Physical Structure for BW-REQ Channel

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       None

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    To be discussed and adopted by TGm for the 802.16m SDD

Notice:

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Physical Structure for BW-REQ Channel

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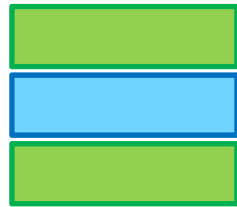
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PHY Structure for BW-REQ

16m Green field   **16m PUSC**

BW-REQ indicator

BW-REQ message

- **Tile structure**
  - Three (6X6) tiles for Green field mode,
  - Three (4X6) tiles for 16m PUSC mode,

- **Ratio of indicator/message**
  - Resource Ratio = 2:1 for Green field
  - BW indicator only for 16m PUSC mode,

- **BW-REQ indicator (BR code)**
  - (4X6)X3 tones,
  - (Semi/Quasi) orthogonal sequence,

- **BW-REQ message**
  - ~12 info bits through (2X6)X3 tones,
  - QPSK modulated block code (rate : 1/6)

Design Criteria for BW-REQ Indicator

- **Sequence Candidates for BR indicator**
  - Orthogonal sequence
    - **24 length Hadamard sequence**
  - Quasi/semi-orthogonal sequence
    - Truncated Zadoff-Chu sequence
  - ~~Pseudo-random sequence (m-sequence)~~

- **Evaluation Criteria for BR indicator sequence**
  - Detection performance (Missing/FA Probability)
  - Number of BR opportunities
 - Channel estimation for detecting the BR message

Usage Example for BR Indicator

- **How to use 24 orthogonal sequences**
  - Efficient support both 3 step & 5 step procedures,

- **We can divide 24 sequences into 2 subgroups,**
  - Subgroup1 can carry 4 bits additional information for 3 step BW-REQ procedures (Sequences #1~16)
  - Subgroup2 can be used for 5 step BW-REQ procedure (Sequences #17~24)

- **Benefits of Subgroups**
  - No false alarm detection for BW-REQ message is required

Detection Performance

BW-REQCH (Ped B 3km)
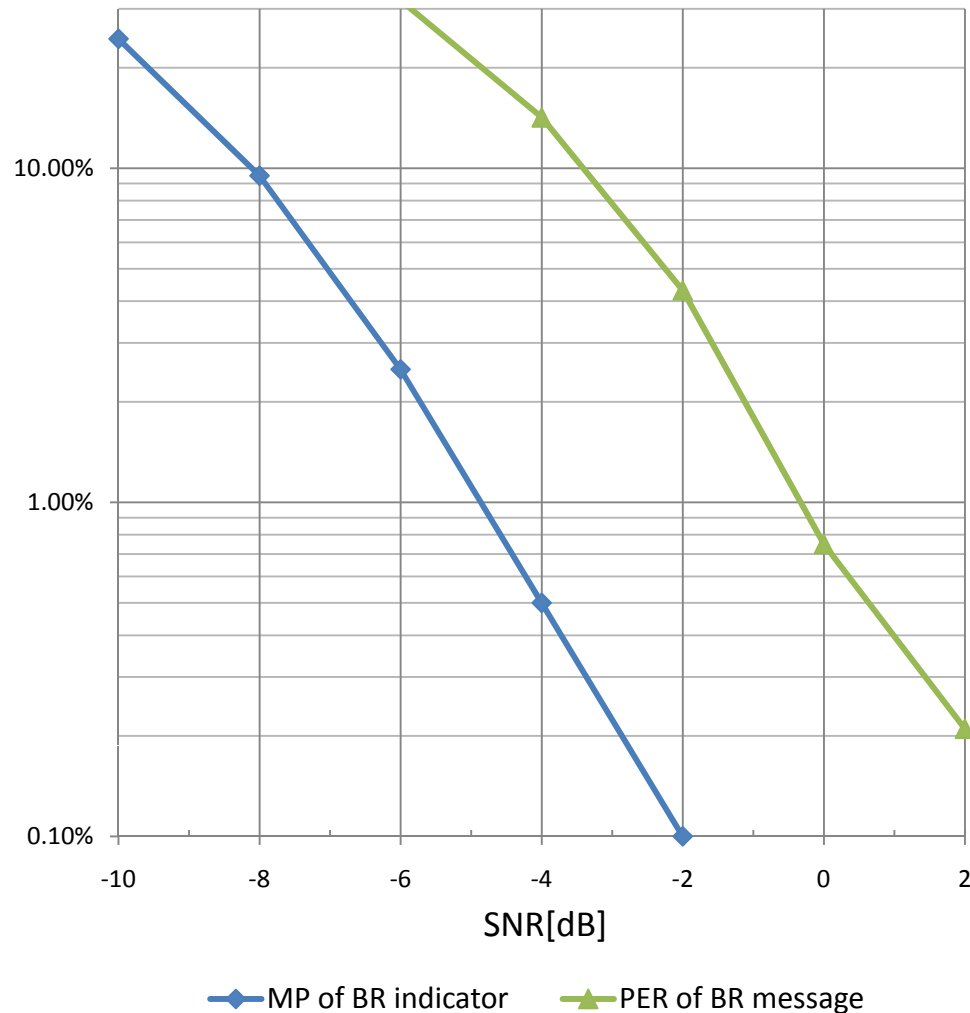
- **BR indicator**
  - False alarm rate < 0.1%,
  - 1% Missing Probability @ -5.0dB

- **BR message**
  - One BR message only,
  - Channel coding is not optimized yet,
  - No false alarm rate
  - 1% PER @ -0.6dB

Concluding Remarks

- **PHY structure for BW-REQ consists of**
  - Three (6X6) tiles,
  - (4X6) sub-tiles are used for BW-REQ indicator
  - (2X6) sub-tiles are used for BW-REQ message

- **In a legacy support mode (16m PUSC),**
  - Only BW-REQ indicators are transmitted,
  - Only 5 step BR procedures are supported,

- **Different BW-REQ indicators for different BR procedures**

- **To meet their different required SNR,**
  - BW-REQ message can be boosted over BW-REQ indicator