Project: IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)

Submission Title: Modified PHY header
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Abstract: Combination of PHY header

Purpose: Contribution to IEEE 802.15.7 TG-VLC

PHY header in 6.4.1

- Figure 21 and 22 is general frame format
  - Comments about figure 21 and 22
    - CID 321,322 - Figure 21: Having 1 reserved bit is not a good option. It caused a lot of problems during the transition from 11g --> 11n
    - CID 329 - The packet formats are different from the frame formats in section 5.6.4.x.
    - CID 335 - Normally, a channel estimation field is used to improve the demodulation of data. In this case, the channel estimation field needs to precede the PHR and not be part of the data that is checked by the FCS.
    - CID 343 - Delete CSK PPDU
    - CID 381 - FCS is generated in MAC

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

Octets: variable	3			variable	2
Preamble	Frame length (7 bits)	Reserved (1 bit)	HCS (see 6.4.1.5)	PSDU	Frame Check Sequence (see 6.4.1.6)
SHR	PHR			PHY payload	FCS

Figure 21—Format of the PPDU

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

Octets: variable	TBD				variable	2
Preamble	Frame length	Channel estimation sequence [where is this defined?]	Reserved	HCS (see 6.4.1.5)	PSDU	Frame Check Sequence (see 6.4.1.6)
	(7 bits)	(TBD)	(1 bit)	(16 bits)		
SHR	PHR				PHY payload	FCS

PHY header in 6.4.2

- Table 23 is also PHY header format
  - Comments about Table 23
    - CID 333- There is a conflict between this figure and Table 23 and the text in the draft. Apparently, the intent was to have more information than just the frame length. This will require some work.
    - CID 372- The maximum packet size is 64 kB, which requires 16 bits for the length field. This is reflected in Table 23 for the PHY header and appears to be the intention of the group. The 7 bit length is from 802.15.4, which is trying to solve a much different problem.
    - CID 395 - CRC is not defined for the PHY Header in Table 23
    - CID 397 - Table 23 What is the meaning of the column bit? Does it represent bit position? Number of bits?
    - CID 399 - It appears that multiple PHY headers are defined, e.g. in 6.4.2 as well as in Figures 21 and 22, presumably for the different modulation types. In the case of the latter, a frame length of 64kB cannot be supported, since the frame length field is 7 bits.
    - CID 403 - Table 23 (PHY Header) is not consistent with the previously defined packet format.

Table 23—PHY Header

PHY header fields	Bit	Explanation on use
Burst mode	1	Reduce preamble and IFS
Channel number	3	Band plan ID
Data rate	3	PHY data rate
Length of MAC payload	16	Length up to aMax-MacPayloadSize (Table 84)
Alternate Mode	1	CSK
Reserved fields	6	Future use

What I changed based on comments

- Merge Figure 21 and 22
- Leave 6.4.1.1 and 6.4.1.2
- Modification of 6.4.1.3
- Leave 6.4.1.4 PSDU
- Move 6.4.1.5 HCS to before 6.4.1.4
- Delete 6.4.1.6 FCS
  - There is FCS subclause in 7.2.1.9
- Move table 23 to 6.4.2 and move 6.4.2 after 6.4.1.2
  - Table 23 should be palced in 6.4.2 not 6.5.1.
  - Make a subclause and explain about burst mode, channel number, Data rate, alternative mode

Proposed PHY Header

- Proposed PHY Header based on comments

- Burst mode
  - 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.
- 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 range and channel assignments for more detailed information
- MCS ID
  - Next slide
- Length of PSDU
  - The PSDU length field is 16 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 6.5.1
- Reserved fields
  - Future use
- HCS
  - See 6.4.1.5
- Channel estimation sequence
  - The length of channel estimation sequence is 8 bit. Refer to 6.8.6.1 CSK Calibration for more detailed information
- PSDU field
  - The PSDU field has a variable length and carries the data of the PHY packet.

MCS ID

- MCS ID
  - Refer 15-10-0383-04-0007-comment-resolution-assignment

MCS indication		PHY type	Data rate	unit
0	000000	1	11.67	kbps
1	000001	1	24.44	kbps
2	000010	1	48.89	kbps
3	000011	1	73.3	kbps
4	000100	1	100	kbps
5	000101	1	35.56	kbps
6	000110	1	71.11	kbps
7	000111	1	124.4	kbps
8	001000	1	266.6	kbps
16	010000	2	1.25	mbps
17	010001	2	2	mbps
18	010010	2	2.5	mbps
19	010011	2	4	mbps
20	010100	2	5	mbps
21	010101	2	6	mbps
22	010110	2	9.6	mbps
23	010111	2	12	mbps
24	011000	2	19.2	mbps
25	011001	2	24	mbps
26	011010	2	38.4	mbps
27	011011	2	48	mbps
28	011100	2	76.8	mbps
29	011101	2	96	mbps
32	100000	3	12	mbps
33	100001	3	18	mbps
34	100010	3	24	mbps
35	100011	3	36	mbps
36	100100	3	48	mbps
37	100101	3	72	mbps
38	100110	3	96	mbps
others			Reserved	