

Collected comments on Section 12 of draft standard D1

12	Wim Diepstraten	T	There is no means specified with which a MAC can evaluate the quality of an IR link, so that it is not possible to determine which AP is the best candidate for reassociation. An RSSI and / or SQ type of indication could provide with the relative information that can be used by the MAC Management entity to determine the best candidate.	
12 (general)	Fischer, Mike.	E	There are far too many paragraphs in this section that read like they are in a marketing document rather than a draft standard. There is no reason to mention IrDA, discuss "true LAN system" in qualitative terms, state "without the possibility of eavesdropping" (do I hear product liability lawyers lining up outside?), etc.	It would be nice if the result of this work was a standard where the different chapters appeared to have been written on the same planet, maybe even the same continent.
12, 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	
12.	bdobyns	T	Add thermal operating range.	
12.1	Bob O'Hara	E	replace "insure" with "ensure"	
12.1	C. Thomas Baumgartner	e	10 paragraph change to (placing it in a different room) delete "is usually sufficient"	placing it in another room from the LAN coverage is always sufficient.
12.1, 5th paragraph	Fischer, Mike.	T	"... may suffer" add statement of what the symptoms of this suffering may be	clarity
12.1.1	Bob O'Hara	E	replace "by" with "to", "for" with "by", "might" with "may"	
12.1.1	Mahany	E	Replace "Nodes" with "Stations"	Term Node not in earlier definitions.
12.1.3	C. Thomas Baumgartner	e	Definitions missing	Fill in section or delete if nothing to put here
12.1.3, 12.1.4, 12.1.5	Fischer, Mike.	E	these should be merged into the relevant portions of section 1	uniformity of notation and nomenclature
12.1.4	bdobyns	E	Merge with section 1.3, Abbreviations	don't need a <i>Distributed Abbreviation Function</i> .
12.1.4	C. Thomas Baumgartner	e	Add Acronyms SYNC, SFD,DR, FER	These acronyms are equally in need of explanation
12.1.4 Acronyms	Rui Valadas	E	None.	The Acronyms list should be only one, common to the MAC and all the PHYs.
12.2, also 10.1, 10.5, 11.1, 11.4, and 2.9	Fischer, Mike.	T	The reference model in figure 2D11 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.
12.2.1	Bob O'Hara	E	replace "appended" with "prepended", "MPDU" with "MPDU (PSDU)"	
12.2.2	Bob O'Hara	E	replace "MPDU" with "PSDU"	
12.2.2	C. Thomas Baumgartner	e	Change title of Figure 12-1: to PDU Frame Format	The diagram shows the entire PDU Frame
12.2.2 (Figure 12-1)	Bob O'Hara	E	replace "MPDU" with "PSDU"	
12.2.3	Bob O'Hara	E	replace "MPDU" with "PSDU", "rates: Mbps" with "rates: 1 Mbps"	
12.2.3	C. Thomas Baumgartner	e	missing number 1 as in 1 Mbps bit rate	typo
12.2.3	Fischer, Mike.	E	"words" is not a term used elsewhere in this standard for this purpose "Mbps and 2Mbps" should be "1 Mbps and 2Mbps" The use of "LPPM" here is valid, but in several later subsections "LPPM" appears where I believe the correct usage would be either "16PPM" or "4PPM" please clarify	consistency
12.2.3	Geiger	E	Mbps s/b/ 1Mbps	Spelling

12.2.3	Samdahl	E	Para 2 line 4: Should be "1 Mbps" instead of "Mbps"	
12.2.3	Fischer, Mike.	T	The behavior of the IR PHY which does not implement the 2Mbps transmission option when requested to transmit at 2Mbps needs to be specified. (I don't particularly care about what is specified as long as the result is <u>not</u> the transmission of the MPDU at 1Mbps, which would foul up the MAC's sense of time by remaining on the medium twice as long as the duration field indicates.)	completeness
12.2.3	Fischer, Mike.	T	What modulation is used for the DCLA field? Should be stated, as this falls after the data rate field and the length field is at the higher rate if so indicated.	completeness
12.2.4.1	Fischer, Mike.	T	How is the absence of a pulse distinguished from the empty slot that ends the SYNC field? Either specify the distinction or use consistent terminology for what is really the same thing.	clarity
12.2.4.2	C. Thomas Baumgartner	e	Add note that 1=pulse and 0=no pulse in slot	Not clear what binary digits mean regarding energy in slots.
12.2.4.2	Fischer, Mike.	T MAJOR ISSUE	How does this SFD meet the 802 Hamming distance requirement? The SYNC field appears to be of the form 10101010. . ., so the hamming distance to this sequence is only 2. Recommend use of a 16-bit unique word, as is done by the other PHYs.	Reliable start-of-frame delimitation is one of the most important functions of any PHY. With the current type of PLCPs, the importance is even greater because there is no end-of-frame delimiter, just a length in the PLCP header, so the importance of reliable SFD detection is even more important.
12.2.4.3	Bob O'Hara	E	replace "which will" with "that shall"	
12.2.4.3	Bob O'Hara	E	replace "is" with "shall be"	
12.2.4.3 12.2.4.5 12.3.4.1	Wim Diepstraten	T	The rate field is not specified such that the CCA based on the Length field can support coexistence with a possible future extended rate. in addition, the Length field is specified to be transmitted at the target data rate, so that it can not be interpreted by all receivers that do only support the basic rate.	This may not be an issue when no in band extended rate extension of this standard can be expected.
12.2.4.4	Bob O'Hara	E	replace "is" with "shall be"	
12.2.4.4	Bob O'Hara	E	replace "MPDU" with "PSDU"	
12.2.4.4	Fischer, Mike.	T	Does the encoding in the DCLA field allow for future introduction of 6 more data rates? If so, this should be stated. If not, the last sentence of 12.2.4.3 should be replaced with a statement that other data rate codes are possible, but may not be usable because of limitations imposed by the (length?, format?) of the DCLA field.	consistency
12.2.4.6	Bob O'Hara	E	replace "is" with "shall be"	
12.2.4.6, also 11.2.3.6, and 10.3.2.2.3	Fischer, Mike.	T	The CRC polynomial does not match its name. The listed polynomial is $\text{CRC}_{\text{CCITT}}$. There is a polynomial named CRC_{16} 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 CRC_{16} polynomial is desired and the error was in the polynomial rather than the name of the polynomial).	consistency, technical correctness
12.2.4.7	Bob O'Hara	E	replace "MPDU" with "PSDU"	
12.2.4.7	Bob O'Hara	E	replace "are" with "shall be"	
12.2.5.1	Bob O'Hara	E	replace "MPDU" with "PSDU"	
12.2.5.1	C. Thomas Baumgartner	e	Add before a) "Following is the transmit procedure:"	List of steps needs an introduction.
12.2.5.1	C. Thomas Baumgartner	t	Change Start_of_Data to Start_of_Activity	Paragraph 8. defines Start_of_Activity, not Start_of_Data
12.2.5.1	C. Thomas Baumgartner	t	confirm with authors of Section 8. that there is an End_of_Data class.	Section 8. has contradictions about this

12.2.5.1	C. Thomas Baumgartner	t	describe the procedure in more realistic terms	Even though the introduction says that the procedure description is theoretical and based on actions taking place with no delay time the real PHY has to work with a real MAC. With an exposed interface the PHY developer will not have control of the MAC. It is not possible to send the headers, then send a confirm to the MAC, and wait for data from the MAC.
12.2.5.2	C. Thomas Baumgartner	e	Add before a) "Following is the receive procedure:"	List of steps needs an introduction.
12.2.5.2	C. Thomas Baumgartner	e	in a) correct to End_of_Activity, delete 1	typo
12.2.5.2	C. Thomas Baumgartner	e	in a) rewrite 2nd and 3rd sentences to "When PHY senses activity on the medium it indicates that the medium is busy with a PHY_DATA. Indicate class=Start_of_Activity. This will normally occur during the SYNC field of the PLCP preamble.	more clear, concise and accurate and same as CCA description in 12.2.5.3
12.2.5.2	C. Thomas Baumgartner	e	in d) correct to Start_of_Data	typo
12.2.5.2, 10.2.3.1, 11.2.7,	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 DD 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.
12.2.5.3	C. Thomas Baumgartner	e	Add before a) "Following is the CCA procedure:"	List of steps needs an introduction.
12.3.1	Bob O'Hara	E	replace "from" with "on"	
12.3.1	C. Thomas Baumgartner	e	delete Figure 12-2: PMD Layer Reference Model, add reference to Layer Reference 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 IR section. There is more detail in Figure 10-1 so this is the one that should survive.

12.3.1 figure 12-2	bdobyns	T	PHY LME shown connecting to MAC. figure 12-2 should be deleted and the text should refer instead to figure 2-11.	
12.3.1 (Figure 12-2)	Bob O'Hara	T	this figure must match all other architectural figures	inconsistent
12.3.1, 2.9, 11.1.2, 10.1.2,	Isabel Lin	E	Make them consistent.	The Reference Models in those sections are not consistent. What needs to be done: Make them consistent.
12.3.2 PMD Operating Specifications General	Rui Valadas	T	There should exist a section specifying the operating environment, with the following text: 12.3.2.3 Operating Environment The IR-PHY will operate only in indoor environments. IR-PHY interfaces can not be exposed to direct sun light. The IR-PHY does not require a line-of-sight between emitter and receiver in order to work properly. The performance of the system will vary with the geometry of the environment and with the natural and artificial illumination conditions.	It is not clear from the current standard, the conditions required for an IR-PHY to work properly.
12.3.2 PMD Operating Specifications General	Rui Valadas	T	There should exist a specification for the "operating temperature range", with the following text: 12.3.2.4 Operating Temperature Range The temperature range for full operation compliance with the IR PHY is specified as 0 to 40 degrees centigrade.	There should exist a specification for the "operating temperature range".
12.3.2.2	C. Thomas Baumgartner	e	show LSB on the right, not left	section 1.6 "Conventions" says that is the way to do it in this standard
12.3.3.2	Bob O'Hara	T	specify method to determine jitter	is jitter for pulse as a whole or for each edge independently?
12.3.3.2 figure 12-3	bdobyns	E	figure 12-3 could be smaller, without loss of information.	
12.3.3.3	C. Thomas Baumgartner	t	Change to "The mask represents the irradiance normalized to the total emitted power..."	Isn't it more accurate than average emitted power?
12.3.3.3	C. Thomas Baumgartner	t	Must add at least one other emitter radiation pattern now for portable handheld device. Should not cover entire azimuth in recognition that the handheld is likely to be positioned in certain way relative to ceiling.	The pattern in the spec is for a ceiling mounted device in the middle of a room. Must have at least one other pattern for a handheld or mobile device where the perfectly circular pattern is not nearly so useful. This pattern is probably not so wide, therefore the total power might reasonably be reduced in paragraph 12.3.3.1.
12.3.3.3 figure 12-4	bdobyns	E	figure 12-4 uses grey shades for lines, should use dotted, dashed or otherwise non-colored lines for clarity.	
12.3.3.6	C. Thomas Baumgartner	e	change paragraph number to 12.3.4 and ripple changes through rest of section 12 as follows: 12.3.3.7 to 12.3.4.1; 12.3.3.8 to 12.3.4.2; 12.3.3.9 to 12.3.4.3; 12.3.4 to 12.3.5; 12.3.4.1 to 12.3.5.1; 12.3.4.2 to 12.3.5.2; 12.3.4.3 to 12.3.5.3. Don't forget to change the reference in 12.3.4.2.	The PMD Transmit Spec were 12.3.3. The PMD Receiver Spec should be at same level, ie 12.3.4, not a subset of Tx spec.
12.3.3.7	Bob O'Hara	E	replace "an MPDU" with "a PSDU"	
12.3.3.7	Bob O'Hara	E	replace "an MPDU" with "a PSDU"	
12.3.3.7	Samdahl	E	"FER" (Frame Error Rate) should be defined if it hasn't been done earlier	
12.3.3.7	Samdahl	T	Para 1 line 2: Add "unmodulated" before "background"	This is intended as a measure of immunity to a background 'DC' source of IR in the passband of the receiver. There may also be a need to specify the noise performance, but that was not the original intent of this section.
12.3.3.7	Samdahl	T	Para 2 line 1: Use "background" instead of "noise"	Same as above.

12.3.3.9	Samdahl	T	Para 3 line 1: Add a new paragraph: "The receiver sensitivity will be greater than 10% of its maximum value at +/- 85 degrees from the normal."	Page: 5 Specifying 90 degrees will result in very inefficient operation. In a diffuse system, a substantial fraction of the available energy in the vicinity of the receiver will occur at entry angles greater than +/- 45 degrees from the normal vertical. As defined, a conformant receivers acceptance angle could fall to zero at any point outside the +/- 45 degree cone, as long as its sensitivity was greater than 50% at the +/- 45 degree point. Such a conformant receiver would exhibit performance much inferior to units with sensitivity out to, say, +/-85 degrees, which I believe to be a more realistic value. A true Lambertian receiver will have 50% sensitivity at +/- 60 degrees, so specifying +/- 45 degrees may not be too poor a choice. The problem is that the extinction point or perhaps the angle at which the sensitivity falls to 10% should also be specified, probably to a value of +/-85 degrees. It can also be argued that a superior implementation might have a receiver that has sensitivity enhanced at shallow angles, since it is at these shallow angles that radiation from most distant sources will arrive. High sensitivity in the cone above the receiver (at narrow receptor angles) is of relatively little value, since radiation arriving in this cone typically originates nearby and is of high intensity.
12.3.3.9 Receiver Field-of-View (FOV)	Rui Valadas	T	Define the receiver axis as the direction of incidence of the optical signal at which the received optical power is maximum. Define the receiver FOV as twice the angle measured between the receiver axis and the direction of incidence at which the received optical power is equal to 1% of the maximum received optical power. For incident angles smaller than half the FOV, the received optical power should always be higher than 1% of the maximum received power. The receiver FOV of a conformant receiver shall be greater than or equal to 150° .	The receiver FOV should be as wide as possible to minimise the hidden station problem.
12.3.4.1	Bob O'Hara	E	delete ":", replace "will" with "shall"	
12.3.4.1	C. Thomas Baumgartner	e	Italics not necessary at end of first paragraph	Italics not used other places for primitives
12.3.4.1	C. Thomas Baumgartner	e	Change last sentence in 2nd paragraph to "The CCA may remain "BUSY" after the end of data if some form of energy is still being detected. The PHY will signal PHY_DATA.Indicate class=End_of_Activity only when the CCA goes "CLEAR".	more accurately states the case
12.3.4.2	Bob O'Hara	E	delete ":"	
12.3.4.2	C. Thomas Baumgartner	t	Change 3rd sentence to "Conforming PHY are required to assert this condition within the first 12 microseconds of signal reception, when the received signal level is between the receiver sensitivity defined in 12.3.3.7 "Receiver Sensitivity" and the maximum set by the dynamic range defined in 12.3.3.8 "Receiver Dynamic Range", and the background IR signal is at the level defined in 12.3.3.7 "Receiver Sensitivity."	more accurate to define this parameter over the range of received level
12.3.4.3	Bob O'Hara	E	delete ":"	

12.3.4.3 Energy Detect	Rui Valadas	T	For further study	The sensitivity of the Energy Detection mechanism is too low. With the indicated threshold there is a high probability that one or more transmissions from a like-PHY will not produce enough energy to assert the Energy Detection Signal.
12.4	C. Thomas Baumgartner	e	in table CCA_Watchdog_Timer_Min needs units, I believe microseconds	missing units required
12.4	Wim Diepstraten	E	A clear Slot time specification should be provided.	It is difficult to assess which parameters do add up to the Slot Time.
		E	The meaning of the PHY_SAP_delay is unclear.	
12.4	Bob O'Hara	T	MIB definition is required in ASN.1 format	definition is incomplete
12.4	C. Thomas Baumgartner	t	in table Channel_Transit_Delay should be larger than 25 nsec for 10 meter range. Whatever change is made the same change required for Channel_Transit_Variance.	I think that IR propagation speed is about 1.7 nsec per foot
12.4	C. Thomas Baumgartner	t	delete MPDU_Current_Maximum attribute	Unnecessary complication in an already too complex protocol. The only use I know would be for PHY to know that its error rate is high so a smaller packet could get through better. But the MAC has responsibility for making this decision and MAC doesn't have to tell PHY it just sends smaller MPDU. In Section 5.1.4 the attribute is called Fragmentation_Threshold.
8.	C. Thomas Baumgartner	e	Global replace of Ph with PHY	Need to be consistent with rest of document in referring to Physical Layer