or conformance unless these items are completely defined

Adopted. Replace section with:
7.1.4 Adjusting Station Timers and Coalescing

In the infrastructure network, Stations shall always adopt the timer in a Beacon or Probe Response coming from the AP in their BSS.

In an ad hoc network, a station shall always adopt the information in the contents of a beacon or probe response frame when those frames contain a matching ESSID and the value of the time stamp is greater than the station's TSF timer. A station may return to its previous BSS, if any, and transmit a beacon with the newly adopted information.

7.1.4	Gegier	T	Stations shall always adopt the timer...	In this text, I have seen the Long Time Stamp, the Short Time Stamp, the timer in the Probe or Beacon and the use of just time stamp. This is very confusing because I believe these are all the one in the same variable. If not, then some explanation is missing in the standard of how each of these is used

Adopted. Changes shall be made in section four to change all references to time stamps to be the long time stamp.

7.1.4	Geiger	T	Coalesce Function not defined. AdjustTimer algorithm not defined. Suitable number not define	Define these functions

Accepted.

7.1.4	Miceli	T	need specification of the timer adjustment algorithm	incomplete

Accepted.

7.1.4	Renfro	T		Procedure for Ad Hoc networks is wrong. Update to reflect recent agreements.

Done.

7.1.4	Rick White	T	In an ad hoc network a beacon master must be elected. An algorithm must be defined on how to elect a beacon master.	This will be much simpler than trying to define an algorithm for using the weight and how to coalesce of which neither are defined.

Rejected. Another approach has been selected.

7.1.4	Rick White	T	The Weight value must be defined.	Not defined.

Rejected. Defined-away.

7.1.4	Rick White	T	The algorithm for using the weight value must be defined.	Not defined.

Rejected. Defined-away.

7.1.4	Tim Phipps	T	*Rename this section "Acquiring Timing Synchronization".* An unsynchronised station shall always adopt a time-stamp value from their BSS on joining. This is present in probe response and beacon frames. It then updates its TSF time based on received beacon frames using algorithms defined in section 7.1.1. *Delete the rest of this section.*	Algorithms for maintaining timing synchronization are given in sections 7.1.1.1 and 7.1.1.2.

Accepted (though the text changed to make the specific wording above inappropriate).

7.1.4.	Mahany	T	Delete References to Coalesce option. Define Weight Algorithm	Not Defined, Discussed or Supported Elsewhere

Rejected. Alternative algorithm selected.

7.1.5	McDonald		Complete "function to be specified" Define acceptable tolerance especially in ad hoc networks What happens in some beacons are missed? This needs to be addressed	What looks like good basic concept needs refinement
7.1.5	McDonald		Fix the PHY and Mac synchronization functions as required.	Takashi Enomic of NTT comments that it appears that the Mac needs the FH PHY for synchronization and that the FH PHY needs the Mac for synchronization. This he concludes will not work
7.1.5	Geiger	E	MACMGT_Dwell_Interval	Missing from MIB
7.1.5	A. Bolea	T		The hopping sequence information is passed in probe response and beacon messages. The mapping function which selects a hopping pattern needs to be specified. The TFSTIMER description should be changed to agree with timer specification given in remarks for section 7.1.2 .

Adopted first two comments, rejected third because it refers to items corrected in previous sections.

7.1.5	bdobyns	T	Same MAC for all PHY?	

Rejected. The MAC controls hopping in the current architecture.

7.1.5	Bob O'Hara	T	Delete this section.	This is PHY management and belongs there.

Rejected. The MAC controls hopping in the current architecture.

7.1.5	C. Thomas Baumgartner	t	Specify the function that maps BSS ID to hop sequence. I think that this practice should be re-examined for long term implications.	This section describes operation that is basic operation. Can't have interoperability or conformance unless this item is completely defined I think it is short sighted to map BSS ID to hop sequence. That might be acceptable as the beginning hop sequence but there may be reasons to change during operation. For example I have proposed a method to handle overlapping point coordinated BSA's by changing channel on one BSS.

Rejected (see comment below).

7.1.5	Geiger	T	New Stations joining the BSS should exchange the hop table information in the JoinNet function whatever that is. It doesn't make sense to send the hop state in every data frame. It might make sense to send this information in the Probe Response message as well.	

Accepted.

7.1.5	John Hayes	T	TBD	Define mechanism to map BSSID to specific sequence in the hop table.

Rejected (see comment below).

7.1.5	Lewis	T	define the BSSID mapping function referenced. The mechanism describes how a STA can determine the hopping sequence from a received frame, but it is not clear how a new STA seeking to join a BSS locates the current channel on which to receive said frame.	

Rejected (see comment below).

7.1.5	Mahany	T	Define Function to map BSSID to hopping sequence	Required for Interoperability.

Rejected (see comment below).

7.1.5	N. Silberman	T	The function that maps the BSSID to a particular entry in the sequence table needs to be specified or explained.	Without this specification interoperability is not possible. If a table will be created to create the function, the format of the table has to be uniform for all stations so this can be downloaded through the management entity..

Adopted. Need for function has been eliminated.

7.1.5	Renfro	T		Hopping pattern no longer selected using a mapping from BSS ID. Important to ensure that adjacent BSSs use different hopping pattern so should be selected by network administrator and desiminated using beacons and probe responses.

First comment adopted. Remainder rejected due to no need for administration as suggested.

7.1.5	Rick White	T	This section needs to be rewritten.	It will not work the way it is currently defined. The hopping sequence is defined in the beacon frame. There is no way that a Station will be able to determine a hopping sequence by using the BSSID.

Adopted.

7.1.5	Simon Black	T	Replace text in first paragraph: 'There is a function (to be specified) that maps from BSS ID to a particular entry in the hopping sequence table' with; BEACON and Probe Response management frames carry elements which identify the hop parameters. Hop paprameters are determined by the station which creates the BSS.	Two methods two determine hopping parameters are currently specified in the draft standard. One is undefined - the mapping from BSS-ID. Suggest this is deleted and the elements method specified.

Adopted.

7.1.5	Tim Phipps	T	Replace: "There is a function that maps from BSSID to a particular entry in the hopping sequence table. ... from any received frame." With: "Every beacon and probe response frame carries elements which identify the hop set and hop sequence. The hop parameters are determined by the station which starts the BSS." *Replace:* "Stations in the BSS ... = 0", *with* "Each hop dwell starts whenever: TSFTIMER MOD MACMGT_Dwell_Interval = 0. Stations start adjusting to the next frequency a time PHY_base.aHop_Time before the scheduled start of each hop dwell and will be stable on frequency at the scheduled start of the hop dwell."	The D1 specification includes two methods to determine the hopping parameters. Firstly, they are elements within probe responses and beacons. Secondly, they are determined by performing an undefined mapping from the BSS-ID. One of these has to go. Choosing the elements approach avoids having to specify the mapping function in the spec. We have to define here whether the **hop** starts at these target times, or whether the **dwell** starts. Because beacon, wake and superframe target transmission times are also of this form, (i.e. become due at time zero), it makes sense to have the hop immediately followed by a target beacon/wake/superframe time, rather than always defer the beacon/wake-period/superframe during a hop.

Adopt first comment. Reject remainder to ease specification by specifying the time at which a station concludes a dwell interval.

7.1.5	Wim Diepstraten	T	This section describes that there is a function that maps a BSSID into a hop sequence table, and describes that a station is to use this to determine its position in the hopsequence. In addition elements are specified that identifies a Set, Pattern and Index to specify the Fhop sequence. A single method needs to be specified, so section 7.1.5 should be deleted.	

Not adopted, comment is self-contradictory.

7.1.5.	Mahany	T	Define Algorithm to Map BSSID to Hop Table	

Rejected (see next comment).

7.1.5.	P. Brenner	T	Remove the mapping from BSSID to Hopping Sequence	The BSSID is fixed (MAC Address), and the Hopping Sequence should be a manageable object. The Hopping Sequence should be learned from the PROBE response and/or Beacon frames.

Adopted.

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	Lewis	E	provide introduction to power management concepts	
7.2	Mahany	E	Need brief intro before first paragraph.	Should introduce power management and PSP concepts before adding implementation detail.
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 Beacon 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	bdobyns	T	If you can't fix 5.3 (PCF restrictions for single channel PHY) add a "polling" power management mode which does not rely on a PCF or TIM. e.g. -2. Station associates with BPMM (Barrys' power management mode). -1. AP assumes all stations in BPMM are sleeping 0. Station wakes up. 1. Station sends "poll" (includes "up" element with count of to-ap frames) 2. AP sends "poll-response" (includes "down" element with count of from-ap-frames) (this is basically a single-station TIM). Marks station awake. 3. Station sends up frames, but no more than up-count. 4. AP sends down frames, but no more than down-count. Marks station asleep. 5. Station sleeps.	

Accepted. This technique works with the algorithm in D1.2.

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
7.2.1	Bob O'Hara	E	replace "Mode" with "Networks" in the header	
7.2.1.1	C. Heide	e	first paragraph, second sentence, add "s" to "station".	
7.2.1.1	Greg Ennis	E	Paragraph 4: replace "short Poll frame" by "Poll frame"	there is only one kind of Poll frame
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

Accepted.

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.

Accepted. Random delay should avoid having all the STA probe at the same time.

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.

7.2.1.1	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

Accepted. It is now explicit that an ACK'ed frame must be sent.

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.

Accepted.

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.

Accepted.

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.

Accepted. A Thousand words are no longer necessary to scribe mechanism.

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

Accepted.

7.2.1.4	Renfro	T		DTIM information must also include PSP stations in case they happen to always wakeup on DTIM.

Accepted. DTIMs are also TIMs.

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.

Text 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
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
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.

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

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

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

7.2.2.1	C. Heide	t	define "short frame"	clarification

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

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

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

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

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

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).

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

7.2.2.1	Tim Phipps	T	*"In the case that a **short frame...**".* *Surely this requires a MIB variable to define the threshold.*	

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

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.

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

7.2.2.2	A. Bolea	T		ATIMs should be transmitted after the beacon, not before as shown in figure 7-6.

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

7.2.2.3	Geiger	E	TSF Timer s/b TSFTIMER	consistency
7.2.2.3	Jim Panian	E	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)

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

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.

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

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?

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

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.

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

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.

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

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

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

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

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

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

[Refers to 7.4, not 7.2.4] Accepted.

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

[Refers to 7.4, not 7.2.4] Rejected. AP operation is above the MAC layer, so this is inapproriate.

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

[Refers to 7.4, not 7.2.4] Accepted, since STA needs to know this in order to decide when to send 4-address frames.

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

********** (applies to many comments above) **********

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.	See imbeded comments and annotations

This seems to fit here.

7.3	Renfro	T		Add case for Association Denied response to both station procedures and AP procedures.

Accepted

7.3	Rick White	T	This section needs a considerable amount of detail to define how a station determines with which AP to associate.	This section does not address how a station makes a determination on which AP to try to associate.

The station choice of access point to asscociate to is implemantation dependent.

7.3	Rick White	T	The timers must be defined in the MIB.	Not defined.

Accepted

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	out of date

Accepted

7.3.1	C. Heide	t	explain - what is a "Previous AP Address Element"	clarification

Shall be defined in Section 4.

7.3.1	C. Thomas Baumgartner	t	in a) define Previous AP Address	I don't know what it is and I don't know why it is needed.

Shall be defined in Section 4.

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. 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 a Association Response frame is received, the station shall check the Status Value and Error Indicators to determine the association result. The station shall accept the new MIB values passed to it within the Association Response frame.	See imbeded comments and annotations

Accepted.

7.3.1	Tom T.	T	Add to Section 4.4: Previous AP Address and Associate elements.	

Accepted.

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.

Rejected. Aging is not part of this standard.

7.3.2	Bob O'Hara	T	Update the procedure to use the defined frame types	out of date

Accepted.

7.3.2	C. Heide	t	correct contents of association response frame	conflict with section 4.2.3.5

Accepted.

7.3.2	C. Heide	t	remove step (c)	that is beyond the scope of this standard. As we are not specifying the DS, we should not specify how implementers must use it.

Redefined as Distribution System.

7.3.2	C. Thomas Baumgartner	t	Define how AP informs other AP's about a new STA association	This is an interoperability issue so must be defined exactly.

Redefined as Distribution System.

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 frame is received from a station, the access point shall assign a Station ID to the station and shall transmit an Association Response frame back to the station 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 the new association.	See imbeded comments and annotations

Accepted.

7.3.2	Geiger	T	b) RESPONSE frames should also include the hop Set, PATTERN and INDEX element for the FHSS PHY	This allows the join node to get the same hop sequence as the other stations in the logical LAN

Fixed in other ways in Beacons and Probe Responses.

7.3.2	Wim Diepstraten	T	bullit item b and c should be exchanged in sequence.	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.

Declined. The association completion in step B must complete before step C can occur.

7.3.2.	P. Brenner	E	Update the paragraph according to the actual frame formats	There is no such: "frame of type REQUEST including the Associate element".

Accepted.

7.4	Jim Panian	E	Remove the object identifiers from the management definitions. When it is certain that the management definitions will not be changing, then assign a new group of object identifiers to the management definitions.	It was premature to assign object identifiers to the management definitions. Object identifiers should have been assigned right before the draft is released as an official standard. Object identifiers indicate that a management definition is fixed in time, and will never be changed. That is not the case with the MIB as it stands today. Since the draft is still open to comments, the MIB definitions with object identifiers already assigned will most likely be changing.

Rejected. Time necessity makes it unreasonable to wait until the end to do all this work.

7.4	Wim Diepstraten	E	A number of MIB attributes used throughout the standard are missing. The following is a (incomplete) list of the identified attributes: TSFTIMERMOD (NOT ADDED) SF_Length (NOT ADDED) CF_Boundary (NOT ADDED) Dwell_Interval Listen_Interval NoActivity_Holdover (NOT ADDED) Scan_State Scan_Mode Scan_Duration or different applicable timeout attributes.	

Partially accepted. Text changes have obviated the need for adding four of the suggested attributes.

7.4	A. Bolea	T		In general the definitions of the parameters are not very clear. We should go through all parameters and clearly define them. In addition the GET-REPLACE status of each parameter needs to be updated.

Accepted. Definitions have been clarified.

7.4	David Bagby	T	in general the MIB section is inconstant with portions of the rest of the draft. make consistent before sponsor ballot.[DB7]	See imbeded comments and annotations

Accepted. (We promise)

7.4	Geiger	T	This section is missing a couple of hundred entries. To many missing and so little time left.	add missing MIB variables and appropriate descriptions of each.

Accepted.

7.4	Lewis	T	define sections 7.4.5.2 through 7.4.8.1	

Accepted. Text will be created after the meeting (note that 8.4.5.2.4 deleted as inappropriate).

7.4	PFS	T	unified phy MIB parameters need to be placed in this section and removed from the individual phy sections. Additional parameters will need to be included for the DS PHY - for example, correlation strength.	

Rejected. PHY MIB variables are no longer part of this section.

7.4	Simon Black	T	Review of managed objects list required.	There would seem to be an excess number of managed objects. Do we REALLY want to gain access/twiddle ALL of these parameters.

Accepted. We agree a review is needed.

7.4..4.1.8.	P. Brenner	T	The beacon period should be in microseconds not nanoseconds	The MAC protocol timer resolution is microseconds

Accepted.

7.4.1	David Bagby	T	The MIB is too complex, only those variables that are required for MAC operation should be present. Additional variables must be justified on a case by case basis - this MIB contains variables that are optional for other 802 MACs - I do not want lots of optional MIB variables either, what is required is a lean, tight appropriate set of variables. I have marked section 7.4.1.1.x to show variables to be removed as not needed and variables missing that must be added. Corresponding later sections of 7.4 will also require editing as a result.	See imbeded comments and annotations

Accepted.

7.4.1.1 - 7.4.1.5	David Bagby	T	**4. Station Management Attributes** **4. agStation_Config_grp** aActing_as_AP_Status, aAssociated_State, aBeacon_Period, aPower_Mgt_State, ; DELETED **4. agAuthentication_grp** aAuthentication_Algortihms, aSelected_Authentication_Algorithm, DELETEDaAuthentication_State, DELETED **4. agPrivacy_grp** aPrivacy_Algortihms, aSelected_Privacy_Algorithm, DELETED aPrivacy_State, DELETED **4. Not Grouped** aStation_ID aCurrent_BSS_ID aCurrent_ESS_ID aKnown_APs **4. MAC Attributes** **4. agAddress_grp** aMAC_Address, aGroup_Addresses;	See imbeded comments and annotations

Accepted.

7.4.1.1 - 7.4.1.5	David Bagby continuation	T	**5. agOperation_grp** aNAV, aNAV_max, aHandshake_Overhead, aRTS_Threshold, DELETED aCW_max, aCW_min, aCTS_Time, aACK_Time, aRetry_max, aMax_Frame_Length, aFragmentation_Threshold; **5. agCounters_grp** way to many counters - this is unneeded implementation cost. cut back to cmtee consensus on bare minimum set required. aTransmitted_Frame_Count, aOctets_Transmitted_Count, aMulticast_Transmitted_Frame_Count, aBroadcast_Transmitted_Frame_Count, aFailed_Count, aCollision_Count, aSingle_Collision_Count, aMultiple_Collision_Count, aReceived_Frame_Count, aOctets_Received_Count, aMulticast_Received_Count, aBroadcast_Received_Count, aError_Count, aFCS_Error,Count, aLength_Mismatch_Count, aFrame_Too_Long_Count, aTotal_Backoff_Time;	

Partially accepted. aSlot_Time deleted. Others are not in the PHY MIB, so they have to be in MAC MIB for proper MAC operation. Insufficient technical detail supplied to decide how to change the set of counters.

7.4.1.1 - 7.4.1.5	David Bagby continuation	T	**6. agStatus_grp** aTransmit_Enable_Status, aPromiscuous_Status; **6. Not Grouped** aManufacturer_ID aProduct_ID **6. ResourceTypeID Attributes** **6. Not Grouped** aResourceTypeIDName aResourceInfo **6. Actions** **6. SMT Actions** acStation_init acStation_reset **6. MAC Actions** acMAC_init acMAC_reset **6. PHY Actions** acPHY_init acPHY_reset **6. Notifications**	

Accepted.

7.4.1.1 - 7.4.1.5	David Bagby continuation	T	**7. SMT Notifications** nAssociate nDissociate also need notification for Authentication and deauthentication events. nAuthenticated nDeauthenticated **7. MAC Notifications** nFrame_Error_Rate_Exceeded	

Accepted.

7.4.1.1.1.	P. Brenner	T	Add aActing_as_CF_status	

Rejected. Insufficient detail to motivate adding this variable.

7.4.1.1.2	Bob O'Hara	T	delete aAuthentication_Handshake_State and aMin_Authentication_Required	does not provide useful information (7.4.1.1.2, 7.4.2.1.1, 7.4.3.1.2, 7.4.4.1.11, 7.4.4.1.15)

Accepted.

7.4.1.1.2&3	Scaldeferri	T	Text to be provided at March Meeting	These station management attributes should be harmonized with those in IEEE 802.10f

Rejected. No references to 802.10 remain.

7.4.1.1.3	Bob O'Hara	T	delete aPrivacy_Handshake_State and aMin_Privacy_Required	does not provide useful information (7.4.1.1.3, 7.4.2.1.1, 7.4.3.1.3, 7.4.4.1.12, 7.4.4.1.16)

Accepted.

7.4.1.2.	P. Brenner	T	Add aMAC_Version_Number	

Rejected. There is currently only one version number, so such a variable would not convey any information.

7.4.1.2.2	Bob O'Hara	E	delete aNAV	missed in previous editing
7.4.1.2.2	Bob O'Hara	E	delete aNAV	missed in previous editing
7.4.1.2.2	Bob O'Hara	E	delete aNAV_Max	missed in previous editing
7.4.1.2.2	Bob O'Hara	T	add aProtocol_Revisions_Supported	provides for future evolution of the standard

Rejected. There is only one revision to support, so enumerating "them" is unnecessary. (New revisions can add this variable)

7.4.1.2.3	Bob O'Hara	E	replace "," with "_"	
7.4.1.2.6.	P. Brenner	T	Add an agAP_Information_grp containing AP information as aCurrent_Number_of_Associations aMax_Number_of_Associations aNumber_of_Association_Denials aNumber_of_Disassociations aBSS_Internal_Relay_Count aBSS_FromDS_Frames_Count aBSS_ToDS_Frames_Count	This is useful information on BSS activity

Rejected. These fields apply to AP operation, not MAC functioning, and are not rightly part of this standard.

7.4.1.4.3	Bob O'Hara	E	delete section	wrong chapter

7.4.2, et seq	Bob O'Hara	T	Complete object identifier arc must be defined	get rid of "xxxx" in identifier arc and replace with a real number

Accepted.

7.4.2.1.1	Bob O'Hara	E	delete "(1 to N deep)"	incorrect syntax, belongs in attribute definition
7.4.2.1.1	Bob O'Hara	T	delete aAuthentication_Handshake_State and aMin_Authentication_Required	does not provide useful information (7.4.1.1.2, 7.4.2.1.1, 7.4.3.1.2, 7.4.4.1.11, 7.4.4.1.15)

Accepted.

7.4.2.1.1	Bob O'Hara	T	delete aPrivacy_Handshake_State and aMin_Privacy_Required	does not provide useful information (7.4.1.1.3, 7.4.2.1.1, 7.4.3.1.3, 7.4.4.1.12, 7.4.4.1.16)

Accepted.

7.4.2.1.1	Scaldeferri	T	Text to be provided	As above the SMT object class should be harmonized with the 802.10f Std.

Rejected. References to 802.10 have been removed.

7.4.2.1.1.	P. Brenner	T	Add a new attribute: aCurrent_BSS_Type with values Infrastructure or Ad-hoc	A Management station would like to know which kind of BSS is the station attached to.

Rejected. There are other mechanisms for determining what type of BSS a STA is associated with. Suggested change does not fix something that is broken.

7.4.2.2	Scaldeferri	T	Text to be provided	As above harmonization with 802.10f is needed.

Accepted.

7.4.2.2.1	bdobyns	E	<page 132 line 7> CW_MAX should be aCW_MAX	
7.4.2.2.1	Bob O'Hara	E	fix column alignment	
7.4.2.2.1	Bob O'Hara	T	add actions: "acAdd_Group_Address" and "acDelete_Group_Address"	matches management actions available in 802.3

Accepted.

7.4.3	Mahany	E	Use Consistent Spelling of Behavior throughout the draft	The Queen's English
7.4.3.1.2	Bob O'Hara	T	delete aAuthentication_Handshake_State and aMin_Authentication_Required	does not provide useful information (7.4.1.1.2, 7.4.2.1.1, 7.4.3.1.2, 7.4.4.1.11, 7.4.4.1.15)

Accepted.

7.4.3.1.3	Bob O'Hara	T	delete aPrivacy_Handshake_State and aMin_Privacy_Required	does not provide useful information (7.4.1.1.3, 7.4.2.1.1, 7.4.3.1.3, 7.4.4.1.12, 7.4.4.1.16)

Accepted.

7.4.4.1.1.1	Bob O'Hara	T	delete aAuthentication_Handshake_State	does not provide useful information (7.4.1.1.2, 7.4.2.1.1, 7.4.3.1.2, 7.4.4.1.11, 7.4.4.1.15)

Accepted.

7.4.4.1.12	Bob O'Hara	T	delete aPrivacy_Handshake_State	does not provide useful information (7.4.1.1.3, 7.4.2.1.1, 7.4.3.1.3, 7.4.4.1.12, 7.4.4.1.16)

Accepted.

7.4.4.1.15	Bob O'Hara	T	delete aMin_Authentication_Required	does not provide useful information (7.4.1.1.2, 7.4.2.1.1, 7.4.3.1.2, 7.4.4.1.11, 7.4.4.1.15)

Accepted.

7.4.4.1.16	Bob O'Hara	T	delete aMin_Privacy_Required	does not provide useful information (7.4.1.1.3, 7.4.2.1.1, 7.4.3.1.3, 7.4.4.1.12, 7.4.4.1.16)

Accepted.

7.4.4.1.17	Bob O'Hara	T	Behaviour must be defined	not defined

Accepted, even though no text supplied.

7.4.4.1.18	Tim Phipps	E	Change: ". . . in nano-seconds . . .", to ". . . in micro-seconds . . .".	Using nano-seconds for beacon interval is far too accurate. Using micro-seconds would be consistent with the resolution used in other managed objects.

7.4.4.1.18	Wim Diepstraten	E	Specify all times in usec rather then nsec. Suggest to change the text as follows: ".... time, in **microseconds,** between the **targetted** transmission of Beacon frames..."	
7.4.4.1.20	Wim Diepstraten	T	Specify the aPower_Mgt_Capability as a Get / Replace.	An application should be able to specify which of the Power Management modes should be used.

Rejected. STA still has a *capability* to go into a state, even if an application disallows using it.

7.4.4.1.4	Bob O'Hara	T	replace "WITH APPROPRIATE SYNTAX integer" with "DERIVED FROM IEEE802ommonDefinitions.MACAddress"	updates MIB to match current MAC definition

Accepted.

7.4.4.1.5	Tim Phipps	E	*Replace:* "integer" *with* "variable number of octets".	ESS is now a variable number of octects.
7.4.4.1.5	Bob O'Hara	T	replace "integer" with "octet string"	updates MIB to match current MAC definition

Accepted.

7.4.4.1.5.	P. Brenner	E	Syntax of aCurrent_ESS_ID should be string not integer	
7.4.4.1.6	Bob O'Hara	T	add "A station may delete AP identities from this set using any algorithm of its choosing. The set may include fewer AP identities than the number of APs the station has encountered." to the end of the BEHAVIOUR	This implements some of the MIB agreements made at November's meeting

Accepted.

7.4.4.1.7 and 7.4.4.1.9	Tim Phipps	E	*Remove:* "The values of the numbers in the list .. 802.10".	802.10 does not define authentication algorithm numbers. Of course, someone needs to, and there should be a new section in the standard which defines at least one non-null authentication algorithm.
7.4.4.2.1	Bob O'Hara	T	delete "xxx"	not required

Accepted.

7.4.4.2.10	C. Thomas Baumgartner	t	Delete the Single_Collision_Count attribute or change its name.	It is physically impossible for the PHY's to detect collisions. Perhaps what is meant is count of number of deferrals and backoffs

Accepted.

7.4.4.2.11	C. Thomas Baumgartner	t	Delete the Multiple_Collision_Count attribute or change its name.	It is physically impossible for the PHY's to detect collisions. Perhaps what is meant is count of number of deferrals and backoffs

Accepted.

7.4.4.2.18	P. Brenner	E	Delete aLength_Mismatch_Count	There is no length in the MAC Frame (!)
7.4.4.2.18	Tim Phipps	E	*Replace:* "length field of the frame" *with* "length field within the PLCP header of the frame"	The MAC frame does not contain a length field.
7.4.4.2.18	Bob O'Hara	T	delete this attribute	out of date (also in 7.4.1.2.3, 7.4.2.2.1, 7.4.3.2.3)

Accepted.

7.4.4.2.19.	P. Brenner	T	Add aFrame_Duplicate_Count	This is an important error counter

Accepted.

7.4.4.2.19.	P. Brenner	T	Add aFragment_Duplicate_Count	This is an important error counter

Rejected. Insufficient technical detail provided to resolve comment.

7.4.4.2.19.	P. Brenner	T	Add aReceive_MSDU_Timer_Elapsed_Count	This is an important error counter

Rejected. Insufficient technical detail provided to resolve comment.

7.4.4.2.19.	P. Brenner	T	Add aTransmit_MSDU_Timer_Elapsed_Count	Important error counter.

Rejected. Insufficient technical detail provided to resolve comment.

7.4.4.2.21	Tim Phipps	T	*Delete this section.*	It makes no sense to enable, or disable, the transmitter of a MAC. There is no text in the specification explaining what this function would do if it were enabled or disabled.

Accepted.

7.4.4.2.22	Bob O'Hara	E	delete this section	missed in editing
7.4.4.2.22.	P. Brenner	T	Delete aNAV (or keep NAV Histograms)	Real time knowledge of the NAV value is useless

Accepted.

7.4.4.2.23	Bob O'Hara	E	delete this section	missed in editing
7.4.4.2.23	Wim Diepstraten	E	It should be clearly specified what the functionality of the a NAV_max attribute is intended to be.	The intention and function of this attribute is unclear.
7.4.4.2.24.	P. Brenner	E	change bytes per second to bits per second	Rate is usually specified in bits per second
7.4.4.2.26 to 28	Wim Diepstraten	E	It should be specified that the SIFS, PIFS and DIFS attributes are PHY dependent	
7.4.4.2.29	C. Thomas Baumgartner	t	Add "unless the RTS/CTS operation is set to never"	The description of RTS/CTS said that a never option existed. There needs to be an attribute for this or maybe this attribute can have a value of -1 to indicate never.

Rejected. Handshake takes this amount of time, even if you don't use it. The details of tuning RTS_Threshold are up to the implementor.

7.4.4.2.4.	P. Brenner	T	The Attribute should be divided into two attributes: aTransmitted_MPDU_Count and aTransmitted_MSDU_Count	The number of frames (MSDUs) is different from the number of fragments MPDUs

Accepted.

7.4.4.2.9	C. Thomas Baumgartner	t	Delete the Collision_Count attribute or change its name.	It is physically impossible for the PHY's to detect collisions. Perhaps what is meant is count of number of deferrals and backoffs

Accepted.

7.4.4.2.9 - .11	Tim Phipps	E	*Replace:* "Collision" *with* "Transmission failure"	Collision is only one of the several causes of tx failure (e.g. Collision, destination not receiving, ack lost). A more general-purpose terminology should be adopted.
7.4.4.2.9.	P. Brenner	E	aCollision_Count should be renamed aRetransmission_Count	Lack of ACK does not necessarily mean collision
7.4.4.2.9.	P. Brenner	T	aCollision_Count should be divided into aRTS_Retransmission_Count and aRetransmission_Count	Information about percentage of RTS retransmissions could be helpful for RTS_Threshold fine tuning.

Accepted.

7.4.4.23	Tim Phipps	T	*The "aNAV_max" attribute is not referenced elsewhere. It is not clear what its function should be.*	

Accepted. aNAV_max is gone.

7.4.5	David Bagby	T	**8. Action Templates** action templates must be specifed before sponser ballot.	See imbeded comments and annotations

Rejected. Insufficient technical detail provided to resolve comment.

7.4.5	Mahany	T	Complete this section.	Omission

Rejected. Insufficient technical detail provided to resolve comment.

7.4.5	**Siep**	**T**	**Action Templates[must be specified]**	**A standard must be complete in order to be functional.**

Rejected. Insufficient technical detail provided to resolve comment.

7.4.5.1.1	Bob O'Hara	E	replace "acIntialize_SMT" with "acSMT_Init"	
7.4.5.1.1	Bob O'Hara	T	define acSMT_Init	not defined

Rejected. Insufficient technical detail provided to resolve comment.

7.4.5.1.1	Bob O'Hara	T	define ac"SMT_Reset"	not defined

Rejected. Insufficient technical detail provided to resolve comment.

7.4.5.2	Tim Phipps	T	*This section is incomplete. Just mentioning acExecute_Self_Test here is not an adequate specification of its behaviour. .*	

Accepted. acExecute_Self_Test has been deleted, so its non-description is therefore adequate.

7.4.5.2, et seq	Bob O'Hara	T	define MAC action templates	not defined

Rejected. Insufficient technical detail provided to resolve comment.

7.4.5.2.1	Bob O'Hara	E	replace "acIntitialize_MAC" with "acMAC_Init"	
7.4.6	Bob O'Hara	T	define SMT and MAC notification templates	not defined

Rejected. Insufficient technical detail provided to resolve comment.

7.4.6	Mahany	T	Complete this section.	Omission

Rejected. Insufficient technical detail provided to resolve comment.

7.4.7	Mahany	T	Complete this section.	Omission

Rejected. Insufficient technical detail provided to resolve comment.