Collected comments on Section 10 of draft standard D1

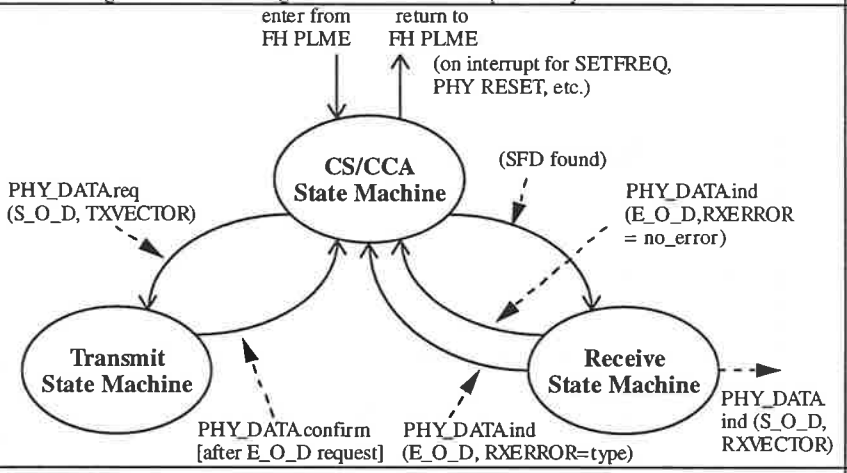
10	Wim Diepstraten	T	The FH PHY should adopt a CCA detection method that will apart from the detection of a complient FH signal also activate on Energy detection of a defined value.	Currently two standards are defined in the same frequency band. This is possible, butthen those standards should include provisions to coexist in the same band. Such provisions are included in the DS PHY, but are not included in the FH PHY. The FH PHY does only indicate a CCA=Busy when a compliant signal modulation has been detected. This is not acceptable, because it does not provide coexistance with other type PHY's.
10 5.4	Jerry Loraine	T	Delete section	This is not an exposed interface. We cannot test it therefore it cannot be mandatory.
10, ch 10	MLT	E	many of the drawings cannot be read when printed	
10, ch 10 , 11	MLT	E	maintain uniformity between description of data whitener or use a reference to a common location where it described only once	
10, ch 10,11,12	PFS	E	PLCP general descriptions should use similar language and text for all phy's and should speak to the MAC layer primitives in the same way	
10.0	bdobyns	E	Add an introductory section to FHSS PHY similar to 12.0, page 282	
10.1	C. Thomas Baumgartner	e	move Figure 10-1: Protocol Reference Model, add reference to model in another part of document	This is a general model of the interaction of the layers and should be somewhere in the general specification not in the FHSS section.
10.1	Fischer, Mike.	E	these shold be moved to the relevant portions of section 1	consistency
10.1	Mahany	E	Replace "Nodes" with "Stations"	Term Node not in earlier definitions. 10.1.1, 10.1.2.3, 10.3.2
10.1, also 10.5, 2.9,, 11.1, 11.4, and 12.2	Fischer, Mike.	T	The reference model in figure 2Ð11 should be replaced with one that matches the remainder of the standard. A recommended replacement drawing appears in document 95/16. To the extent that it makes editorial sense to include reference model drawings in subsequent (e.g. PHY) chapters, those drawings should be copies of, or subsets of, the drawing in section 2.9.	There should be a consistent reference model for all sections of the specification, and for all PHYs; otherwise the concept of a reference model is of dubious value. The existing drawings in 4 chapters are all different, and none fully match the description of the MAC and PHY elsewhere in this document.
10.1.1	Bob O'Hara	E	Replace first sentence with "This section describes the physical layer services provided to the 802.11 Wireless LAN MAC by the 2.4 GHz Frequency Hopping Spread Spectrum (FHSS) PHY.	
10.1.2	Bob O'Hara	E	ensure this figure is the same as revised figure for architecture	
10.1.2	Mahany	E	Revise Figure 10-1 and provide text linking to reference model in Figure 2-11.	This diagram may be viewed as inconsistent with that in Figure 2-11 (for example the presence of PHY layer management)
10.1.2, 2.9, 11.1.2, 12.3.1	Isabel Lin	E	Make them consistent.	The Reference Models in those sections are not consistent. What needs to be done: Make them consistent.
10.1.2.2	Mahany	E	Use Consistent Terminology for PLME	LME and PLME used here
10.1.3	McDonald	e	Make Clear	1st paragraph seems to indicate that the standard is based on the models but reality is more complex than the models.
10.2	Bob O'Hara	E	replace title with "PHSS PHY Service Primitives"	
10.2	Bob O'Hara	E	fix syntax for all service primitives and ensure all PHY sections match	
10.2	**Siep**	**T**	**FHSS PYY Specific Service Prarmeter Lists[This does not seem to agree with the MAC version of this interface]**	**A standard must be complete and consistant in order to be functional.**
10.2.1	Mahany	E	Use Consistent Terminology for PLME	Physical Layer ME is used here.
10.2.1	Renfro	E	Change 'define' to 'defined' in 3rd and 5th sentences.	

10.2.2	Bob O'Hara	E	replace "indicate" with "request"	
10.2.2	Geiger	E	S/B PHY_DATA.request not indicate	
10.2.2	McDonald	e	.....in the PHY_Data.request(*indicate)* service....	Fix typo
10.2.2	Mahany	T	Change length field in TXVECTOR to 1-2000.	Both of the other PHY's support 2000 octet maximum packets. The FH PHY has straddled the fence on this, supporting 1000 octet maximums in the TX vector (10.2.2.1), RX vector (10.2.3.1), and PLCP header (10.3.2), yet has reserved one bit in the PSF to allow length expansion. As a more flexible alternative, the length fields in all of these areas should be expanded to allow 2000 octets. The 1000 octet maximum can be enforced in the MIB table if it is still desired to do so..
10.2.2	McDonald	t	There may need to be a max on n but higher than 2	
10.2.2.1	Tom T.	T	Change first sentence to: 'The LENGTH parameter has the value of 0 to 2500.	Since fragmentation is an integral part of the MAC, the decision to fragment or not depends strictly on the Fragmentation Threshold. Therefore it does not make sense to limit the FH spec to an absolute size smaller than DS or IR. Under good conditions there should be no problem in sending this size of packet. The 2500 size was obtained from the IR section and makes sense if you really want a user payload of 2048. Taking the argument further maybe the maximum should be the same as the maximum that may be found on the Distribution System, making the bridging function of the AP much easier. (e.g. 4K on a Token Ring)
10.2.2.2	Sonnenberg	Tech	Delete this section.	Antenna selection does not seem supported in the MAC.
10.2.2.3	Bob O'Hara	E	replace "SP" with "HIGHSPEED"	
10.2.2.3	Renfro	E	SP should be Highspeed	
10.2.2.3	Geiger	T	BSS_Basic_Rate, Current_HighS_Rate	Missing in MIB or MIB uses different variables
10.2.2.3	McDonald	t	The bit rate of the PMD needs to be spec'd. this is a 2 bit parameter not 1	There are 4 possible bit rates. For the receiving station or another station to know how long the pack is the bit rate needs to be specified.
10.2.2.3	Renfro	T		As defined only allows two rates. May be useful to be more generic for future modifications.
10.2.3	Sonnenberg	Edit	Delete the row in the table for RSSI.	RSSI does not seem supported in the MAC, so there does not seem to be a need for it.
10.2.3	Mahany	T	Change length field in RXVECTOR to 1-2000.	Both of the other PHY's support 2000 octet maximum packets. The FH PHY has straddled the fence on this, supporting 1000 octet maximums in the TX vector (10.2.2.1), RX vector (10.2.3.1), and PLCP header (10.3.2), yet has reserved one bit in the PSF to allow length expansion. As a more flexible alternative, the length fields in all of these areas should be expanded to allow 2000 octets. The 1000 octet maximum can be enforced in the MIB table if it is still desired to do so..
10.2.3.1	Fischer, Mike.	T	change ÒPLCP has extractedÓ to ÒPLCP expects to transfer to MAC as the MPDUÓ	The use of past tense is incompatible with the time at which the RXVECTOR is transferred to MAC as part of the PHY_DATA.indicate(Start_of_Data).
10.2.3.1	Geiger	T	number of octets that the PLCP s/b the value of the LENGTH field in the PLCP header	clarity

10.2.3.1, 11.2.7, 12.2.5.2	Fischer, Mike.	T MAJOR ISSUE	It is imperative that all PHYs explicitly constrain the length reported in the RXVECTOR of the PHY_DATA.indicate(Start_of_Data) to equal the length sent from MAC to PHY in the TXVECTOR of the PHY_DATA.request(Start_of_Data) at the peer PHY entity that placed the PhPDU onto the WM. This needs to be true even if the unification of TXVECTOR and RXVECTOR formats and encodings recommended in another of my comments is not adopted.	If the receiving MAC cannot rely upon the length indicated in the RXVECTOR to be an accurate copy of the MPDU length from the peer MAC entity, the entire fragmentation/reassembly model needs to be reexamined. The absence of a fragment length field in the MAC header has been discussed extensively, both regarding fragmentation and regarding WEP (especially WEP, which applies to MSDUs, in conjunction with fragmentation, which generates MPDUs after WEP has encrypted the MSDU). In several of these discussions, the ability to omit this fragment length indication was justified on the basis of this property of the length indication from the RXVECTOR ĐĐ but the current PHY drafts do not explicitly require that this property is true. Note that if this property can be relied upon (in cases that the HEC is valid on reception), the use of the PLCP length reported in the RXVECTOR is superior to a length field in the MAC header, because a MAC implementation may use the length from the RXVECTOR as a validated (rather than speculative) quantity prior to receipt and validation of the CRC at the end of the MAC frame.
10.2.3.3	Sonnenberg	Edit	Delete this section.	RSSI does not seem to be needed or supported in the MAC.
10.2.3.3	Dellacorte	T	The value 0 is the weakest signal strength for which the CCA requirements of 10.6.23 are no longer met while 15 is the strongest signal strength.	What good is a parameter with no bounds? It makes sense to set the lower signal strength bounds related to CCA performance as this will provide some level of system intelligence without the need to define a receiver's implementation.
10.2.3.3	Jerry Loraine	T	Delete text, plus any reference on RSSI.	RXVECTOR RSSI. This is optional and not covered in the specification of the PMD.
10.2.3.3	McDonald	t	need 64 levels	16 levels is not enough to provide useful resolution
10.2.3.3	Renfro	T		RSSI definition is insufficient. How do 16 levels map to RSL? Also, change 'define' to 'defined' in next to last sentence.
10.26.28	Dellacorte	E/T	... The interfering signal shall be modulated with the FHSS PMD modulation uncorrelated in time to the desired signal. In addition, desensitization should be measured at the receiver's image frequencies. A DP Minimum of 40 db is required for image frequencies.	Future 802.11 receivers will, in all likelihood, have to with coexist with emerging PCS wireless services. In light of the FCC spectrum auctions for the 1800-1900 MHz bands and the FCC NOI to develop wireless services at 2300-2310 and 2390-2400 MHz, it is important that 802.11 receiver architecture's account for this type of image frequency interference.
10.3.1.1	McDonald	e	needs definition of "ON"	
10.3.1.1	Joe Kubler	T	remove text "(e.g. repeaters)"	no such thing is defined anywhere in standard.
10.3.1.1	Mahany	T	Delete reference to " repeaters" Change first sentence of text top of p 169 to state that "some implementations of the standard may include devices with two or more ports"	"Repeaters" not used elsewhere in draft.
10.3.1.1	Renfro	T		It is unacceptable to have the state diagrams define the standard. They will never completely define processing requirements and should only be aid in understanding real requirements defined by text.
10.3.2	Geiger	E	MPDU data whitener is PLCP_PDU data whitener	clarity
10.3.2	McDonald	e	what is data delineation	
10.3.2	McDonald	e	this paragraph should state that the PLCP preamble and header are in binary form,	
10.3.2	Bob O'Hara	T	A succinct description of bit transmission order is required.	not fully defined

10.3.2	Mahany	T	Change PLW to 11 bits, and PSF to five bits to accommodate 2000 octet length.	Both of the other PHY's support 2000 octet maximum packets. The FH PHY has straddled the fence on this, supporting 1000 octet maximums in the TX vector (10.2.2.1), RX vector (10.2.3.1), and PLCP header (10.3.2), yet has reserved one bit in the PSF to allow length expansion. As a more flexible alternative, the length fields in all of these areas should be expanded to allow 2000 octets. The 1000 octet maximum can be enforced in the MIB table if it is still desired to do so..
10.3.2	Renfro	T		Make length word and signaling fields fall on byte boundaries. A 16 bit length word and an 8 bit signaling field will simplify the implementation while increasing the overhead by 0.2 percent for a 400 byte data message. Also allows for non-fragmented frames greater than 1024 bytes to be transmitted if link will support.
10.3.2 +	Simon Black	T	Align the PLCP header codings for all PHYs (allow different PLCP preambles).	The FH, DS and IR PLCP headers all contain basically the same information - a length field, rate coding and a CRC. Why then are they all different formats. I can understand the Sync and UW being different - perhaps these should be added in the PMD sub-layer.
10.3.2.1.1	A. Bolea	E	"starting with zero and ending with one.." should be "**transmitted** starting with zero and ending with one.."	
10.3.2.1.2	A. Bolea	E	"(left-most bit first.." should be "(**transmitted** left-most bit first.."	
10.3.2.2	Tom T.	T	Redistribute the bits in the PLW and PSF such that the PLW is 12 bits long and the PSF field is 4 bits long. In table 10-3 the PDU_RATE bits will change from bits 4,5 to bits 2,3.	The reason for this is related to the change requested in section 10.2.2.1 relating to the maximum length of PLCP_PDU.
10.3.2.2.1	Bob O'Hara	E	replace "bytes" with "octets"	
10.3.2.2.1	A. Bolea	T		The DS PHY byte aligns the Length and Signaling fields. It would make sense that all PHYs have similar length and signaling field definitions. The length field should be 16-bits long and the signaling field 8-bits long.
10.3.2.2.1	McDonald	t	need more than 1023 bytes	To support 4 Mb/s 3.2 mSec fragments, we need to have more that 1023 bytes. Do we define max fragment length in mSec or in bytes? Perhaps we could drop the 3 and 4 Mb/s rates
10.3.2.2.2	Bob O'Hara	E	replace "undefined" with "reserved" in table 10-3	
10.3.2.2.2	A. Bolea	T		Reserved Parameter values should be set to zero.
10.3.2.2.2	Joe Kubler	T	change text in table 10-3, col parameter values to "Reserved (0) "	this forces implementations to be consistant allowing future upgrades to PHY to interoperate better
10.3.2.2.2	Joe Kubler	T	change "10,11 undefined" to "10,11 reserved" in table 10-3	prevent usage of these bits in a proprietary manner
10.3.2.2.2	McDonald	t	In the table, "Reserved for length expansion" and "undefined" in the bottom line are inappropriate	These issues effect the calculation of the packet length. This needs to be defined, now, for all possible cases to be developed in the future, because it affects CCA.
10.3.2.2.2	Zuckerman	T	The 14-bit PLCP Signaling Field (PSF) is defined in ....."	On each transmission, a four bit code should be sent to represent transmitted power level, and a four bit code should be sent to represent the path loss to the station being answered (derived from the transmitted power level code and the received RSSI. This will allow advanced Clear Channel Assessment procedures.
10.3.2.2.2.	Mahany	T	Set reserved bits to defined states. Add statement that transmitters not doing so are non compliant.	Reserved means reserved, and these bits should not be available for proprietary functions.

10.3.2.2.3	Dean Kawaguchi	E	Header Error Check Field 1) The remainder of $x^k \bullet (x^{16} + x^{15} + x^{14} + ... + x^2 + x^1 + 1)$ divided (modulo 2) by G(x), where k is the number of bits in the PSF and PLW fields of the PLCP Header;	Error in original text.
10.3.2.2.3	Stuart Kerry	E	Header Error Check Field 1) The remainder of $x^k \bullet (x^{16} + x^{15} + x^{14} + ... + x^2 + x^1 + 1)$ divided (modulo 2) by G(x), where k is the number of bits in the PSF and PLW fields of the PLCP Header;	Error in original text.
10.3.2.2.3	Bob O'Hara	T	define "BCH type"	not defined
10.3.2.2.3	Bob O'Hara	T	replace "inserted" with "transmitted"	ambiguous
10.3.2.2.3	Bob O'Hara	T	define usage of HEC to correct errors	not defined
10.3.2.2.3 also 11.2.3.6, and 12.2.4.6,	Fischer, Mike.	T	The CRC polynomial does not match its name. The listed polynomial is ÒCRCÐCCITT.Ó There is a polynomial named ÒCRCÐ16Ó but its polynomial is (X^16)+(X^15)+(X^2)+1. Either of these polynomials is acceptable for PLCP header checking, but the name and the polynomial should be consistent (and uniform across all of these PHYs). Please choose 1. The description of the algorithm in 10.3.2.2.3 is the clearest, and should be replicated for all of the other HEC sections (or adapted for all if the CRCÐ16 polynomial is desired and the error was in the polynomial rather than the name of the polynomial).	consistency, technical correctness
10.3.2.2.3	Geiger	T	HEC 1) xk *(x16+x15... sb 1) xk *(x15+x14....	Math problem
10.3.2.2.3	Joe Kuber	T	remove "and correction field"	no discussion of usage of field for error correction is made
10.3.2.2.3	Mahany	T	Add text or external reference illustrating usage of the HEC as a correction mechanism and an appropriate algorithm. Alternatively, reference to correction must be deleted.	HEC Correction is referenced in 10.3.2.2.3 and in 10.3.3.3.2. If correction is possible or required, or implies use of a different procedure in the receiver processing, it must be defined.
10.3.2.3	Bob O'Hara	E	replace "scrambling" with "scrambler" and delete "from highly redundant patterns	
10.3.2.3	Geiger	E	Scrambling will only minimize the DC bias and run length of certain redundant patterns. For other patterns this scrambler may increase the DC bias and increase the run lengths	Throw scrambler away
10.3.2.3	Bob O'Hara	T	description and figures for scrambler must match between FH and DS	differing descriptions of identical functions are unnecessarily confusing.
10.3.2.3	Mark Demange	t	The data whitener is specified as having a polynomial of $X^7 + X^4 + 1$. The diagram shown in figure 10-4 does not correspond to that polynomial. This diagram needs to be corrected.	
10.3.2.3	Mark Demange	t	Delete the PLCP_PDU Data Whitener from the specification entirely. The data whitener serves no useful function and as such should be removed from the specification.	The 32/33 bit stuffing feature maintains the DC balance of the data near 0 thereby allowing the radio to receive any incoming data stream. The net result after whitening is that any data pattern is likely (assuming equal probability of any original data pattern). Since the whitener doesn't serve any useful function it should be deleted from the spec.
10.3.2.3	Mark Demange	t	Need a means to disable the whitener on a per frame basis.	Japan call sign id requirements specify that the call sign id be transmitted in the clear with no scrambling or whitening. This means the 802.11 standard needs to define a mechanism which allows the data to be sent in this format.
10.3.2.3	McDonald	t	Arrow at #4 on figure goes up not down	Incorrect as is

10.3.2.3	McDonald	t	Provide security or privacy to the text of the mpdu	An 802.11 link may be an extension of a wired system. As such, the user would expect the wireless extension to provide the same level of privacy as the wired link. Clear text RF won't come close to meeting this need. If an 802.11 unit with simple modifications, for instance could be mounted outside the boundary of an operational 802.11 BSS and be used to eavesdrop, then the 802.11 standard will fail. The text being transferred must be protected at the 802.11 level. Higher level privacy is not good enough. This would require a user to change his network/operating/applications program to use the wireless extension
10.3.3	Bob O'Hara	E	format of figure 10-6 does not agree with that described previously	
10.3.3	Dean Kawaguchi	E		The PHY_DATA.ind(S_O_D, RXVECTOR) is not generated until a valid PLCP header is received. This occurs in the Rx state machine. An alternative would be to stay in the CS/CCA state machine until a valid PLCP header is received. This would be more of a change but it would be cleaner.
10.3.3	Bob O'Hara	T	make figure of state machines match description	the figure shows one state machine, the text describes three independent state machines. this is inconsistent
10.3.3.1.1	McDonald	e	2nd paragraph, 2nd sentence. ...to receive a MPDU ...	replace "an" with "a"
10.3.3.1.1	McDonald	e	3rd para, 2nd sentence: .... the MAC layer, ramp off..	add comma to fix the meaning of this.
10.3.3.1.1	A. Bolea	T		Text references a description of the Data Whitener Algorithm in Section 10.3.2.3 which does not exist. Figure 10-7a is missing algorithm for 2Mbps case.
10.3.3.1.1 Fig. 10-7a and 10.3.3.3 Fig. 10-11a	Iwen Yao	T Approv e		Needs a Stuff Symbol instead of Stuff Bit in the case of 4GFSK modulation which needs to be defined.
10.3.3.1.1	McDonald	t	Re figure 10-7: There needs to be a delay between PMD_TXRX and PMD_RAMP and PMD_DATA.request to allow for the actions to be completed without overlap	Either in the standard or in the implementations, the delays need to be accommodated.
10.3.3.1.1	McDonald	t	Re figure 10-7: Generate the subfigure indicated in the block ":Generic Header"	In the block "Generic Header" a subfigure is referenced that does not appear to be present.
10.3.3.1.1	McDonald	t	Re: figure 10-7, Block Load Byte Count: If N=4 is incorrect, then correct it	Seems that N should = the # of octets in the MPDU
10.3.3.1.1	McDonald	t	The whitening algorithm of figure 10-7a needs an independent verification	The impact of a simple error is very significant

10.3.3.1.1	Renfro	T		In figure 10-7, N=4 must be N=8 for 2 Mb/s if 32 symbol blocks are desired. Figure 10-7a does not include stuff and invert processing for 2 Mb/s mode. Note: Should consider using block size of 16 symbols for 2 Mb/s. Makes implementation slightly easier but will also improve performance. If 32 symbols is sufficient for 2GFSK it may not be for 4GFSK with a tighter frequency tolerance.
10.3.3.1.1 (fig 10-7)	Bob O'Hara	T	Use PHY SAP primitives for transition terms	Proper standard language
10.3.3.1.1 (fig 10-7)	Bob O'Hara	T	Use PMD SAP primitives as actions in states	Proper standard language
10.3.3.1.1 (fig 10-7)	Bob O'Hara	T	define or properly reference "sub-figure" (two places)	not defined
10.3.3.1.1 (fig 10-7)	Bob O'Hara	T	provide complete detail of PHY operation in the state machine	insufficient detail is provided, multi-byte steps are poorly described
10.3.3.1.2	McDonald	t	This paragraph is approximately correct, but there are a few aspects that need review. Is the 20 uSec a max spec or a reference? How does PLCP know when the "last bit has propagated through the radio.?	tolerances and/or min/maxs need to be integrated into these specs.
10.3.3.1.2	Renfro	T		20 usec Rx to Tx switch is defined as 19 usec in 10.6.13. In general, I would keep numbers out of state diagram section since they must be included in later sections.
10.3.3.1.2 (fig 10-8)	Bob O'Hara	T	provide all PMD SAP primitives	insufficient detail is provided
10.3.3.1.2.	Mahany	E	Figure 10-8: Add 20 usec max. between PMD_TXRX.req and beginning of PLCP preamble. Replace "bytes" with Octets in PCLP_PDU	Clarity
10.3.3.2	McDonald	t	The CS/CCA process should be based on 1.) detection of 1,0 header and issuing a SoA to the Mac 2.) detection of a verified length field, PLW, within a specified period, about 125 us 3.) If the PLW is received without error within that period then maintain ch_Busy for the indicated length of time If it is not received indicate channel not busy. 4.) Do not attempt to detect or sense an 802.11 compliant signal by sensing for random data. 5.) If a unit is activated it must hold off, give a CCA_busy command to the MAC for the max length on a fragment which is 3.2 mSeconds. This is a one time event, not repeated each packet.	CCA packet detection within 16 microseconds is practical if the data is a 0,1 pattern, not if it is random data. This is particularly true if the random data is multilevel symbols. Note we are now considering data rates of 3 and 4 Mb/s which makes the situation worse. In the environment we anticipate, there will be splatter from signals in adjacent and nearby channels, crosstalk, and IM producing data like "on channel" energy that may result in false CCA detection. Thus, we have a process that is difficult or impossible to implement, which would not work reliably even if it were implemented. All this to protect against an occasional omission of a CCA command. Given that the CCA process is only 50 or 60 % accurate to begin with because of the hidden node situation, it makes little sense to improve it by 1 or 2% by avoiding the above mentioned omissions. In addition, the end of the packet is precisely defined if the CCA is bases on PLW. If the end of the packet is defined by an RSSI process, which is required if the P/N detection process is used for CCA, the definition of the end of the packet will be imprecise. Therefore the contention windows must be longer. Thus, an effort to improve the accuracy from 50% to say 52% will cause difficulty in implementation and produce unreliable results. In addition if will also increase the length of the contention windows and lead to degraded channel efficiency. Thus, eliminate the part of the CCA directed at the random data detection.

10.3.3.2 and 10.6.23	Jan Boer	T	corrected text can be partly copied from section 11.4.8.4 for DS CCA. FH CCA must be based on energy rather than on a compliant FH PMD signal.	The standard makes two different PHY's possible in the same frequency bands. All possible effort must be done to make fair coexistance between the two possible,i.e. a FH defers for a DS system whenever it sees energy and vice versa. The DS standard has implemented this approach by basing CCA on a energy level. FH, however, only looks for a compliant FH signal for CCA. In my view it is not acceptable that there is no attempt in the FH part of the standard to make coexistance possible between a DS and FH system.
10.3.3.2.1	Bob O'Hara	E	replace all occurrences of "packet" with "frame"	
10.3.3.2.1	Belanger	T	The description of CS/CCA should be replaced. It does not make sense.	This is a circular definition. This section asserts that "The PLCP shall perform a CS/CCA assessment on a minimum of one antenna winthin a contention backoff slot time of 50 µsecs." In the MAC slot time is defined as Transmitter turn on delay+medium propagation delay+medium busy detect response time. Medium busy detect reponse time is the time it takes to do CCA.
10.3.3.2.1	Bob O'Hara	T	delete the last sentence of the fifth paragraph	this does not belong in the PHY section
10.3.3.2.1	Bob O'Hara	T	replace "is unspecified" with "shall be zero" in the last sentence of the section	all operation must be specified
10.3.3.2.1	Renfro	T		4th paragraph sounds too much like implementation. May not wish to disable antenna switching immediately after signal detect.
10.3.3.2.1	Renfro	T		Figure 10-9. What are countdown and CS/CCA timer? Should be deleted from diagram. Only need specify performance of CCA function and not implementation.
10.3.3.2.1	Renfro	T		1st paragraph does not belong in state machine discussions.
10.3.3.2.1	Sonnenberg	Tech	Third sentence: The PLPC shall be capable of detecting sync pattern within the slot...	During the slot time, the PLPC is looking for the sync pattern, and the start word will not be in the slot. Note also, the fourth paragraph of this section defines "channel busy" as detection of sync.
10.3.3.2.1 (fig 10-9)	Bob O'Hara	T	The PHY shall not report channel busy after a Ph_DATA.request. The PHY shall unconditionally transmit.	The current operation does not meet the requirements of the MAC
10.3.3.2.1 (fig 10-9)	Bob O'Hara	T	Use complete names of signals or define abbreviations	not defined
10.3.3.2.1.	Mahany	E	First Paragraph: Reference 10.6.2.3 for CCA performance within a slot interval rather than 10.6. Substitute "detection performance" or "probability of detection" for the term "performance". Fourth paragraph: last sentence: insert "successful" before "reception"	Clarity
10.3.3.2.2.	Mahany	E	Revise sentence immediately prior to figure 10-10.	What does this mean?
10.3.3.2.2.	Mahany	T	Replace "end of last packet on air" with specific defintion: End of transmitter ramp down = figure 10-19, -50dBm point.	Current reference is vague.
10.3.3.3.1	McDonald	t	Last Para, 2nd sent: (If after receiving ..) Eliminate this idea	A receiver cannot know reliably that a carrier has been lost.
10.3.3.3.1	Renfro	T		Figure 10-11. Check signal lock status and Check packet format are not requirements and should not be in standard. Figure 10-11a, update to include 2 Mb/s. Delete format error checking and bias error checking. Should not be required and is not nearly as accurate as HEC and CRC. Also, reference to fig 10-10a should be to fig 10-11a.
10.3.3.3.1 (fig 10-11)	Bob O'Hara	T	Provide complete detail to show haw every Ph_DATA.indication is generated	ambiguous

10.3.3.3.1 (fig 10-11)	Bob O'Hara	T	Define the procedure and requirements for "Check Packet Format"	not defined
10.3.3.3.1 (fig 10-11)	Bob O'Hara	T	The state machine must be driven by PMD_DATA.indication primitives	ambiguous
10.3.3.3.2	McDonald	t	Is 8 useconds the correct number	Is this too fast?
10.3.3.3.2	Renfro	T		Will take more than 1 usec to send PHY_Data.indicate to MAC after last symbol is received at the air interface. Need to define all times at air interface. Don't specify how long after errors are detected that receive procedure must be terminated. Not practical to test and is meaningless unless everyone implements everything the same way.
10.3.3.3.2.	Mahany	T	Second Paragraph: Delete reference to error correction, or point to section containing algorithm or procedure.	HEC Correction is referenced in 10.3.2.2.3 and in 10.3.3.3.2. If correction is possible or required, or implies use of a different procedure in the receiver processing, it must be defined.
10.4	Jerry Loraine	T	Delete section	This is not an exposed interface. We cannot test it therefore it cannot be mandatory.
10.4.1	Bob O'Hara	E	delete this section	
10.4.1	Renfro	E		Service primitives cannot be mandatory unless it is mandatory to have a testable interface. This does not impact interoperability.
10.4.1, 10.5.4	Simon Black	T	Replace ' all of the service primities described in this section are considered mandatory unless otherwise specified' with 'The PLME/PMD services are defined in terms of service primitives. These primitives are abstract representations of the service and are not intended to restrict implementations'	Much care is required in defining abstract primitives as mandatory where there is no testable interface. This is a conformance test issue - ie how do you test that a particular DUT implements primitives specified as mandatory.
10.4.2.1	Furuya		PLME_SAP Management Service Primitive Parameters Table 10-5: PATTERN PLME_SETCHNL 0, 2-23, 24-45, 47-68, 2-5, 6-9, 10-13 INDEX PLME_SETCHNL 2-80, 73-95	Should include the Japanese Regulations
10.4.2.2.5	McDonald	e	What does "Set equal 0" is used by the Mac to discover current LANs mean?	
10.4.2.2.5	Bob O'Hara	T	Remove references to MAC operation, match values referenced to table 10-5, remove reference to frequencies	operation must be completely specified within the PHY
10.4.2.2.5	McDonald	t	Should the frequency be given in advance of when its needed and then stroked	If this is not an exposed interface then perhaps my comment is not warranted.
10.4.3.1	Bob O'Hara	E	delete "such things as"	
10.4.3.1	Bob O'Hara	T	provide description of relationship between MAC managment and FH PLME state machines	not defined
10.4.4.2	Bob O'Hara	T	Define operation if PLME_SETCHNL or PLME_POWER is received when the PLCP is in transmit state. Remove references to MAC, use service primitives.	Management requests may come from anywhere, asynchronism must be dealt with.
10.4.7.3	Renfro	T		Delete requirement. To be useful you would need to specify antenna gains as well. Also, when and how transmit power control is used.
10.5.	McDonald	t	There is a timing relationship between parameters listed in 10.5 that is not specified. Should this be specified, or is it not required in the standard?	System timing tolerances estimates rely on these delay.
10.5.1 (fig 10-14)	Bob O'Hara	E	ensure this matches other architecture figures.	
10.5.4	Bob O'Hara	E	Delete this section	
10.5.4	Renfro	E		Service primitives cannot be mandatory unless it is mandatory to have a testable interface. This does not impact interoperability.

10.5.4	Wim Diepstraten	T	It is unclear how the PMD is controlled to change speeds. A PMD primitive should be identified for this purpose. The current PLCP description does not show when the rate switching is done and how.	
10.5.4.3	Furuya		PMD_SAP Service Primitives Parameters Change Table TXPWR_LEVEL PMD_TXPWRLVL.request LEVEL1, LEVEL2, LEVEL3 LEVEL4	Must be consistent with 10.5.5.6. PMD_TXPWRLVL.request
10.5.4.3	Furuya		PMD_SAP Service Primitives Parameters Table 10-8: CHNL_ID_1 PMD_FREQ.request 2 through 80 exclusive CHNL_ID_2 PMD_FREQ.request 73 through 95 exclusive	Should include the Japanese Regulations
10.5.4.3	Mahany	E	Remove TBD in figure 10-8, replace with 0-15 per 10.5.5.8	Clean Up
10.5.5.1	Bob O'Hara	T	Revise description to handle multi-bit symbols (2 Mbit PHY).	does not meet all requirements
10.5.5.1	Renfro	T		Should take on six values: 0, 1, 00, 01, 10, 11
10.5.5.10	Mahany	E	This should be a gross fault indicator, and not used for any operational purpose other than detecting that something is broken when this checked during steady state conditions.	While the effect of receipt of this primitive is not specified, indication of LOCKED in an unlocked state or UNLOCKED in a locked state are probably not fault conditions. However it is dangerous to assume that a realizable implementation of a lock detect function will provide useful indication of frequency accuracy during channel switching. Also, since the lock detect is no better than the synthesizer frequency reference, it provides no indication of whether absolute frequency error is within specified limits.
10.5.5.10	McDonald	e	See last line. Why do this if the result is unspecified?	
10.5.5.2	Renfro	T		Should take on six values: 0, 1, 00, 01, 10, 11
10.5.5.3	McDonald	e	Does this come from the PLME or PLCP?	
10.5.5.5	McDonald	t	The number of antennas allowable should be more than two.	The standard should not limit the degrees of diversity a manufacture might use.
10.5.5.5	Renfro	T		Should not be limited to only 2 antennas.
10.5.5.6	Zuckerman	T	.....The TXPWR_LEVEL parameter can be one of the following values listed in Table 10-9 below (Show 16 values instead of 4.)	Sixteen power levels will be needed to implement an advanced Clear Channel Assessment.
10.5.5.7	Renfro	E	Change "following list" to "channel numbers listed"	
10.5.5.8	Bob O'Hara	E	remove references to MAC, use service primitives	Proper standard language
10.5.5.8	Bob O'Hara	E	replace "constantly" with "continuously"	
10.5.5.8	Sonnenberg	Edit	Remove this section.	RSSI does not seem to be required or used by conformant products, so leave it out to simplify things.
10.5.5.8	McDonald	t	change parameter range to 0-63	16 level gives a resolution of several dB which is not good enough.
10.5.5.8	Renfro	T		0 - 15 is meaningless unless it maps to actual RSL.
10.6.10	Bob O'Hara	E	replace "will" with "shall"	Proper standard language
10.6.10	Mahany	E	Move after 10.6.15	Fits better there
10.6.11	Mahany	T	Change to 75 KHz	This specification makes no allowance for steady state frequency error. The idea here is to make sure that it is close enough to its final value.
10.6.11	McDonald	t	The issue of channel switching for the frequency hop PHY begs the question of synchronization. Assuming that all units in a BSS are synchronized and hop at the same time what happens after switching to a new frequency. It would seem reasonable that 224 microseconds (+/- tolerance) after the start of a new dwell period there would be a new time reference which would have similar properties to the timing reference established by the "last bit of a packet". (Why not transmit a beacon at the start of each dwell period to help define this special reference period.) Now SIFS, DIFS and contention periods would follow.	The channel switching spec is probably not the best place to mention this comment, but the comment is related to the total issue of channel switching. We must address the issue of what is allowed to happen at the end of the 224 microseconds after the start of a new dwell period
10.6.12	Bob O'Hara	E	replace "must" with "shall"	Proper standard language

10.6.12	Bob O'Hara	T	a complete specification of the time required is necessary.	not defined
10.6.12	Fischer, Mike.	T	State a time, not an external functional requriement.	The discussion of a MAC functional characteristic does not belong in the PMD definition. The PMD should specify the time, set the MIB appropriately, and allow the MAC to determine how long a gap is needed so that the PHY is able to receive all control frames. Another example of why layering should be ovserved is that the constraint is not just control frames, as there are cases in the MAC where a data frame follows a previous frame by an SIFS interval (POLL to Data, CFÐData to CFÐdata during the CFP, etc.).
10.6.12	Renfro	T		Tx to Rx must be fast enough to switch to receive all packets not just control packets. Should spec to be less than Rx to Tx time.
10.6.13	Bob O'Hara	E	replace "can individually" with "individually may"	Proper standard language
10.6.13	Jerry Loraine	T	10.6.13 Receive to Transmit Switch Time The maximum time for a conformant PMD to switch the radio from the receive state to the transmit state and place the start of the first bit on the air shall be 19 usec.	This change is technical as it is removing text that can be interpreted as a specification, but is intended to be informative text. To avoid confusion it should be deleted.
10.6.13	Renfro	T		Delete everything after first sentence. Specify time from last symbol of MPDU at air interface until first symbol of sync field at air interface. This must include both Tx and Rx delays and should be about 24 - 25 usec. Vendor can allocate time however they desire. It is not necessary to tell them so.
10.6.13	Sonnenberg	Tech	The maximum time for a conformant PMD to switch the radio from the receive state to the transmit state and place the start of the first bit on the air shall be 19 usec. At the end of this 19uS switch time, the rf carrier shall be within 1dB of its final value, and within 60kHz of the center of the channel. While the transmitter's PA is ramping up (before the transmission of the first bit), the rf carrier shall be set to the nominal center frequency. This specification provides a reference point for manufacturers to meet the Receive to Transmit turn-around time for a compliant 802.11 FHSS PMD.	Power output and center frequency are very important when defining transmit turn on time. Specifying it this way simplifies the standard and makes it straightforward to test.
10.6.14	Bob O'Hara	E	replace "must" with "shall"	Proper standard language
10.6.14	Mahany	T	Delete, or define test conditions fully.	This is a meaningless specification, and is not included in any other PHY.
10.6.14	Renfro	T		This requirement is meaningless unless we define a channel model and a required operating range.
10.6.15	Mahany	E	The paragraph headings following this section should be demoted to subheadings, e.g. 10.6.16 should be 10.6.15.1	Readability
10.6.15	McDonald	e	Sections 10.6.15 through 10.6.19 are subparagraphs of 10.6.14 "transmitter spec	
10.6.15	Renfro	E		Delete this paragraph or make it a heading over the information referenced.
10.6.16	McDonald	e	....applicable regulations, and comply to the limits of the local regulatory agency	Not a sentence. The thought needs to be completed
10.6.16	A. Bolea	T		First sentence is not complete. What is it trying to say?

10.6.16	Mahany	T	Add the text from 11.4.7.1 beginning with the sentence: "In the USA...." . Alternatively the following text would be appropriate.: "Unless governed by more stringent local geographic regulations, The radiated emissions from compliant devices shall meet ANSI C95.1-1991 limits for controlled or uncontrolled environments, in accordance with their intended usage."	The issue of emissions safety should be addressed in the FH PHY, if addressed in the DS PHY. Not doing so may imply that DS is safer, or that the DS community is more safety conscious.
10.6.16	Renfro	T	Replace with: An 802.11 conformant PMD shall meet all applicable transmit power and EIRP requirements specified by applicable regulatory organizations. In addition, a conformant PMD shall be capable of transmitting with a minimum EIRP of 0 dBm.	As written this paragraph makes no sense.
10.6.16	Sonnenberg	Tech	**Transmit Power Levels** In addition to the requirements imposed on the transmit signal by the baseband wave shape detailed in section 10.6.20, the signal shall also exhibit the characteristic that the maximum Equivalent Isotropically Radiated Power (EIRP) of the PMD, as measured in accordance with the geographically applicable regulations, shall not exceed 4000mW or the power level governed by applicable local regulations, whichever is the lesser. In addition, all conformant PMD implementations shall be capable of transmitting a minimum of ~~1.0 mW~~ 100mW.	All 802.11 compliant products should be capable of outputting 100mW of rf power. Without this, some products will have severely limited range— unusable in many applications. This will give all 802.11 product a bad reputation.
10.6.16 - 10.6.23	Bob O'Hara	E	move in one heading level	
10.6.17	Mahany	E	First sentence: replace " measured by" with "measured in accordance with"	Readability
10.6.17	A. Bolea	T		If the draft requires having one or more levels of transmit power control, then it should specify how and when they are used.
10.6.17	Jerry Loraine	T	10.6.17 Transmit Power Level Control If a conformant PMD implementation has the ability to transmit in a manner that results in the EIRP of the transmit signal exceeding the level of 100 mW, as measured by the geographically applicable regulations, at least one level of transmit power control shall be implemented. This transmit power control shall be such that the level of the emission is reduced to a level below 100 mW under the influence of said power control.	Delete the reference to 4 power levels. It is not specified how this is used in the MAC. It seems to be unnecessary.
10.6.17	McDonald	t	eliminate first paragraph	There is no point in requiring a power level switching capability if there is no algorithm to control it. I suggest that we cannot create an acceptable algorithm
10.6.17	Renfro	T		Delete this section. Only requirement should be based upon applicable regulations. We have already required higher power transmitters to be more polite. As written, I could use a 100 mW transmitter with a 16 dBi gain antenna without power control but not a 101 mW transmitter with a 0 dBi gain antenna.
10.6.17	Sonnenberg	Tech	Delete the second paragraph altogether.	There appears to be no need to specify 4 power levels when they are optional, and unsupported in the MAC.
10.6.18	Bob O'Hara	E	replace "should" with "shall"	Proper standard language
10.6.18	Bob O'Hara	E	replace "SPECTRUM" with "spectrum"	
10.6.18	Bob O'Hara	E	replace "packet" with "frame"	
10.6.18	Bob O'Hara	E	delete "as"	
10.6.18	Bob O'Hara	E	Make "Power by N=M+/-2 -40dB..." into a complete sentence.	

10.6.18	P Chadwick	Edit	The adjacent channel power, which is the sum of the power measured in a 1MHz band, shall, as a function of channel offset N from the centre frequency of the channel M, be below the transmitter power by:- N = M+/-2 40dB N>= M+/-3 60dB in Fig 10-17, for 2.0MHz, substitute 4.0 MHz, and for 3.0 MHz, substitute 6.0MHz	Power levels are not '-40dB below'. 'Assigned Channel' has a particular meaning within the ITU Radio Regulations. Fig 10-17 is incorrect.
10.6.18	Jerry Loraine	T	10.6.18 Transmit Spectrum Shape Transmitter should pass a SPECTRUM mask test. The duty cycle between Tx and Rx is nominally 50% and the transmit packet length is nominally 400 usec. The adjacent channel power, which is sum of the power measured in a 1 MHz band, shall be either less than -70dBm or as a function of channel offset N from the assigned transmitter channel M: Channel N=M+/-2 -20dBm or -40dBc, whichever is the lower power. N>=M+/-3-40dBm or -60dBc, whichever is the lowest power. The levels given in dBc are measured relative to the transmitter power measured in a 1MHz channel centered on the transmitter center frequency. The adjacent channel power and the transmitter power for this section of the specification shall be measured with a resolution bandwidth of 100 kHz, with a peak detector and the measurement device set to maximum hold. Within the frequency band of 2.4 GHz to 2.4835 GHz. three failures are permitted providing they are less than -50dBc.	This section of the specification does not penalise higher power transmitters, which can unintentionally radiate higher noise levels. These figures need to be translated into absolute power levels. The dBc number also need to be maintained, this prevents lower power noisy transmitters.
10.6.18	Joe Kubler	T	figure 10-17 should define power as absolute values instead of deltas.	the deltas are fine relative to 100mwat transmitters, but are not fine for higher power transmitters.
10.6.18	Mahany	T	Revise Figure 10-17 to correctly indicate the limits in the text. Revise to indicate that the three permitted failures are for N>=M+/-3 cases only	The figure shows -40 dB a N= M+/- 1
10.6.18	Mahany	T	Revise Transmitter Mask to Reflect Absolute levels rather than relative levels: -20 dBm at M +/-2, -40 dBm at M+/- 3 Offsets.	With a relative emissions mask, 1 W transmitters are allowed to be significantly larger interferers on alternative and second alternate channels. This works to the detriment of co-located, lower power devices. The standard should be penalize operation at a relatively lower power level. The absolute levels in the current mask are also a detriment in a 1 W only system. Their interference potential is relative to the receiver sensitivity spec which is fixed independent of TX power level.
10.6.18	Renfro	T		This section needs to be reworded. Also, delete -20 dB requirement. It is either redundant with earlier section or not consistent (if you use 99 percent BW).
10.6.19	Furuya		Transmit Center Frequency Tolerance An 802.11 FHSS compliant PMD shall have a transmit center frequency accuracy, as measured from FC of +/- 60 kHz. It shall maintain this stability over the following operating temperature ranges: (1) Office Environment 0 deg C to 40 deg C (2) Industrial Environment -20 deg C to 50 deg C	Should state a temperature range (with actual numbers). Reading the specification, a manufacturer can set the temperature range to whatever it wants.

10.6.19	Bob O'Hara	E	replace "An 802.11 FHSS compliant" with "The"	
10.6.19	Joe Kubler	T	operating temperature range is not defined in standard (and should be)	
10.6.19	Mahany	T	Define Referenced temperature range per Mahany comment at 10.6.5	Text calls for stability to be maintained over temperature. No temperature ranges are now indicated in the PMD (see comment at 10.6.5)
10.6.2	Furuya		Operating Frequency Range USA *	Be consistent. At any time, the FCC can modify the frequency band.
10.6.2	Furuya		Operating Frequency Range A conformant PMD implementation...from the full geographic-specific set of available...	Consistency with table and "*" note.
10.6.2	Furuya		Operating Frequency Range * These numbers are subject to geographic-specific Regulatory Authorities.	Note should be consistent with the Figure.
10.6.2	Iwen Yao	E Approve	'2.482 GHz' from '2.480 Ghz'.	The Upper Limit for Europe should be identical to the USA.
10.6.2	Mahany	E	Add asterisk to USA. Replace note (*) with These frequency ranges are subject to local geographic frequency allocation.	Improved readability.
10.6.2	Renfro	E	Delete * and associated note.	All are subject to Regulatory Authorities.
10.6.2	A. Bolea	T		The Lower and Upper Limit columns in Table 10-10 do not match the limits shown in Table 10-12. It is not clear why we even have these two columns.
10.6.2 (table 10-10)	Bob O'Hara	E	the items referenced by the "*" are not numbers	
10.6.20	Mahany	E	The paragraph headings following this section should be demoted to subheadings, e.g. 10.6.21 should be 10.6.20.1	Readability
10.6.20	McDonald	e	Sections 10.6.20 through 10.6.21 are subparagraphs of 10.6.28 "receiver spec	
10.6.20	Renfro	E		Delete this paragraph or make it a heading over the information referenced.
10.6.20	Mahany	T	Insert the following under a subheading in this section: Conducted Signal leakage from the from the receiver within the operating frequency range shall not exceed -50 dBm	Local oscillator leakage within the operating frequency range is a significant potential inteferer. Under FCC regulations, equipment can potentially be approved with emissions can be up to the 15.249 limits. Consider a direct conversion receiver with -20 dBm leakage, changing frequencies from near the top of the band to the near the bottom. The emissions will be a swept signal traversing the entire band in 200 usec. This will interfere will other receivers operating near sensitivity at distances in excess of 15 -20 m. -50 dBm is consistent with the previous specified TX output in the off condition.
10.6.21	Bob O'Hara	E	replace "A conformant PMD implementation must" with "The PMD shall"	
10.6.21	Bob O'Hara	E	superscript "-5"	
10.6.21	Mahany	E	Eliminate "Spurious Free"	Incorrect terminology per November Meeting Discussion and Vote
10.6.21	Renfro	E		Should state where dynamic range is referenced to.
10.6.21	P Chadwick	Edit	Input Dynamic Range.	"Spurious Free Dynamic Range" has a particular meaning within the radio industry, which is different to the usage here. NB:This change was approved at the November 1994 meeting and incorporated into the draft P802.11-94/068r6.
10.6.21.	Jerry Loraine	T	replace 'a BER of less than or equal to10-5' with: a PER of less than or equal to10-2. [Where PER is the packet error rate, with a 112 byte PLCP_PDU.]	These sections needs to be re-written in terms of Packet Error Rate.

10.6.22	Furuya		Receive Center Frequency Acceptance Range An 802.11 FHSS compliant PMD shall meet all specifications over the stated operating temperature range specified in 10.6.19, with the input signal having a center frequency range of +/- 60 kHz from nominal.	Refer to comments from 10.6.19.
10.6.22	Bob O'Hara	E	replace "An 802.11 FHSS PHY implementation must, with "The PHY shall,"	
10.6.23	Bob O'Hara	E	replace "A compliant FHSS PHY implementation must" with "The PHY shall"	
10.6.23	P Chadwick	Edit	This parameter applies to a PMD operating with a nominal output power of 100mW or less.	The current "_100mW" is meaningless.
10.6.23	Jerry Loraine	T	Remove reference to CCA on data packets.	I do not believe that the 2Mb/sec signal will be detected by the 1Mb/sec demod. The 4 level modulation, will without pre-amble, not appear to give bit interval transitions. Therefore it will mostly go undetected. Therefore detection on non preamble signals is both difficult and unreliable.
10.6.23	Renfro	T		State where -85 dBm input is reference to. Add statement that lower power transmitters can increase the threshold level based upon equation. Should really be based upon EIRP and not transmitter power. Suggest we also modify threshold as antenna gain varies from 0 dBi. State that CCA detection during data only applies to 1 Mb/s FH and not 2 Mb/s FH. It will be worse. I don't believe a clock detect method with multiple antennas will meet these requirements for a reasonable P_{fa}. RSL detection will work very fast and very well if you believe we have a AWGN channel. Should increase time to **TBD**.
10.6.23	Sonnenberg	Tech	A compliant FHSS PHY implementation must, in the presence of any 802.11 compliant FH PMD signal above -85 dBm, signal busy with a 90% probability in detection of the ~~preamble~~ sync pattern within the CCA assessment window. ~~and a 70% probability for detection of random data within the CCA assessment window~~. This specification applies to a PMD operating with a nominal output power of _ 100mW. A compliant PMD operating at a nominal output power greater than 100mW shall use the following equation to define the CCA threshold. Pt represents Transmit Power.	Detecting random data is not needed for the MAC to work. It is also difficult and unreliable. If a product misses the PLCP header, the signal was probably weak enough that it should not be deferred to.
10.6.23 and 10.3.3.2	Jan Boer	T	corrected text can be partly copied from section 11.4.8.4 for DS CCA. FH CCA must be based on energy rather than on a compliant FH PMD signal.	The standard makes two different PHY's possible in the same frequency bands. All possible effort must be done to make fair coexistance between the two possible,i.e. a FH defers for a DS system whenever it sees energy and vice versa. The DS standard has implemented this approach by basing CCA on a energy level. FH, however, only looks for a compliant FH signal for CCA. In my view it is not acceptable that there is no attempt in the FH part of the standard to make coexistance possible between a DS and FH system.
10.6.24	Bob O'Hara	E	delete "conformant"	

10.6.24	McDonald	e	Should be in the transmitter section not receiver	
10.6.24	Bob O'Hara	T	Slope of power ramp is not specified as in section 10.6.25	remove inconsistencies
10.6.24	McDonald	t	Fig 10-18 is obsolete. This figure with less specification might be a good illustration for informative purposes. It shows that 8 bit periods are used and that there can be little action in the first or last bit periods	The ramp limits are now controlled by the splatter spec of 10.6.18
10.6.24	Renfro	T	Change to: The transmitter shall go from off (EIRP < -50 dBm) to on (within 1 dB of nominal EIRP value) in less than 8 usec. During this time, the transmitter shall meet all spectral requirements defined in section 10.6.5.	No reason to give mask. Real requirement is to meet spectrum requirements. Mask should not assume 100 mW transmitter.
10.6.24	Sonnenberg	Tech	Delete this section.	The ramp-up period does not have to be specified, because a conformant product must meet the TX splatter mask and the RX-to-TX turnaround spec. These other two specifications are enough.
10.6.24 & 10.6.25	Zuckerman	T	Deleted	I believe we voted to eliminate specifying the transmitter power ramping characteristic as a means to control splatter in favor of specifying maximum splatter & stating how to measure it.
10.6.25	Bob O'Hara	E	delete "conformant"	
10.6.25	Joe Kubler	E	second paragraph clearly is copy of second paragraph from ramp up section and should be changed to reflect going from steady state on to steady state off	
10.6.25	Mahany	E	Figure 10-19: Delete Steady State Pwr = 100 mW, +/- 25 mw, +/-50 mW references.	These are specific to 100 mW.
10.6.25	McDonald	e	Should be in the transmitter section not receiver	
10.6.25	P Chadwick	Edit	The purpose of a conformant PMD Ramp Down Time Period is to control the rate of change of the amplitude of the transmit signal during its transition from the steady state transmit output level to the off state. The following states are defined by the mask of Figure 10-19. The transmitter is considered to be at the steady state transmit power level at the start of the first 1µsec period of the ramp down, and remains +/-3dB of that level until the end of the first 1µsec period. the output is less than 0dBm at the end of the 7th 1µsec period, and is "off" (less than -50dBm) at the end of the 8th 1µsec period.	The wording for the ramp down is incorrect.
10.6.25	Bob O'Hara	T	specify slope in mW/usec	units do not match
10.6.25	Mahany	T	Replace with Text Describing Ramp Down	The Text here describes ramp up. Figure 10-19 is correct except for editorial changes.
10.6.25	McDonald	t	Fig 10-19 is obsolete. This figure with less specification might be a good illustration for informative purposes. It shows that 8 bit periods are used and that there can be little action in the first or last bit periods	The ramp limits are now controlled by the splatter spec of 10.6.18
10.6.25	Renfro	T	Change to: The transmitter shall go from on (within 1 dB of nominal EIRP value) to off (EIRP < -50 dBm) in less than 8 usec. During this time, the transmitter shall meet all spectral requirements defined in section 10.6.5.	No reason to give mask. Real requirement is to meet spectrum requirements. Mask should not assume 100 mW transmitter. Mask should not define slope.

10.6.25	Sonnenberg	Tech	Delete this section.	The ramp-up period does not have to be specified, because a conformant product must meet the TX splatter mask and the RX-to-TX turnaround spec. These other two specifications are enough
10.6.26	Bob O'Hara	E	move as a subsection under 10.6.20	
10.6.26	Bob O'Hara	E	superscript "-5"	
10.6.26	Bob O'Hara	E	replace "A conformant" with "The"	
10.6.26	Dellacorte	E	Change parameter name to "Minimum Receiver Sensitivity"	Current parameter name does not quantify the minimum sensitivity as defined in the paragraph definition .
10.6.26	Renfro	E	Delete	Redundant with dynamic range spec.
10.6.26	P Chadwick	Edit	Minimum Sensitivity is defined as the minimum signal level required to produce a BER of 10-5.	Sec. 10.6.21 defines -80dBm as minimum sensitivity, while 10.6.26 calls this sensitivity. As sensitivity is a general property of a receiver, rather than a fixed parameter, the term "minimum sensitivity" should be used in 10.6.26.
10.6.26	Bob O'Hara	T	rewrite this paragraph so it makes some sort of sense	unintelligible
10.6.26	McDonald	t	Update to reflect PER rather than BER criteria. This may require a change in the RF level as well in order to make the test and spec practical	BER cannot be measured directly
10.6.26	Zuckerman	T	....to produce a Block Error Rate of _____ for a packet length of _____.	In order to facilitate compliance testing, block or packet error rates are preferred.
10.6.26.	Jerry Loraine	T	replace 10-5 BER with: 10-2 PER. Where PER is the packet error rate, with a 112 byte PLCP_PDU.	These sections needs to be re-written in terms of Packet Error Rate.
10.6.27	Bob O'Hara	E	move as a subsection under 10.6.20	
10.6.27	Bob O'Hara	E	replace "A conformant" with "The"	
10.6.27	Renfro	E	Change to: With two signals located 4 and 8 MHz away at a power level of ...., a conformant PMD shall maintain a BER of less than 10^{-5} for an input signal level of ...	Positive spec easier to test.
10.6.27	Dellacorte	E/T	Intermodulation protection (IMp) is defined as the ratio of the desired signal strength to the minimum amplitude of one of two equal interfering signals at 4 and 8 MHz removed from center frequency , both on the same side of center frequency, that cause the BER of the receiver to be increased to 10^5, when the desired signal is -77 dBm.	The current definition is ambiguous as to what is the signal strength for the desired signal when measuring (IMp). Furthermore, the corrected text would assure that a very sensitive receiver would still meet IMp requirements as it relates to the minimum sensitivity requirements in 10.6.26
10.6.27	Jerry Loraine	T	Change definition of the signal level for this test to read: 'when the desired signal is 3dB above the specified sensitivity'	This is a technical change to that I believe was agreed during the meeting. This simplifies testing of the equipment, to a point where it can be auto mated. All test should refer to the specified sensitivity, not measured sensitivity as this complicates testing excessively.
10.6.27	McDonald	t	Update to reflect PER rather than BER criteria. This may require a change in the RF level as well in order to make the test and spec practical	BER cannot be measured directly
10.6.27	Zuckerman	T	....., that cause the Block Error rate (_____length blocks) to be increased to _____.	In order to facilitate compliance testing, block or packet error rates are preferred.

10.6.27.	P Chadwick	Edit/ Tech	Intermodulation protection (IMp) is defined as the ratio to -77dBm, of the minimum amplitude of one of the two equal level interfering signals at 4 and 8 MHz removed from the receiver tuned frequency, both on the same side of the tuned frequency, that cause the BER at the output of the receiver to be increased to 10-5, when the desired signal is -77dBm.	From the above, the term "sensitivity" should be replaced with "minimum sensitivity". Further, so that this section and the following one are compatible, and that a very sensitive receiver shall have sufficient intermodulation protection, the wanted signal level should be defined as -77dBm, rather than 3dB above the actual minimum sensitivity.
10.6.27.	Jerry Loraine	T	replace 10-5 BER with:10-2 PER. Where PER is the packet error rate, with a 112 byte PLCP_PDU.	These sections needs to be re-written in terms of Packet Error Rate.
10.6.28	Bob O'Hara	E	move as a subsection under 10.6.20	
10.6.28	Bob O'Hara	E	superscript "-5"	
10.6.28	Bob O'Hara	E	add "The minumum Dp shall be as given in Table 10-14." to the end of the section	
10.6.28	Renfro	E	Change to: With an interfering signal located at a channel offset of ... at a level of ..., a conformant PMD shall maintain a BER of less than 10^{-5} for an input signal level of ...	Positive spec easier to test.
10.6.28	P Chadwick	Edit	Desensitization is defined as the ratio to measured minimum sensitivity of the minimum amplitude of an interfering signal that causes the BER at the output of the receiver to be increased to 10-5 when the desired signal is -77dBm.	As for 10.6.27
10.6.28	Bob O'Hara	T	replace "dB" with "dBm"	use correct units
10.6.28	Mahany	T	Change Dp to: 20 dB at N+/-2, 35 dB at N =/- 3, 40 dB at N> +/- 3	The current Dp specification is not achievable when tested with an interfering signal meeting the mask limits of 10-6-18 text, due to presence of significant sideband energy on channel. Testing with another procedure may allow these specs to be met. Note that the mask indicated in Figure 10-17 would allow these specs to be met.
10.6.28	McDonald	t	Update to reflect PER rather than BER criteria. This may require a change in the RF level as well in order to make the test and spec practical	BER cannot be measured directly
10.6.28	Zuckerman	T	..... that causesthe Block Error rate (_____length blocks) of the receiver to be increased to _____.....	In order to facilitate compliance testing, block or packet error rates are preferred.
10.6.28	P Chadwick	Tech	ADD: "This parameter shall apply for signals within the band 1800 - 1900, 2400 - 2500 and 5650 - 5800 MHz."	No allowance is made for discrete spurious responses, such as image, image of second IF, etc. This forces manufacturers towards specific implementations, while such responses, if carefully chosen within the frequency domain, may be neglected because of the specific nature of the signals using these frequencies. For example, a receiver response falling in the frequency band used for space - earth communications would not be a problem, even though theoretically undesirable.
10.6.28.	Jerry Loraine	T	replace 10-5 BER with: 10-2 PER. Where PER is the packet error rate, with a 112 byte PLCP_PDU.	These sections needs to be re-written in terms of Packet Error Rate.

10.6.3	Renfro	T	Delete * and associated note.	All are subject to Regulatory Authorities. 79 channels is only correct in the US and Europe Table 10-11. Why include this table? The standard defines the size of the hopping set. Other numbers are meaningless.
10.6.3 (table 10-11)	Bob O'Hara	E	the items referenced by the "*" are not numbers	
10.6.5	Furuya		Occupied Channel Bandwidth The occupied channel bandwidth for a conformant PMD is 1.0 Mhz wide. The required transmitted bandwidth requires the 20 dB bandwidth to be less than 1 Mhz (see Figure 10-15: Occupied Channel Bandwidth). The transmitter center frequency shall be within +/- 60 kHz of one the specified operating center frequencies listed in Secion 10.6.4. The following diagram illustrates the relationship of the transmitter center freqency to the occupied channel bandwidth. [Modify the drawing by removing the strike-throughs from illustration of the 20 dB measurement, and remove "Shaded area represents 99% of the emitted energy"]	The occupied bandwidth spec must be the narrowest of all specs or worst case scenario which might be required by all of the regulatory bodies in the countries. Currently, 20 dB measurement is required by the FCC and is a tougher spec than the 99% measurement.
10.6.5	Bob O'Hara	E	delete "wide" from first sentence	
10.6.5	Mahany	E	Move sentence " The FCC ..... to be less than 1 MHz." to a footnote Second Para: add "maintained" after shall be.	Readibility. The text is currently "US Centric"
10.6.5	Bob O'Hara	T	remove reference to FCC and specify completely	This is targetted to be an international standard. The specification should be independent of geography, explicit for all areas, or provide independent PMD's for each differinggeographical area.
10.6.5	Geiger	T	Shade area not shaded. Fix -20dB cross outs	
10.6.5	Mahany	T	Incorporate Operating Temp ranges per 11.4.6.10 Alternatively adopt two designations: Standard Temperature Range e.g. 0 -50 C Extended Temperature Range (anything beyond the standard range)	This is an area where FH and DS PHYs should be in sync. End users need a way of insuring Interoperability in their applications. If different manufacturers provide compliant equipment over specified over various temperature ranges, it creates confusion in the end user population. We should provide designations to allow end users to easily identify the equipment they need.
10.6.5	Renfro	T	Change to "Occupied channel bandwidth shall meet all applicable requirements issued by regulatory organizations for the geography of operation."	European requirement is 20 dB bandwidth. I have no idea what Japanese requirement is. We need only specify minimum modulation deviation so that narrowest case can be met. Not even necessary to specify bandwidth since type acceptance for product will test that requirement. If we specify minimum deviation and adjacent channel interference it will be sufficient. Also, no shaded area in figure 10-15. Delete crossed out information from figure.
10.6.5 (fig 10-15)	Bob O'Hara	E	no area is shaded	
10.6.6	Mahany	E	Replace first paragraph with: The PMD entity will hop at rate governed by the MAC. Second para, first sentence: delete: "on the other hand"	Readability
10.6.6	Bob O'Hara	T	Hopping control must be provided by the PMD or PLME.	The MAC does not require hopping. It is independet of all PMDs.
10.6.6	Bob O'Hara	T	Must list all regulatory requirements for intended operation locations	not defined
10.6.6	Lewis	T	specifies hopping is governed by the MAC. The mechanisms by which the MAC determines when the PHY should hop is not clear in the standard. The connection with channel hopping and MAC operations needs to be clarified. If not in this section then somewhere else.	

10.6.6	Renfro	T		Replace second paragraph with table showing minimum hop rate for each regulatory domain (e.g., Europe, US, Japan). Or, simply state that minimum rate is governed by applicable regulations.
10.6.6, also Òcurrent dwell timeÓ in 10.9.3	Fischer, Mike.	T	The maximum dwell time should be limited to be much shorter than the regulatory maximum of 400ms. I would suggest a maximum of 100ms (or at absolute maximum, 125ms).	The sole mechanism available to a MAC/PHY pair for recovery from certain types of errors is retransmission at a later time. In the case of the FHSS PHY, many communication failure modes (such as narrowband interference, multipath fading at the current frequency in the recipientÕs location, simultaneous use of the same channel by colocated FHSS systems using different hop sequences, inaccurate hop synchronization, etc.) preclude successful retransmission later during the same dwell. Therefore, the longer the maximum dwell time, the longer the retry timeouts, the less useful the ÒboundsÓ on timeÐbounded service, the longer the queue length provisions in the MAC and/or LLC, the lower the network throughput, etc. Times in the 10Ð50ms range are appropriate to meet the needs of the MAC (and users, especially of TBS). The typical/default value of 20ms in table 10Ð17 falls in this range. However, the timeouts and TBS limits must be based on the maximum (and a ÒreasonableÓ assumption about how many successive dwells are typically needed to recover from one of these error events). A maximum time over 125ms (assuming the recovery is on the next hop, otherwise shorter) renders the FHSS PHY essentially useless as a medium to convey voice using TBS.
10.6.7	Dean Kawaguchi	E	Hop Sequences $\frac{(p-1)-(2*F)}{2k+1} = \frac{(p-13)}{2k+1}$ = 22 patterns / set for USA and Europe (F = 6) $= \frac{(p-11)}{2k+1}$ = 4 patterns / set for Japan (F = 5)	Clarification.
10.6.7	A. Bolea	T		**Fi** should be **Fj** in last sentence. In Equations, (I * J) should be ((I-1) * J) to match tables A, B,C.

10.6.7	Renfro	T	Replace with: The PMD Layer supports multiple frequency hopping patterns in order to allow for colocation of multiple data networks. A frequency hopping pattern, F_X , consists of a permutation of all frequency channels defined in Tables 10-12 and 10-13. For a given pattern number, x, the hopping sequence can be written as: $F_X = \{f_X(1), f_X(2), ... f_X(p)\}$ where, $f_X(i)$ = channel number (as defined in 10.6.4) for i^{th} frequency in x^{th} hopping pattern p = number of frequency channels in hopping pattern (79 for US/Europe, 23 for Japan) Given the hopping pattern number, x, and the index for the next frequency, i, the channel number shall be defined to be: $f_X(i) = [(i - 1) * x] \bmod (79) + 2$ in US and Europe $= [(i - 1) * x] \bmod (23) + 73$ in Japan. For the 802.11 compliant FHSS PMD operating in the US or Europe, there are three sets of hopping patterns with 22 patterns per set which meet a criteria for limited adjacent channel interference. These patterns are listed in Tables A, B and C of section 10.8. Similarly, there are three sets of patterns (with 4 patterns per set) for use when operating in Japan. These sets are listed in Table D of section 10.8. All PMD entities operating within range of each other must select a hopping pattern from the same set. All PMD entities compliant with 802.11 shall support all hopping patterns for their particular geographic region of operation (e.g., US, Europe, Japan).	Wording difficult to follow. p defined as number of channels in hopping pattern and then used as family of patterns? Equations don't match values in section 10.8 since index starts with 0 here and 1 in tables. No need to include formula for number of patterns/set.
10.6.9	Bob O'Hara	E	replace "it is" with "The PMD shall be", "The PMD accepts" with "The PMD shall accept", "is encoded" with "shall be encoded", "Fc is" with "Fc shall be", "is to be measured" with "shall be measured"	Proper standard language
10.6.9	Mahany	E	Move after 10.6.15 Second paragraph: insert "peak" before "deviation", and "Figure" before "10-16"	Fits better there Readability
10.6.9	Renfro	E	Change 'center frequency' to 'average center frequency' in 3rd paragraph.	
10.6.9	Naftali Chayat	T	The 2-GFSK deviation factor h2 is defined as the frequency separation of the {0} and {1} symbols divided by symbol rate. The minimal value of h2 shall be 0.30; the maximal value will result from the Occupied Bandwidth definition. The frequency deviations of +/-0.5*h2*Fsym are achieved by symbols being surrounded by identical symbols; in actual data stream the instantaneous deviation will vary due to Gaussian pulse shaping. The nominal {0} and {1} frequencies will be measured in the middle of 0000 and 1111 sequences, as encountered in the PLCP Start Frame Delimiter. The modulation error shall be less than +/-40 KHz from the nominal {0} and {1} values for any symbol. The nominal center frequency shall not vary more than +/-20kHz/msec, from the start to end of the 2GFSK MPDU section. The center frequency will be defined as an arithmetic mean of frequencies of {0} and {1}, when surrounded by identical symbols.	The text proposed is intended to replace the third paragraph of 10.6.9. The proposed definition of frequency deviation better reflects the fact that the deviation of the frequencies from nominal are intrinsic to the nature of Gaussian filtered data. Similar definition was accepted for the 10.7.9 , the 2 Mbit corresponding section, by accepting document P802.11-94/297. The accuracy requirements are relaxed here with respect to 4GFSK, in order to reflect the better tolerance of 2GFSK to inaccuracies.
10.6.9	P Chadwick	Tech	ADD: The nominal centre frequency shall not vary at a rate of greater than 10KHz/ms from the start to the end of the transmitted word.	In section 10.7.9 there is a parameter specified of maximum rate of change of centre frequency. This parameter should be included within the 1Mbps PMD.

10.7	Bob O'Hara	E	delete the first two paragraphs of this section	do not belong in a standard
10.7	McDonald	t	The high data rate specifications must be integrated into the 10.6 Frequency hop specifications. as it now stands the 2 Mb/s specification represents a separate PHY the second sentence of 10.7.1 states the problem directly. The 2.0 Mb/s PMD was developed ... We don't want this, we want an option to the FHSS PMD. You could argue that this is an "e" comment. If, However, you consider the impact this issue could cause at a higher level of approval it takes on more significance.	Note that the just from an outline standpoint, the 2 Mb/s PHY has the same status as the 1 Mb/s PHY. The FHSS group has clearly indicated that there is only one FHSS PHY, but that this PHY has an optional data rate or perhaps more than one optional data rate.
10.7	Simon Black	T	Add a simple block FEC code to the 2Mbps 4-FSK FH PHY standard. Suggest light 15,11,1 or 31,26,1 BCH codes. Go for small block length to introduce minimum group delay (which may affect IFS times) and minimum complexity.	Our experience with the 4FSK modulation for the 2Mbps FH PHY suggests that the C/N ratio required for reasonable BER is impactical (our results give a BER of 2x10E-5 for a C.N of 28dB!). For a more reasonable C/N of 24dB we get a BER of 9x10E-4. Simple FEC introduces worthwhile gains. Expect a full paper in March.
10.7.	Jerry Loraine	T	FEC encoding is needed for 4GFSK.	4GFSK requires of the order of a 30dB Carrier to noise. This is due to the lax, non coherent specification of the transmitter. This is therefore incredibly prone to noise and interference. Some protection is needed in the specification, I propose that FEC is added.
10.7.1	Mahany	E	First Sentence: Delete "may" 1st paragraph, third sentence: Delete "might coexist and possibly"	Readability
10.7.1	Renfro	E	Delete first paragraph.	Not necessary to justify selection.
10.7.10	Bob O'Hara	E	replace "A compliant 802.11 FHSS" with "The", replace "will" with "shall"	
10.7.10	Renfro	E	Add "and 1.0 Mb/s" to end of sentence.	
10.7.14	Renfro	T		As in section 10.6.14, this section should be deleted unless range and channel model are defined. Also, 4GFSK will have different performance than 2GFSK.
10.7.21	Bob O'Hara	E	replace "A conformant" with "The", replace "must" with "shall"	
10.7.21	Renfro	T	Add : A conformant PMD shall maintain a BER of less than 10^{-5} over this range.	
10.7.23	Renfro	T		Detection performance of 4GFSK will be worse during data than 2GFSK.
10.7.26	Bob O'Hara	E	superscript "-5"	
10.7.26	Bob O'Hara	E	replace "A conformant" with "The"	
10.7.26	Renfro	E		Redundant with 10.7.21 when BER requirement is added.
10.7.27	Bob O'Hara	E	replace "A conformant" with "The"	
10.7.27	Renfro	E	Change to: With two signals located 4 and 8 MHz away at a power level of ...., a conformant PMD shall maintain a BER of less than 10^{-5} for an input signal level of ...	Positive spec easier to test.

10.7.27	P Chadwick	Edit/ Tech	Intermodulation protection (IMp) is defined as the ratio to -77dBm of the minimum amplitude of one of two equal level interfering signals at 4 and 8 MHz removed from the receiver tune frequency, both on the same side of the tune frequency, that cause the BER at the output of the receiver to be increased to 10-5 when the desired signal is at a level of -72dBm. A conformant 2Mb/sec PMD shall have the IMp for the interfering signal at 4 and 8 MHz equal to or greater than 20dB.	The Intermodulation performance specified for the 2Mbps PMD is considerably higher than for the 1Mbps PMD. This is because of the approximately 10db greater C/N required for the high bit rate signal. In view of the probabilistic nature of intermodulation causing a problem to a receiver (requiring that two interfering signals be at channels spaced by frequencies of f and 2f at the same time that a wanted signal is to be received) it is proposed to harmonize these requirements. Further, the desired signal level should be defined as -72dBm so that the IMp is maintained for very sensitive receivers.
10.7.27.	Jerry Loraine	T	I propose that the intermodulation specification is reduced by 10dB to a figure of 20dB.	As the Eb/No for 4-GFSK is >10dB worse than that for 2GFSK, this number needs reducing by some 10dBm. This ensures that the 2Mb/sec radio can achieve a reasonable sensitivity with a reasonable power consumption.
10.7.28	Bob O'Hara	E	replace "should" with "shall"	
10.7.28	Renfro	E	Change to: With an interfering signal located at a channel offset of ... at a level of ..., a conformant PMD shall maintain a BER of less than 10^{-5} for an input signal level of ...	Positive spec easier to test.
10.7.28	Jerry Loraine	T	Power level is written as -72dB, should be -72dBm. Section needs to be translated to Frame Error Rate.	These sections needs to be re-written in terms of Packet Error Rate.
10.7.28	P Chadwick	Tech	PROPOSED TEXT: Table 10-16, DP Minimum 20 and 30 dB respectively.	The selectivity requirements are non-conformant with those of the 1Mbps PMD, insofar as the 10db higher C/N ratio required is not reflected in the limits. Additionally, not only are the filter(s) in a superheterodyne architecture receiver more difficult, but the phase noise is similarly affected. In order to achieve parity, it is proposed to harmonize this.
10.7.8	A. Bolea	E	"10 and **01**" should be "10 and 00"	
10.7.9	Bob O'Hara	E	replace "a" with "the", delete "conformant"	
10.7.9	Bob O'Hara	E	delete "101010"	defined elsewhere
10.7.9	Naftali Chayat	E	Text as per P802.11-94/297	The Draft Standard, as distributed, does not reflect the changes made in the November meeting and approved by both the FH Working Group and the Plenary. The document P802.11-94/297 (by N.Chayat and Jerry Lorraine) is dealing with general definitions, measurements and whitening for 2 Mbit/sec PHY.

10.7.9	Renfro	E	In second paragraph, add "of the 2GFSK modulated signal" after "The peak to peak deviation". Change "101010" to sync. In 4th paragraph, change "slot" to "frame". change "data word" to "data burst", change "01" to "00".	
10.7.9	Mahany	E (T?)	Insert Sections 10.7.9.1 through 10.7.9.3 (does whitening go here?) or renumber	
10.7.9	P Chadwick	Edit	"For definition purposes, the nominal centre frequency is the mid frequency between the symbols 10 and 00".	Table 10.15 and the wording on P213 are contradictory.
10.7.9	Bob O'Hara	T	replace "10 and 01" with "11 and 01"	make consistent with the table
10.7.9.	M. Rothenberg	E	Include the text from submission IEEE P802.11/94-297	The said submission was approved but the text is not yet in the draft.
10.7.9.4	Dellacorte	E	... The nominal center frequency is the mid frequency between symbols 10 and 00.	Typo
10.7.9.4	Joe Kubler	E	last paragraph defines "nominal center frequency ... between symbols 10 and 01." Clearly this should be "symbols 10 and 00". this is clear from table 10-15	
10.7.9.4	Mahany	T	Last paragraph: correct to state that "the nominal center frequency is the mid frequency between 10 and 00"	Error
10.7.9.4	Mahany	T	Add 4 FSK Whitening and Bias Control	Voted in the FH PHY during November Meeting, omitted from draft (The 4 FSK Whitening approach voted in November use 2-FSK symbols for stuff bits. Replace these with the 10 and 00 signals to remain within the 4 FSK alphabet once 4 FSK modulation commences. Simplifies Implementation. Repeated switching between 4 FSK during course of PDU is unnecessary, and requires additional overhead in modulation control).
10.7.9:	Jerry Loraine	T	Replace Section 10.7.9: with text in paper 94/297.	More complete definition.
10.8	A. Bolea	E	In Table A, Page 219, top of last column, "27" should be "37"	
10.8	Geiger	E	Move Hopping Tables to Appendix of Standard	not required in main text
10.8	Renfro	E	Add "For US and Europe" to title for Tables A, B and C. Change "27" to "37" on page 2 of Table A.	
10.8	Renfro	T		Table D is messed up.
10.9	Geiger	E	Section 10.9 needs to be rewritten to compliment the PHY MIB format	
10.9	A. Bolea	T		Some of the MIB Parameters, for example aRxTx_Switch_Time, are of no use to a network manager or higher layer control. Therefore there is no need for them and should be removed from the MIB list. Also some of the parameters such as aRx_SIFS are also defined in the MAC MIB. Do we need to carry the definition twice?
10.9	Rick White	T	All PHY MIB information must be one place. This includes both PHY independent and dependent MIB information.	More readable standard.
10.9, 9 (all), 11 (missing)	bdobyns	T	Eliminate Section 10.9 FHSS PHY MIB, reconcile and merge content of 10.9 with 9.0 Fabricate content for DSSS PHY MIB and merge with 9.0	All three PHY should reference same MIB. Section 9 and Section 10.9 must be reconciled with each other, as well as with the DSSS PHY (section 11)
10.9.2.2	Bob O'Hara	E	replace "aSythesizer_Locked GET," with "aSythesizer_Locked GET;" , add ";" after "agPhyHopping_grp", add ";" after "none"	
10.9.2.2	Mahany	T	Add a_ MPDU_ Min, Support for Hop Set, Hop Pattern	Omitted,
10.9.2.3	Joe Kubler	T	there is a conflict in templates. this section uses phy(1) and section 9.1.4 uses PHY(3). Earlier section used MAC(1). so I suspect that phy(1) should be phy(3).	ASN1 strings must be consistant
10.9.2.3.1	Bob O'Hara	E	add "," after all attribute names except last, put ";" there	
10.9.2.3.2	Bob O'Hara	E	add "," after all attribute names except last, put ";" there	
10.9.2.3.3	Bob O'Hara	E	add "," after all attribute names except last, put ";" there	
10.9.2.3.4	Bob O'Hara	E	add "," after all attribute names except last, put ";" there	

10.9.2.3.5	Bob O'Hara	E	add "," after all attribute names except last, put ";" there	
10.9.2.4.1	Bob O'Hara	T	values for this attribute must be defined	incomplete specification
10.9.2.4.20	Bob O'Hara	T	delete this attribute	unnecessary
10.9.2.4.21	Bob O'Hara	T	delete this attribute	unnecessary
10.9.2.4.21	Renfro	T		Only one SIFS time is defined by MAC and I believe they intend to calculate it from parameters given by the PHY. I don't think we need SIFS time here.
10.9.2.4.22	Bob O'Hara	T	delete this attribute	unnecessary
10.9.2.4.22	Renfro	T		Only one SIFS time is defined by MAC and I believe they intend to calculate it from parameters given by the PHY. I don't think we need SIFS time here.
10.9.2.4.24	Bob O'Hara	E	rename to "aMAX_Full_MPDU" to match description in MAC section	
10.9.2.4.24	Bob O'Hara	E	replace the behaviour with "The absolute maximum number of bytes in an MPDU that the PHY will accept."	
10.9.2.4.24	Bob O'Hara	T	define "aMin_Full_MPDU"	required for proper MAC operation
10.9.2.4.25	Bob O'Hara	E	replace "load" with "loaded"	
10.9.2.4.27	Tom T.	E	The attribute aRate_1MHz should be deleted.	The FH PHY will always support the 1 Mbit rate therefore this attribute does not contain any new information.
10.9.2.4.29	Bob O'Hara	T	values for this attribute must be defined	incomplete specification
10.9.2.4.31	Bob O'Hara	T	values for this attribute must be defined	incomplete specification
10.9.2.4.31	Renfro	T		Delete. Why is antenna type listed here???
10.9.2.4.32	Bob O'Hara	T	values for this attribute must be defined	incomplete specification
10.9.2.4.32	Renfro	T		Delete. Why is antenna type listed here???
10.9.2.4.34	Bob O'Hara	T	units for this attribute must be defined	incomplete specification
10.9.2.4.35	Bob O'Hara	T	units for this attribute must be defined	incomplete specification
10.9.2.4.36	Bob O'Hara	T	units for this attribute must be defined	incomplete specification
10.9.2.4.37	Bob O'Hara	T	units for this attribute must be defined	incomplete specification
10.9.2.4.38	Bob O'Hara	T	units for this attribute must be defined	incomplete specification
10.9.2.4.40	Bob O'Hara	T	values for this attribute must be defined	incomplete specification
10.9.2.4.42	Bob O'Hara	T	if the value if this attribute is a constant other than infinity, rewrite the description so it says something useful	ambiguous
10.9.2.4.43	Bob O'Hara	T	delete "set by the MAC"	PHY management should be managing the PHY operation
10.9.2.4.6	Bob O'Hara	T	values for this attribute must be defined	incomplete specification
10.9.2.4.6	Renfro	T		Why does CCA method exclude "Data Only" detection?
10.9.2.4.8	Renfro	T		Delete. CCA method only required to make decision at end of slot time.
10.9.3	A. Bolea	T		Many of the subsections are missing text.
10.9.3	Bob O'Hara	T	move all of this information into the proper attribute definitions in section 10.9.2	improperly located
10.9.3	Mahany	T	Change MDPU designations to: a_ MPDU_ Min =400, a_MPDU_Max=2000, a_MPDU_Current_Maximum=1000	Omitted ,Inncorrect
10.9.3	McDonald	t	As indicated at the Jan 95 meeting, major changes are required in the MIB. The FHSS PHY editor has recorded a number of these.	Some specs are required, some might be useful for reference, some require limits, and some should be eliminated. PHY_SIFS_max and PHY_SISF_MIN are examples of specs that need to be added.

10.9.3	Renfro	T		Rx_Clk_Rcy_Delay = 2 usec? Not very believable. MPDU_Maximum_Length = 400 bytes? SB 2^{10} - 1. MPDU_Current_Max_Length = 0??? Current_Dwell_Time = 20 msec? Why specify this? The MAC seems to want it to be up to them so let them set it.
10.9.3, 6.2, 6.3, 6.4,	Isabel Lin	E	Since Ed G. is working on the editorial issues, as what he suggested, it will be inefficient t have multiple versions of text for the same section. I'd like to wait to see his version of text.	These sections are incomplete. What needs to be done: Fill them up.
10.9.3, 6.2, 6.3, 6.4,	Ryan Tze	E	Since Ed G. is working on the editorial issues. Would like to see his version of text	Sections are incomplete. What needs to be done: Complete sections
10.9.3, also Òcurrent dwell timeÓ in 10.6.6	Fischer, Mike.	T	The maximum dwell time should be limited to be much shorter than the regulatory maximum of 400ms. I would suggest a maximum of 100ms (or at absolute maximum, 125ms).	The sole mechanism available to a MAC/PHY pair for recovery from certain types of errors is retransmission at a later time. In the case of the FHSS PHY, many communication failure modes (such as narrowband interference, multipath fading at the current frequency in the recipientÕs location, simultaneous use of the same channel by colocated FHSS systems using different hop sequences, inaccurate hop synchronization, etc.) preclude successful retransmission later during the same dwell. Therefore, the longer the maximum dwell time, the longer the retry timeouts, the less useful the ÒboundsÓ on timeÐbounded service, the longer the queue length provisions in the MAC and/or LLC, the lower the network throughput, etc. Times in the 10Ð50ms range are appropriate to meet the needs of the MAC (and users, especially of TBS). The typical/default value of 20ms in table 10Ð17 falls in this range. However, the timeouts and TBS limits must be based on the maximum (and a ÒreasonableÓ assumption about how many successive dwells are typically needed to recover from one of these error events). A maximum time over 125ms (assuming the recovery is on the next hop, otherwise shorter) renders the FHSS PHY essentially useless as a medium to convey voice using TBS.
10.9.3.1	Joe Kubler	T	as section 10.9.3.1.6-10.9.3.1.44 say ADD TEXT	clarification of MIB values
10.9.3.1	Mahany	T	Add Text to Sub paragraphs	Omission
10.9.3.1	McDonald	t	Complete the "add text" sections	Standard not complete
10.9.3.1.2	A. Bolea	T		Since the next three sections define whether the PHY supports various geographic regions, there is no need for this field.
10.9.3.1.2	McDonald	t	Change to region reference. The reference can be political area such as country, or a region of the world that supports given Specifications such as FCC or ETSI. Counties are then mapped into regions.	The standard can not predict what the political area's will do.

10.xx	Gegier	T	-- The Multi-rate PHY was sold to many people as the only upgrade path for high speed PHY implementations. This is not true. The length field in the PLCP header plus the bits in the PSF must be defined now or the IFS timing will not work based on the PLCP header in future rate schemes. The methods for determining rate shifting is undefined and implementation specific, meaning that inter-operation between different implementors will be inconsistent, having unknown effects to overall WLAN performance. The method for determining rate shift should be documented or support of rate shifting should be removed from the standard. -- There has been no consideration to any of the coding gain techniques or FEC methods which will improve BER both in a AWGN channel or in an channel experiencing interference from foreign RF sources. Lots of these methods are highly practiced today in cellular phones, radar, satellite communications, radio links, etc. We need to take advantage of lots of these available and proven techniques	
10.xx	Geiger	T	These are general comment regarding FHSS PHY. --The RxTx Turnaround time is much too slow for 100mW radio transmitters. This represents 20 us of the 26 usec collision window. Any reasonable implementation of 100mW radio could reduce this time to a maximum of 10 usec or less. Assuming a 16 us collision window and 16 us preamble detect time, one could redefine the CCA assessment time to 32us. Allowing for two CCA assessment times in every slot would insure no collisions ever except in the case of hidden nodes. This also eliminates the problem of nodes missing the header but detecting the rest of the data transmission excluding the last bit. -- Placing no power restrictions on nodes associated with a BSS makes it virtually impossible for the FHSS PHY to prevent overlapping BSSs. This situation will give many users and installers problems and reduce the desire for 802.11 compliant WLANs. These problems include PCF overlaps, greater hidden node problems, WLAN access fairness issues, etc. Controlling power or specifying operating power on a BSS by BSS basis greatly improves the users ability to control the infra-structure. Dictating output power on a BSS by BSS basis will also BSSs to customize other operating parameters such as collision windows (variations in RAMP and switch times) as well as longer ranges (Propagation delays increase collision window). -- Extending the CCA assessment time as stated above, allows implementors the option of performing better diversity measurements. Diversity can improve the CCA sensitivity by as much as 10dB which can effectively reduce the transmit power, thus extending battery life in mobile units.	
Section	**Name**	**Type**	**Corrected Text**	**Rationale**