

Using Burst Marker to signal Start and Stop RE with Upstream Data

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Number of bits in Burst is always Multiple of 65 b

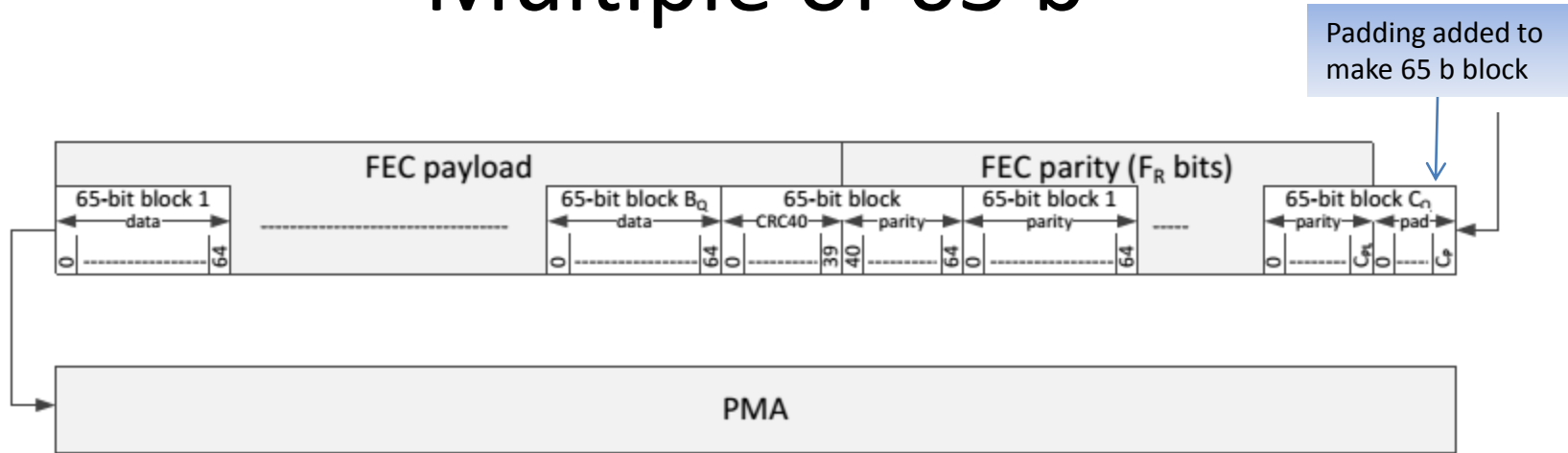


Figure 101-6—10GPASS-XR PCS transmit path processing

Number of bits to PMA for a full (no shortening) Long, Medium and Short Codeword

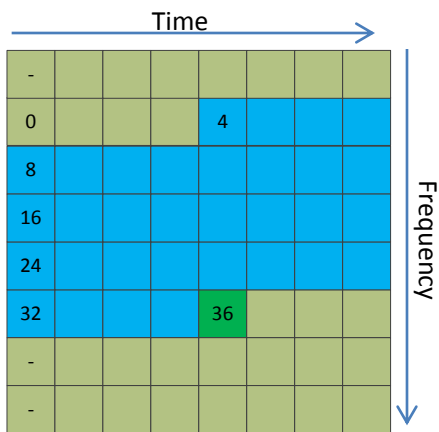
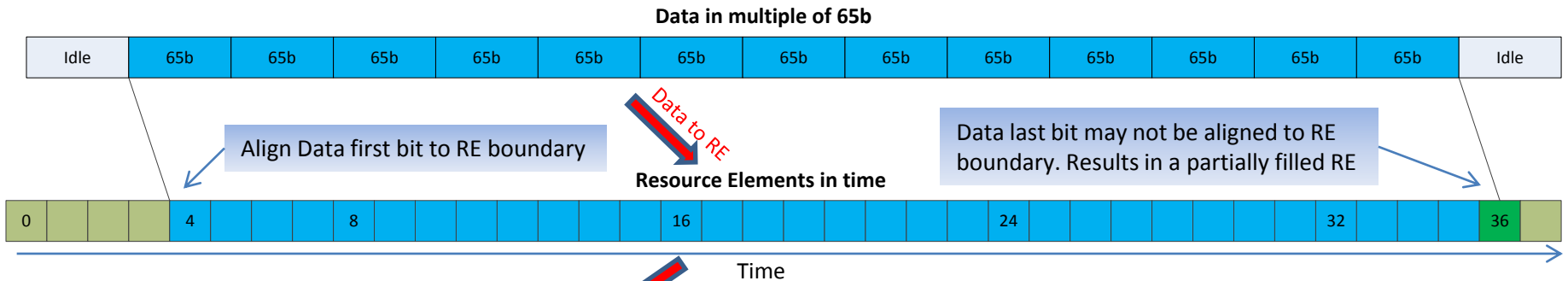
| Codeword | B _q Payload | C _q + 1 CRC+Parity | Nb. of 65 b blocks | Nb. bits |
|----------|---------------------------|----------------------------------|-----------------------|----------|
| Long | 220 | 29 | 249 | 16185 |
| Medium | 76 | 15 | 91 | 5915 |
| Short | 12 | 5 | 17 | 1105 |

Proposal

- There is 11 orthogonal cyclic shift of S_0 for BM 4x6.
- Payload data length is multiple of 65 b.
- RB allowed to start on any active subcarrier. Burst has an integer number of RB. RB can be 1, 4 or 8 subcarriers.
- RB bit loading known by CLT and CNU.
- Cyclic shift of Start BM point to first RE with data.
 - If $K \leq 13$, count forward in step of 1 RE. Skip over Pilots.
 - If $13 < K \leq 22$, count forward in step of 2 RE, using even RE.
- For 1024-QAM max (10 b/symbol) upstream, cyclic shift of Stop BM point to last Resource Element with data.
 - Count backward in step of 6 RE.
 - 11 cyclic shift allowing RB composed of up to 66 RE.

Packing of Data into RB example

BM mark first and last RE with Data



OFDMA Frame, 1x8 RB

Note 3: Illustration do not show Start and Stop BM.

1. Insert Data into RE. Align Data to RE first bit.
 2. Fill sequentially RE with Data. We may have partially filled RB at the end.
 3. Pack the RE in RBs of OFDMA frame.
 4. Add Start Burst Marker with cyclic shift of S_0 to indicate position of first RE with Data. Depending on K , count forward in step of 1 or 2.
 5. Add Stop Burst Marker with cyclic shift of S_0 to indicate from the end position of last RE with Data. Count backward in step of 6.
 6. Burst receiver determine the size of Data burst from known bit loading per RB and granularity of Data length, i.e. integer multiple of 65b.
- Start BM: For $4 \leq K \leq 13$, cyclic shift of S_0 indicate first RE with data. For $13 < K \leq 22$, data is only allowed to start on even RE.
 - Stop BM: Cyclic shift of S_0 indicate RE with end of data. The RE are counted in step of 6. The number of subcarrier in RB should be less than $\text{floor}(66/K)$. For example, valid size are: 4x8, 4x16, 8x8.

Pilots, Data and Burst Marker Example

Start Data on RE followed by Start BM indicating RE with Data

Start Data on 3th RE of RB → Cyclic shift +2

Resource Block = 4x8
Burt Marker = 4x6

Stop Data on last 4th RE of RB → Cyclic shift 0

Stop Data preceded by Stop BM indicating last RE with Data

| | | | | | | | |
|---|----|---|----|----|----|----|----|
| - | - | - | - | - | - | - | - |
| P | - | P | - | D | CP | D | CP |
| D | 0 | D | -1 | 0 | 1 | -1 | 0 |
| D | 1 | D | 0 | 1 | 0 | 0 | 1 |
| D | 0 | D | 1 | 1 | 0 | 0 | -1 |
| P | -1 | P | 0 | 0 | 1 | 1 | 0 |
| D | D | D | D | D | D | D | D |
| D | D | D | D | D | D | D | D |
| D | D | D | D | D | D | D | D |
| P | D | P | D | D | CP | D | CP |
| D | D | D | D | D | D | D | D |
| D | D | D | D | D | D | D | D |
| D | D | D | D | D | D | D | D |
| P | D | P | D | D | CP | D | CP |
| D | D | D | D | D | D | D | D |
| D | D | D | D | D | D | D | D |
| D | -1 | D | 0 | 1 | 0 | 0 | 1 |
| P | 0 | P | 1 | 0 | 1 | 1 | 0 |
| D | -1 | D | 0 | 0 | -1 | 1 | 0 |
| D | 0 | D | 1 | -1 | 0 | 0 | 1 |
| P | D | P | D | - | CP | - | CP |
| - | - | - | - | - | - | - | - |

Burst Marker sequence (shift=0)
S0 = [-1 +1 +1, +1 +1 +1, -1 -1 +1, +1 -1 +1]

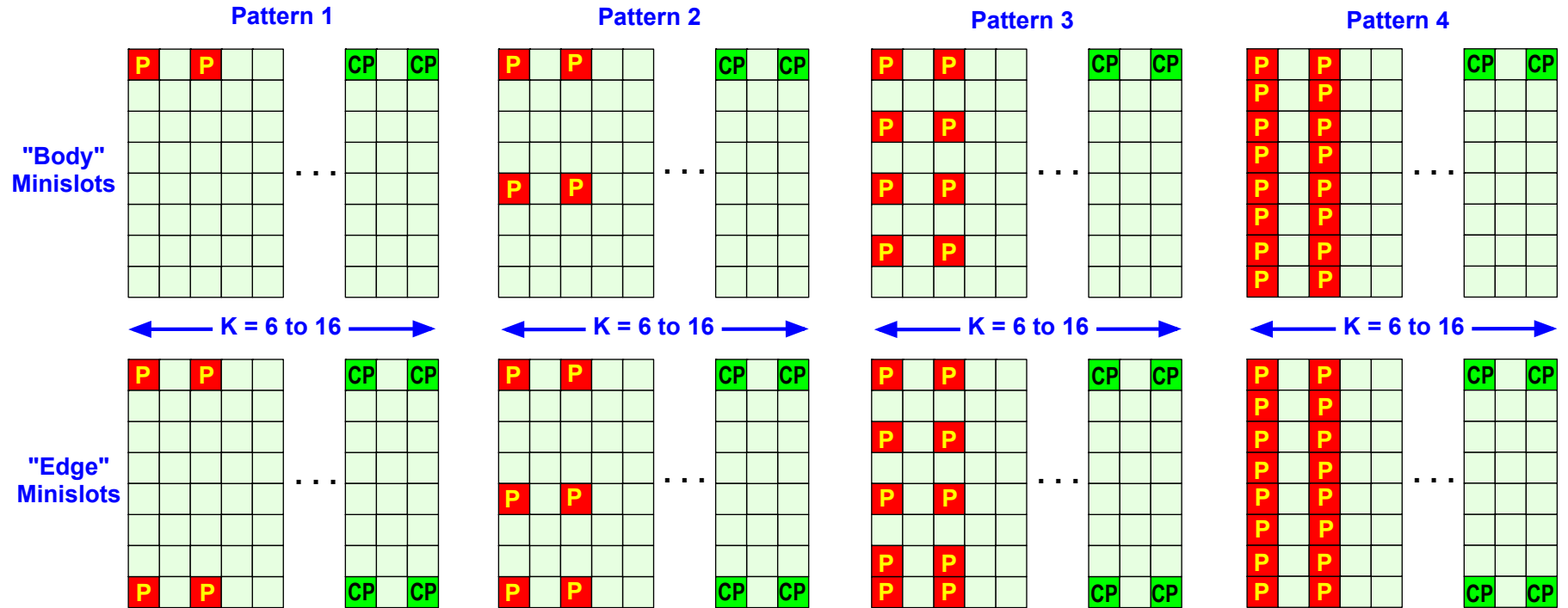
- P Pilot
- CP Complementary Pilot
- X Burst Marker
- D Data
- D Partial Data
- No TX

Regular pilots

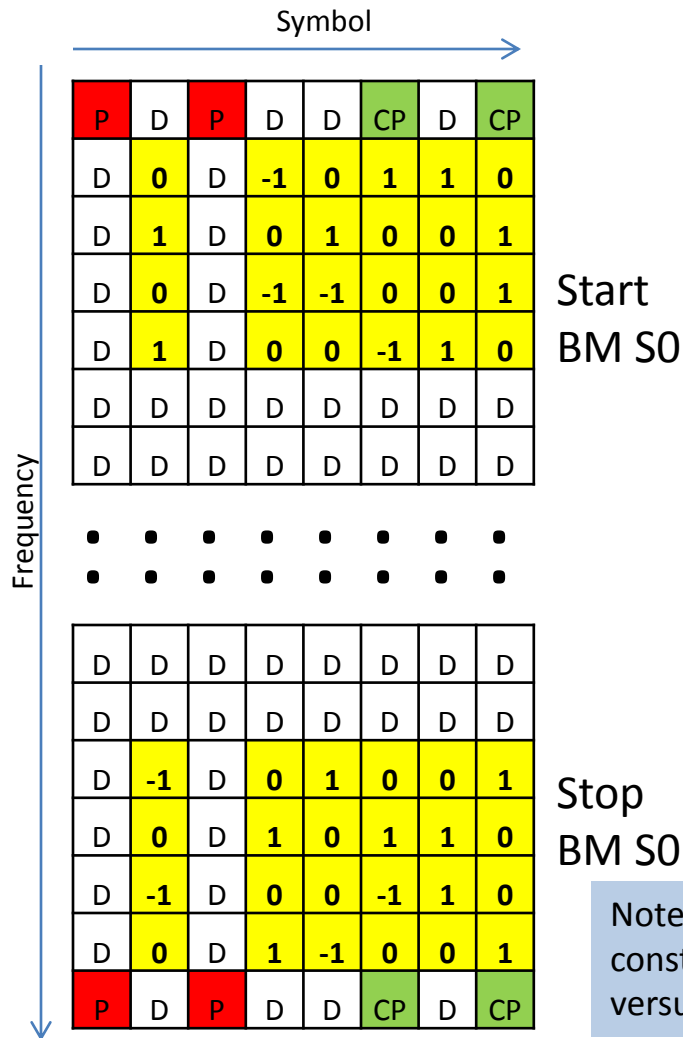
Edge pilots

**BACKUP MATERIAL,
PILOT PATTERN AND BURST MARKER**

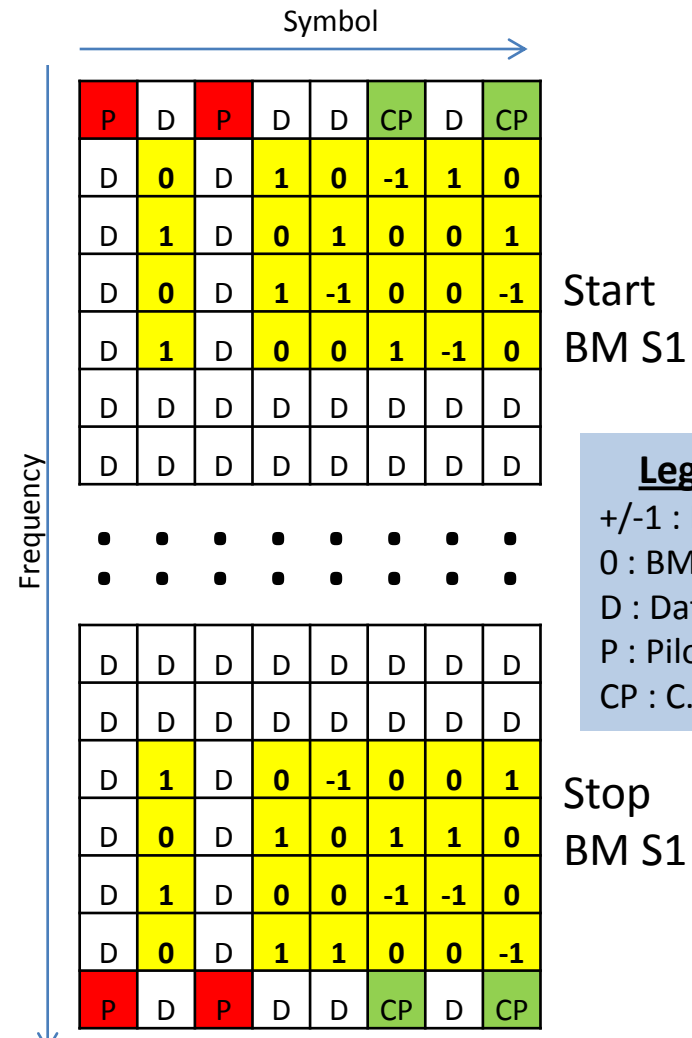
Pilot Pattern



Examples of BM 4x6 in 8 symbols RB



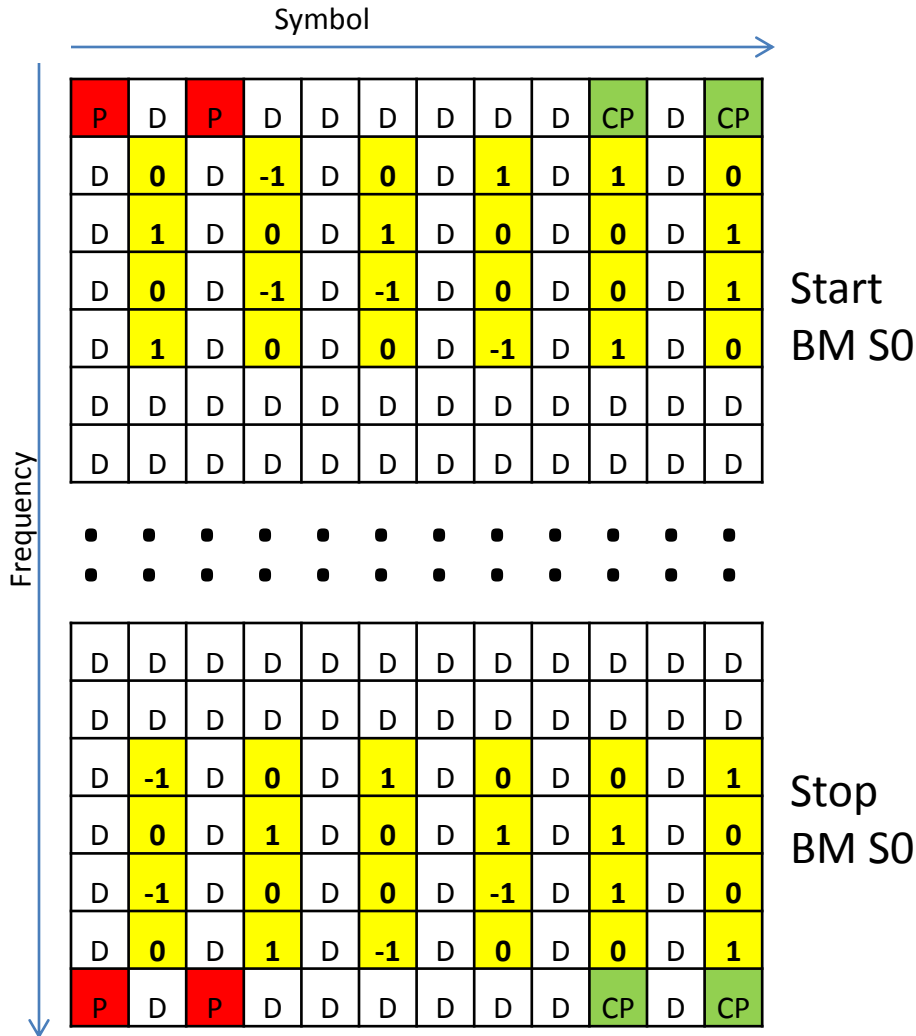
Note: Power is constant versus time



Legend

- +/-1 : BM "B"
- 0 : BM "N"
- D : Data
- P : Pilot
- CP : C. Pilot

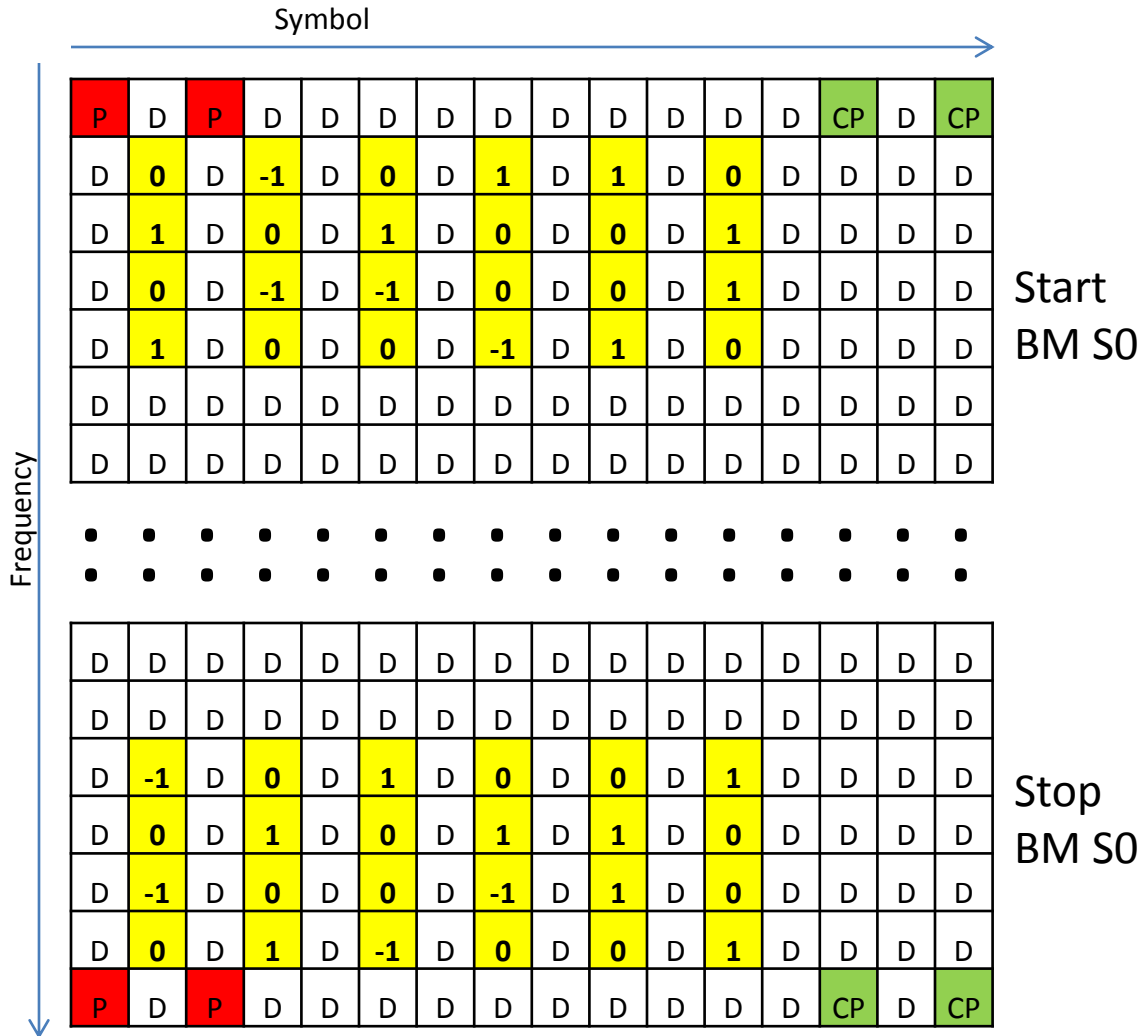
Examples of BM 4x6 in 12 symbols RB



Legend
 +/-1 : BM "B"
 0 : BM "N"
 D : Data
 P : Pilot
 CP : C. Pilot

Note: Power is constant versus time

Examples of BM 4x6 in 16 symbols RB



Legend
 +/-1 : BM "B"
 0 : BM "N"
 D : Data
 P : Pilot
 CP : C. Pilot

Note: Power is constant versus time