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Re:	Sponsor re-circulation Ballot
Abstract	Uplink sub-channelization modifications for OFDMA PHY mode
Purpose	Adoption of proposed changes into P802.16-REVd/D4-2004
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Page 510, line 17-18, section 8.4.6.2.4

Change lines 17-18 as follows:

The additional optional subchannel structure for the uplink supports 9~~2~~6 subchannels where ~~each transmission uses~~ a subchannel consists of 48 data carriers ~~symbols as their minimal block of processing~~ and 6 pilot carriers. Each new transmission for the uplink commences with the parameters as given in Table 274.

Replace Table 274 with:

Table 274- OFDMA uplink subcarrier allocations

Parameters	value
Number of DC Subcarriers	1
Number of Guard Subcarriers, Left	159
Number of Guard Subcarriers, Right	160
Number of Used Subcarriers(N_{used})	1728
$N_{subchannels}$	96
N_{tiles}	576
Number of subcarriers per tile	3
Tiles per subchannel	6
Number of data subcarriers per subchannel	48

Add a new section:

8.4.6.2.4.1 Symbol structure for subchannel

Change line 54-55, page 510

A burst in the uplink is composed of 3 time symbols and 1 subchannel, within each burst, there are 48 data subcarriers and 6 fixed-location pilot subcarrier. ~~Tile configuration~~ The subchannel is constructed from 6 uplink tiles, each tile has 3 subcarriers and it's configuration is illustrated in Figure 226.

O O O Symbol 0

O X O Symbol 1

O O O Symbol 2

X pilot carrier O data carrier

Figure 226-Description of an uplink tile

Page 511, delete all the text below figure 226, change as follows:

8.4.6.2.4.2 Partitioning of subcarriers into subchannels in the uplink

To allocate the subchannels, subcarriers are partitioned into tiles which is 3x3 frequency-time block containing 9 tones(1 pilot tones and 8 data tones). The whole frequency bands are partitioned into groups of contiguous tiles. Each subchannel consists of 6 tiles each of which is chosen from different groups.

For 2048-FFT, the number of tiles in a group is 32 and there are 18 groups in the whole frequency band. Since a subchannel consists of 6 tiles, 6 groups at equal distance (3 groups away from each) are chosen and each tile is selected from each group.

The exact partitioning into subchannels is according to Equation (104), called UL permutation formula.

$$Tile(s,m) = \begin{cases} 96m + 32S + \left[s' + P_{1,c_1}(m) + P_{2,c_2}(m)\right] & 0 < c_1, c_2 < N_s \\ 96m + 32S + \left[s' + P_{1,c_1}(m)\right] & c_1 \neq 0, c_2 = 0 \\ 96m + 32S + \left[s' + P_{2,c_2}(m)\right] & c_1 = 0, c_2 \neq 0 \\ 96m + 32S + s' & c_1 = 0, c_2 = 0 \end{cases} \quad (104)$$

where

Tile(*s*, *m*) = tile index of *m*-th tile in subchannel *s*.

S = $\lfloor s/32 \rfloor$, s' = s mod 32

m = tile-in-subchannel index from the set [0 ~ 5]

s = index number of a subchannel from the set [0 ~ 95]

$P_{1,c_1}(j)$= *j*-th element of the sequence obtained by rotating basic permutation sequence P_1 cyclically to the left c_1 times. P_1={1, 2, 4, 8, 16, 5, 10, 20, 13, 26, 17, 7, 14, 28, 29, 31, 27, 19, 3, 6, 12, 24, 21, 15, 30, 25, 23, 11, 22, 9, 18}

$P_{2,c_2}(j)$= *j*-th element of the sequence obtained by rotating basic permutation sequence P_2 cyclically to the left c_2 times. P_2={1, 4, 16, 10, 13, 17, 14, 29, 27, 3, 12, 21, 30, 23, 22, 18, 2, 8, 5, 20, 26, 7, 28, 31, 19, 6, 24, 15, 25, 11, 9}

$c_1 = ID_{cell}$ mod 32, $c_2 = = \lfloor ID_{cell}/32 \rfloor$

In Equation (104), the operation in [ ] is over GF(2^5). In GF(2^5), addition is binary XOR operation. For example, 29 + 12 in GF(2^5) is $[(11101)_2$ **XOR** $(01100)_2] = (10001)_2 = 17$, where $(x)_2$ represents binary expansion of x.