IEEE P802.15
Wireless Personal Area Networks

Project	IEEE P802.15 Working Group for Wireless Personal Area Networks (WPANs)	
Title	Proposed Text on Stuff Chips	
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Source	[M.A. Rahman, R. Funada, T. Baykas, C.S. Sum, J. Wang, H. Harada, S. Kato and I. Lakkis]	Voice: [+81-46-847-5060] Fax: [+81-46-847-5089] E-mail: [aziz@nict.go.jp]
Re:		
Abstract	IEEE 802.15 Task Group TG3c Comment Resolution for CID 338 and 615	
Purpose	Proposed Text on Stuff Chips	
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12.2.2.2.4 Stuff ~~Bits~~ Chips

Stuff ~~bits~~ chips shall be added to the end of the encoded and spread data ~~prior to modulation in order to apply some of modulation schemes or~~ to form sub-blocks if the number of encoded and spread data chips is not an integer multiple of ~~the number of bits per sub-block after encoding and/or spreading (*NDBES*), the number of bits per symbol (*NNBPS*), and~~ the length of the data sub-block (sub-block excluding the pilot ~~symbols~~ chips) ~~(N_{NLSB}), respectively~~.

Let N_{OCTETS} be the number of payload octets transferred from MAC layer. The number of RS is LDPC blocks is given by

$$N_{FEC} = \begin{cases} ceil\left(\frac{N_{OCTETS}}{239}\right) & \text{for RS} \\ ceil\left(\frac{N_{OCTETS}*8}{N_{LDPC}*R_{FEC}}\right) & \text{for LDPC} \end{cases}.$$

where N_{LDPC} is the length of coded LDPC code. Let N_{ebits} be the number of encoded bits. This can be computed as follows:

$$N_{FEC} = \begin{cases} N_{OCTETS}*8 + N_{FEC}*16*8 & \text{for RS} \\ N_{OCTETS}*8 + N_{FEC}*N_{LDPC}*(1\text{-}R_{FEC}) & \text{for LDPC} \end{cases}.$$

The number of BPSK (QPSK) symbols after constellation mapping, $N_{B(Q)PSK}$ is:

$$N_{B(Q)PSK} = \frac{N_{ebits}}{N_{NBPS}}$$

where N_{NBPS} is the number of bits per symbol. The total number of chips, N_{chips}, after spreading is given by:

$$N_{chips} = N_{B(Q)PSK} * SF$$

where SF is the spreading factor as specified in 12.2.2.3 The total number of sub-blocks, $N_{sub\text{-}blocks}$, can be computed as:

$$N_{sub-block} = ceil\left(\frac{N_{chips}}{N_{burst} - N_{pw}}\right).$$

Finally, the number of stuff chips, N_{stuff}, is:

$$N_{stuff} = N_{sub-block} * \left(N_{burst} - N_{pw}\right) - N_{chips}.$$

The stuff ~~bits~~ chips ~~may be set to either zero or one~~ shall be set to zero and shall be ignored when the frame is received. Note that the stuff ~~bits~~ chips are not a part of either the HCS or FCS calculation. ~~A compliant PHY shall add enough stuff bits so that the payload data plus stuff bits is an integer multiple of all the *NDBES*, *NNBPS*, and *NNLSB*.~~