*Note to P802.3bn Editor's.  Suggest inserting this after subsection 101.4.4.7 Pilot Patterns as a new subsection "Pilot Insertion".*

101.4.4.8 Pilot Insertion

Upstream pilot insertion is performed using a BPSK mapped bit sequence generated by a pseudo-random sequence (PRBS) generator defined by the polynomial $X_{12} + X_9 + X_8 + X_5 + 1$ (illustrated in Figure 102–27).  Pilots are inserted after the RB Frame is processed by the symbol mapper (see 101.x.x.x) and the interleaving functions (see 101.x.x.x) and before the RB Frame is passed to the IDFT function.

The method for pilot insertion shall be as follows:

- The PRBS generator is initialized with the seed value 0xBFF at the beginning of each RB Frame (OFDMA column) for the subcarrier with index k=0 of the IDFT equation 101-18 (see 101.4.3.9).
- The PRBS generator is clocked once for every subcarrier of the IDFT.
- Pilots are inserted (mapped) into the "P" positions of PHY Link subcarriers in each subcarrier where a CNU is transmitting a PHY Link message (see 102.3.4) and in each resource block to be transmitted containing a data burst designated as Type 1 or Type 2 resource block (see 101.4.4.7).
- "P" pilots are BPSK modulated with the output of the feedback shift register, with a value of 0 mapping to (1 + j0) and a value of 1 mapping to (-1 + j0).
- The same BPSK value is used for each "P" location in a subcarrier.

When an RB Frame has been process by this function, the RB Frame is passed to the IDFT function for further processing.

The Pilot Insertion function provides the PMD_SIGNAL.request primitive generation (see 100.2.1.4):

- If any "P" pilots are inserted in this RB Frame, PMD_SIGNAL.request(ENABLE) is asserted when the RB Frame is passed to the IDFT function.
- If no "P" pilots are inserted in this RB Frame, PMD_SIGNAL.request(DISABLE) is asserted when the RB Frame is passed to the IDFT function.

*EDITORS NOTE (to be removed prior to publication): PMD_SIGNAL.request needs to be coordinated with the Probe Generator function and needs to be glitchless if the same CNU transmitted anything in the probe region followed by any transmission in the RB Frame following the probe region.  Might be provided by an OR function on the same signal generation from each function before going into PMD Functions box in Figure 100-3, or something that just surveys the input to the IDFT after both functions (in this case, modify and move this text into that functional description based on any non-null I/Q bin input to the IDFT.*