Additional Preamble Definitions for 802.16d OFDM-256

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Purpose:
To describe the need for multiple preamble definitions for network reuse planning purposes.

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March 11, 2004
Problem Statement

- Consider a TDD network with a low reuse frequency plan:
  - Network will need to be frame synchronized to avoid undue interference problems (between uplink/downlink)
  - In downlink, SS will detect signals from multiple base stations
  - Current long preamble marking the start of the downlink frame has only a single definition
  - Interference between multiple BS transmissions of the same preamble will result in degraded frame synchronization and channel estimation by the SS
- Similar issues can occur in uplink
Suggested Remedy

• Design a set of preambles to replace each of the current preambles, supporting a reuse pattern:
  – Unique preambles with good cross-, auto-correlation
  – Frequency-spread subchannel preambles
  – Cyclic time shifted versions of the above

• The preambles for which to consider designing replacement sets include:
  – 4x64, 2x128
  – AAS network entry preamble
  – STC preamble
  – Subchannel preambles

• Support for new preambles would be mandatory for all SS
Design Issues

• How many distinct preambles in each set that replaces current preamble definitions?
  – Are distinct frame start preambles required?
  – Impact on SS performance requirements

• Low PAR required

• Good auto-correlation and cross-correlation properties required
Proposal

• Subgroup of interested 802.16 members to discuss detailed preamble design for May interim meeting:
  – Naftali Chayat, Alvarion
  – Dale Branlund, BeamReach
  – Hassan Yaghoobi, Minnie Ho, Intel Corp
  – Bogdan Franovici, Redline Communications
  – Roger Bertschmann, SiWorks
  – Martin Lysejko, David Castelow, Ofer Kelman, Airspan

• To be added, please email adam@arraycomm.com