DISPOSITION	#	SECTION	AUTHOR	TYPE	PROPOSED CHANGE	RATIONALE

IEEE P802.11

Wireless Access Method and Physical Layer Specification

Section 1 Response to Draft D1 Letter Ballot
processed at March 1995 meeting

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Abstract: This paper presents the Section 1 Response to the Draft D1 Letter Ballot proccesed at March 1995 meeting.

Action: Adopt the changes in this paper to replace the relevent portions of Section 1 of P802.11/D1, as shown in the companion document P802.11-95/56.

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Recomemndations for Collected comments on Section 1 of draft standard D1

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1: recommendation: accept dependent on TB votes	1	1.1	C. Heide	t	remove from the second paragraph in the third group, "and time bounded MAC service"	this specification does not describe the medium access control procedure to support time-bounded MAC service data unit delivery services.
2: recommendation: no change to 1.1, this is what par says, other sec referenced may change depending on group actions.	2	1.1, 2.4.2, 3.2, 5.8	Jim Panian	T	Provide MAC service primitives to facilitate the three distribution system services: • Association • Reassociation • Disassociation - including the detection of link outage The above mentioned MAC service primitives will feed into the Association, Reassociation, and Disassocation services in the state machine descriptions as well.	Enough detail must be provided by the 802.11 standard to facilitate hand-off mechanisms on the distribution system.
3:, 4: recommendation: decline, no reason to be restricted to 802 interface, .11 does better.	3	1.2	Bob O'Hara	T	Replace "an existing network" with "other 802 networks" in definition of "Integration"	The scope of this standard is within the 802 hierarchy
recommendation: see 3	4	1.2	Bob O'Hara	T	Replace "a non 802.11" with "another 802" in the definition of "Portal"	The portal may connect to a different 802.11 LAN as well
5: recommendation: decline to change - while pathological, it is possible for a ad-hoc infrastr net to exist, thus "often" should not change to "always:.	5	1.2	C. Heide	T	definition of an Independent Basic Service Set, second sentence should read " An IBSS is always the form an Ad-Hoc network takes."	what else could an ad-hoc network be but an IBSS?
6; recommendation: SEC 1 should be change d to be consistent with decisions re multi rate scope in later sections. (ESS wide or not).	6	1.2	C. Thomas Baumgartner	t	Change ESS_BASIC_RATE_SET to BASIC_RATE_SET. Make similar change to definition of STATION_BASIC_RATE	The basic rate set applies to the PHY a a medium type and has no relation to geography. The IR PHY and other sections I have read just refer to the Basic Rate Set.
7: recommendation: - make change.	7	1.2	C. Thomas Baumgartner	t	delete second sentence in MPDU definition	The term "frame" NEVER applies to MPDU. MPDU could be called the packet.

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8: recommendation: change (really editorial in nature).	8	1.2	David Bagby	T	**Access control.** The prevention of unauthorized us~~age~~ee of resources~~.; including the prevention of use of resource in an unauthorized manner.~~ **Association.** The service *used to* ~~that~~ establishes AP/STA mapping and enables STA invocation of the *D*distribution *S*system *S*services. **Authentication.** The service used to *positively* establish the identity of *one* station *to another station*~~s to each other~~. **Basic Service Area (BSA).** The *conceptual* area within which members of a *B*basic *S*service *S*set can communicate. **Basic Service Set (BSS).** A set of stations controlled by a single *C*coordination *F*function.	See imbeded comments and annotations
9: recommendation: change - was wrong.	9	1.2	David Bagby	T	**Distribution System Medium (DSM).** The medium used by a *D*distribution *S*system *(for Access Point*~~(for basic service set~~ interconnections).	See imbeded comments and annotations

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10: recommendation: make change (re clairifing that phy are specifici not all DS or FH for all time)- clarify by ref to phy section for each phy.	10	1.2	David Bagby	T	~~ESS_BASIC_RATE_SET: A set of rates that all the stations on the given ESS are required to be capable to receive. According to the PHYs definitions the default ESS BASIC RATE SETs for the differen PHYs will be:~~ ~~For DS: {1,2}~~ ~~For FH: {1}~~ ~~For IR: {1,2}~~ Definition as written in D1 no good. implies that there is only on DS phy and one FH for all time. this might not always be true. at a min (assuming no other multi-rate changes are adopted) it needs to be re written to specify the 2.4ghz ism phys only in this table. ~~Note that this value is preset for all stations in the ESS.~~ ~~EXTENDED_RATE_SET: The set of rates beyond the BASIC_RATE_SET that a station supports. This can be a speed that is defined in future PHY standards.~~	See imbeded comments and annotations
11: recommendation: make change	11	1.2	David Bagby	T	The following paragraph must be changed because it is factually incorrect. There are no exposed interfaces between STAs and APs (other than antenna which are not exposed interfaces in the 802.11 standard sense), nor are there exposed interfaces between AP and DSS - in fact this was specifically excluded from 802.11 standardization by the group. ~~Within the infrastructure there are two exposed interfaces:~~ ~~a) between stations and access points; and~~ ~~b) between access points and distribution system.~~ ~~Additionally,~~ DS services are provided between pairs of 802.11 MACs.	See imbeded comments and annotations

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12: recommendation: make change (really editorial)	12	1.2	David Bagby	T	**MAC Protocol Data Unit (MPDU).** The unit of data exchanged between two peer MAC entities using the services of the PHY. ~~The term "frame" is often used as a synonym for MPDU.~~ The preceding sentence while possbly true, is not relevant to the definition.*[DB5]*	See imbeded comments and annotations
13: recommendation: requires discussion in larger group	13	1.2	David Bagby	T	~~STATION_BASIC_RATE: A value belonging to the ESS BASIC RATE SET, that is used by the station for specific transmissions (it could change dynamically, for example the Station Basic Rate on the IR depends on the Power Consumption Mode of the Station).~~	See imbeded comments and annotations
14: recommendation: make change - editorial really	14	1.2	David Bagby	T	**Wired Equivalent Privacy (WEP).** The optional cryptographic privacy algorithm specified by 802.11 used to provide data confidentiality which is subjectively equivalent to a wired media *confidentiality.*	See imbeded comments and annotations
15: recommendation: really sec 4 1.5 - re needed. now how to get done? remains no vote	15	1.2	Lewis	T	conformance requirements need to be defined	
16: recommendation: add sentence A BSS can have one PCF and one DCF.	16	1.2	Rick Whit	T	Basic Service Set Definition - A BSS can have both a Point and Distributed Coordination Function.	This definition needs to be refined to indication it is a group of STAs that can communicated with one another in an ad hoc network or a group of STAs associated with an AP in an infrastructure network.
17: recommendation: make change - units should be specified for rate.	17	1.2	Rick Whit	T	Definition of ESS_BASIC_RATE_SET should specify that rates are megabits per second	
18: recommendation: Decline mobility is not restricted to a lower limit of velocity. Def is ok as written.	18	1.2	Rick Whit	T	Rewrite definition of Mobile Station.	Station does not need to be using network communications when in motion. It could be simply moving from one location to another. I guess this is covered by Portable Station.

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19: recommendation: discussion required in large group	19	1.2 2.3; also 1.2 definition of Òinfrastructureó 2.4.1.1, 6th paragraph; 2.4.2.2, 3rd paragraph; 2.4.2.3, 3rd paragraph; 2.7	Fischer, Mike.	T MAJ R ISSU	The standard needs to specify the message formats used to communicate (intraÐESS) for th provision of (at least) association, reassociation, integration, and distribution. This requires enough words (and pictures), and impacts enough places in the document, that I have not attempted to put specific text in this box of the table. A set of changes adequate to overcome my ÒnoÓ vote on this subject appear in document 95/17. The bulk of the message format information will end up in section 2.7.	The fundamental purpose of this standard is to provide a basis for mixedÐvendor interoperability across each of the exposed interfaces in the subject specification. The WM i one such exposed interface, and is covered in considerable detail in the D1 draft. The DSM is another such exposed interface, but the degree of abstraction of distributionÐrelated definitions makes interoperable distribution (even in simple cases such as multiple vendorsÕ APs attached to the same 802.3 wire) impossible without additional definitions. Even the current draft state that there is an exposed interface between access points and the distribution system (even if not stated very well, see above). The concept that 802.11 should Ònot specify specific DS implementationsÓ remains valid. What is needed is the definition of specific frame payloads, that can be delivered over 802Ðstyle LANs, which shall be used fo interÐAP communication (called an IAPP in some submissions to this working group) to establish the necessary information about associations/reassociations to support mobility transitions, and for APÐto/fromÐportal communication to support integration of other 802 wired LANs. In 2.4.1.1, 6th paragraph is states that Òall 802.11 is required to do is to provide the DS with enough information . . .Ó This is generally correct, but the support of reassociation for BSSÐtransition mobility, and the preservation of ÒauthentificationÓ across such transitions (even when using a wireless distribution system), require the directed exchange of information between the DSS at one AP and the DSS at another AP in the same ESS (among other intraÐESS exchanges between MAC LMEs over the DSM). How the DS gets the messages containing this information between APs may be external to this standard, but the formats of those messages must be defined or users will have to outfit an entire ESS with APs from a single vendor (or deÐfacto interoperability group of vendors operating outside of the 802 standards process), even if they can procure nonÐAP stations from multiple sources. The other alternative is to remove mobility support and the ESS concept from the standard. This not only leaves aspects of the PAR unaddressed, but would yield a standar that fails to meet most usersÕ needs ÐÐ at the ranges discussed for several of the PHYs almost any potential customer for more than about 10 or 15 stations would probably need to deploy a multiÐAP ESS.

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20: recommendation: make change.	20	1.2, entry for ÒAccess PointÓ	Fischer, Mike.	T	Any entity that has station functionality and proides access to distribution services, via the WM, for other (associated) stations.	The ÒaccessÓ provided by an access point is for other stations that lack direct access to the distrbution system. A station that is connected to the DSM but does not make distribution services available to other stations via the WM is not useful as an AP. A station that does make distribution services available to other stations via the WM is an AP even if the DSM is null. Even without a multiÐBSS network, there is a difference between BSS without distribution services (an adÐhoc network) and a BSS with disrtribution services (an infrastructure IBSS). In this later case the DSM is null, but an associated STA may send a frame to the AP with ToDS=1. If the station addressed by the DA of that frame is also associated with the same AP, distribution services at that AP can deliver the frame (sent by the AP to the DA with FromDS=1).
21: recommendation: decline, limit of 2 incorrect. mixes infra and IBSS with as-hoc slang. discussion?	21	1.2, entry for ÒAdÐhoc networkÓ	Fischer, Mike.	T	Add after 1st or 2nd existing sentence: ÒThe principal distinctions between adÐhoc and infrastructure networks is that stations in adÐhoc networks communicate without using distribution services; and that adÐhoc networks exist for a strictly limited temporal extent, which is never longer than the time until the number of active stations in the adÐhoc network drops below two.Ó	This provides the quantitative criteria appropriate for such a fundamental definition. Reliance strictly upon a distinction in the qualitative convenience of setup and dissolution leaves too much potential for misinterpretation.
22: recommendation: change	22	1.2, entry for ÒchannelÓ	Fischer, Mike.	T	change Ò. . . that can coexist with other instances of medium use.Ó to Ò. . . that can be used simultaneously, in the same volume of space, with other instances of medium use on other channels by instances of the same PHY, with an acceptably low frame error rate due to mutual interference. Some PHYs only provide one channel, whereas others provide multiple channels. For example:Ó	The phrase Òthat can coexistÓ is ambiguous. The important characteristic is nonÐinterference, which is clearer with the modified wording.
23: recommended	23	1.2, entry for ÒDistributed Coordination FunctionÓ	Fischer, Mike.	T	change Ò. . . in every station at any given time.Ó to Ò. . . in every station in the BSS at any given time that the network is in operation.Ó	The limits of ÒeveryÓ in the existing sentence are unclear. The correct unit is the BSS.
24: recommended	24	1.2, entry for ÒDistributio n System ServicesÓ	Fischer, Mike.	T MAJ R ISSU	The set of services provided by the distribution system which enable the MAC to transport MAC service data units between stations that are not in direct communication with each other over a single instance of the wireless medium. This includes transport of MSDUs between basic service sets within an extended service set, the transport of MSDUs between portals and basic service sets within and extended service set, and the transport of MSDUs between stations in the same basic service set in cases where the station sending the MSDU chooses to involve distribution system services.	The current definition limits the scope of distribution service much too narrowly to be consistent with the subsequent facilities. In particular, there should be no restriction that distribution must involve two or more BSSes. There can, and will, be instances where distribution is used within a single BSS, especially in cases where the user wishes to remain in communication through BSSÐtransition mobility events (reassociations) and cases where at least one of the endÐstations is operating in a powerÐsave mode for which the AP buffers traffic.
25: recommended but - correct is "... and integrated LANs", not portals.	25	1.2, entry for ÒDistributio n SystemÓ	Fischer, Mike.	T	change Òbasic service setsÓ to Òbasic service sets and portalsÓ	Be consistent with section 2. The portal concept was added after this definition was written and the definition was never updated.

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26: recommended change to: A set of 1 or more interconnected basic service sets and integrated LANs which appear as a single basic service set to the logical link control at any station associated with one of those basic service sets	26	1.2, entry for Òextended service setÓ	Fischer, Mike.	T	A set of 1 or more interconnected basic service sets and portals which appear as a single basic service set to the logical link control at any station associated with one of those basic service sets or attached to any of those integrated LANs. (or Ò. . . which appear as a single logical network to the logical link control entities at any station . . .Ó)	The current definition does not cover the existence of portals, nor the degenerate case of distribution in a singleÐBSS or singleÐBSSÐplusÐportal environment. These should be behaviorally indistinguishable (viewed by LLC) from an ESS, and should therefore be within the definition of ESS.
27: recommended, also fixed by comment 11.	27	1.2, entry for ÒinfrastructureÓ	Fischer, Mike.	T MAJ R ISSU	1) The last sentence does not belong with this definition. It may either be deleted or moved to the definition of distribution system services. 2) The listing of the exposed interfaces is WRONG. There are several acceptable ways to fix this. If the intent is to identify exposed interfaces already defined in this standard, the interfaces are Òbetween stations associated with a given access pointÓ or Òbetween stations that are members of the same BSSÓ (e.g. frames on the WM); and Òbetween access points and/or portalsÓ (e.g. frames on the DSM). This is the simplest change which is consistent with the bulk of the remaining chapters of the D1 draft.	1) apparent editing error 2) Since an AP is a station that also provides DSS access, to have an interface exposed at this point would be an interface within the station that functioned as an AP. Such an interface is only worth exposing if the result is to render an 802.1D MAC bridge capable of being the sole function needed on the other side of this interface to achieve distribution functionality. This is probably infeasible, especially for BSSÐtransition mobility which maintains logical connectivity. There appears to be negligible benefit, and considerable complexity, from exposing an interface between the STA functionality and the AP functionality at a given station. Also, the existing definition does not deal with the fact that portals connect to the same DSM as APs.
28: recommended - make change.	28	1.2, entry for Òpoint coordination functionÓ	Fischer, Mike.	T	change Ò. . . in only one station at any given time.Ó to Ò. . . in only one station in a BSS at any given time that the network is in operation.Ó	The limits of ÒoneÓ in the existing sentence are unclear. The correct unit is the BSS.
29: recommended change def to "... to another (or the same) access point".	29	1.2, entry for ÒreassociationÓ	Fischer, Mike.	T	The service which enables an established association (of a station) to be transferred from an access point to another access point, and enables the attributes defined between a station an access point at the establishment of an existing association to be modified while that station remains associated with the same access point.	There are instances, such as for CFÐawareness and use of WEP, where the settings are established at association time. Subsequent portions of the draft assume that a station can change these settings by reassociating with the same AP, but the existing definition of reassociation requires a change to another AP, which is too restrictive.
30: recommended.	30	1.2, entry for Òwired equivalent privacyÓ	Fischer, Mike.	T	change Ò. . . subjectively equivalent to a wired media.Ó to Ò. . . subjectively equivalent to the confidentiality of a wired LAN medium that does not employ cryptographic techniques to enhance privacy.Ó	The idea of WEP is to match the typical, nonÐencrypted, wired LAN. Not to match a wired LAN running with full 802.10 message encryption, or comparable message security facilities.
31: recommended	31	1.2, new entry needed	Fischer, Mike.	T	Add entry for ÒNetwork Allocation Vector (NAV). An indicator, maintained by each station, of time periods when transmissions onto the WM may not be initiated by this station whether or not the stationÕs clearÐchannel assessment function senses the WM as being nonÐbusy.	NAV is a key concept that is not well defined before itÕs use in this document, and which people not familiar with the last several years of work within this group will not necessarily understand at first reading.
32: recommended.	32	1.3	Fischer, Mike.	T	Add ÒWDS wireless distribution systemÓ	clarity
33: recommended.	33	1.4	Bob O'Hara	T	add ISO 10039	required for MAC service interface definition

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34: recommended	34	1.4	Scaldeferri	T	References should include IEEE Std 802.10f-1993, Secure Data Exchange (SDE) Sublayer Management (Subclause 2.8)	This reference includes the SDE MIB, (SMIB), variables and other information need to harmonize 802.11 and 802.10
35-42,44: recommended: add sentence to section that explicitly says "for further study" or something similar... TBD?	35	1.5	C. Thomas Baumgartner	t	fill in section	Can't approve standard until I know what I am approving.
recommended see 35	36	1.5	Fischer, Mike.	T	< The absence of this sectionÖs text is understandable at this point, but there is no point referring the draft to sponsor ballot with no text here.>	
recommended see 35	37	1.5	John Haye	T	TBD	Needs to be specified
recommended see 35	38	1.5	Mark Demange	t	Need to define conformance requirements. Should include lockdown testing.	
recommended see 35	39	1.5	Mark Demange	t	Need to add a convention for True = 1 and False = 0	
recommended see 35	40	1.5	McDonald	t	Provide Golden units that can first be used to verify the functionality of the standard and then used to verify the compliance of units produced by various manufactures Sometimes this is called a lock down test.	A very pragmatic approach is offered to establish the validity of the standard and equipment that is designed to comply with the standard
recommended see 35	41	1.5	MLT	T	appropriate text for this section should be entered before draft approval	
recommended see 35	42	1.5	Rick Whit	T	Conformance requirements must be defined	Must define in order to provide interoperability.
43: recommendation: decline - not exposed interface defined, w do not spec unexposed interfaces.	43	1.5	Ryan Tze	T		MAC/PHY interface has not been defined. What needs to be done: A MAC/PHY interface has t be defined and include in the draft standard.
recommended see 35	44	1.5	Stuart Kerry	T		Section to be completed
45: recommended - improved def for notation.	45	1.6	Bob O'Hara	T	add convention "2: This standard represents fields longer than a single octet as strings of octets and fractions thereof. A field longer than a single octet is represented in figures with the most significant bit (MSB) on the left. Each octet to the right of the MSB is of correspondingly lesser significance."	No method to interpret the figures is included.
46, 47: recommended by adoption of 46.	46	1.6	David Bagby	T		See imbeded comments and annotations
recommended see 46	47	1.6	Rick Whit	T	Must Resolve editor's comments	Can not have a draft with questions from the editor's

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48: recommendation: move to another section? This is not a notation convention comment. It is a technical comment re bit xmission order - requires discussion - which section does this belong in?	48	1.6	Vic Hayes	T	**1.6 Frame Format conventions and order of transmission of bits** This standard defines frame formats in graphical notation, such that: 1. All frames are an integer number of octets 2. the octets are delivered to the MAC/PHY interface octet by octet with the leftmost octet transferred first 3. bits within octets are delivered to the MAC/PHY interface such that the rightmost bit is transmitted before the others 4. bitstrings containing a numeric value are depicted with the lesser significant bit at the right-hand side 5. bitstrings containing other values are placed in the fields as given in the text and tables. The leftmost bit is placed in the field at the leftmost side in the field 6. hexadecimal values are placed in an octet with the first written value at the lefthand side 6. The CRC is placed in the FCS field with the bits with the higher coefficients in the leftmost octet. In each octet the bits with the higher co-efficients to the right, so that the CRC is transmitted with the higher co-efficient first ($x^{31}, x^{30}, x^{29}, \ldots\ldots x^{1}, x^{0}$)	The order of bit transmission needs to be defined unambiguously, so that the product of a designer of a receiver at one part of the globe can be sure that he places the into memory in the same way as the designer the transmitter at a place at another side of the globe took them from memory.