Improved Support for Four-Sector Deployments in the PHY Structure (Section 15.3.5 and Section 15.3.8)

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Re: P802.16m/D2 comments for LB30a
Area: Section 15.3.5 – DL PHY Structure and Section 15.3.8 – UL PHY Structure.

Purpose:
A large number of existing 802.16e deployments have four sectors. This contribution proposes modifications to the PHY structure to better support four-sector deployments.

Introduction & Problem Statement

- A large number of existing 802.16e deployments are four-sector deployments.
  - Many of these deployments are 1x4x2 reuse (2 RF carriers with 4 sectors)
- The current PHY structure in the D2 draft does not adequately support four-sector deployments
- This contribution proposes changes that will provide support for four-sector deployments
  - Provides support for 2 partitions, which are useful for 4-sector deployments

Text Proposal

- Replace the last line of Tables 771 and 861 (20 MHz bandwidth) with the last three lines of the following:

DFPC / UFPC	**Frequency Partition**	**FPCT**	**FPS_0**	**FPS_i (i>0)**
7	0:1:1:0	2	0	N_{PRU}*1/2 (i=1,2), 0 (i=3)
8	1:1:1:0	3	N_{PRU}*1/3	N_{PRU}*1/3 (i=1,2), 0 (i=3)
9–15	*Reserved*			

Text Proposal (cont.)

- Replace the last line of Tables 772 and 862 (10 MHz bandwidth) with the last two lines of the following:

DFPC / UFPC	**Frequency Partition**	**FPCT**	**FPS_0**	**FPS_i (i>0)**
6	0:1:1:0	2	0	N_{PRU}*1/2 (i=1,2), 0 (i=3)
7	1:1:1:0	3	N_{PRU}*1/3	N_{PRU}*1/3 (i=1,2), 0 (i=3)

Text Proposal (cont.)

- Replace the last line of Tables 773 and 863 (5 MHz bandwidth) with the last three lines of the following:

DFPC / UFPC	**Frequency Partition**	**FPCT**	**FPS_0**	**FPS_i (i>0)**
5	0:1:1:0	2	0	N_{PRU}*1/2 (i=1,2), 0 (i=3)
6	1:1:1:0	3	N_{PRU}*1/3	N_{PRU}*1/3 (i=1,2), 0 (i=3)
7	*Reserved*			

Text Proposal (cont.)

- Replace Eq. 187 with:

$$K_{SB,FP_i} = \begin{cases} K_{SB} - (FPCT - 1)\, DFPSC & i = 0, FPCT = 4 \\ DFPSC & i > 0, FPCT = 4 \text{ or } DFPC = 1 \\ K_{SB} - (FPCT - 1)\, DFPSC & i = 0,\ FPCT = 3,\ DFPC \neq 1 \\ DFPSC & i = 1, 2,\ FPCT = 3,\ DFPC \neq 1 \\ K_{SB} / 2 & i = 1, 2, FPCT = 2 \\ K_{SB} & i = 0, FPCT = 1 \end{cases}$$

When $FPCT = 2$, $DFPSC$ shall be zero.

Text Proposal (cont.)

- Replace Eq. 238 with:

$$K_{SB,FP_i} = \begin{cases} K_{SB} - (FPCT - 1)UFPSC & i = 0, FPCT = 4 \\ UFPSC & i > 0, FPCT = 4 \text{ or } UFPC = 1 \\ K_{SB} - (FPCT - 1)UFPSC & i = 0,\ FPCT = 3,\ UFPC \neq 1 \\ UFPSC & i = 1,2,\ FPCT = 3,\ UFPC \neq 1 \\ K_{SB}/2 & i = 1,2, FPCT = 2 \\ K_{SB} & i = 0, FPCT = 1 \end{cases}$$

When $FPCT = 2$, $UFPSC$ shall be zero.

Text Proposal (cont.)

- In section 15.3.5.3.1, p. 298, lines 46-52, replace “FP_i (i>0)” with “FP_i (i>0, FPCT≠2)” (3 locations)

Text Proposal (cont.)

- In section 15.3.5.3.1, p. 298, add the following paragraph before line 62 (before the paragraph containing Eq. 194):

  When FPCT=2, $DCAS_{SB,i}$ and $DCAS_{MB,i}$ for i=1 and 2 are signaled using the $DCAS_{SB,0}$ and $DCAS_{MB,0}$ fields in the SFH. Since FP_0 and FP_3 are empty, $L_{SB\text{-}CRU,FP0} = L_{MB\text{-}CRU,FP0} = L_{DRU,FP0} = 0$ and $L_{SB\text{-}CRU,FP3} = L_{MB\text{-}CRU,FP3} = L_{DRU,FP3} = 0$. For i=1 and 2,

  $$L_{SB\text{-}CRU,FPi}=N_1 DCAS_{SB,0.}$$

  $L_{MB\text{-}CRU,FPi}$ is obtained using the mappings in Tables 774 through 776 for system bandwidths of 20MHz, 10MHz, and 5MHz, respectively.

Text Proposal (cont.)

- In section 15.3.8.3.1, p. 455, lines 49-53, replace “FP_i (i>0)” with “FP_i (i>0, FPCT≠2)” (3 locations)

Text Proposal (cont.)

- In section 15.3.8.3.1, p. 455, add the following paragraph before line 64:

  When FPCT=2, $UCAS_{SB,i}$ and $UCAS_{MB,i}$ for i=1 and 2 are signaled using the $UCAS_{SB,0}$ and $UCAS_{MB,0}$ fields in the SFH. Since FP_0 and FP_3 are empty, $L_{SB\text{-}CRU,FP0} = L_{MB\text{-}CRU,FP0} = L_{DRU,FP0} = 0$ and $L_{SB\text{-}CRU,FP3} = L_{MB\text{-}CRU,FP3} = L_{DRU,FP3} = 0$. For i=1 and 2,

  $$L_{SB\text{-}CRU,FPi}=N_1 UCAS_{SB,0.}$$

  $L_{MB\text{-}CRU,FPi}$ is obtained using the mappings in Tables 864 through 866 for system bandwidths of 20MHz, 10MHz, and 5MHz, respectively.