Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>
Title	**Variabkle pilot boosting in uplink**
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Re:	SDD Session 56 Cleanup; in response to the TGm Call for Contributions and Comments 802.16m-08/033 for Session 57
Abstract	Values for variable pilot boosting in uplink
Purpose	Consider for inclusion into the SDD
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Pilot Boosting in Uplink

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Comment

To handle interference on pilot signals in multi-user MIMO transmission using the same pilot pattern in different layers, variable pilot boosting is required.
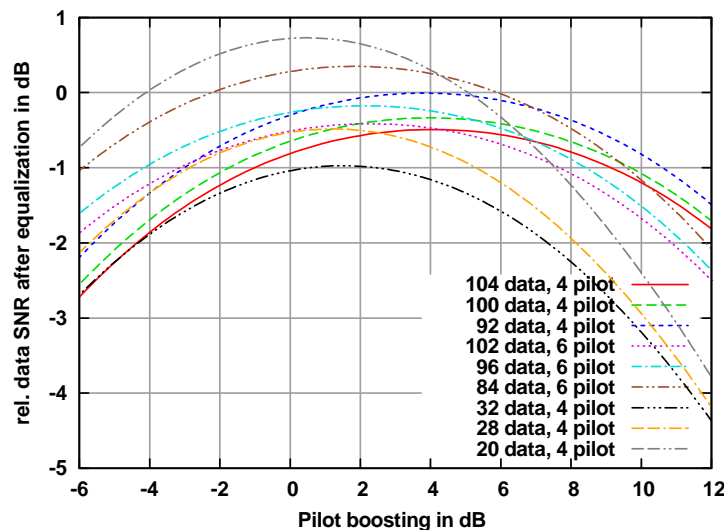

Figure 1: Relative data SNR as a function of the pilot boosting value

Figure shows the noise limited SNR (normalized to a constant depending on the size of the resource allocation unit) after equalization using pilots with different boosting values. It takes into account the reduction of data tone power due to increased pilot tone power (constant sum power) and the decrease in SNR due to noisy channel estimates.

From the figure we can see:
- data SNR curves have a relatively flat maximum with respect to the boosting value of the pilots
- → a step size of about 3 dB is sufficient
- reasonable boosting values for typical pilot configurations are in the range 0 dB … 6 dB

In multi-user MIMO systems, different layers can use the same pilot pattern to save pilot overhead. This may result in interference between the pilots of the different layers. To keep the data SINR in the reasonable range, a sufficient pilot tone SINR is required. Variable pilot boosting can be used to increase pilot SINR by choosing different pilot boosting on different layers (especially, if the layers have significantly different power levels).

The signaling of the variable boosting can be done with low signaling overhead (e.g. by signaling only the changes).

Proposed Text

"The supported boosting values are: -3dB, 0 dB, 3 dB, 6 dB."