

Seq. #	Section number	your initials	Cmnt type E, e, T, t	Part of NO vote	Corrected Text/Comment	Rationale	Disposition/Rebuttal
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Section 3 comments from Ballot on Draft Standard D2 (Vic Hayes, Chair, AT&T WCND)

1	1.X, 2.X, 3.X 4.X, 5.X, 6.X 7.X 8.X	BD	E	N	<p>My editorial comments are contained in the files D2lb_edx.doc (where x is the relevant major section number) which were submitted along with this ballot response.</p> <p>All comments in these files are purely 100% editorial in nature (incorrect fonts, extra blank lines, misformatting etc). Any change for which there was any question in my mind that anyone might think it other than editorial, I have included as separate comment in this table.</p>	<p>Doc D2 is of Insufficient quality.</p> <p>1) There are numerous editorial errors in the D2 draft which need to be corrected before the draft can be forwarded for sponsor ballot. The editorial errors range from incorrect fonts in the middle of sentences & page formatting to a dire need to have a spelling check run on the document.</p> <p>2) While no single item is enough to prevent forwarding of the draft, in aggregate they impact the draft quality to such an extent that it would be embarrassing to forward it in this state. I have forwarded to the editors a marked up copy of the draft showing the editorial errors I noticed during review (this was at the editors request, for various obscure reasons a hard copy was requested over an electronic copy as being easier to deal with in this instance).</p> <p>3) Additionally all the section X.X, Y.Y etc place holder in the text need to be found and changed to correct section references.</p>	editorial commnets accepted.
2	3	ZV	e		<p>Clause 3 should be labeled "Definitions." Each definition should be numbered, e.g., 3.1, 3.2, 3.3, etc. Definitions must be in the form of a clause rather than a full sentence. Fix definitions for ad-hoc network, infrastructure, MSDU, mobile station, and portable station. I don't believe that any definitions should appear again in the "Architecture Components" clause on page 12, and again on page 13.</p>		refer to editors
3	3.1.1	ZJ	e		<p>Replace "X.X" with "5.1"</p>		no such ref in 3.1.1...?

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4	3.1.2	TM	e		if sentence is kept, change to read ... support for time bounded services <u>is</u> also optional.	consistency with previous sentence and proper grammar	corrected
5	3.1.2	EG	t		remove "Maintaining time bounded services within an ESS shall be supported"	sentence makes no sense in light of optionality of PCF	corrected
6	3.1.2	TM	t/e		two sentences seem to conflict Maintaining time bounded services within an ESS shall be supported. Since the PCF is optional, support for Time-Bounded Services are also optional.	which statement is correct?	corrected
7	3.1.2	FMi	t	N	<u>Time-Bounded services may be provided by future extensions to the 802.11 MAC. The MSDU delivery functions available using are implemented within the Point Coordination Function (PCF), in conjunction with as connection-mode-based data transfer services. An encoding is defined for representing connection identifiers within MAC headers, and reserved management frame subtypes are available for connection and disconnection control. These mechanisms allow for the implementation of time bounded connections which may be</u> The access point adds connections to the polling list in a best attempt to maintain the requested connection. maintained ing time bounded services within an ESS (e.g. through BSS transition mobility).shall be supported. Since the PCF is optional, support for Time-bounded Services are also optional.	Consistency with the decisions made at the last several meetings to remove the incomplete and inconsistent vestiges of old TBS proposals.	partially adopted. The removal of vestiges is done. The description of what might be is inappropriate in the draft - this could be in an informative annex, but the normative sections can only describe what is, not what may be. referred to editors to create an informative annex with this information.
8	3.1.2	DW	E	Y	It should be made clear that the current version of the standard does not specify connection based data transfers.	Make omission of TBS explicit.	see comment 8 resolution
9	3.1.3	GE	e		remove X.X in last paragraph.		corrected
10	3.1.3	BTh	e		change in 3rd line... Station-to-Station_data substitute for X.X... 5.1	typo best authentication reference I found	corrected

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11	3.1.3	MB	e		1st paragraph should reference the reference model 2.7 instead of 2.4 4th paragraph ...information as described in X.X-5		corrected
12	3.1.3	TM	e		... Wired Equivalency Privacy (WEP) mechanism.	remove 'hereafter referred to as' because this abbreviation has been introduced previously in the document	declined
13	3.1.3	TM	e		add space Station-to-Station data ... change 3 occurrences of sub-layer to sublayer change ... in the reference model-2.4.		corrected
14	3.1.3	WR	e		Define clause X.X in next to last paragraph	Incomplete reference	corrected
15	3.1.3	ws	e		should "reference model - 2.4" read "reference model - figure 2.11"		corrected
16	3.1.3	ws	e		the reference "Layer 2" is unclear		corrected
17	3.1.3	DW	e		Update "reference model - 2.4" reference.	Which one is intended?	2.11 - corrected
18	3.1.3	DW	e		Shouldn't this section be named Privacy instead of security.	We do not provide SECURITY, but Privacy.	Two different security services are Authentication and Privacy - both are referred to in this section so the title seems correct.
19	3.1.3	HDA	e	N	During the authentication exchange, parties A and B exchange authentication information as described in X.X.	Identify X.X	corrected
20	3.1.3	BD	T	N	Threats protected against are: 1) unauthorized disclosure; 2) unauthorized resource use; and 3) masquerade.	The section shown at the left is partially, technically incorrect. WEP does not provide absolute protection against the threats listed. Changing the intro phrase to include the wording "...partially protected against..." would make it better. However doing so would simply open a larger can of worms trying to quantify "partially". Since the snippet of text is not really relevant to the content of the section, I believe	accepted.

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						the best thing to do is to simply delete the sentence. This change is shown to the left.	
21	3.1.3	SA	t	N	WEP does not protect against masquerade		accepted.
22	3.1.4	BA	E		TITLE: <u>MSDU</u> s--MPDU <u>s</u>	Paragraph talks about reordering of MSDUs , not MPDUs.	corrected
23	3.1.4	DW	e		Change MPDU by MSDU.		corrected
24	3.1.4	SA	t		change Reordering of MPDUs to Reordering of MSDUs	The MAC cannot reorder MPDUs	corrected
25	3.1.4	BSi	t	N	Review decision to allow MAC to re-order MSDUs	Doesn't LLC Type 2 break if you re-order MSDUs since control frames can now arrive out of order ?	MSDU reordering is specifically allowed for 802 MAC layers, at the same time, it is not encouraged. Please refer to previous mtg minutes for exact references. the 802.11 Mac does not try to reorder MSDUs, but is cannot guarentee ordering either (DS effects etc). What LLC type 2 does in this case is not known personally by the comment reviewers, it is assumed that 802.2 did their job and created an LLC that appropriately handles permitted MAC layer behavior - if not, it is a LLC spec problem not a MAC spec problem.
26	3.1.4	DM	T	N	Need to define reordering rules for MSDU's. MAC needs to be capable of servicing more than 1 MSDU simultaneously. This topic is too complicated for simple text inclusion and should be discussed in committee.	802.11 should provide for MSDU reordering. This would allow allow for the situation where one MPDU of an MSDU is in back-off due to poor coverage by the destination station while another MPDU of another MSDU is forwarded to a station that is in good coverage. This is critical for infrastructure systems. If this is not defined then all traffic to a BSA from an AP will be held back due to marginal coverage to one of	MSDU reordering is specifically allowed for 802 MAC layers, at the same time, it is not encouraged. Please refer to previous mtg minutes for exact references. the 802.11 Mac does not try to

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						the STAs. The end result is unacceptable 802.11 performance since there will always be devices in the fringe of the BSA. MSDU reordering should not be allowed on a per destination basis since this could cause incompatibilities with existing NOS'.	reorder MSDUs, but is cannot guarantee ordering either (DS effects etc). No specific change requested or provided as proposed draft text. No change made as result.
27	3.2.1	FMi	T	N	Add sub-section, 3.2.1.3 MA_UNITDATA_STATUS.indication The text for this sub-section is found in document Clause 1 of document 95-222.	There are status (error) conditions resulting from parameter combinations in the MA_UNITDATA.request primitive which the MAC Data Service state machine can detect, but the current service interface provides no way to report. The LLC sublayer/MAC sublayer interface specified in 802.2, 1994 Edition provides a status indication primitive for this purpose (clause 2.3.2.3 in the ISO/IEC version of this standard). I strongly believe that 802.11 should support this primitive, given the existence of relevant status to report — its absence to date probably is due to the fact that the 1989 edition of 802.2 did not provide a status reporting indication at the LLC/MAC interface.	adopted with wording changes to match 1994 802.2
28	3.2.1 4.1.2.1	DW	T	Y	Add a separate signalling provision to identify special format MSDU's. What is basically needed is a signalling method included in the 802.11 Frame Header, to identify that a separate Length/Type field (as specified in 802.3) is added to the MSDU. This can be implemented as in the subtype field with Type value Data. The 1xxx value can then identify the special MSDU type. Doc 95/188 describes a suitable mechanism, and	We need provisions in the MAC to allow signalling facilities such that Ethernet and DIX Ethernet frames can traverse the 802.11 network. An alternative is to add a separate 16 bit Length/Type field to the 802.11 Header.	Comment handled in section 4. please see that sections response.

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					contains suitable text to support this function.		
29	3.2.1.1	GE	e		Reference were Type 2 operation is defined. (4.1.2.1.2	What is Type 2 operation. I didn't see it defined prior to this paragraph.	corrected
30	3.2.1.1	ws	e		under When Generated - Type 2 operation is an unclear reference. Refer to another document for definition if possible		corrected
31	3.2.1.1	BPa	t		There is a routing_information field in the MA_UNITDATA.request that does not seem to be addressed later in the document	For example, how does a station upon receiving a packet , know whether there is routing_information or not? In 3.2.1.2 it specifies that this field is "null for 802.11 MACs" so this is probably an Editorial Comment.	Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.
32	3.2.1.1	ZJ	T	???	If MA_UNITDATA.request is allowed to specify contention versus contention-free, it should be able to specify PHY data rate desired and whether WEP must be used.	Otherwise these same pieces of information have to be controlled in a very kludgy way through MIB variables.	Declined Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.
33	3.2.1.1	BD	T	N	The source_address parameter (SA) shall specify thean individual MAC sublayer entity-address, this SA shall be replaced in the MPDUs resulting from this request with the individual MAC sublayer address of the MAC entity to which the request is made.	Because of the multiple address potentially involved in and 802.11 data fame, the sentence as it reads in D2 is incorrect - it leaves confused the distinction between TA and SA. Rather than try to describe this complexity in sec 3, it is much better to leave it to the existing sec 4 text. The changes shown to the left correct the sec 3 sentence without attempting to duplicate sec 4 information in sec 3.	accepted
34	3.2.1.1	BD	T	N	This primitive is generated by the LLC sublayer entity whenever a MSDU must be transferred to a peer LLC sublayer entity or entities. This can be as a result of a request from higher layers of protocol, or from a MSDU generated internally to the LLC sublayer, such as required by Type 2 operation.	The sentence in this section, while probably strictly correct is not relevant to the contents of the section. Sec 3 should not be attempting to explain what <u>could</u> occur in upper layers to cause the action specified in the preceding	accepted

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35	3.2.1.1	BD	T	N	The routing_information parameter specifies the route desired for the data transfer. <u>This value must be Null as 802.11 does not perform routing (as the term is used by LLC)(a null value indicates source routing is not to be used).</u>	Source routing can not be specified to 802.11.	declined Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.
36	3.2.1.1	BTh	T	N	In When Generated paragraph I don't know the definition of Type 2 operation so I think one is needed here.	I don't know the definition of Type 2 operation and I suspect that many readers will also not know. Need either: a prior definition, or define here, or a reference to definition	corrected
37	3.2.1.1	SMr	t	N	<p>1. MA_UNITDATA.request</p> <p>Function</p> <p>This primitive defines the transfer of a MSDU from a Local LLC sublayer entity to a single peer LLC sublayer entity, or multiple peer LLC sublayer entities in the case of group addresses.</p> <p>Semantics of the Service Primitive</p> <p>The semantics of the primitive are as follows:</p> <p style="text-align: center;">MA_UNITDATA.request (</p> <p style="text-align: right;">source_a ddress, destinati on_adre ss, routing_i nformati on; data, priority, service_c</p>	The 802.11 standard does not defined the use or setting of the routing information. Including a null or non-existent function as a part of the service parameters seems to imply support for this feature.	Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.

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					<p style="text-align: right;">lass)</p> <p>The source_address parameter (SA) shall specify an individual MAC sublayer entity address, this SA shall be replaced in the MPDUs resulting from this request with the individual MAC sublayer address of the MAC entity to which the request is made. The destination_address parameter (DA) shall specify either an individual or a group MAC sublayer entity address. The routing_information parameter specifies the route desired for the data transfer (a null value indicates source routing is not to be used). The data parameter specifies the MAC service data unit (MSDU) to be transmitted by the MAC sublayer entity. The length of the MSDU shall be less than or equal to 2304 octets. The priority parameter specifies the priority desired for the data unit transfer (contention or contention-free). The service_class parameter specifies the service_class desired for the data unit transfer (asynchronous or time-bounded).</p> <p>When Generated</p> <p>This primitive is generated by the LLC sublayer entity whenever a MSDU must be transferred to a peer LLC sublayer entity or entities. This can be as a result of a request from higher layers of protocol, or from a MSDU generated internally to the LLC sublayer, such as required by Type 2 operation.</p> <p>Effect of Receipt</p> <p>The receipt of this primitive shall cause the MAC sublayer entity to append all MAC specified fields, including DA, SA, and any fields that are unique to the</p>		

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					<p>particular media access method, and pass the properly formatted frame to the lower layers for transfer to peer MAC sublayer entity or entities.</p> <p>1. MA_UNITDATA.indication</p> <p>Function</p> <p>This primitive defines the transfer of a MSDU from the MAC sublayer entity to the LLC sublayer entity, or entities in the case of group addresses. In the absence of error, the contents of the data parameter are logically complete and unchanged relative to the data parameter in the associated MA_UNIT_DATA-Request primitive.</p> <p>Semantics of the Service Primitive</p> <p>The semantics of the primitive are as follows:</p> <pre> MA_UNITDATA.indication(source_address, destination_address, routing_information, data, reception_status, priority, service_class) </pre>		
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					The source_address parameter must be an individual address as specified by the SA field of the incoming frame. The destination_address parameter shall be either an individual or a group address as specified by the DA field of the incoming frame. The routing_information parameter specifies the route desired for the data transfer (null for 802.11 MACs). The data parameter specifies the MAC service data unit (MSDU) as received by the local MAC entity, and shall be less than or equal to 2304 octets in length. The reception_status parameter indicates the success or failure of the incoming frame. The priority parameter specifies the priority desired for the data unit transfer (contention or contention-free). The service_class parameter specifies the service_class desired for the data unit transfer (asynchronous or time-bounded).		
38	3.2.1.1	STh	T	N		<u>Discription incomplete</u>	corrected
39	3.2.1.1	STh	T	N		<u>Discription incomplete</u>	corrected
40	3.2.1.1	TM	e/t	x	the structure for MA_UNITDATA.request should include the CRC or is the LLC responsible for generating the CRC	section 4.1 implies that the CRC will be computed before data is passed to the LLC	Declined CRC is not passed across the MAC/LLC interface. Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clairified to be consistant with 802.2 1994.
41	3.2.1.2	BPa	e		The priority parameter specifies the priority <u>used</u> desired for the data unit transfer (contention or contention-free).	This is an indication not a request.	Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clairified to be consistant with 802.2 1994.
42	3.2.1.2	BTh	E		change in 1st paragraph... MA_UNIT<undersere>DATA<hyphen><period>Rreque	Please maintain consistent nomenclature for readability.	Service Primitives are defined by 802.2, the D2 descriptions were

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					st change under When Generated... MA_UNIT<underscore>DATA<hyphen><period>Indicate		rewritten and clarified to be consistent with 802.2 1994.
43	3.2.1.2	TM	e		change MA_UNIT_DATA-INDICATION to be MA_UNIT_DATA.indicate		Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.
44	3.2.1.2	ws	e		under Function - MA_UNIT_DATA_Request should read MA_UNITDATA.request		Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.
45	3.2.1.2	ws	e		under When Generated - MA_UNIT_DATAIndication should read MA_UNITDATA.Indication		Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.
46	3.2.1.2	GE	t		MA_UNITDATA.indication remove the reception_status parameter from primitive	Erred MSDUs, ie. bit erred, can not/should not be passed to LLC because the bit error could be in the DA, (as well as anywhere else). Unless a reception_status error is better documented, remove it and only pass good packets.	Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.
47	3.2.1.2	ZJ	T	???	MA_UNITDATA.indication should indicate whether frame was received with WEP on, and what the PHY data rate was	Otherwise these same pieces of information have to be conveyed in a very kludgy way through MIB variables.	Declined. 802.11 is not at liberty to redefine the LLC/MAC interface - that is specified by 802.2. Since WEP is completely contained within the mac layer, it would be inappropriate to reflect this information to LLC as it is not relevant - similarly for data rate.
48	3.2.1.2	BD	T	N	under the "when generated" paragraph: ...frames that are received in error may be reported, at the option of LLC;...	This sentence must either be changed to indicate that error frames are NOT reported, or the mechanism	declined Service Primitives are defined by 802.2, the D2 descriptions were

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						which is implied by the phrase "... at the option of LLC" must be specified.	rewritten and clarified to be consistent with 802.2 1994.
49	3.2.1.2	BSi	t	N	More specific text required for the Semantics of the service primitive - rather than largely copied from the request primitive.	Priority and service class parameters in the indication are presumably inferred from whether an MSDU arrives during contention-free or contention.	Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.
50	3.2.1.2	STh	T	N		Discription incomplete	corrected
51	3.2.1.2	STh	T	N		Discription incomplete	corrected
52	3.2.1.2	TM	e/t	x	the structure for MA_UNITDATA.indicate should included the CRC or is the LLC responsible for checking the CRC	section 4.1 implies that the CRC will be computed before data is passed to the LLC	CRC is not passed across the LLC/MAC boundary. Service Primitives are defined by 802.2, the D2 descriptions were rewritten and clarified to be consistent with 802.2 1994.
53	3.2.2	BA	E		???	Text seems to be missing. What was agreed on by the subgroup?	unknown what is considered missing - no change made.
54	3.2.2	BPa	E		What's the meaning of this paragraph? Seems to be missing something		see comment 58 resolution
55	3.2.2	EG	e		first sentence should be in style "body"	avoid "normal" style	see comment 58 resolution
56	3.2.2	FMi	E		Delete this subsection.	The MAC Management service interface now appears in Clause 7.	see comment 58 resolution
57	3.2.2	DW	E		Complete this section.	This section is currently not complete, and no interface to higher layers has been identified.	see comment 58 resolution
58	3.2.2	GE	t		Remove section 3.2.2	3.2.2 Specifies MAC Management Service Primitives, where are the primitive definitions?	accepted - section removed.
59	3.2.2	BD	T	N	3.2.2 MAC Management Services To facilitate the three distribution system services: a) Association b) Reassociation	The entire contents of the section are shown to the left. Either this section must be expanded into something useful or the section must be deleted. I much prefer a cogent description of	see comment 58 resolution

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					c) Disassociation - including the detection of link outage	a MAC management service specification.	
60	3.2.2	KJ	t	N	section is not complete	since scanning can be initiated from outside the mac, and multiple APs could respond, a choice of APs is possible and an interface for this choice provided	see comment 58 resolution
61	<u>3.3</u>	<u>STh</u>	<u>T</u>	<u>N</u>		<u>Omitted from current draft; these drawing are from my notes on corrections needed</u>	Declined. These sections were removed as result of decisions re removing vestages of connection support.

Point Coordination Function Initiates Connection Set-up Illustration

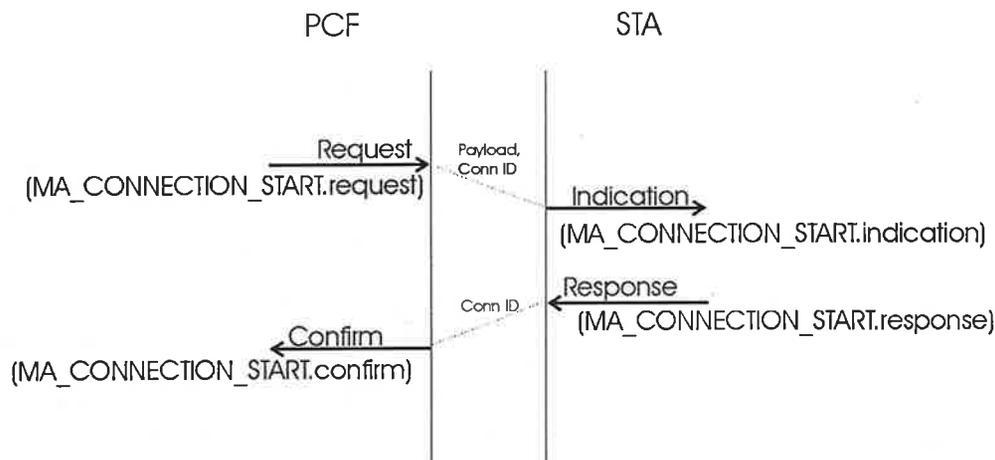
The following exchange will be used when an PCF wants to establish a connection.

1. AP MAC user makes . If the PCF MAC believes that it can support this connection then the AP MAC generates Start Connection Request frame (otherwise the AP MAC asserts a Connection Not Granted Indication).
2. If the STA MAC can support this connection then it generates a Grant Connection frame and a Grant Connection Indication. On receipt of the Grant Connection Frame a Grant Connection Indication is generated.

Note: Only one connection request may be outstanding, with any one station, at any given time. The exchange fails if no response is received before a time-out (connection set up time-out). This will result in a Connection Not Granted Indication.

Figure 3.5 shows the establishment of a connection-based association between a Point Coordination Function (typically an Access Point), and a STation. Note the connection ID (Conn ID) is established by the PCF, but is not passed to the LLC.

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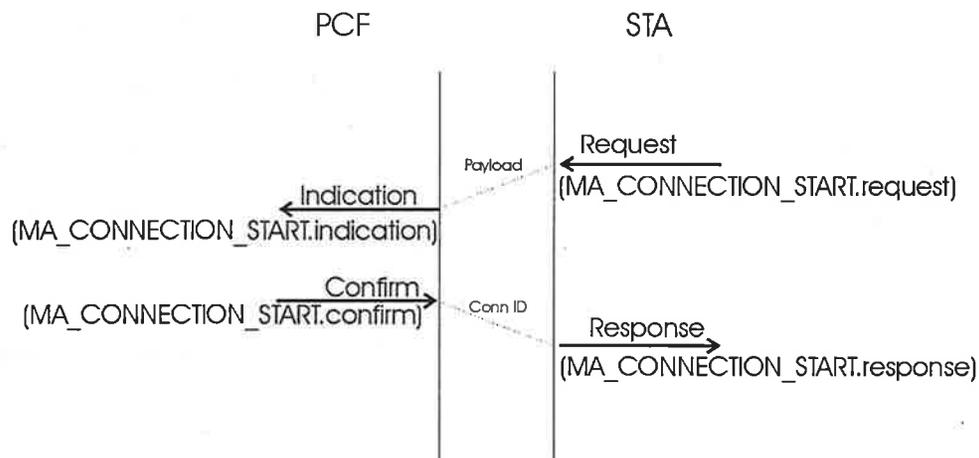


Connection Initiated by Point Coordination Function to STation

Figure 3-5

Figure 3-6 shows one possible failure condition for the establishment of a connection-based data transfer session. In this case the STation failed to respond or the MAC deemed that a connection was not possible, such as is the case during traffic congestion. If the STation had refused the connection, It would have generated a MA_DISCONNECT.request.

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Connection Initiated by STA to Point Coordination Function

Figure 3-7

End Connection

Either an PCF or a station may end a connection in the following way:

1. End Connection.

No MAC layer negotiation is needed to end a connection.

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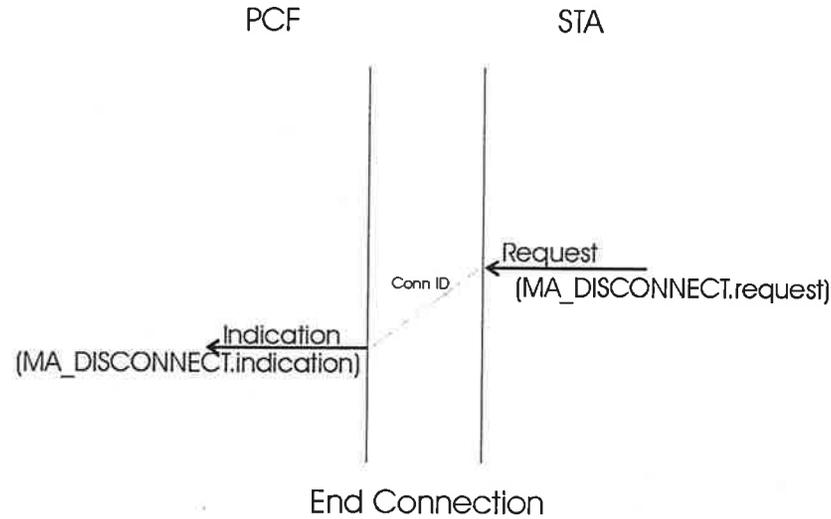


Figure 3-8

