

# Comments on Outer Permutation Size

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\* <<http://standards.ieee.org/faqs/affiliationFAQ.html>>

Re: IEEE 802.16m-08/016 – Call for Comments on C802.16mDL\_PHY-08/046 “802.16m DL PHY Structure Baseline Content Suitable for use in the 802.16m SDD”

Purpose: Adopt the proposal into the IEEE 802.16m System Description Document

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# Channelization Procedure

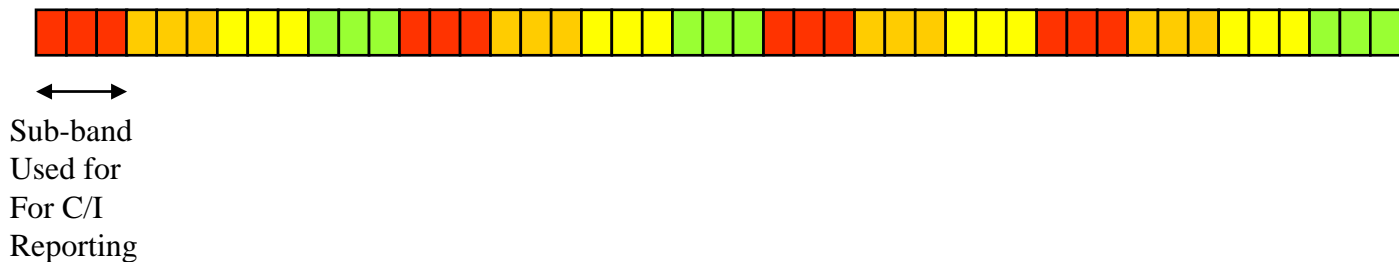
- In C802.16mDL\_PHY-08/046 and as described in C80216m-08/009r5, the proposed text indicates that the outer permutation should be performed in the units of PRUs
- Outer permutation spreads the PRUs of each frequency partition evenly across the band as shown in the figure below. The localized resource units (LLRU) will be evenly spread over the entire band even for the case where there is no distributed resource with the frequency partition.
- For example, if there are 4 FFR zones then each FFR zone contains PRUs that are spaced by 4 PRUs.
- For frequency selective scheduling, the mobiles report multiple C/I. In order to reduce MS complexity, the mobiles should be calculating a C/I based on a sub-band rather than per PRU.
- With this outer permutation, when there are 4 FFR zones the number of PRUs in a sub-band is one. This results in only one assigned LLRU per user per sub-band, which increases the signaling overhead.



Sub-band  
Used for  
For C/I  
Reporting

# Proposed Channelization Procedure

- The outer permutation should be performed in the units of N PRUs
- In this case, there will be N contiguous LLRUs and the contiguous blocks of LLRUs from each FFR zone are evenly spread over the entire band.
- When there are 4 FFR zones there are multiple PRUs in a sub-band.
- Each assigned user can be assigned multiple PRUs, which will reduce the signaling overhead.
- Even when a FFR zone is divided into LLRU and DRU, for example,  $\frac{2}{3}$  of resource is allocated for LLRU and  $\frac{1}{3}$  of resource is allocated for DRU, there will be 2 contiguous LLRU in one sub-band. At the same time, each DRU has 4-order diversity which already saturates the diversity gain.



# Proposed Text Changes in C802.16mDL\_PHY-08/046

- Section 11.5.2.2 Downlink Subcarrier to Resource Unit Mapping
  - Delete line 27
  - Add the following text.
    - “1. First-level or outer permutation is applied to the PRUs in the units of  $N \times \text{PRU}$ , where  $N$  is configured by the BS.”