Updates on 802.3bn EPoC Upstream Pilot Proposal

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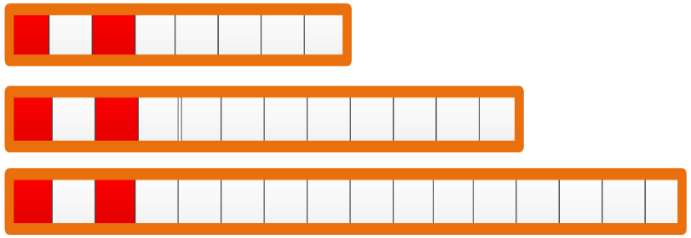
Resource Block Rules

- RB types are fixed in frequency and set during configuration
- All RBs have a single subcarrier and the same length of 8, 12 or 16 symbols for the entire OFDMA spectrum
- Any change in configuration (type or length) requires a restart
- RBs are configured with a RB type and bit loading

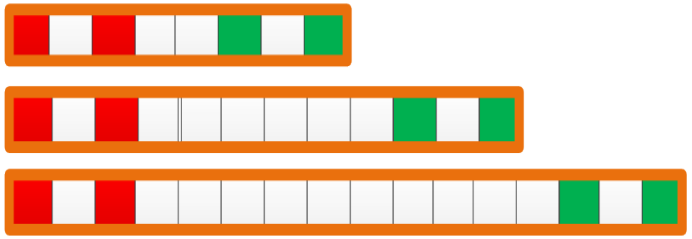
RB Types and Pilot Patterns

- Three types of RBs
  - Type 0 – RB does not include pilots
  - Type 1 – RB includes two pilots
  - Type 2 - RB includes two pilots and two low-density data subcarriers (“LD pilots”)
    - LD density is four bits lower than data density or QPSK, the largest of the two.



RB Type 1

Two pilots on the first and third symbols



RB Type 2

Two pilots on the first and third symbols and two LD pilots on last and second to last symbols

Bursts Rules

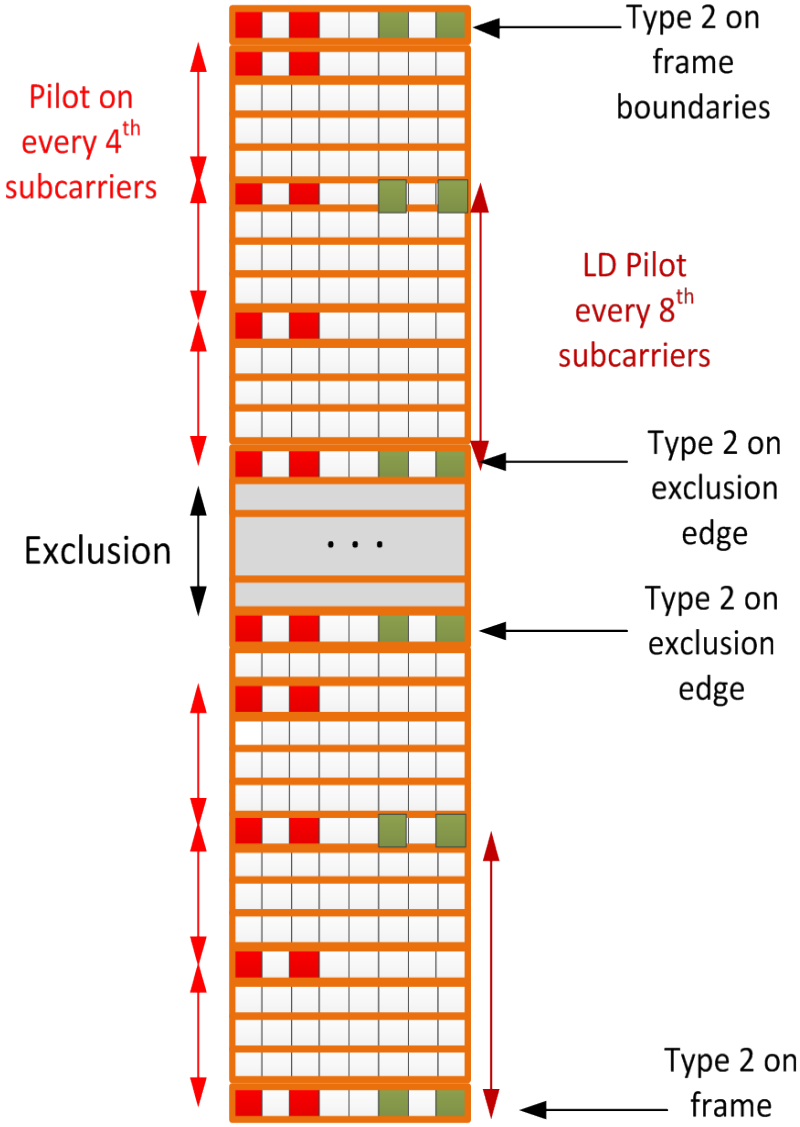
- A Burst must start with a type-2 RB followed by four contiguous subcarriers with start Burst Markers
- A Burst must end with a type-2 RB preceded by four contiguous subcarriers with end Burst Markers
- The burst may comprised of a series of RBs of different types and different bit loading

Pilots Rules

- Configurable pilot locations
  - Pilot patterns are configurable during network initialization and constant over the entire spectrum
- Pilots on Boundaries
  - Type-2 RBs are always used on OFDMA frame boundaries and exclusions edge subcarriers
- Start of a transmission burst
  - First RB in a transmission burst is always of type #2
- End of a transmission burst
  - Last RB in a transmission burst is always of type #2

Pilot Rules – Examples (1)

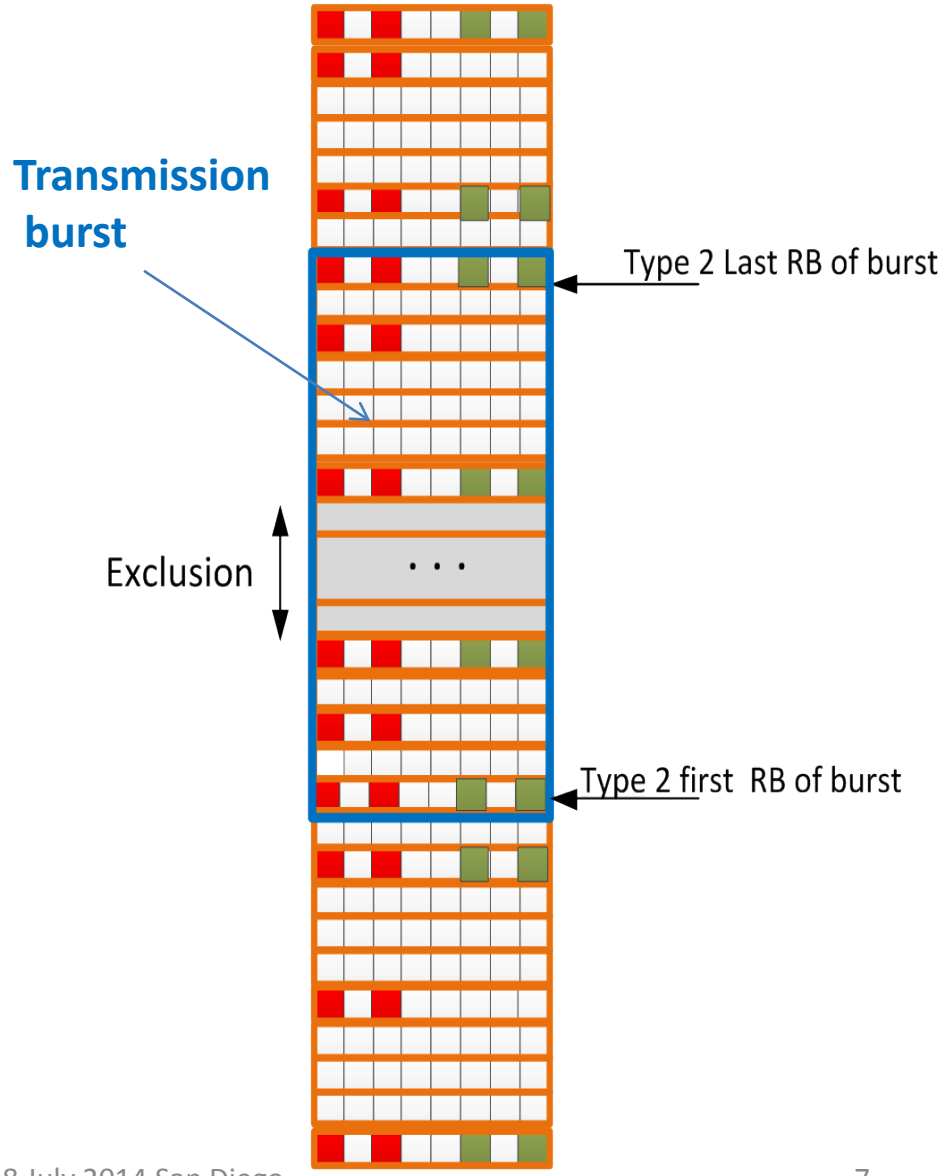
- Pilot grid example:
  - Pilots repeat every four subcarriers
  - LD pilots repeat every eight subcarriers
- This pilot pattern is configured during initialization



Pilot Rules – Examples (2)

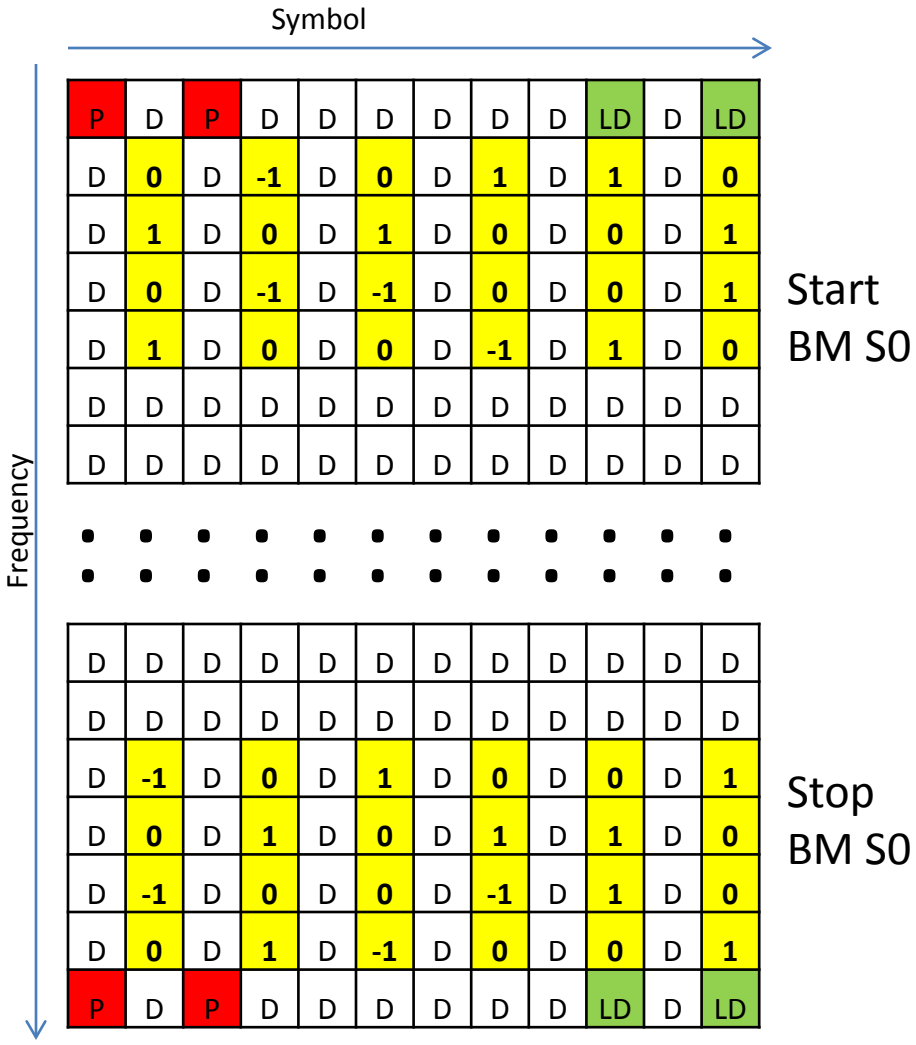
- A transmission burst starts and ends with a Type 2 RB followed by the BM
  - These pilots are added over the fixed pilot pattern

(Markers are not shown in this figure, see following slides with Markers)



Examples BM 4x6 in 8 symbols RB

Examples of BM 4x6 in 12 symbols RB



Start BM S0

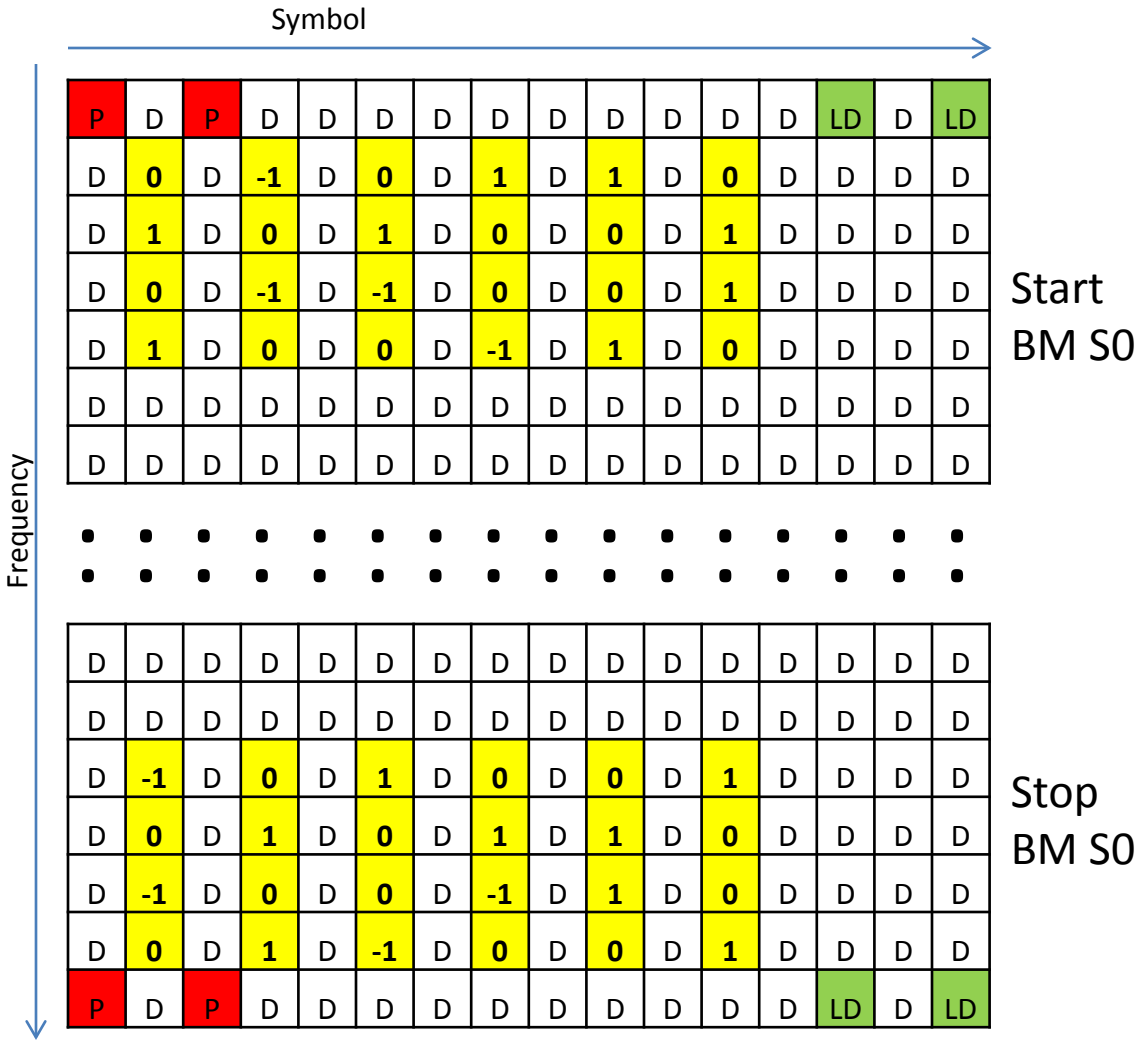
Stop BM S0

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



Start BM S0

Stop BM S0

Legend

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

Note: Power is constant versus time

Configuring the RB Profile

- Profile Information (PI) – 8 bits per RB
  - 2 bits for RB type
  - 4 bits for bit loading
  - 2 reserved
- RB MAP is the mapping of the PIs to subcarriers over the full bandwidth
  - Up to ~4K PIs can be defined
- RB MAP messages are sent by the CLT over the DS PLC
- Repetitions of string of PIs can be used to shorten RB MAP messages
- Up to TBD entries can be allowed in a RB MAP message

MAP Repetitions Example

- Assume a pattern with pilots every 4th subcarrier and LD pilots every 8th subcarrier over N subcarriers.
- Bit loading fixed at 8 bits per subcarrier
- A string of PIs is defined and repeated N/8 times

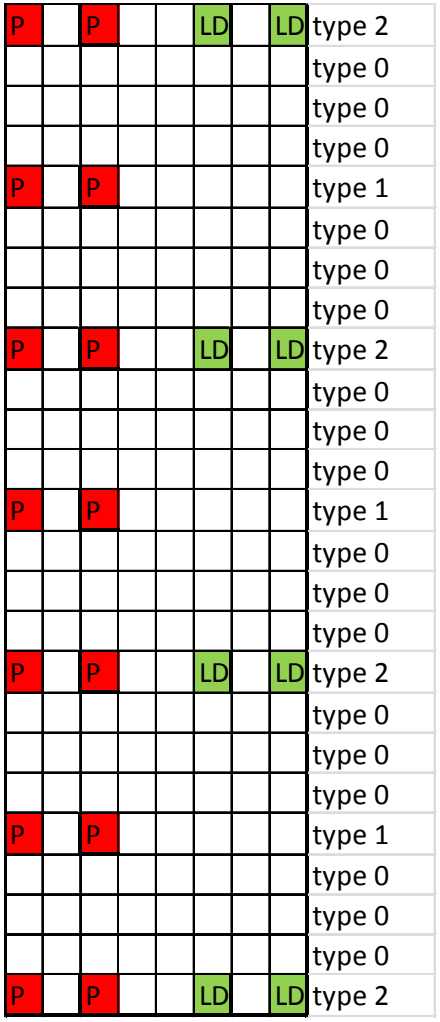
PI_0 : 8 bits / type 0

PI_1 : 8 bits / type 1

PI_2 : 8 bits / type 2

MAP can be defined as:

N/8 * {PI_2, 3*PI_0, PI_1, 3*PI_0}



THANKS