Pilot allocations for 5, 6, 7, and 8 BS antennas

Abstract

Pilot allocations for 5-8 transmit antennas in optional FUSC and Band AMC

Purpose

Adoption of proposed changes into P802.16e

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Pilot Allocations for 5-8 Transmit Antennas
in optional FUSC and Band AMC

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Abstract

Closed-loop MIMO can benefit from a large number of transmit antennas by conducting transmit beamforming. The current feedback channel CQICH assigns three bits to the number of transmit antennas and allows it to be 2,3,…,7,8 as shown in Table 289a , page 189. Using less than 5 antennas would waste one bit. Furthermore, the text in section 8.4.8.3.6, page 242 doesn’t restrict the number of transmit antennas to less than 4, and it is open to more than 4 antennas. Pilot allocations for up to 4 transmit antennas are already defined in section 8.4.8.3.

In this contribution, pilot allocations for 5, 6, 7, and 8 transmit antennas are derived. The pilots are at the same locations as those for 4 transmit antennas. The pilots for each antenna are evenly spread across frequency and time as much as possible, which tracks the channel variations on the two dimensions and minimizes the channel estimation/interpolation complexity.

1 Pilot allocations for 5, 6, 7, and 8 transmit antennas

For 5-antenna base station (BS), pilot pattern is shown in Figure 1. The pilot in gray is periodic with a frequency period of 9 subcarriers and a time period of 4 OFDM symbol durations. The pilot in light blue has a frequency period of 9 subcarriers and a time period of 8 OFDM symbol durations. The pilot density of each antenna except antenna 0 is 1/24 and the pilot density of antenna 0 is 1/18. Antenna 0 is desired to be the antenna also employed in the adjacent zones.

![Pilot allocation for 5-antenna BS for the optional FUSC and the optional AMC zones.](image-url)
For 6-antenna BS, pilot pattern is shown in Figure 2. The pilot in gray is periodic with a frequency period of 9 subcarriers and a time period of 4 OFDM symbol durations. The pilot in light blue has a frequency period of 9 subcarriers and a time period of 8 OFDM symbol durations. The pilot density of each antenna is 1/24.

![Figure 2 Pilot allocation for 6-antenna BS for the optional FUSC and the optional AMC zones.](image)

For 7-antenna BS, pilot pattern is shown in Figure 3. The pilot in gray is periodic with a frequency period of 9 subcarriers and a time period of 4 OFDM symbol durations. The pilot in light blue has a frequency period of 9 subcarriers and a time period of 28 OFDM symbol durations. The pilot density of each antenna is 2/63.

![Figure 3 Pilot allocation for 7-antenna BS for the optional FUSC and the optional AMC zones.](image)

For 7-antenna BS, pilot pattern is shown in Figure 3. The pilot in gray is periodic with a frequency period of 9 subcarriers and a time period of 4 OFDM symbol durations. The pilot in light blue has a frequency period of 9 subcarriers and a time period of 8 OFDM symbol durations. The pilot density of each antenna is 1/36.
For 5-antenna BS, pilot pattern is shown in Figure 1. The pilot in gray is periodic with a frequency period of 9 subcarriers and a time period of 4 OFDM symbol durations. The pilot in light blue has a frequency period of 9 subcarriers and a time period of 8 OFDM symbol durations. The pilot density of each antenna except antenna 0 is 1/24 and the pilot density of antenna 0 is 1/18.

For 6-antenna BS, pilot pattern is shown in Figure 2. The pilot in gray is periodic with a frequency period of 9 subcarriers and a time period of 4 OFDM symbol durations. The pilot in light blue has a frequency period of 9 subcarriers and a time period of 8 OFDM symbol durations. The pilot density of each antenna is 1/24.
For 7-antenna BS, pilot pattern is shown in Figure 3. The pilot in gray is periodic with a frequency period of 9 subcarriers and a time period of 4 OFDM symbol durations. The pilot in light blue has a frequency period of 9 subcarriers and a time period of 28 OFDM symbol durations. The pilot density of each antenna is 2/63.

For 8-antenna BS, pilot pattern is shown in Figure 3. The pilot in gray is periodic with a frequency period of 9 subcarriers and a time period of 4 OFDM symbol durations. The pilot in light blue has a frequency period of 9 subcarriers and a time period of 8 OFDM symbol durations. The pilot density of each antenna is 1/36.
Figure 251g—Pilot allocation for 8-antenna BS for the optional FUSC and the optional AMC zones.

References:

