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Title	Clarification of renumbering and permutation based on DL_PermBase parameter	
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Re:	IEEE 802.16 WG Recirculation Ballot #18 on P802.16-2004/Cor1/D3	
Abstract	This contribution is for clarification of renumbering and permutation based on DL_PermBase parameter	
Purpose	The C80216maint-05_102r5 was accepted in IEEE 802.16's Session #37 Meeting in Sorrento. However only part of the contribution was incorporated in P802.16-2004/Cor1/D3. This contribution is submitted in order to incorporate the rest text modification proposed in C80216maint-05_102r5 into P802.16-2004/Cor1/D4.	
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Clarification of renumbering and permutation based on DL_PermBase parameter

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1. Problem Statement

In section 8.4.6.1.2.1.1 of P80216_Cor1_D3, the text of downlink subchannel subcarrier allocation in PUSC mentions that DL_PermBase is used both for renumbering and permutation formulas. However, one of them states that DL_PermBase = 0 in the first zone, the other says DL_PermBase = IDcell in the first zone.

Above statements are very confusing. Firstly, in the first PUSC DL zone the DL_PermBase is set to "0" for renumbering in item (2), and at the same time, DL_PermBase is set to "IDcell" for permutation equation in item (4). What is the value of DL_PermBase in the first PUSC zone? Secondly, this parameter does not exist in the first PUSC DL zone. DL_PermBase is a parameter of an optional zone switch IE, STC_DL_Zone_IE(). Before that, what is DL_PermBase in the first DL zone? With the text changes of this contribution, the DL_PermBase conditions are rightfully removed from the first PUSC zone, no more ambiguity in interpretation.

2. Proposed solutions

The forcing of DL_PermBase = 0 ensures that the first zone of PUSC, all the different sectors from different cells are orthogonal. However, IDcell shall be used in the subcarrier permutation equation to have different permutations in the first zone for different cells, where the IDcell values can be chosen differently. By adding the conditions to the renumbering and permutation formulas, DL_PermBase = 0 is no longer required. The standard text will be clean.

3. Specific text changes

=== Start text changes ===

[Modify the following text to section 8.4.6.1.2.1.1 Downlink subchannels subcarrier allocation in PUSC]

8.4.6.1.2.1.1 Downlink subchannels subcarrier allocation in PUSC

Change the numbered items of the first paragraph as indicated:

- 1) Dividing the subcarriers into 120 physical clusters containing 14 adjacent subcarriers each (starting from carrier 0).
- 2) Renumbering the physical clusters into logical clusters using the following formula:

~~$$\text{LogicalCluster} = \text{RenumberingSequence}((\text{PhysicalCluster} + 13 * \text{IDcell} \text{DL_PermBase}) \bmod 120)$$~~

$$\text{LogicalCluster} = \begin{cases} \text{RenumberingSequence}(\text{PhysicalCluster}) & \text{First DL Zone} \\ & \text{or "AllSC Indicator=0" in STC_DL_Zone_IE()} \\ \text{RenumberingSequence}((\text{PhysicalCluster} + 13 * \text{DL_PermBase}) \bmod 120) & \text{Otherwise} \end{cases}$$

In the first PUSC zone of the downlink (first downlink zone), the default used IDcell is 0 renumbering sequence is used for logical cluster definition. For all other zones DL_PermBase parameter in the STC_DL_Zone_IE() shall be used. In the first PUSC zone of the downlink (first downlink zone) the default used DL_PermBase is 0. When the 'Use all SC indicator=0' in the STC_DL_Zone_IE(), DL_PermBase is replaced with 0. For All other cases DL_PermBase parameter in the STC_DL_Zone_IE() shall be used.

4) Allocating subcarriers to subchannels in each major group is performed separately for each OFDMA symbol by first allocating the pilot carriers within each cluster, and then taking all remaining data carriers within the symbol and using the same procedure described in 8.4.6.1.2.2.2 (with the parameters from Table 310, using the ~~PermutationBase~~basic permutation sequence appropriate for each major group, ~~PermutationBase12~~basic permutation sequence 12 for even numbered major groups, and ~~PermutationBase8~~basic permutation sequence 8 for odd numbered major groups) to partition the subcarriers into subchannels containing 24 data subcarriers in each symbol. Note that the preamble IDcell used for the first PUSC zone is 0. is used for the first PUSC zone in Equation (111). Otherwise the DL_PermBase parameter in the STC_DL_Zone_IE() shall be used in the equation. The subcarrier indexing within each group shall start from 0, where 0 is the lowest number subcarrier in the lowest numbered logical cluster belonging to the group.

[Modify the following text to section 8.4.6.1.2.2.2 Partitioning of data subcarriers into subchannels in downlink FUSC]

8.4.6.1.2.2.2 Partitioning of data subcarriers into subchannels in downlink FUSC

Replace Equation (111) with the following equation:

$$\text{subcarrier}(k, s) = \begin{cases} N_{\text{subchannels}} n_k + \{p_s [n_k \bmod N_{\text{subchannels}}] + \text{IDcell}\} \bmod N_{\text{subchannels}} & \text{First DL Zone} \\ N_{\text{subchannels}} n_k + \{p_s [n_k \bmod N_{\text{subchannels}}] + \text{DL_PermBase}\} \bmod N_{\text{subchannels}} & \text{Otherwise} \end{cases} \quad (111)$$

==== End text changes =====

4. References

- [1] IEEE 802.16-2004
- [2] P80216_Cor1_D3