| | | |
|---|---|---|
| Project | **IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>** | |
| Title | **Clarification of renumbering and permutation based on DL_PermBase parameter** | |
| Date Submitted | **2005-05-05** | |
| Source(s) | Sean Cai<br>Jason Hou<br>Liujun Hu | scai@ztesandiego.com<br>jhou@ztesandiego.com |
| | ZTE San Diego Inc.<br>10105 Pacific Heights Blvd.<br>San Diego, CA 92121<br>USA | Voice: 858-554-0387<br>Fax: 858-554-0894 |
| | Lei Wang | lwang@cygnuscom.com |
| | Cygnus Multimedia Communications, Inc. | Voice (760)448-1984<br>Fax: (760)448-1989 |
| | Yigal Leiba<br>Yossi Segal<br>Runcom Ltd. | yigall@runcom.co.il<br>Voice:+972-3-9528440<br>Fax:+972-3-9528805 |
| Re: | IEEE 802.16 WG Recirculation Ballot #17a on P802.16-2004/Cor1/D2 | |
| Abstract | This contribution is for clarification of renumbering and permutation based on DL_PermBase parameter | |
| Purpose | To incorporate the text modification proposed in this contribution into P802.16-2004/Cor1/D3. | |
| Notice | This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein. | |
| Release | The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16. | |

| | |
|---|---|
| Patent Policy and Procedures | The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:chair@wirelessman.org> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>. |

# Clarification of renumbering and permutation based on DL_PermBase parameter

*Sean Cai, Jason Hou, Liujun Hu*
*ZTE San Diego Inc.*

*Lei Wang*
*Cygnus Multimedia Communications, Inc.*

*Yigal Leiba, Yossi Segal*
*Runcom Ltd.*

## 1. Problem Statement

In section 8.4.6.1.2.1.1 of P80216_Cor1_D2, 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.

## 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

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

=== Start text changes ====
1)
2) Renumbering the physical clusters into logical clusters using the following formula:
~~*LogicalCluster = RenumberingSequence( (PhysicalCluster + 13*IDcellDL_PermBase) mod 120)*~~

$$\text{LogicalCluster} = \begin{cases} \text{RenumberingSequence}(\text{PhysicalCluster}) & \text{First DL Zone or "All SC Indicator = 0" in STC\_DL\_Zone\_IE(} \\ \text{RenumberingSequence}((\text{PhysicalCluster} + 13 * \text{DL\_PermBase}) \bmod 120) & \text{Otherwise} \end{cases}$$

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.~~

3)

4) …. subcarriers in each symbol. Note that IDcell ~~used for the first PUSC zone is 0.~~ is used for the first PUSC zone in Equation (111). 0therwise the DL_PermBase parameter in the STC_DL_Zone_IE() shall be used in the equation.

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

***Replace Equation (111) with the following equation:***

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

*[Modify the following text]*

**8.4.5.3.4 Transmit diversity (TD)Space-Time Coding (STC)/DL_Zone switch IE format**

In the DL-MAP, a BS may transmit DIUC = 15 with the TDSTC_DL_ZONE_IE() to indicate that the subsequent allocations shall use a specific permutation, or be transmit diversitySTC encoded. The downlink frame shall start in PUSC mode with ~~IDcellDL_PermBase = 0 and~~ no transmit diversity. Allocations

***[Replace Figure 219 with the following figure:]***

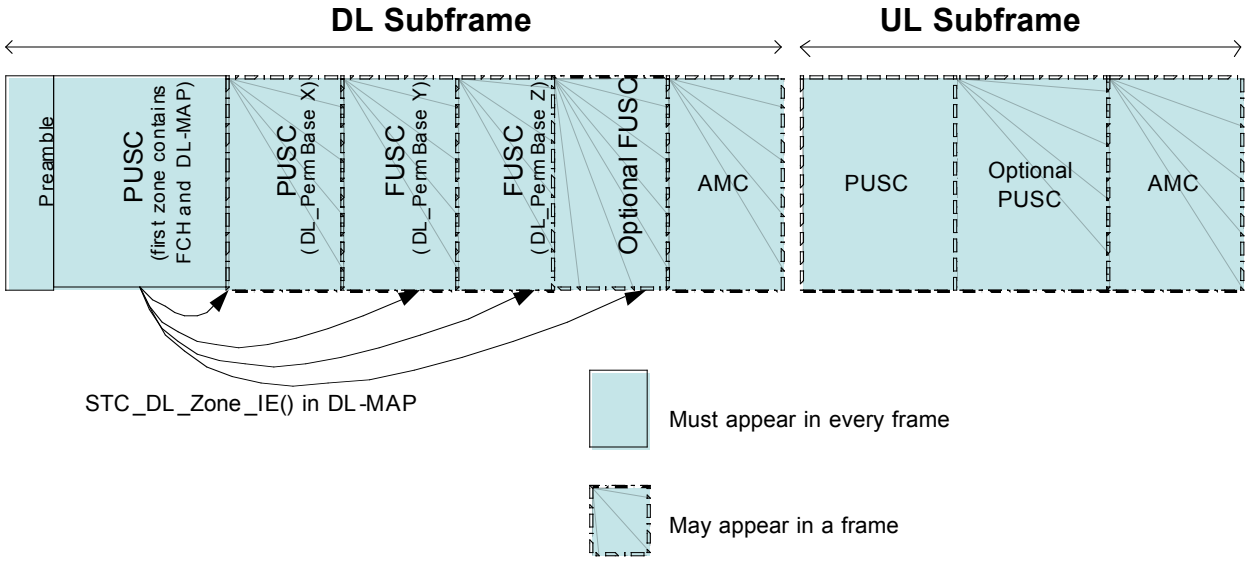


**Figure 219-Illustration of OFDMA frame with multiple zones**

=== End text changes ====

# 4. References

[1] IEEE 802.16-2004
[2] P80216_Cor1_D2