IEEE P802.15
Wireless Personal Area Networks

Project	IEEE P802.15 Working Group for Wireless Personal Area Networks (WF	PANs	5)	-			
Title	Modified PHY Header			-			
Date Submitted	[30_June, 2010]			-			
Source	[Jaeseung Son, Samsung Electronics]E-mail:[js1007.son@samsung.c[Sangkyu Lim, ETRI][sklim@etri.re.kr]	com]	서식 하극	- 있음: 글꼴: (한글) +본문 (한국) 하구어			
Re:			- 서식 하글	, (한글) 한국 (있음: 글꼴: (한글) +본문 () (한글) 하국어			
Abstract	Modified PHY Header based on LB comments		<u> </u>				
Purpose	[TG 7 received about <u>PHY header related</u> comments in LB. This docum response about <u>PHY header</u> comments]	pent i	[삭제 [:] - 삭제 [:]	됨: CSK constellation 됨: CSK constellation			
	This document has been prepared to assist the IEEE P802.15. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.						
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6.4 PPDU format

This clause specifies the format of the PPDU packet.

For convenience, the PPDU packet structure is presented so that the leftmost field as written in this standard shall be transmitted or received first. All multiple octet fields shall be transmitted or received least significant octet first and each octet shall be transmitted or received least significant bit (LSB) first. The same transmission order should apply to data fields transferred between the PHY and MAC sublayer.

Each PPDU packet consists of the following basic components:

- a) A SHR, which allows a receiving device to synchronize and lock onto the bit stream.
- b) A PHR, which contains frame length information.
- c) A variable length payload, which carries the MAC sublayer frame.

6.4.1 General packet format

The PPDU packet structure shall be formatted as illustrated in Figure 21.

Preamble (see 6.4.1.1)	Burst mode (see 6.4.1.3.1)	Channel number (see 6.4.1.3.2)	MCS ID (see 6.4.1.3.3)	Length of PSDU (see 6.4.1.3.4)	Reserved fields (see 6.4.1.3.5)	HCS (see 6.4.1.3.6)	Channel estimation sequence (Option) (see 6.4.1.5)	PSDU (see 6.4.1.6)			Octets: variable	
SHR			Pi Figure	-⊪ 21—Forı	nat of th	e PPDU		PHY Payload	- +) 		Preamble	Frame (7 b
6.4.1.1 Prea	mble field	l 			*				$\sum_{i=1}^{n}$		SHR	
The preamb incoming me the purposes The preambl transition see The fast lock attains lock sequence. At	le field is essage. Th of disting le first sta quence pro- king patter and recov- fter the fas	used by e standard uishing di rts with a pyides the n length s ers the cl t locking	fast lock ability to shall not o lock, it h.	sceiver to one fast lo HY topolo ing pattern) lock the exceed 16 as no way repetition	obtain c cking pati ogies. n of at lea clock and 384 bits. of deter as of one of	tern follo tern follo ast 64 alte data reco Before th mining th of four pro	ernate 1's and overy circuit e clock and one logic value eambles are s	o's. This maximum o's. This maximum in the quickest time. lata recovery (CDR) e of the transmitted ent.		삭제됨: In the cass Figure 22 establishn 변경된 물 서식 있을	e of CSK, the CSK is used after link ient 월드 코드 음: 가운데	[1]
											Octets: variable	
											Preamble	Frame length (7 bits)
											SHR	
										삭제됨:		

서식 있음: 글꼴: (영어) Arial, (한글) 맑은 고딕, 10 pt



Figure 23—Default preamble transmission

P1: 1	1	1	1	0	1	0	1	1	0	0	1	0	0	0	
P2: 0	0	1	0	1	1	1	0	1	1	1	1	1	1	0	
P3: 1	0	0	1	1	0	0	0	0	0	1	0	0	1	1	
P4: 0	1	0	0	0	0	1	1	0	1	0	0	1	0	1	

Figure 24—Preambles for various topology modes

The preamble of Figure 24 shall be transmitted using an OOK modulation. If there are multiple light sources supported by the device, all light sources shall transmit the same preamble simultaneously.

It is also acceptable to invert the proposed preamble sequences and transmit; that is, the PHY can select whether to transmit each preamble sequence or its inversion. The advantage of doing this is that this allows for two preamble sequences to be searched for simultaneously at the receiver for a given MAC operating mode and allow co-existence of two piconets in a given operating mode, without any increase in complexity.

The same preamble sequences are used for low rate and high rate PHY. The number of repetitions of the fast locking pattern can be extended by the MAC during idle time or for different operating modes for better synchronization or to provide visibility or image array device discovery.

P1 can be used with any topology and can also be used for visibility support frames.

6.4.1.2 Preamble for burst mode

The fast locking pattern can be dropped for the burst mode since it is already synchronized to the transmitter. This reduces the preamble length by half and provides higher throughput at the MAC layer.

Table 21—Preamble for MAC operation code

Preamble	Topology operating mode
P1 or inverted P1	topology independent
P2 or inverted P2	peer to peer
P3 or inverted P3	star
P4 or inverted P4	broadcast

'4' repetitions



Burst mode preamble transmissions (no fast locking pattern) Figure 25—Burst preamble transmission

6.4.1.3 PHY header

The header, as shown in Table 23, shall be transmitted with an OOK modulation. If there are multiple light sources supported by the device, all light sources shall transmit the same header contents simultaneously. The band plan ID field in this case shall be that of the lowest band plan ID.

PHY header fields Bit width Explanation on use Burst mode 1 Reduce preamble and IPS Channel number 3 Band plan ID MCS ID 6 Provide information on PHY type and data rate Length of PSDU 16 Length up to aMaxPHYPacketSize HCS 16 Header check sequnce HCS 16 Header check sequnce HCS 16 Header check sequnce HA4 208: 328: 10 pt Ad4 208: 328: 024 G.4.1.3.1 Burst mode 16 Header check sequnce HA4 208: 328: 024 16 Header check sequnce Ad4 208: 328: 024 16 Header check sequnce MA4 208: 328: 024 18 18 Bernel number 16 Header check sequnce Ad4 208: 328: 024 19 19 Ad4 208: 324: 024 12 pt. 37 12 pt. 37 Bernel number 12 pt. 37 12 pt. 37 Ad4 208: 324: 024 12 pt. 37 12 pt. 37 Ad4 208: 328: SP196634. 27 qt: 2 pt. 37 12 pt. 37 12 pt. 37 Ad4 208: 328: 300 12 pt. 37 10 pt. 37 12 pt			- 서식 있음: 글꼴: 10 pt		
PHY neader neids Bit within Explanation on use Burst mode 1 Reduce paramble and IFS Channel number 3 Band plan ID MCS ID 6 Provide information on PHY type and data rate Length of PSDU 16 Length up to aMaxPHYPacketSize HCS 16 Header check sequnce HCS 16 Header check sequnce Ad4 있음: 코音: 10 pt Ad4 있음: 고문. 간격 단락 크音. 6.4.1.3.1 Burst mode 1 Meader check sequnce The burst mode bit is for the next packet. It indicates that next packet is burst mode. Refer to 6.4.1.2 Meader check sequnce Preamble for burst mode for more detailed information. Meader check sequnce Meader check sequnce 6.4.1.3.2 Channel number Meader check is burst mode. Refer to 6.4.1.2 Meader check sequence 6.4.1.3.2 Channel number Meader check is burst mode. Refer to 6.4.1.2 Meader check sequence 6.4.1.3.2 Channel number Meader check is burst mode. Refer to 6.4.1.2 Meader check sequence 6.4.1.3.3 MCS ID Meader check is in Table 1 are used to indicate the frequency band channel assignments for more detailed information Meader check sequency 6.4.1.3.3 MCS ID Meader check is sequency <td< td=""><td>DIIV has des Calde</td><td>D'4 14h</td><td>Time I and Alexandree</td><td></td><td>서식 있음: 가운데</td></td<>	DIIV has des Calde	D'4 14h	Time I and Alexandree		서식 있음: 가운데
Durst indde 1 Reduce prenime and PS Channel number 3 Band plan ID MCS ID 6 Provide information on PHV type and data rate Length of PSDU 16 Length up to aMaxPHYPacketSize HCS 16 Future use HCS 16 Header check sequnce Ad4 Q8: BE: 70 pt Ad4 Q8: BE: 70 pt 6.4.1.3.1 Burst mode Ad4 Q8: BE: 70 pt The burst mode bit is for the next packet. It indicates that next packet is burst mode. Refer to 6.4.1.2 Ad4 Q8: C4008, BE: 70 pt Preamble for burst mode for more detailed information. Ad4 Q8: SC4008, BE: (000) EE: (000) 6.4.1.3.2 Channel number Channel number Ad4 Q8: SC4008, BE: (000) EE: (000) 6.4.1.3.3 MCS ID Channel assignments for more detailed information. Ad4 Q8: EEE TO pt 6.4.1.3.3 MCS ID Ad4 Q8: SC4008, BE: (000) EE: (000)	PHY neader fields	<u>Bit widtn</u>	Explanation on use		서식 있는 표
Claimer hunder 2 End pair Le MCS ID 6 Provide information on PHY type and data rate Length of PSDU 16 Length up to aMaxPHYPacketSize (Table 24) Reserved fields 6 HCS 16 Header check sequnce HCS 16 Header check sequnce Ad4 0.81: ##2: 10 pt Ad4 0.81: ##2: 10 pt 6.4.1.3.1 Burst mode Ad4 0.81: ##2: 10 pt The burst mode bit is for the next packet. It indicates that next packet is burst mode. Refer to 6.4.1.2 Ad4 0.81: ##2: 0.21: 0.21: ##2: 0.21: 0.21: ##2: 0.21:	<u>Buist mode</u>	2	Reduce pleanble and IFS	_	
MCS ID O Provide information on PHT Hype and data rate Length of PSDU 16 Length up to aMaxPHYPacketSize (Table 24) Reserved fields 6 Future use HCS 16 Header check sequnce Ad4 있음: 글끝: 10 pt 6.4.1.3.1 Burst mode Ad4 있음: 로준, 간격 단락 글끝, 글끝: (한글) +보문 한글, 굵게 Ad4 있음: 도준, 간격 단락 글끝, 글끝: (한글) +보문 한글, 굵게 Preamble for burst mode bit is for the next packet. It indicates that next packet is burst mode. Refer to 6.4.1.2 Ad4 있음: Sc4008, 글끝: (한글) 한국어 Ad4 있음: Sc4008, 글끝: (한글) 한국어 Ad4 있음: Sc4008, 글끝: (한글) 한국어 Ad4 있음: Set of a Sc4008, 글끝: (한글) 한국어 Channel number Ad4 있음: Channel number Ad4 있음: Channel number Ad4 있음: Channel number Channel number is code in Table 1. The codes in Table 1 are used to indicate the frequency band containing the spectral peak (energy) for the transmitted packet. Refer to 6.1.2 Operating frequency Ad4 있음: 글꼴 ' 국게 없음 Ad4 있음: 글꼴 ' 국게 없음 Ad4 있음: 글꼴 ' 국게 없음 Ad4 있음: 글꼴 ' 국게 없음 Ad4 있음: 글꼴 ' 국게 없음 6.4.1.3.3 MCS ID D Ad4 있음: Sc4008, 글꼴 : (한글) ' 다 국經 Ad4 있음: Sc4008, 글꼴 : (한글) ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' ' '	<u>Chainer humber</u>	<u> </u>	Dallu plan 1D Drouida information on DHV type and data rate		
Reserved fields 6 Future use HCS 16 Header check sequnce 6.4.1.3.1 Burst mode Ad4 있음: 글꼴: 10 pt 6.4.1.3.1 Burst mode Md4 있음: 표준, 간격 단락 뒤: 0 pt The burst mode bit is for the next packet. It indicates that next packet is burst mode. Refer to 6.4.1.2 Preamble for burst mode for more detailed information. Md4 있음: 기본 단락 글꼴, 글꼴: (한글) *본문 한글, 굵게 없음, (한글) 한국어 6.4.1.3.2 Channel number Ad4 있음: SC4008, 글꼴: (한글) 말은 고딕, 12 pt, 굵게, 글꼴 4: 자동 Channel number is code in Table 1. The codes in Table 1 are used to indicate the frequency band containing the spectral peak (energy) for the transmitted packet. Refer to 6.1.2 Operating frequency range and channel assignments for more detailed information. Md4 있음: 글꼴: 굵게 없음 Md4 있음: 글꼴: 굵게 없음 Md4 있음: 글꼴: 굵게 없음 Md4 있음: 글꼴: 기보 pt, 국귀 없음 6.4.1.3.3 MCS ID Md4 있음: SC4008, 글꼴: (한글) 막은 고딕, 12 pt, 굵게, 글꼴	Length of PSDU	<u>16</u>	Length up to aMaxPHYPacketSize (Table 24)		
HCS16Header check sequnce6.4.1.3.1 Burst modeThe burst mode bit is for the next packet. It indicates that next packet is burst mode. Refer to 6.4.1.2Preamble for burst mode for more detailed information.6.4.1.3.2 Channel number6.4.1.3.2 Channel numberChannel number is code in Table 1. The codes in Table 1 are used to indicate the frequency band containing the spectral peak (energy) for the transmitted packet. Refer to 6.1.2 Operating frequency range and channel assignments for more detailed information.6.4.1.3.3 MCS ID6.4.1.3.3 MCS ID	Reserved fields	<u>6</u>	<u>Future use</u>		
6.4.1.3.1 Burst mode서식 있음: 표준, 간격 단락 뒤: 0 ptThe burst mode bit is for the next packet. It indicates that next packet is burst mode. Refer to 6.4.1.2 Preamble for burst mode for more detailed information.서식 있음: 기본 단락 글꼴, 글꼴: (한글) +본문 한글, 굵게 없음, (한글) 한국어K.4.1.3.2 Channel number서식 있음: SC4008, 글꼴: (한글) 마로의물꼴 (한글) 다금게, 글꼴 석: 자동Channel number is code in Table 1. The codes in Table 1 are used to indicate the frequency band containing the spectral peak (energy) for the transmitted packet. Refer to 6.1.2 Operating frequency range and channel assignments for more detailed information.서식 있음: 글꼴 색: 자동6.4.1.3.3 MCS ID서식 있음: SC4008, 글꼴: (한글) 만물꼴: (한글) 만	HCS	<u>16</u>	Header check sequnce		서식 있음: 글꼴: 10 pt
The burst mode bit is for the next packet. It indicates that next packet is burst mode. Refer to 6.4.1.2 서식 있음: 기본 단락 글꼴, 글플: (한글) +본문 한글, 굵게 없음, (한글) 한국어 Preamble for burst mode for more detailed information. 서식 있음: SC4008, 글꼴: (한글) 방국어 6.4.1.3.2 Channel number 서식 있음: SP196634, 간격 앞: 24 pt Channel number is code in Table 1. The codes in Table 1 are used to indicate the frequency band containing the spectral peak (energy) for the transmitted packet. Refer to 6.1.2, Operating frequency 서식 있음: 글꼴 색: 자동 서식 있음: 글꼴: 감게 없음 서식 있음: 글꼴: 감게 없음 서식 있음: 글꼴: 감게 없음 서식 있음: 글꼴: 감게 없음 서식 있음: 글꼴: 감게 없음 서식 있음: 글꼴: 감게 없음 서식 있음: 글꼴: 10 pt 서식 있음: 글꼴: 10 pt 6.4.1.3.3 MCS ID 서식 있음: 글꼴: (한글) 밝은 고딕, 12 pt, 굵게, 글꼴	6.4.1.3.1 Burst mode			/	서식 있음: 표준, 간격 단락 뒤: 0 pt
6.4.1.3.2 Channel number 서식 있음: SC4008, 글꼴: (한글) 6.4.1.3.2 Channel number 서식 있음: SP196634, 간격 앞: M4 있음: SP196634, 간격 앞: 서식 있음: 글꼴 색: 자동 M4 있음: 글꼴 색: 자동 서식 있음: 글꼴 색: 자동 M4 있음: 글꼴 색: 자동 서식 있음: 글꼴 색: 자동 M4 있음: 글꼴: 카게 없음 서식 있음: 글꼴: 카게 없음 M4 있음: 글꼴: 기게 없음 서식 있음: 글꼴: 기게 없음 M4 있음: 글꼴: 이 pt 서식 있음: 글꼴: 10 pt 6.4.1.3.3 MCS ID 서식 있음: 물꼴: (한글)	The burst mode bit is for the Preamble for burst mode for	e next packet. It ind r more detailed info	icates that next packet is burst mode. Refer to 6.4.1.2 rmation.		★ 서식 있음: 기본 단락 글꼴, 글꼴: (한글) +본문 한글, 굵게 없음, (한글) 한국어
Channel number is code in Table 1. The codes in Table 1 are used to indicate the frequency band containing the spectral peak (energy) for the transmitted packet. Refer to 6.1.2 Operating frequency 서식 있음: 글꼴 색: 자동 서식 있음: 글꼴 색: 자동 서식 있음: 글꼴: 굵게 없음 서식 있음: 글꼴: 기 없음 서식 있음: 글꼴: 기 없음 서식 있음: 글꼴: 기 없음 서식 있음: 글꼴: 기 없음 서식 있음: 글꼴: 기 없음 서식 있음: 글꼴: 기 없음 6.4.1.3.3 MCS ID 서식 있음: sc4008, 글꼴: (한글) 맞은 고딕, 12 pt, 굵게, 글꼴	6.4.1.3.2 Channel number			• 	서식 있음: SC4008 , 글꼴: (한글) 맑은 고딕, 12 pt, 굵게, 글꼴 색: 자동
Channel number is code in Table 1. The codes in Table 1 are used to indicate the frequency band containing the spectral peak (energy) for the transmitted packet. Refer to 6.1.2 Operating frequency 서식 있음: 글꼴 색: 자동 서식 있음: 글꼴: 굵게 없음 서식 있음: 글꼴: 기 없음 서식 있음: 글꼴: 기 없음 서식 있음: 글꼴: 기 없음 6.4.1.3.3 MCS ID 서식 있음: 글꼴: (한글) 말은 고딕, 12 pt, 굵게, 글꼴					서식 있음: SP196634 , 간격 앞: 24 pt
containing the spectral peak (energy) for the transmitted packet. Refer to 6.1.2 Operating frequency 서식 있음: 글꼴: 굵게 없음 range and channel assignments for more detailed information 서식 있음: 글꼴: 10 pt 6.4.1.3.3 MCS ID 서식 있음: SC4008, 글꼴: (한글)	Channel number is code in	Table 1. The codes	in Table 1 are used to indicate the frequency band	· * ,	서식 있음: 글꼴 색: 자동
range and channel assignments for more detailed information, 6.4.1.3.3 MCS ID 	containing the spectral peak	(energy) for the tra	nsmitted packet. Refer to 6.1.2 Operating frequency		- 서식 있음: 글꼴: 굵게 없음
<mark>6.4.1.3.3 MCS ID</mark> <mark>서식 있음:</mark> SC4008, 글꼴: (한글) 맑은 고딕, 12 pt, 굵게, 글꼴	range and channel assignme	ents for more detaile	<u>ed information</u>		- 서식 있음: 글꼴: 10 pt
색: 가동	<u>6.4.1.3.3 MCS ID</u>				서식 있음: SC4008, 글꼴: (한글) 맑은 고딕, 12 pt, 굵게, 글꼴 색: 자동

Submission

	MCS in	ndication	PHY type	Data rate	unit			서식 있음: 표준, 가운데, 간격
	0	000000	1	11.67	kbps			[단락 뒤: 0 pt
	1	000001	1	24.44	kbps		1	서식 있음: 글꼴: 12 pt, 굵게
	2	000010	1	48.89	kbps		i i	
	3	000011	1	100	kbps kbps		- i :	[서식 있음: 글플: 굵게
	4	000100	1	35.56	kbps		- 11	서식 있음: SC4008, 글꼴: (한글) 마은 고디 12 nt 국계 없은
	6	000101	1	71 11	kbps		- []	글꼴 색: 자동
	7	000111	1	124.4	kbps		11	서식 있음: 글꼴: (한글) 맑은
	8	001000	1	266.6	kbps			[고딕, 굵게, (한글) 한국어
	16 17	010000	2	1.25	mbps			지역 있음 ·기존 단역 들들, 글꽃: (한글) +본문 한글, 굵게
	18	010010	2	2.5	mbps		上間	[없음
	19	010011	2	4	mbps		上尉	이 pt
	20	010100	2	5	mbps		日間	서식 있음: SC4008, 글꼴: (한글)
	21	010101	2	6	mbps	•	日間] 밝은 고딕, 12 pt, 굵게 없음,
	22	010110	2	9.6	mbps		- 86	[글을 색·사망
	23	010111	2	12	mbps		一個的	서식 있음: SC4008, 글꼴: (한글) 맑은 고딕 12 pt 굵게 없음
	24	011000	2	19.2	mbps		一般的	글꼴 색: 자동
	25	011001	2	24	mbps		一般出	삭제됨: .
	20	011010	2	30.4 18	mbps		一般出	6.4.1.3 Frame length field
	28	011100	2	76.8	mbps		調問	The frame length field is 7 bits in
	29	011101	2	96	mbps		脂	of octets contained in the PSDU (i.e.
	32	100000	3	12	mbps		指出	PSDU). It is a value between 0 and
	33	100001	3	18	mbps		翻出	<i>aMaxPHYPacketSize</i> as shown in 6.5.
	34	100010	3	24	mbps		服 :	Table 22 summarizes the type of payload versus the frame length value
	35	100011	3	36	mbps		招告	payload versus the traine length value.
			-		•		14 T 11	
	36	100100	3	48	mbps		招出。	Table 22—Fra
	36 37	100100 100101	3 3	48 72	mbps mbps			Table 22—Fra
	36 37 38	100100 100101 100110 bers	3 3 3	48 72 96 Reserved	mbps mbps mbps			Table 22—Fra Frame length values
	36 37 38 ot	100100 100101 100110 hers	3 3 3 	48 72 96 Reserved	mbps mbps mbps			Table 22—Fra Frame length values 0-4
<u>6.4.1.3.4 Length of</u>	36 37 38 ot	100100 100101 100110 hers	3 3 3 •	48 72 96 Reserved	mbps mbps mbps			Table 22—Fra Frame length values 0-4 5
<u>6.4.1.3.4 Length of</u> The PSDU length fi	36 37 38 ot <u>PSDU</u> ield is 16 t	100100 100101 100110 hers bits in length	3 3 3 f	48 72 96 Reserved	mbps mbps mbps	ets contained in the		Table 22—Fra Frame length values 0-4 5 5 6.7
<u>6.4.1.3.4 Length of</u> <u>The PSDU length fi</u> <u>PSDU (i.e. PSDU). 1</u>	36 37 38 ot <u>PSDU</u> ield is 16 t It is a value	100100 100101 100110 hers bits in length	3 3 3 A and specifies d <i>aMaxPHYPa</i>	48 72 96 Reserved 	mbps mbps mbps <u>ber of octro</u>	ets contained in the 5.1		Table 22—Fra Frame length values 0-4 5 5 6-7
<u>6.4.1.3.4 Length of</u> The PSDU length fi PSDU (i.e. PSDU).	36 37 38 ot PSDU ield is 16 t It is a value	100100 100101 100110 hers bits in length is between 0 and	3 3 3 • and specifies d aMaxPHYPa	48 72 96 Reserved 	mbps mbps mbps <u>ber of octr</u>	ets contained in the 5.1		Table 22—Fra Frame length values 0-4 5 5 6-7 8 to aMaxPHYPacketSize 5
<u>6.4.1.3.4 Length of</u> The PSDU length fi PSDU (i.e. PSDU). 1 <u>6.4.1.3.5 Reserved fi</u>	36 37 38 ot PSDU ield is 16 t It is a value	100100 100101 100110 hers	3 3 3 • and specifies d aMaxPHYPa	48 72 96 Reserved the total num acketSize as sh	mbps mbps mbps <u>ber of octr</u>	ets contained in the 5.1		Table 22—Fra Frame length values 0-4 5 6-7 8 to aMaxPHYPacketSize ([2] ([2]
<u>6.4.1.3.4 Length of</u> The PSDU length fi PSDU (i.e. PSDU). 1 <u>6.4.1.3.5 Reserved fi</u>	36 37 38 ot <u>PSDU</u> ield is 16 t It is a value	100100 100101 100110 hers	3 3 3 and specifies d <i>aMaxPHYPa</i>	48 72 96 Reserved the total num acketSize as sh	mbps mbps mbps	ets contained in the 5.1		Table 22—Fra Frame length values 0-4 5 6-7 8 to aMaxPHYPacketSize ([2] 서식 있음: 글꼴: 굵게 없음
<u>6.4.1.3.4 Length of</u> <u>The PSDU length fi</u> <u>PSDU (i.e. PSDU). 1</u> <u>6.4.1.3.5 Reserved fi</u> 6.4.1.3.6 HCS	36 37 38 ot PSDU ield is 16 t It is a value	100100 100101 100110 hers	3 3 3 and specifies d aMaxPHYPa	48 72 96 Reserved the total num acketSize as sh	mbps mbps mbps	ets contained in the 5.1		Table 22—Fra Frame length values 0-4 5 6-7 8 to aMaxPHYPacketSize ([2] 서식 있음: 글꼴: 굵게 없음 삭제됨: 5
<u>6.4.1.3.4 Length of</u> <u>The PSDU length fi</u> <u>PSDU (i.e. PSDU).</u> <u>6.4.1.3.5 Reserved fi</u> <u>6.4.1.3.6 HCS</u> The CBC calculation	36 37 38 ot PSDU ield is 16 t It is a value ields	100100 100101 100110 hers	and specifies	48 72 96 Reserved	mbps mbps mbps <u>ber of octr</u>	ets contained in the 5.1		Table 22—Fra Frame length values 0-4 5 6-7 8 to aMaxPHYPacketSize ([2] 서식 있음: 글꼴: 굵게 없음 삭제됨: 5 서식 있음: SP196992, 간격 앞: 12 pt, 단락 뒤: 12 pt
<u>6.4.1.3.4 Length of</u> The PSDU length ff PSDU (i.e. PSDU). 1 <u>6.4.1.3.5 Reserved ff</u> 6.4.1.3.6 HCS The CRC calculation protected with a 2	36 37 38 ot PSDU ield is 16 t It is a value ields ields	100100 100101 100110 hers bits in length between 0 and between 0 and bet	3 3 3 in and specifies d aMaxPHYPa comparison compariso	48 72 96 Reserved the total num acketSize as sh subclause 6.4 c (HCS), A sc	mbps mbps mbps ber of octo nown in 6.2	ets contained in the 5.1 PHY header shall be of the processing is		Table 22—Fra Frame length values 0-4 5 6-7 8 to aMaxPHYPacketSize ([2] 서식 있음: 글꼴: 굵게 없음 삭제됨: 5 서식 있음: SP196992, 간격 앞: 12 pt, 단락 뒤: 12 pt 삭제됨: CCITT
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6.4.1.3.4 Length of The PSDU length fi PSDU (i.e. PSDU). 1 6.4.1.3.5 Reserved fi 6.4.1.3.6 HCS The CRC calculation protected with a 2 shown in Figure 26 modulo-2 division processed in the tra	36 37 38 ot PSDU ield is 16 t it is a value ields ields ields ields 	100100 100101 100110 hers between 0 and between 0 and betw	3 3 3 meand specifies d amaxPHYPa and specifies d amaxPHYPa conception cRC-16 as per reck sequence one's comp the polynom ers shall be i	48 72 96 Reserved the total num acketSize as sh subclause 6.4 (HCS), A se lement of the ial: $x_i^{a} + x_i^{a} + x_i^{a}$ nitialized to a	https mbps mbps ber of octo town in 6.2 1.6. The I hematic of thematic of thematic of thematic of thematic of thematic of thematic of thematic of the thematic thematic of the thematic the the thematic of the thematic the the the thematic of the thematic the the the the the the the the the the the the the the the the the the	ets contained in the 5.1 PHY header shall be of the processing is er generated by the HCS bits shall be A schematic of the		Table 22—Fra Frame length values 0-4 5 6-7 8 to aMaxPHYPacketSize [[2] 서식 있음: 글꼴: 굵게 없음 삭제됨: 5 서식 있음: SP196992, 간격 앞: 12 pt, 단락 뒤: 12 pt 삭제됨: CCITT 삭제됨: The combination of the PHY header and the MAC header (
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6.4.1.3.4 Length of The PSDU length fi PSDU (i.e. PSDU). 1 6.4.1.3.5 Reserved fi 6.4.1.3.6 HCS The CRC calculation protected with a 2 shown in Figure 26 modulo-2 division processed in the tra processing is shown	36 37 38 ot PSDU ield is 16 t It is a value ields ields ields ields ields ields ields ields ields ields ield is 16 t ield is 16 t It is a value ield is 16 t is a value ield is 16 t It is a value ield is 16 t It is a value ield is 16 t It is a value ield is 16 t is a value	100100 100101 100110 hers bits in length between 0 and between 0 and bet	3 3 3 meanuments and specifies d aMaxPHYPa amage of the sequence one's comp the polynom ers shall be i	48 72 96 Reserved the total num acketSize as sh subclause 6.4 (HCS), A sc lement of the ial: $x_i^{a} + x_i^{2} + x_i$ nitialized to a	mbps mbps mbps ber of octo town in 6.2 1.6. The I chematic of the semainde the semainde	ets contained in the 5.1 PHY header shall be of the processing is er generated by the HCS_bits_shall_be A_schematic_of_the	和市地には国家には、「「「「「」」」」」」」」」」」」」」」」」」」」」」」」」」」」」」」」	Table 22—Fra Frame length values 0-4 5 6-7 8 to aMaxPHYPacketSize ([2] 서식 있음: 글꼴: 굵게 없음 삭제됨: 5 서식 있음: SP196992, 간격 앞: 12 pt, 단락 뒤: 12 pt 삭제됨: CCITT 삭제됨: The combination of the PHY header and the MAC header (
6.4.1.3.4 Length of The PSDU length ff PSDU (i.e. PSDU). 1 6.4.1.3.5 Reserved ff 6.4.1.3.6 HCS The CRC calculation protected with a 2 shown in Figure 26 modulo-2 division processed in the tra processing is shown	36 37 38 ot PSDU ield is 16 t It is a value ields ields ields n used for t octet CRC 5. The HC of the PH ansmit ordo in Figure 2	100100 100101 100110 hers bits in length between 0 and between 0 and bet	3 3 3 and specifies d <i>aMaxPHYPa</i> 	48 72 96 Reserved the total num acketSize as sh subclause 6.4 $(HCS), A sclement of theial: x_1^{i_0} + x_1^{i_2} + x_2^{i_2}nitialized to a$	mbps mbps mbps ber of octu- nown in 6.3	ets contained in the 5.1 PHY header shall be of the processing is er generated by the HCS bits shall be A schematic of the	和市地になっていたが、「「「「「」」」」」」」」」」」」」」」」」」」」」」」」」」」」」」」」	Table 22—Fra Frame length values 0-4 5 6-7 8 to aMaxPHYPacketSize ([2] 서식 있음: 글꼴: 굵게 없음 삭제됨: 5 서식 있음: SP196992, 간격 앞: 12 pt, 단락 뒤: 12 pt 삭제됨: CCITT 삭제됨: The combination of the PHY header and the MAC header ([3] 서식 있음: 위 첨자 삭제됨: All HCS calculations shall be made prior to data scrambling. 삭제됨: .
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Figure 26—CCITT CRC-16 Implementation

As an example, consider the following 32-bit length sequence to be protected by the CRC-16

0101 0000 0000 0000 0000 0011 0000 0000

b0.....b31

The leftmost bit (b0) is transmitted first in time.

The ones complement for this sequence would be the following:

0101 1011 0101 0111

b0.....b15

The leftmost bit (b0) is transmitted first in time. Bit b0 corresponds to x15 in the Figure 26.

An illustrative example of the HCS calculation using the information from Figure 26 is shown in Figure 27.

Data	CRC Regis	ters	
	msb	1sb	
	111111111	1111111	- Initialize preset to one
٥	111011111	1011111	, minanze preset to ones
1	110111111	0111110	
0	1010111110	1011101	
1	010111101	0111010	
0	101111010	1110100	
0	011010101	1001001	
õ	110101011	0010010	
õ	101110110	0000101	
ň	011001100	0101011	
õ	110011000	1010110	
0	100010001	0001101	
0	000000010	0111011	
0	000000100	1110110	
0	000001001	1101100	
0	000010011	1011000	
0	000100111	0110000	
0	001001110	1100000	
0	010011101	1000000	
0	100111011	0000000	
0	001010110	0100001	
0	010101100	1000010	
0	101011001	0000100	
1	010110010	0001000	
1	101000100	0110001	
0	010101000	1000011	
0	101010001	0000110	
0	010000010	0101101	
0	100000100	1011010	
0	000101001	0010101	
0	001010010	0101010	
0	010100100	1010100	
0	101001001	0101000	

Figure 27—Example of CRC calculations

6.4.1.3.7 Channel estimation sequence

The channel estimation sequence is optional and is used in PHY Type 3. The information about PHY type 3 is obtained after decoding the PHY header. The length of channel estimation sequence is 8 bit. Refer to 6.8.6.1 CSK Calibration for more detailed information.

6.4.1.5 PSDU field

The PSDU field has a variable length and carries the data of the PHY packet.

The header, as shown in Table 23, shall be transmitted with an OOK modulation. If there are multiple light sources supported by the device, all light sources shall transmit the same header contents simultaneously. The band plan ID field in this case shall be that of the lowest band plan ID.

삭제됨: 6.4.2 PHY header



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페이지 2: [1] 삭제됨			Jason	(Jaeseung Son)	2010-06-30 PM 2:51:00		
	Octets: variable		3		variable	2	
	Preamble	Frame length (7 bits)	Reserved (1 bit)	HCS (16 bits as defined in 6.4.1.5)	PSDU	Frame Check Sequence (as defined in 6.4.1.6)	
	SHR		PHR		PSDU	FCS	

Figure 21—Format of the PPDU

In the case of CSK, the CSK PPDU of Figure 22 is used after link establishment.

폐이지 5: [2] 삭제됨 Jason(Jaeseung Son)	2010-07-01 PM 4:45:00
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6.4.1.3 Frame length field

The frame length field is 7 bits in length and specifies the total number of octets contained in the PSDU (i.e. PSDU). It is a value between 0 and *aMaxPHYPacketSize* as shown in 6.5. Table 22 summarizes the type of payload versus the frame length value.

Frame length values	Payload
0-4	Reserved
5	MPDU (Acknowledgment)
6-7	Reserved
8 to aMaxPHYPacketSize	MPDU

Table 22—Frame length values

6.4.1.4 PSDU field

The PSDU field has a variable length and carries the data of the PHY packet.

폐이지 5: [3] 삭제됨	Jason (Jaeseung Son)	2010-07-07 PM 1:29:00
The complication of the DUV	handen and the MAC handen shall be mustaat	d mith a 2 antat handan ahaala

The combination of the PHY header and the MAC header shall be protected with a 2 octet header check sequence (HCS).

페이지 5: [4] 삭제됨	Jason (Jaeseung Son)	2010-06-30 PM 2:51:00
	-	

6.4.1.6 Frame Check Sequence

The frame shall be protected with a CCITT CRC-16 frame check sequence (FCS). The FCS shall be the one's complement of the remainder generated by the modulo-2 division of the protected frame by the polynomial $x_{16+x_{12}+x_{5}+1}$. The protected bits shall be processed in transmitted order. All FCS calculations shall be made prior to data scrambling.