Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			

Results of LMSC Ballot on Draft Standard 802.11 D5.0

Resolutions for Comments on Clause 7

Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			
	7.1.1	SB	E	N	Paragraph three of this clause refers to an FCS field whereas elsewhere in this clause this field is referred to as a CRC field. There is also a necessity to define a transmission order for the WEP ICV which is also a CRC-32.	Change to clause 7.1.1 either as follows, or to capture this intent: Fields that are longer than a single octet are depicted with the least significant octet on the left. The least significant bit of each octet is defined as bit 0 for that octet and is the leftmost bit of the octet(except the FCS field) Any field containing a Cyclic Redundancy Code (CRC) shall	Recommend Accept and make appropriate change to 7.1.1
						be an exception to this convention and shall be transmitted commencing with the coefficient of this highest order term. Fields that are less than one octet in length are ordered with the least significant bit to the left.	
2	7.1.1 (also	MAF	E	(na)	The technical intent of this paragraph on bit and octet ordering is correct: All fields other than CRC	Fields that are longer than a single octet are depicted with the least	See (1 - SB) Accepted
	see				fields are to be depicted in the standard, and sent	significant octet on the left. The least	
	related				across the MAC/PLCP boundary inonformant	significant bit of each octet is defined	
	issue				implementations, least significant bit first; while	as bit 0 for that octet and is the	
	with				CRC fields are sent most significant bit first. This	leftmost bit of the octet The sole	

C	Clause your Cm			D. 4	C		Disconsisting / Debugger
Seq.		your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
<u> </u>		code	T, t	vote			
	0.2.5			1	1 1 0 CD C (1) 1 1 1 1 1 1 1 CD C 221	() () () () () () () () () ()	
	8.2.5)				ordering of CRC fields is consistent with CRC-32 in		
					other 802 protocols (and is simpler to implement in		
					most cases). However, the existing text is confusing		
					(at best) because there is not an "FCS field" defined	with the coefficient of the highest	
					in Clause 7.	order termthe FCS field). Fields that	
					The convected test in the word column does not inst	are less than one octet in length are ordered with the least significant bit to	
					The corrected text in the next column does not just replace "FCS field" with "CRC field" for 2 reasons:	the left.	
					(1) While there is a CRC field defined in 7.1.3.6,	the left.	
					there are other CRCs referenced in the standard, so		
					this change might still be ambiguous.		
					(2) The same issue exists with the ICV field defined in		
					Clause 8.2.5, which is also a 4-octet field containing		
					CRC-32 polynomial remainder.	•	
					By correcting the text as shown to the right, all of the		
					CRC-related ordering issues are covered, without		
					requiring enumeration of field names in a		
					"conventions" sub-clause.		
					(Note: This sub-clause pertains to MAC conventions	<u>.</u>	
					but the wording to the right is also correct when	,	
					applied to all CRCs in the standard, because the		
					PLCP CRC fields in all PHYs are transferred with		
					the highest order coefficient first.)		
3	7.1.1,	SB	t	N	Clause 7.1.1 relies on the depiction of fields in diagrams	Add figures for each of these fields	Accept
	7.3.1				to define the ordering convention:	(preferred) or define an ordering	_
						convention that does not depend on the	Need to draw some simple
					~~~~~	depiction of fields in figures.	pictures
					The protocol data units (PDUs) in the MAC sublayer are		
					described as a sequence of fields in specific orderEach	Figures will not fit in this column, but	
					figure in clause 7 depicts the fields as they appear in the	I would be happy to provide them if	
					MAC frame and in the order in which they are	this comment is accepted.	
					transferred, leftmost field first.		
					The sequence of octets in the fields of the MAC frame		
					forms an octet stream at the MAC/PLCPsublayer		
					boundary. The leftmost octet in each field of the MAC		

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Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal	
#	number	voter'	type	of				
		s ID	E, e,	NO				
		code	T, t	vote				
			•					
					frame is passed across the MAC/PLCP boundary first.			
					Fields that are longer than a single octet are depicted			
					with the least significant octet on the left. The least			
					significant bit of each octet is defined as bit 0 for that			
					octet and is the leftmost bit of the octet (except the FCS			
					field). Fields that are less than one octet in length are			
					ordered with the least significant bit to the left.			
					~~~~~~			
					Problem is there are no pictures for any of the fixed			
					fields in clause 7.3.1. Therefore the transmission order			
					of the following is undefined:			
					of the following is undermed.			
					Authentication Algorithm Number			
					Authentication Transaction Sequence Number			
					Beacon Interval			
					Capability Information			
					Current AP Address			
					Listen Interval Reason Code			
					Station ID (SID)			
					Status Code			
					Timestamp			
	7121	ME	Œ		C. NATE: 4.4	Design of the Atlantin State of the State of	Dananda an masalada a a C	
4	7.1.3.1.	MT	T		ref: MT_14	During the AUTHENTICATION	Depends on resolution of	
	6.1.3					process (since authentication is	comment by other section working	
	10				The strictly order service class does not accomplish	common among infrastructure and	groups.	
	9.8				the necessary goals. The current definition allows fo	,		
					a STA only to order its transmitted packets. The	not), additional information such as	Suspect decline - strictly ordered	
					requirement is that the received packets maintain	capability and requirements should	class is a per MSDU attribute not	
					order. What is needed is a method for a station to	be exchanged. At this time, a STA	a per station attribute	
					identify to all other stations of this requirement.	requiring that its incoming frames		
						be in order, would identify this		
					See also MT_15	requirement. In this way, all frames		
						from each communicating station		
						will be in order.		

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Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			
5	7.1.3.1.	MT	t		ref: MT_16	One method with minimal impact to	Probably need to add note that
	1				_	add a Reason Code to clause 7.3.1.7	frame from a new protocol
					In the case of a frame having been received with a	which states Unrecognized Version	version is notACKed
					revision level higher than is supportable, an	or Version Too High and issue a	
					acknowledgment will not be generated to the sending		A device that receives a frame
					station (this is not stated but is assumed that no ACL		with a higher revision level than
					will be sent since the frame is discarded and no	G	it supports shall discard the
					indication given to LLC layer). In this case, the	Another method is to require that all	frame without indication the
					sending station will consume unnecessary bandwidtl		sending stationor LLC.
					with retries.	reason code) the highest common	· .
					The standard should allow for a more graceful	supported version level during	Decline body of comment since a
					method.	association. Then a table must be	receiving station can make no
						maintained for each association and	assumptions about even the type
					In the case of a future access point which must	assurance that all data is sent at this	of frame it receives (note
					simultaneously support multiple versions a cleaner	level.	standard states fundamental
					method is required		incompatibility). Thus there is
					-	For the case of the access point,	no basis for a reasonable
						especially wheremulticasts and	response.
						control and management frames are	•
						concerned, the access point must	
						insure that these packets are sent at	
						the lowest common revision level of	
						all associated stations.	
						A further refinement (and probably	
						necessary) is to guarantee that ALL	
						FUTURE control and management	
						frames are sent at the current	
						revision level, otherwise old	
						equipment will notinteroperate with	
						the newer. (if an RTS/CTS exchange	
						is sent at a higher version level, and	
						they are dropped, so much for	
						virtual CCA, etc.)	
6	7.1.3.1.1	TLP	e		The existing wording is inadequate to handle the	Change "between a new revision and thi	S Accept
ľ	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					revision" to "between a new revision and	-
					12.adonomps among 12 riolons of this standard.	a prior revision".	-
						a pilot levision .	

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Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			
			,				
7	7.1.3.1.	MT	T		ref: MT_17	AUTHENTICATION.request,	The standard specifies a
	3					ASSOCIATION.request frames	number of functions that allow a
	7.1.3.1.				The TO_DS and FROM_DS bits should be allowed t	o from a repeater (or Wireless AP)	station to support wireless
	4				be used in control packets. In particular, these bits	should set the FROM_DS bit to	distribution system traffic.
	8.x.x.x				could identify a wireless access point which is	identify themselves as such.	What is left to theimplementor
					operating in a repeater function. The repeater upon	Appropriate authentication methods	
					association to another access point could identify	(those as established for the	This comment refers to the
					itself as part of the (wireless) distribution system.	distribution system by a system	distribution system not to the
					• •	administrator) can be used.	'media access' part. It is
					In this fashion, a Network administrator can	,	therefore outside the scope of
					establish a security level for the distribution system		the standard and the comment
					(such as requiring all data to be WEP encrypted) bu	t TO FM meaning	is declined
					stations can be allowed to associate to individual Ps	0 0 normal STA operation	
					using the 'clear mode'. In this case, the AP could	0 1 repeater associations	In addition, the reviewers
					filter those 'clear mode' packet requests from the	o i repeater associations	believe that this is new
					distribution system.	Appropriate hooks should be	functionality that is not felt
					Therefore, two stations can communicate in the clear		necessary at this time.
					to each other (using the services of the access point	security or the standard could	necessary at this time.
					and/or distribution system) without having access to	•	
					any other data from the distribution system.	method.	
-	7121	MT	4			define the bits to be allowed in	T1 4 1 1 10
8	7.1.3.1.	MT	t		ref: MT_18		The standard specifies a
	3				Th	AUTHENTICATION and	number of functions that allow a
	7.1.3.1.				The use of these bits during the association process	ASSOCIATION request frames.	station to support wireless
	4				(ref MT_17) would enable automatic distribution		distribution system traffic.
	8.x.x.x				systems functions.	Further refinements could be the	What is left to theimplementor
					By not defining these bits this way, the standard	addition of a required authentication	is the distribution system itself.
					cannot support interoperability among vendors	method (as establish via MIB	This comment refers to the
					supplying repeaters. Each vendor will have to resor		distribution system not to the
					to proprietary packet exchanges to establish the	for instance) and automatic	'media access' part. It is
					station as part of the distribution system.	conveyance of station capability	therefore outside the scope of
						information.	the standard and the comment
					I point out the situation of a repeater which has		is declined
					associated one or more power save stations associate	d	
					to it. The packets must be sent to the repeater for		
					queuing and delivery. Without the standard		
					specifying a way to identify a wireless distribution		
					system component, all this becomes proprietary or		

Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			
	1		I				
					left to another consortium such as the IAPP		
9	7.1.3.1.	MT	T		ref: MT_17	AUTHENTICATION.request,	Declined (see 7)
	4					ASSOCIATION.request frames	
	7.1.3.1.				The TO_DS and FROM_DS bits should be allowed t	• ,	
	3				be used in control packets. In particular, these bits	should set the FROM_DS bit to	
					could identify a wireless access point which is	identify themselves as such.	
	8.x.x.x				operating in a repeater function. The repeater upon	Appropriate authentication methods	
					association to another access point could identify	(those as established for the	
					itself as part of the (wireless) distribution system.	distribution system by a system administrator) can be used.	
					In this fashion, a Network administrator can		
					establish a security level for the distribution system		
					(such as requiring all data to be WEP encrypted) but	TO FM meaning	
					stations can be allowed to associate to individualPs	0 0 normal STA operation	
					using the 'clear mode'. In this case, the AP could	0 1 repeater associations	
					filter those 'clear mode' packet requests from the		
					distribution system.	Appropriate hooks should be	
					Therefore, two stations can communicate in the clear	provided to allow various levels of	
					to each other (using the services of the access point	security or the standard could	
					and/or distribution system) without having access to	simply adopt a single authentication	
					any other data from the distribution system.	method.	
10	7.1.3.1. 4	MT	t		ref: MT_18	define the bits to be allowed in AUTHENTICATION and	Declined (see 8)
	7.1.3.1.				The use of these bits during the association process	ASSOCIATION request frames.	
	3				(ref MT_17) would enable automatic distribution	•	
	8.x.x.x				systems functions.	Further refinements could be the	
					By not defining these bits this way, the standard	addition of a required authentication	
					cannot support interoperability among vendors	method (as establish via MIB	
					supplying repeaters. Each vendor will have to resor	t variables of a system administrator,	
					to proprietary packet exchanges to establish the	for instance) and automatic	
					station as part of the distribution system.	conveyance of station capability	
					-	information.	
					I point out the situation of a repeater which has		
					associated one or more power save stations associate	d	
					to it. The packets must be sent to the repeater for		
					queuing and delivery. Without the standard		
			1	1	cneaifying a way to identify a wineless distribution		

specifying a way to identify a wireless distribution

Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			
	1						
					system component, all this becomes proprietary or		
					left to another consortium such as the IAPP		
11	7.1.3.1.	SD	t		Nothing is said about the Control Type frame.	Add	Accept spirit of comment.
	6					« Control Type frame Retry field is	Reviewers feel that this clause is
						always set to zero.»	missing the 'It shall be set to 0
							in all other frames' phrase.
							Suggest that this be added.
12	7.1.3.1.7	TLP	e		The second occurrence of the word "shall" in each of thes	ε	Accept.
					sentences is incorrect. "Shall" is legislative; "will" is	describing the state in which the station	
					predictive. This sentence and the following sentence make		Change made in markup
					predictions. Therefore "will" is correct in each second	(three occurrences)	
					occurrence (which is a rare instance in a standard).		
13	7.1.3.1.	AS	e	\mathbf{y}	This clause implies that the more data field is only se		One of the many places in the
	8				for directed frames when moreMSDUs are present.	second paragraph to:	standard where MSDU is stated
						"A value of 1 shall indicate that at	but what is really meant is
						least one additional buffered MSDU	MSDU or MMPDU. More than
						or MMPDU is present for the same	this single change needs to be
						STA."	made within this sub-clause.
							Accept.
14	7.1.3.1.	MAF	E	(na)	There is an inconsistency between the blanket	The More Data field shall be one bit in	Accept.
**	8	171111		(Hu)	statement in 7.1.3.1.8 that "The More Data field shall		Песери
					be set to 0 in all other directed frames." and the	a STA in Power Save mode that more	
					allowable (may, not shall) use of the More Data bit in		
					CF-Poll responses (explicitly in clause 9.3.3.5,	the AP. The More Data field shall be	
					indirectly in other PCF operation text). This	valid in directed Data Type frames	
					inconsistency seems to have grown progressively	transmitted by an AP to an STA in	
					since about D2.0, as independent, comment resolutio		
					work proceeded inparrallel for clauses 7, 9, and 11.	indicate that at least one buffered	
					* * *	MSDU is present. The More Data	
					The principle that the More Data (then called just	field may be set to a value of lin	
					"More" because fragmentation had not yet been	directed Data type frames transmitted	
					adopted) was useful for to-AP transfers during the	by a CF-Pollable STA to the Point	
					contention free period has been around since the	Coordinator (AP) in response to a CF-	
					adoption of the proposals in submission 94-283	Poll to indicate that the STA has at	
					("Liberating the More Function") in November,	least one additional buffered MSDU	
					1994. The text at that time, as well as at the time of	available for transmission in response	

Clause Voter Vot		HUVCIII	X CI I /				D		
the PCF cleanup adopted from submissions 95-140 and 95-150 in July, 1995, did not deal directly with clause 7 (then 4), because the exclusion of other instances of frames with More Data = 1 did not yet appear there. The simplification of power save modes wasoccuring parallel during May and July, 1995, which had a side effect of removing some of the (implicit) supporting text in clause 11 (then 8). At this point, the simplest, and most direct, way to fit this inconsistency is the text change shown to the right. This correction does not impact fundamental interoperability, because the additional allowed uses not mandatory ("may be set."), so a CPollable STA that always transmitted More Data = 0 would be able to communicate with an AP that interpreted and used More Data = 1 in CE-Poll responses. The same situation pertains in the reverse case of an STA which sets More Data = 1 and a point coordinator which does not behave differently when a CE-Poll response includes More Data = 1. The same wording is needed in both sentences — either buffered bondacastimulicast. I can't tell which was originally intended. However, the use of the word "buffered" may require prefatory explanation, so deletion scens to be the preferred choice. The Table 3. "(in microseconds from end of this mark) as the end of the last octet of the MAC frame. The wording is unclear in the last sentence Change "in the RTS frame" to "in the corresponding RTS frame" Comment accepted. This sentence should end similarly to Source Address in the text "in the transmitter" Accept This sentence should end similarly to Source Address in the text "in the transmitter" Accept		Clause	·	Cmnt		Comment/Rationale	Recommended change	Disposition/Rebuttal	
the PCF cleanup adopted from submissions 95-140 and 95-150 in July, 1995, did not dead directly with clause 7 (then 4), because the exclusion of other instances of frames with More Data =1 did not yet appear there. The simplification of power save modes wasoccuring parallel during May and July, 1995, which had a side effect of removing some of the (implicit) supporting text in clause 11 (then 8). At this point, the simplest, and most direct, way to fix this inconsistency is the text change shown to the right. This correction does not impact fundamental interoperability, because the additional allowed use is not mandatory ("may be set"), so a CPollable STA that always transmitted More Data =1 would be able to communicate with an AP that interpreted and used More Data =1 in CF-Poll responses. The same situation pertains in the reverse case of an STA which sets More Data =1 and a point coordinator which does not behave differently when a CF-Poll responses. The same situation pertains in the reverse case of an STA which dest More Data =1. The same wording is needed in both sentences—either buffered broadcastmulticast. I can't tell which was originally intended. However, the use of the word "buffered" may require prefatory explanation, so deletion seems to be the preferred choice. To Table 3. "(In microseconds from end of this mark) as the end of this frame" is not defined and gives no actual physical event from which to start counting time. The Wording is unclear in the last sentence. Change "in the RTS frame" Accept. Change "in the RTS frame" Accept. Change "in the RTS frame" Accept. The wording is unclear in the last sentence. Change "in the RTS frame" Comment accepted. Accept Change "in the RTS frame" Comment accepted. This sentence should end similarly to Source Address. Either text "in the transmitter. Accept Change "in the RTS frame" Comment accepted. The wording is unclear in the last sentence. Change "in the RTS frame" Comment accepted. The contraction of the MAC frame. Accept Change "in	#	number							
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and 95-150 in July, 1995, did not dead directly with clause 7 (then 4), because the exclusion of other instances of frames with More Data = 1 did not yet appear there. The simplification of power save modes wasocuring paralled during May and July, 1995, which had a side effect of removing some of the (implicit) supporting text in clause 11 (then 8). At this point, the simplest, and most direct, way to fix this inconsistency is the text change shown to the right. This correction does not impact fundamental interoperability, because the additional allowed use is not mandatory ('may be set'), so a CPollable STA that always transmitted More Data = 1 and a point coordinator which does not behave differently when a CF-Poil response. The same situation pertains in the reverse case of an STA which sets More Data = 1 and a point coordinator which does not behave differently when a CF-Poil response. The same situation pertains in the reverse case of an STA which sets More Data = 1 and a point coordinator which does not behave differently when a CF-Poil response. The same situation pertains in the reverse case of an STA which sets More Data = 1 and a point coordinator which does not behave differently when a CF-Poil response. The same situation pertains in expone includes More Data = 1. The same wording is needed in both sentences — either buffered broadcastmulticast, or simply broadcastmulticast, or simply broadcastmulticast, or simply intended. However, the use of the word 'buffered' may require prefatory explanation, so deletion seems to be the preferred choice. The same wording is needed in both sentences — either buffered may require prefatory explanation, so deletion seems to be the preferred choice. The more productive prefatory explanation, so deletion seems to be the preferred choice. The more productive prefatory explanation, so deletion seems to be the preferred choice. The more productive prefatory explanation, so deletion seems to be the preferred choice. The more productive prefatory explanation,			code	T, t	vote				
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Seq. #	Clause number	your voter' s ID code	Cmnt type E, e, T, t	Part of NO vote	Comment/Rationale	Recommended change	Disposition/Rebuttal
20	7.1.3.4	JMZ	e		Figure 14 is incorrect	the paragraph, or the text "in the source address" should be deleted from the end of the prior paragraph. "B1" should be "B15"	Decline
							Figure is consistent with conventions. Also no B1 in figure.
21	7.2.1.4 7.2.1.5 7.2.1.6	TLP	e		Figures 20 through 22	This picture and the following should be rescaled to 80% x 80%, as are the previous ones.	Accept - editors point
22	7.2.2	SB	e	N	Poor use of the Queen's English!	Data frames sent during the contention period shall use the Data Subtypes: Data, or Null Function. Data frames sent by, or in response to polling by, the Point Coordinator during the contention free period shall use the appropriate ones of the Data Subtypes based upon the usage rules	Accept
23	7.2.2	TLP	е		The acronym IFF is unacceptable.	Change "IFF" to "when".	IFF means if and onlyiff - this is not the same as when. Take the acronym out and write if and only iff - then it is not ambiguous.
24	7.2.2	TLP	e		first bullet, first item is incorrect	Change "Data+CF-Ack" to "Data+CF-Poll".	Accept
25	7.2.3 7.2.3.9 7.3.2 7.3.2.3	WD	Т	Y	Comment: For Direct Sequence, additional channel number information is needed in BEACON and PROBE-Response frames. Rationale; The defined channels are very overlapping, with a frequency spacing of only 5 MHz. Under normal conditions a receiver listening on channel x will receive a frame transmitted on channel (x +/- 1) (5 MHz apart) or even (x +/- 2) (10 MHz apart) without an error (for short messages). This is a problem in association procedures (roaming, start up). The receiver can not determine what frequency the received frame was	7.2.3.1. Change table 5 6: DS/FH Parameter Set Change note-1: Notes: 1. The DS/FH Parameter Set information element shall only be present within Beacon Frames generated by STAs using Direct Sequence or Frequency Hopping Physical Layersrespectively.	Request advice from DS PHY group. Partly accepted, see DS group minutes

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Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of		O	•
		s ID	E, e,	NO			
		code	T, t	vote			
		Coue	Ι, ι	vote			
	1 1						
					transmitted, which may subsequently result in wrong	Section 7.2.3.9, Change Table 12	
					channel settings.		
					To solve this the transmitter channel must be made	Entry 6: <u>DS/</u> FH Parameter Set	
					known to the receiver in one way or the other. The most		
					straight forward is to define a DS Parameter Set with	1. The <u>DS/</u> FH Parameter Set	
					channel # information in BEACON and PROBE-	information shall only be present	'
					Response frames, which is in line with the distribution	within Probe Response Frames	
					of the channel information in FH implementations.	generated by STAs using <u>Direct</u>	
					In this Parameter set also the channels that are actually	Sequence or Frequency Hopping	
					used in an ESS can be defined, this gives a roaming	Physical Layersrespectively.	
					station the possibility to scan a smaller set of channels.	i nysicai Layer <u>siespectivery</u> .	
					station the possibility to scan a smaller set of chamilers.	Carlina 722 A H DC Damandan	L
						Section 7.3.2 Add DS Parameter set	
						and give it element ID code 3, and	
i						move the subsequent numbers as	
						applicable.	
						Add new section behind 7.3.2.3a	
						7.3.2.3.a DS Parameter Set	
						The DS Parameter Set element shall	
						contain the set of parameters necessary	
						for channel number information. The	
						information field shall contain Current	
						Channel number and the numbers of	
						the channels used in an ESS.	
						Element ID Length Current Channel	
						ESS Ch Number	
						octets 1 1 1	
						0 - 12	
						<u>0 - 12</u> Figure 27a,	
						DS Parameter Set Element Format	
						DS Parameter Set Element Format	
						The Comment Observed City	
						The Current Channel field shall be 1	
						octets.	
						The ESS Ch Number identifies the	
						Channel numbers that are used in a	
						ESS. The field shall be between 0 and	

Note Section	ĺ	Ngyèm	ber 19	96		number information is needed in BEACON and	o. Dan ratameter det.: IEI	E_P802.1 F 90/156-4
# number voter Type STD F. c.	Seq.	Clause	•			PROBE-Response frames. Rationale: Comment/Rationale	Recommended-change	Partly accepted, see DS group Disposition/Rebuttal minutes
requency spacing of only 5 MHz. Under normal ore vent. K+ 2; 10 MHz aparty without an error (for short messages). This is a problem in association procedures (roaming, start up). The receiver can not determine what frequency the received frame was transmitted, which may subsequently result in wrong channel settings. To solve this the transmitter channel must be made known to the receiver in one way or the other. The most straight forward is to define a DS Parameter Set with channel # information in BTACON and PROBE. Response frames, which is in line with the distribution of the channel information in HT implementations. In this Parameter set of the straight in the possibility to scan a smaller set of channels. In the parameter set of channels station the possibility to scan a smaller set of channels. Add new section behind 7.3.2.3a 7.3.2.3.a DS Parameter Set and give it element ID clear than a move the subsequent numbers as applicable. Add new section behind 7.3.2.3a 7.3.2.3.a DS Parameters Set Set Element Bull contain the set of parameters recessary for channel number information. The information field shall be cetter. The DSF H Parameter Set information shall only be present within Probe Response Frames generated by STAs using Direct Sequence of Trequency Hopping Physical Layergespectively. Section 7.3.2 And DS Parameter set and give it element ID code 3, and move the subsequent numbers as applicable. Add new section behind 7.3.2.3a 7.3.2.3.a DS Parameter Set Element Shall contain the set of parameters necessary for channel number information. The information field shall be located. Lement ID Length Current Channel leSS Ch Number identifies the Channel moment and the properties of the parameter set and the parameter set and the subsequent number and the pumbers of the channels used to the parameter set and the parameter set	#	number						mmates
a frame transmitted on channel (x + /- 1) (S MHz apart) or even (x + /- 2) (10 MHz apart) without an error (for short messages). This is a problem in succinition procedures (roaming, start up). The receiver can not determine what frequency the received frame was transmitted, which may subsequently result in wrong channel settings. To solve this the transmitter of channel must be made known to the receiver in one way or the other. The most straight froward is to define a DS Parameter's et with channel # information in BIACOV and PROBIT-Response frames, which is in line with the distribution of the channel information in BIACOV and PROBIT-Response frames, which is in line with the distribution of the channel information in Hinplementations. In this Farameter set also the channels that are actually used in an ESS can be defined, this gives a roaming station the possibility to scan a smaller set of channels. Add new section behind 7.3.2.3 a drop Parameter set and give it element ID code 3, and move the subsequent numbers as applicable. Add new section behind 7.3.2.3 a 7.3.2.3. DS Parameter Set The DS Parameter Set II element ID code 3, and move the subsequent numbers of the channels under the promoter of the channel number information. The information field the number of the channel numbers of the channels under the promoter of the channel number of the channel number of the channel number of the channel state of parameters of the channels under the channels under an a ESS. Element ID Length Current Channel Institute of the channels under its and the cotten. The Current Channel field shall be 1 octed. The List of the promoter of the length of the cotten. The Current Channel field shall be 1 octed. The SSS Ch Number identifies the Channel numbers that are used in a ESS. The field between 0 and								
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short messages). This is a problem in association procedures (roaming, start up). The receiver can not determine what frequency the received frame was transmitted, which may subsequently result in wrong channel settings. To solve this the transmitter channel must be made known to the receiver in one way or the other. The most straight forward is to define a DS Parameter Set with Channel information in BHACON and PROBE. Response frames, which is in line with the distribution of the channel information in FH implementations. In this Parameter set also the channels that are actually used in an ESS can be defined, this gives a roaming station the possibility to scan a smaller set of channels. Section 7.2.3.2 Add DS Parameter Set and give it element ID code 3, and move the subsequent numbers an applicable. Add new section behind 7.3.2.3a 7.3.2.3.a DS Parameter Set The DS Parameter Set The DS Parameter Set element shall contain the set of parameters information. The information field shall contain Current Channel number and the numbers of the channels used in an ESS. Element ID Length I Current Channel lESS Ch Number octets The Current Channel field shall be doctors. The ESS Ch Number identifies the Channel numbers that are used in a SS. The field be between 0 and 1.5 SS. The field	i					a frame transmitted on channel (x +/- 1) (5 MHz apart)	-	
procedures (roaming, start up). The receiver can not determine what frequency the received frame was transmitted, which may subsequently result in wrong channel settings. To solve this the transmitter channel must be made known to the receiver in one way or the other. The most straight forward is to define a DS Parameter Set with channel # information in BEACON and PROBE. Response frames, which is in line with the distribution of the channel information in FH Implementations. In this Parameter set also the channels that are actually used in an ESS can be defined, this gives a roaming station the possibility to sean a smaller set of channels. Section 7.2.3 Add DS Parameter Set and give it element ID code 3, and move the subsequent numbers as applicable. Add new section behind 7.3.2.3a 7.3.2.3 a DS Parameter Set element shall contain the set of parameters necessary for channel number information. The information field shall contain Current Channel numbers of the channel sused in an ESS. Element ID Length Current Channel IESS Ch Number October 1 October 2 October 3 Oct								
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Element ID Length Current Channel ESS Ch Number octets								
ESS Ch Number octets 1 1 1 1 O - 12								
octets 1 1 1 0 - 12 Figure 27a, DS Parameter Set Element Format The Current Channel field shall be 1 octets. The ESS Ch Number identifies the Channel numbers that are used in a ESS. The field shall be between 0 and								
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Figure 27a, DS Parameter Set Element Format The Current Channel field shall be 1 octets. The ESS Ch Number identifies the Channel numbers that are used in a ESS. The field shall be between 0 and								
The Current Channel field shall be 1 octets. The ESS Ch Number identifies the Channel numbers that are used in a ESS. The field shall be between 0 and							l ————	
octets. The ESS Ch Number identifies the Channel numbers that are used in a ESS. The field shall be between 0 and							DS Parameter Set Element Format	
The ESS Ch Number identifies the Channel numbers that are used in a ESS. The field shall be between 0 and							The Current Channel field shall be 1	
Channel numbers that are used in a ESS. The field shall be between 0 and							l 	
ESS. The field shall be between 0 and								
		I MCC D	allot D	5.0 Pa	e o luti	ons for Comments on Clause 7 page 11		air Lucant Tachnologias

Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of	Comment Rationale	Recommended change	Disposition/Reductar
"	number	s ID	E, e,	NO			
		code	T, t	vote			
		code	Ι, ι	vote		<u> </u>	
26	7.2.3.10	GMG	Т	Y	Given that Authentication is considered useless in an	Delete the Shared Key	Clause 8 issue - deferred
					environment which does not provide confidentiality.		
	7.3.1.1				because without confidentiality, a station can always		
	8.1.2				pretend to be an other station by using its address as		
					a false identity source address.	Change 8.1 as follows:	
						- · · · · · · · · · · · · · · · · · · ·	
					The "Shared Key Authentication" method should be	802.11 currently defines only	
					deleted from the standard, because it does not	onedefines two subtypes_of	
					provide any additional authentication level above th		·
					"Open System Authentication" with WEP enabled	and "Shared Key". The subtype	
					for data transfers.	invoked is indicated in the body of	
					Frames that do not have the proper WEP key (ICV i		
					wrong) are not forwarded to the DS.	Thus authentication frames are self	
					The fact that the stations have the proper WEP key	identifying with respect to	
					that has been distributed (supposedly in a secure	authentication algorithm.	
					way, which is outside the scope of this standard) is a	n	
					implicit form of authentication.		
					Shared Key Authentication depends on both sides	Therefore delete section 8.1.2	
					having the same WEP key. This is exactly equivalen		
					to the implicit authentication that is achieved with	optional in section 8.1.2.	
					the "Open Authentication", combined with WEP on		
					for all data traffic.	Change Table 14 by deleting all	
					This does also rely on both sides having the same	Shared Key entries.	
					correct key.	CI (7011 6 D	
					Therefore there is no justification for the additional	Change section 7.3.1.1 as follows:	
					complexity, and or the considerable additional delay		
					during reassociation, or the complexity of the pre-	Number = 0: Open	
					authentication.	System Authorization Algorithm	ı
						<u>Authentication Algorithm</u> Number = 1: Shared Key	
						All other values of	
						All other values of Authentication Number shall	
						be reserved.	
						oc reserved.	
27	7.2.3.2	TLP	e		This subclause needs to have wording parallel to the	Change to read "The Frame Body of a	Accept
					following clauses, as indicated.	Management Frame of Subtype ATIM	_

Seq. #	Clause number	your voter' s ID	Cmnt type E, e,	Part of NO	Comment/Rationale	Recommended change	Disposition/Rebuttal
		code	T, t	vote			
						shall be null."	
28	7.2.3.9 7.2.3 7.3.2 7.3.2.3	WD	T	Y	Comment: For Direct Sequence, additional channel number information is needed in BEACON and PROBE-Response frames. Rationale; The defined channels are very overlapping, with a frequency spacing of only 5 MHz. Under normal conditions a receiver listening on channel x will receive a frame transmitted on channel (x +/- 1) (5 MHz apart) or even (x +/- 2) (10 MHz apart) without an error (for short messages). This is a problem in association procedures (roaming, start up). The receiver can not determine what frequency the received frame was transmitted, which may subsequently result in wrong channel settings. To solve this the transmitter channel must be made known to the receiver in one way or the other. The most straight forward is to define a DS Parameter Set with channel # information in BEACON and PROBE-Response frames, which is in line with the distribution of the channel information in FH implementations. In this Parameter set also the channels that are actually used in an ESS can be defined, this gives a roaming station the possibility to scan a smaller set of channels.	7.2.3.1. Change table 5 6: DS/FH Parameter Set Change note-1: Notes: 1. The DS/FH Parameter Set information element shall only be present within Beacon Frames generated by STAs using Direct Sequence or Frequency Hopping Physical Layersrespectively. Section 7.2.3.9, Change Table 12 Entry 6: DS/FH Parameter Set	See (25)

	Novem	<i>5</i> C1 1 <i>7</i>		1		00C.: 1EEE P802.11-90/150-4		
Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal	
#	number	voter'	type	of				
		s ID	E, e,	NO				
		code	T, t	vote				
						the channels used in an ESS.		
						Element ID Length Current Channel		
						ESS Ch Number		
						<u>octets 1 1 1</u>		
						<u>0 - 12</u>		
						Figure 27a,		
						DS Parameter Set Element Format		
						The Current Channel field shall be 1		
						octets.		
						The ESS Ch Number identifies the		
						Channel numbers that are used in a		
						ESS. The field shall be between 0 and		
						12 octets. If no ESSCh Number is		
						specified then all Channels are used. If		
						the value of the first octet of the ESS		
						Ch Number field is 0 then only the		
						Current channel is used.		
29	7.3.1	SB	t	N	Clause 7.1.1 relies on the depiction of fields in diagrams		See (3)	
	7.1.1,				to define the ordering convention:	(preferred) or define an ordering		
						convention that does not depend on the		
					~~~~~~	depiction of fields in figures.		
					The protocol data units (PDUs) in the MAC sublayer are			
					described as a sequence of fields in specific orderEach	Figures will not fit in this column, but		
							1	
						this comment is accepted.		
					transferred, leftmost field first.			
					The sequence of octets in the fields of the MAC frame			
					• • • • • • • • • • • • • • • • • • • •			
					,			
					Fields that are longer than a single octet are depicted			
					with the least significant octet on the left. The least			
					significant bit of each octet is defined as bit 0 for that			
					figure in clause 7 depicts the fields as they appear in the MAC frame and in the order in which they are transferred, leftmost field first.  The sequence of octets in the fields of the MAC frame forms an octet stream at the MAC/PLCPsublayer boundary. The leftmost octet in each field of the MAC frame is passed across the MAC/PLCP boundary first.  Fields that are longer than a single octet are depicted with the least significant octet on the left. The least	I would be happy to provide them if this comment is accepted.		

	Novem	Æ F 002.11-90/130-4					
Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			
				1			
					octet and is the leftmost bit of the octet (except the FCS		
					field). Fields that are less than one octet in length are		
					ordered with the least significant bit to the left.		
					~~~~~		
					Problem is there are no pictures for any of the fixed		
					fields in clause 7.3.1. Therefore the transmission order		
					of the following is undefined:		
					Authentication Algorithm Number		
					Authentication Transaction Sequence Number		
					Beacon Interval		
					Capability Information		
					Current AP Address		
					Listen Interval		
					Reason Code		
					Station ID (SID)		
					Status Code		
1					Timestamp		
20	5 011	CNIC	/ID	T 7			G (26)
30	7.3.1.1	GMG	T	Y	Given that Authentication is considered useless in an	•	See (26)
	8.1.2				environment which does not provide confidentiality	Authentication method from the	
	7 2 2 10				because without confidentiality, a station can always		
	7.2.3.10				pretend to be an other station by using its address as		
					a false identity source address.	Change 8.1 as follows:	
					The "Shared Vey Authentication" method should be	202 11 currently defines only	
					The "Shared Key Authentication" method should be deleted from the standard, because it does not	one defines two subtypes of	
					provide any additional authentication level above the		
					"Open System Authentication" with WEP enabled	and "Shared Key". The subtype	
l 1					for data transfers.	invoked is indicated in the body of	
					Frames that do not have the proper WEP key (ICV i		
					wrong) are not forwarded to the DS.	Thus authentication frames are self	
					The fact that the stations have the proper WEP key	identifying with respect to	
					that has been distributed (supposedly in a secure	authentication algorithm.	
					way, which is outside the scope of this standard) is a		
					implicit form of authentication.	-	
<u> </u>				<u> </u>	implicit form of authoritication.		

	Novem	Æ P802.11-90/150-4					
Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			
					Shared Key Authentication depends on both sides having the same WEP key. This is exactly equivalen to the implicit authentication that is achieved with the "Open Authentication", combined with WEP on for all data traffic. This does also rely on both sides having the same correct key. Therefore there is no justification for the additional complexity, and or the considerable additional delay during reassociation, or the complexity of the preauthentication.	optional in section 8.1.2. Change Table 14 by deleting all Shared Key entries. Change section 7.3.1.1 as follows: Authentication Algorithm Number = 0: Open System	
						_Authentication Algorithm Number = 1: Shared Key All other values of Authentication Number shall be reserved.	
31	7.3.2 7.2.3 7.2.3.9 7.3.2.3	WD	T	Y	Comment: For Direct Sequence, additional channel number information is needed in BEACON and PROBE-Response frames. Rationale; The defined channels are very overlapping, with a frequency spacing of only 5 MHz. Under normal conditions a receiver listening on channel x will receive a frame transmitted on channel (x +/- 1) (5 MHz apart) or even (x +/- 2) (10 MHz apart) without an error (for short messages). This is a problem in association procedures (roaming, start up). The receiver can not determine what frequency the received frame was transmitted, which may subsequently result in wrong channel settings. To solve this the transmitter channel must be made known to the receiver in one way or the other. The most straight forward is to define a DS Parameter Set with channel # information in BEACON and PROBE-Response frames, which is in line with the distribution	7.2.3.1. Change table 5 6: DS/FH Parameter Set Change note-1: Notes: 1. The DS/FH Parameter Set information element shall only be present within Beacon Frames generated by STAs using Direct Sequence or Frequency Hopping Physical Layersrespectively. Section 7.2.3.9, Change Table 12 Entry 6: DS/FH Parameter Set information shall only be present within Probe Response Frames	See (25)

	Novem	~ · ·	<i>,</i> ,			UUC.: 1EEE F 002.11-90/150-4		
Seq. #	Clause number	your voter' s ID	Cmnt type E, e,	Part of NO	Comment/Rationale	Recommended change	Disposition/Rebuttal	
<u></u>		code	T, t	vote				
					of the channel information in FH implementations. In this Parameter set also the channels that are actually used in an ESS can be defined, this gives a roaming station the possibility to scan a smaller set of channels.	generated by STAs using Direct Sequence or Frequency Hopping Physical Layersrespectively. Section 7.3.2 Add DS Parameter set and give it element ID code 3, and move the subsequent numbers as applicable. Add new section behind 7.3.2.3a 7.3.2.3.a DS Parameter Set The DS Parameter Set element shall contain the set of parameters necessary for channel number information. The information field shall contain Current Channel number and the numbers of the channels used in an ESS. Element ID Length Current Channel ESS Ch Number octets 1 1 1 1 0-12		
32	7.3.2.1	AS	t	y	There appears to be no good technical reason to pad	Remove the restriction on N1 and N2	Group religious war	

November 1996 doc.: IEEE P802.11-96/156-4

Clause your Count Part Comment/Patiengle Recommended change Disposition/Rebuttel

Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			
					TIM elements so that they are an even number of	being even.	
- 22	- 2 2 4				bytes.	A 11 1 11	
33	7.3.2.1	TLP	e		It would be useful to have a table or figure illustrating the Bitmap Control octetsubformat.	Add such a table or figure.	A nice to have but since only two fields (one a single bit field)
					Bitinap Control octorsatolormat.		declined
34	7.3.2.3	WD	T	Y	Comment: For Direct Sequence, additional channel	7.2.3.1. Change table 5	See (25)
	7.2.3				number information is needed in BEACON and	6: <u>DS/</u> FH Parameter Set	
	7.2.3.9 7.3.2				PROBE-Response frames. Rationale;	Change note-1:	
	1.3.2				The defined channels are very overlapping, with a	Notes:	
					frequency spacing of only 5 MHz. Under normal	1. The <u>DS/</u> FH Parameter Set	
					conditions a receiver listening on channel x will receive	information element shall only be present within Beacon Frames	
					a frame transmitted on channel $(x +/-1)$ (5 MHz apart)	generated by STAs using <u>Direct</u>	
					or even $(x +/- 2)$ (10 MHz apart) without an error (for short messages). This is a problem in association	Sequence or Frequency Hopping	
					procedures (roaming, start up). The receiver can not		
					determine what frequency the received frame was transmitted, which may subsequently result in wrong	Section 7.2.3.9, Change Table 12	1
					channel settings. To solve this the transmitter channel must be made	Entry 6: <u>DS/</u> FH Parameter Set	
			To solve this the transmitter channel must be made known to the receiver in one way or the other. The most straight forward is to define a DS Parameter Set with channel # information in BEACON and PROBE-Response frames, which is in line with the distribution of the channel information in FH implementations. In this Parameter set also the channels that are actually used in an ESS can be defined, this gives a roaming	1. The <u>DS/FH</u> Parameter Set information shall only be present within Probe Response Frames generated by STAs using <u>Direct Sequence or Frequency Hopping Physical Layersrespectively.</u>			
					station the possibility to scan a smaller set of channels.	Section 7.3.2 Add DS Parameter set and give it element ID code 3, and move the subsequent numbers as applicable.	
						Add new section behind 7.3.2.3a	
						7.3.2.3.a DS Parameter Set The DS Parameter Set element shall	

_	Novem	DCI I)		1		uoc IEEE F 002.11-90/150-4			
Seq. #	Clause number	your voter' s ID code	Cmnt type E, e, T, t	Part of NO vote	Comment/Rationale	Recommended change	Disposition/Rebuttal		
						contain the set of parameters necessary for channel number information. The information field shall contain Current Channel number and the numbers of the channels used in an ESS. Element ID Length Current Channel ESS Ch Number octets			
35	7.3.2.3, 11.1.5, 13.1.4.4 4, 13.1.4.4 5, 14.8.2	SB	t	N	Dwell time related MIB attributes are a complete mess in terms of units. 13.1.4.4 definesaMaxDwellTime and aCurrentDwellTime in nanoseconds (!), the default values in 14.8.2 are in milliseconds and the comparison to a TSF timer value in 11.1.5 is to a time in microseconds. Lastly the value for the dwell time in the FH Parameter set element (7.3.2.3) is inKmicroseconds.	parameter set. It also makes the TSF	Accept Needs to be sorted but section 7 is OK it is 11, 13 and 14 that need to be brought into line.		

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Seq.	Clause	your	Cmnt	Part	Comment/Rationale	Recommended change	Disposition/Rebuttal
#	number	voter'	type	of			
		s ID	E, e,	NO			
		code	T, t	vote			
						(399.360ms)	
						aCurrentDwellTime should be inKus	
						an be a default value of 20.	
36	7.x.x.x	MT	T		referencing MT_17 and MT_18, it is noted that		The standard specifies a
					support of a wireless distribution must be considered	I	number of functions that allow a
					proprietary unless appropriate steps are taken here.		station to support wireless
							distribution system traffic.
					In addition to the association process being		What is left to theimplementor
					standardized, a wireless access point must have a		is the distribution system itself.
					means to share its 'association table' with access		This comment refers to the
					point higher on the network tree. Without the		distribution system not to the
					sharing of associated station information up the tree	,	'media access' part. It is
					it is not possible for packets to be efficiently routed.		therefore outside the scope of
							the standard and the comment
							is declined.