

AAS Direct Signaling Methodologies to Support High Capacity MR-BS to RS Links

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Purpose:

This document provides a Technical Proposal for an AAS Signaling Methodology for consideration by the 802.16j Multi-hop Relay Task Group.

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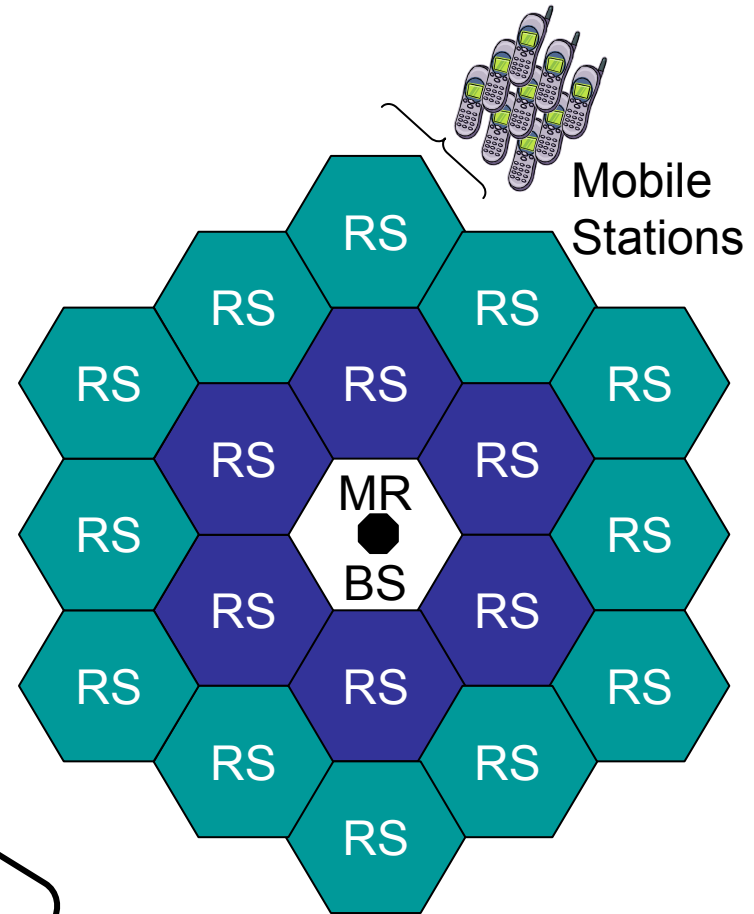
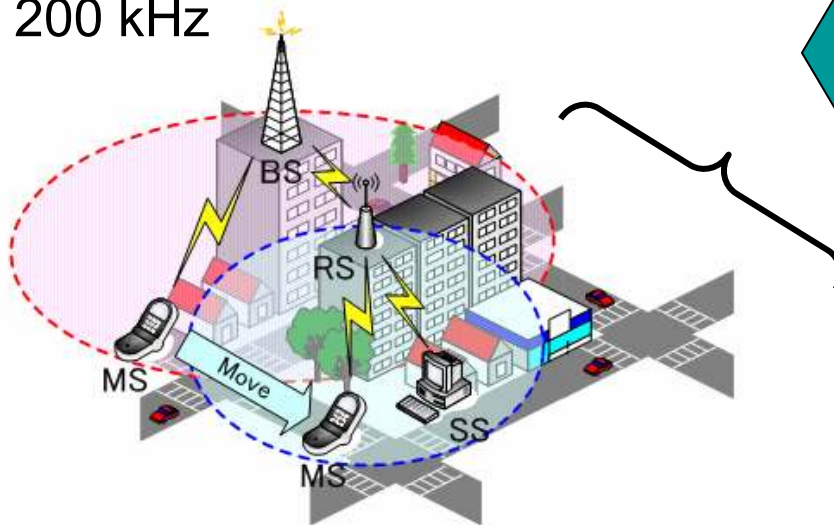
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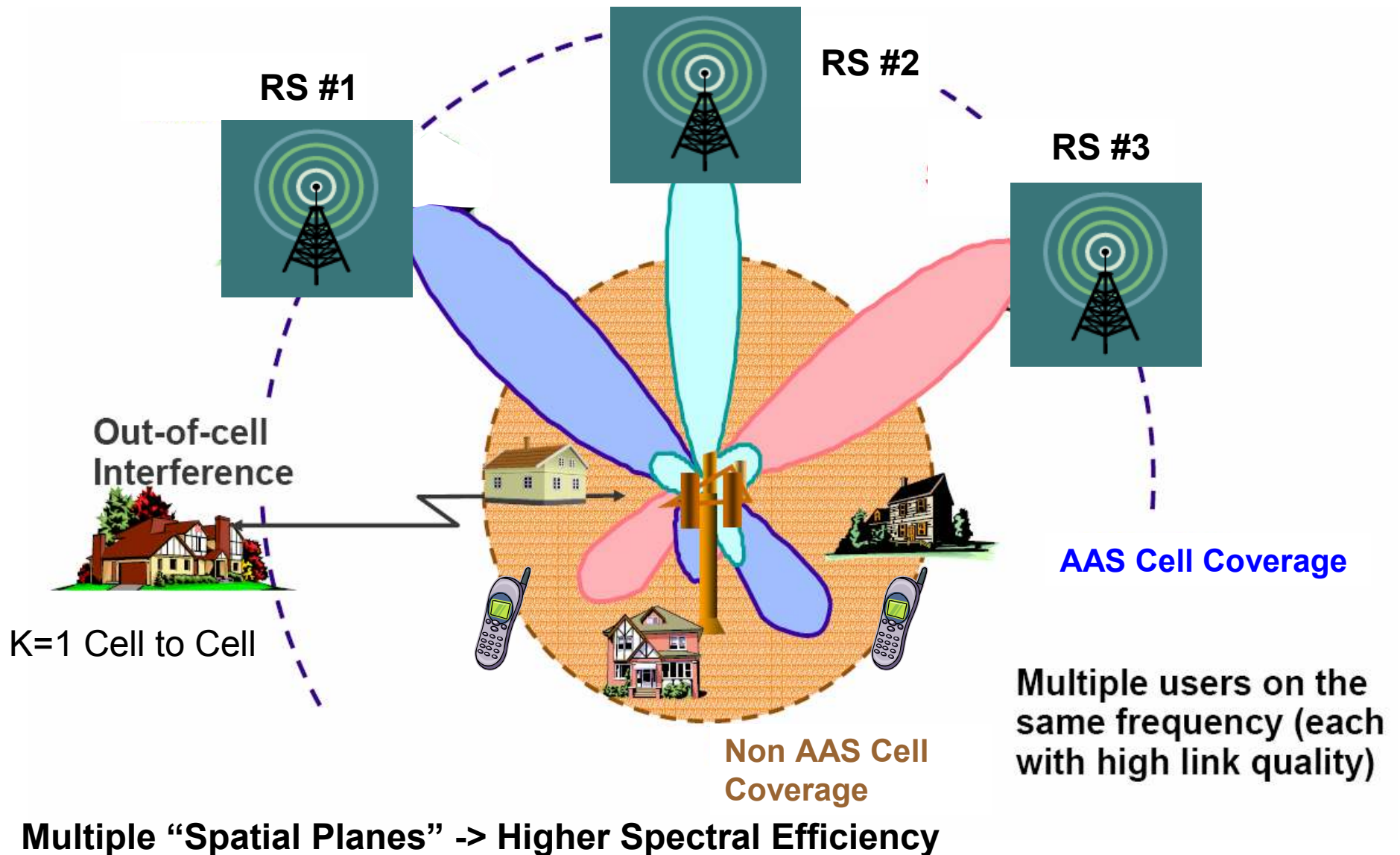
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Motivation: MR-BS w/ 18 RS nodes

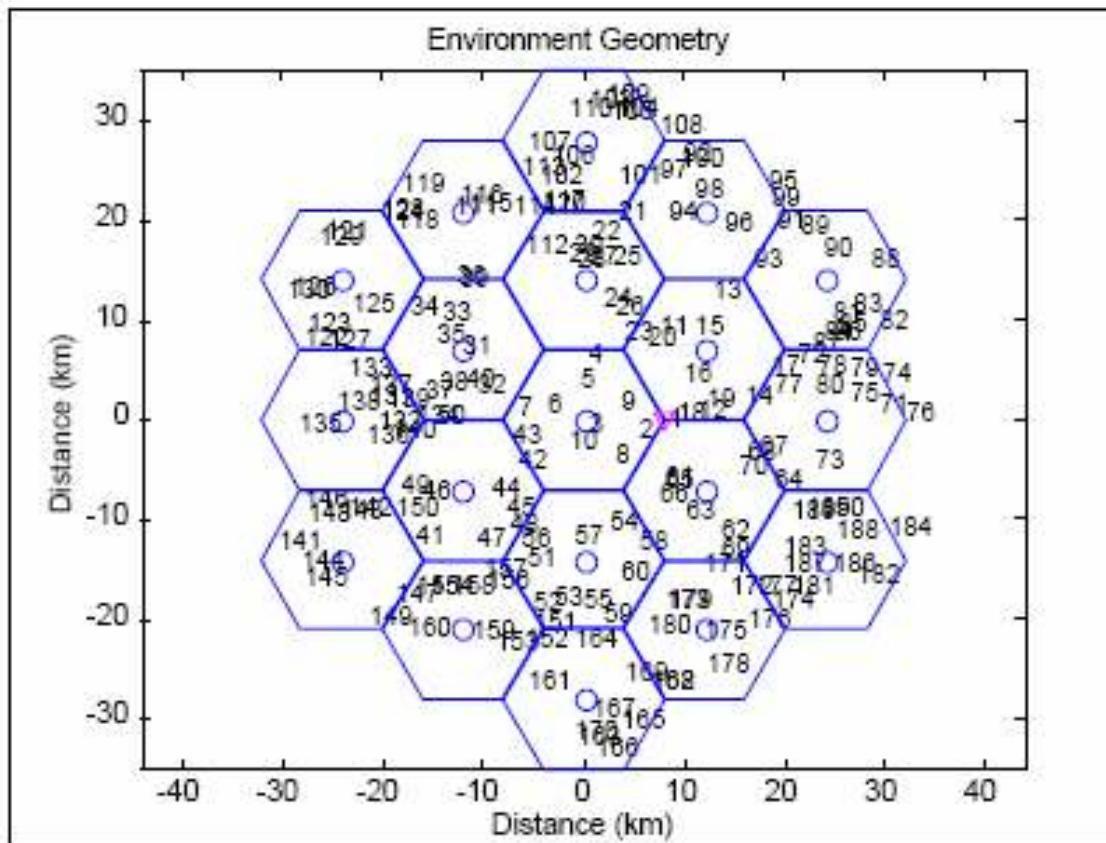
- Relay Nodes
 - DL spectral efficiency
~ 1 bps/Hz
 - 18 nodes, 50% Loading
- MR-BS
 - DL spectral efficiency required
~ 9 bps/Hz
 - Coherence BW of Relay Link
~ 200 kHz



Multi-user Beamforming, Relay Link

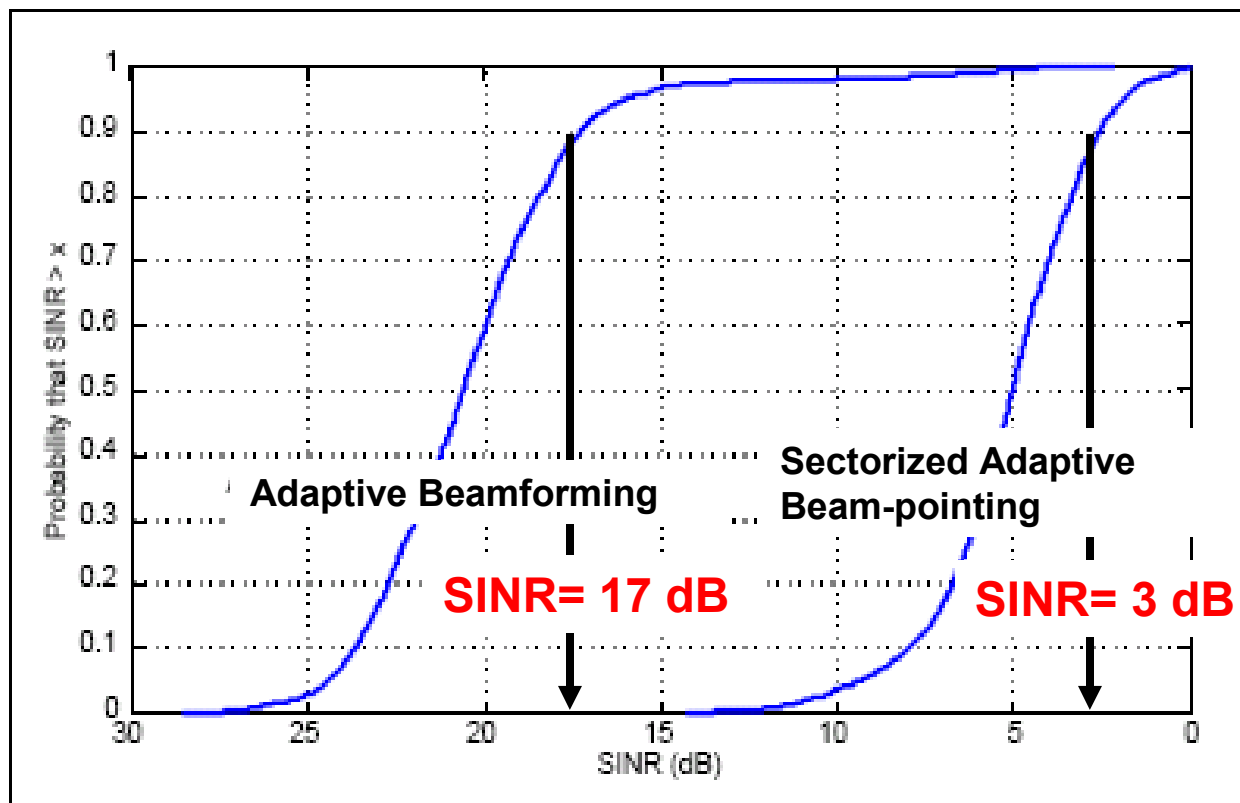


Wireless Network Simulation: 19 MR-BS w/ 10 RS nodes per BS



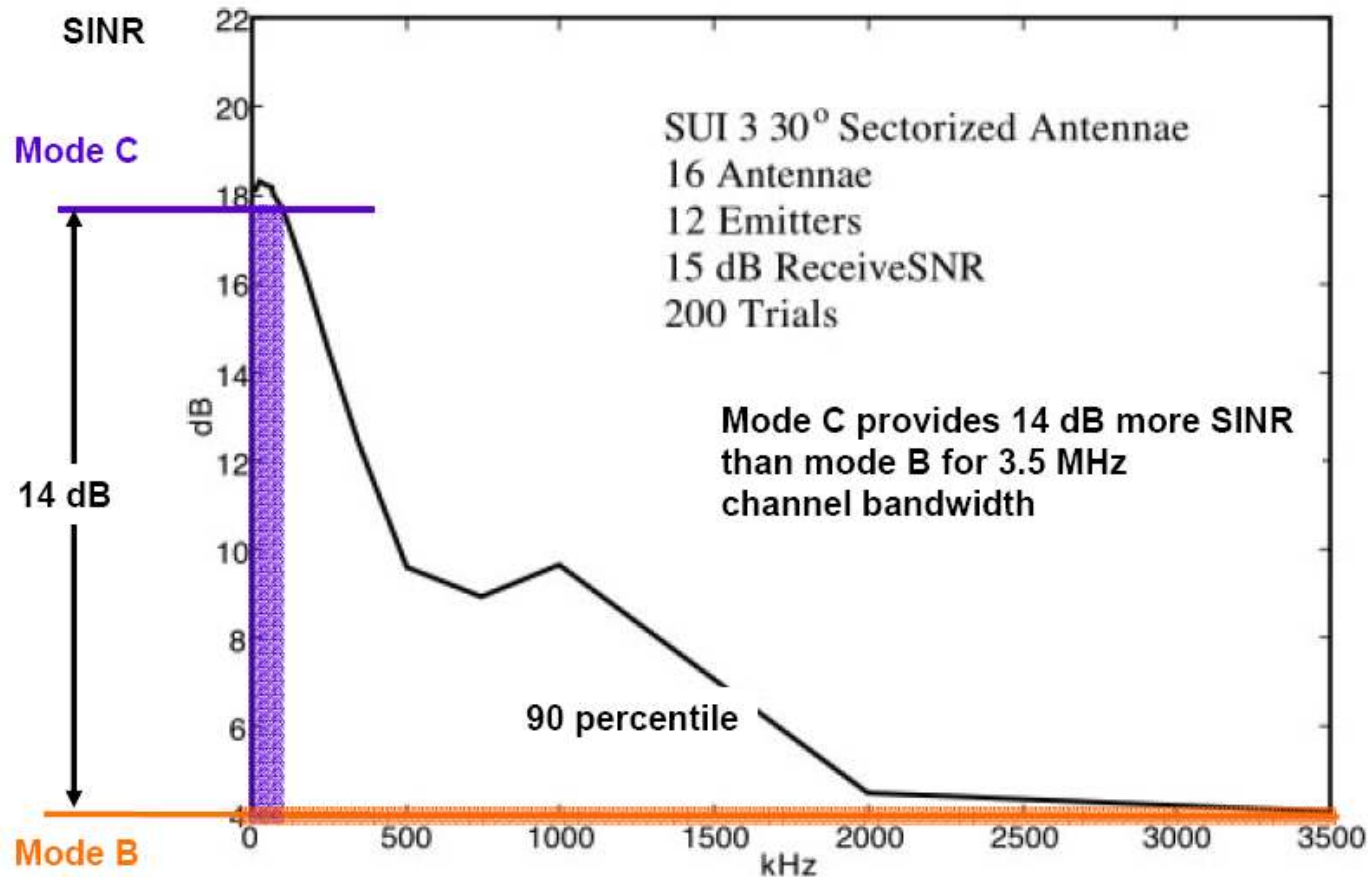
- 200 Monte Carlo Trials
- 190 co-channel links
- Random RS selection from uniform distribution
- Propagation: Geometric Elliptical Model w/ angle spread
- SUI-3s w/ Erceg B
- Log Normal Fading
- 16 antennas at MR-BS
- 1 antenna at RS
- Preamble Length = 64

Simulation Results: SINR w/ 10 Co-channel RS



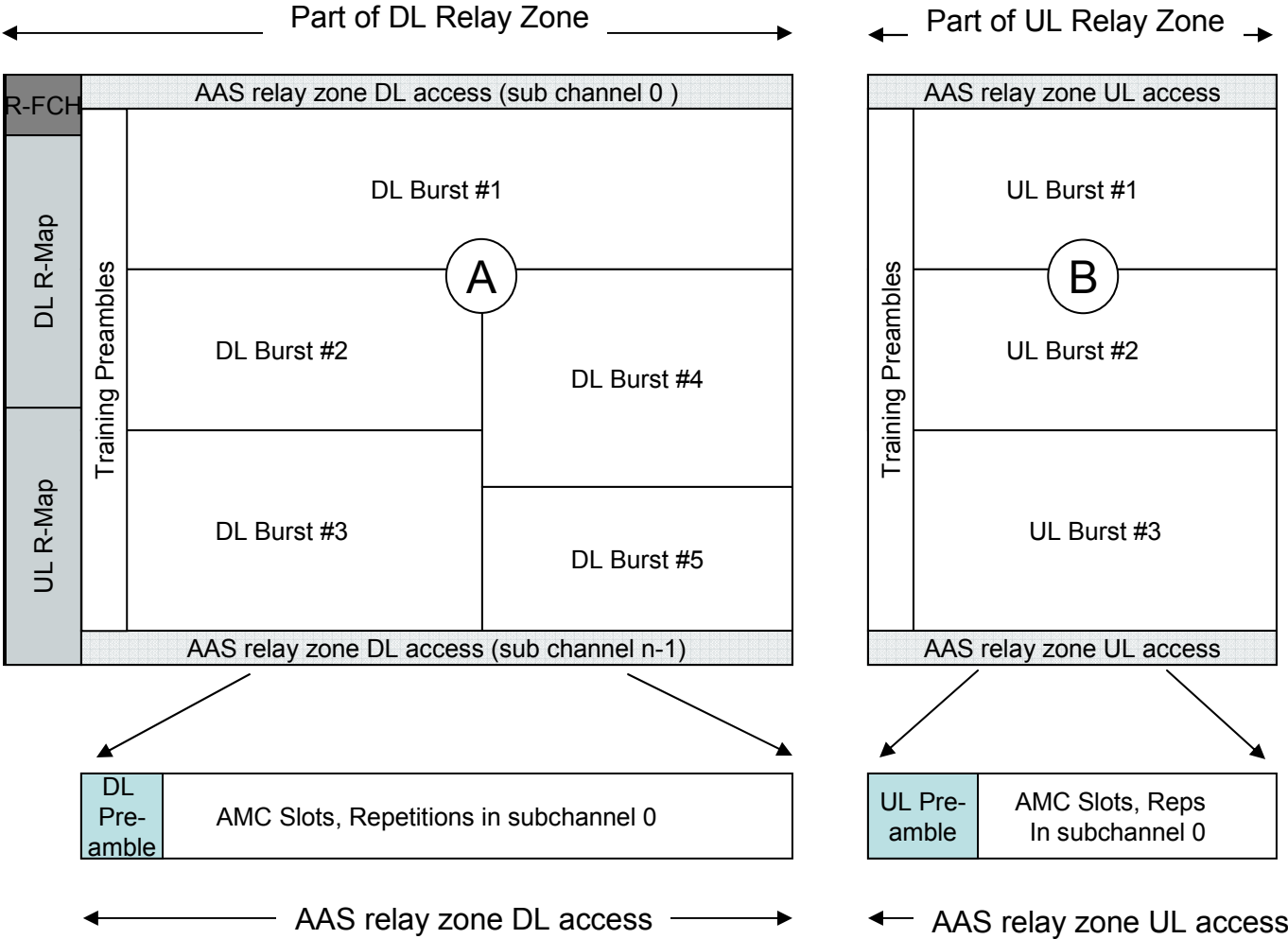
Adequate SINR for 10 Simultaneous Link at $\frac{3}{4}$ rate 64 QAM

SINR Degradation as a Function of Preamble Bandwidth, Length = 64

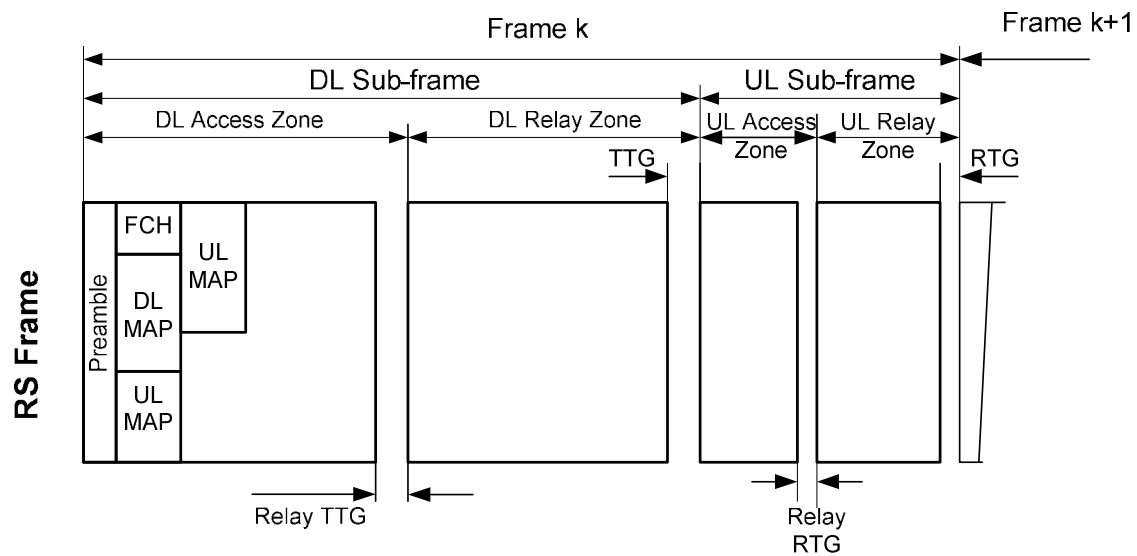
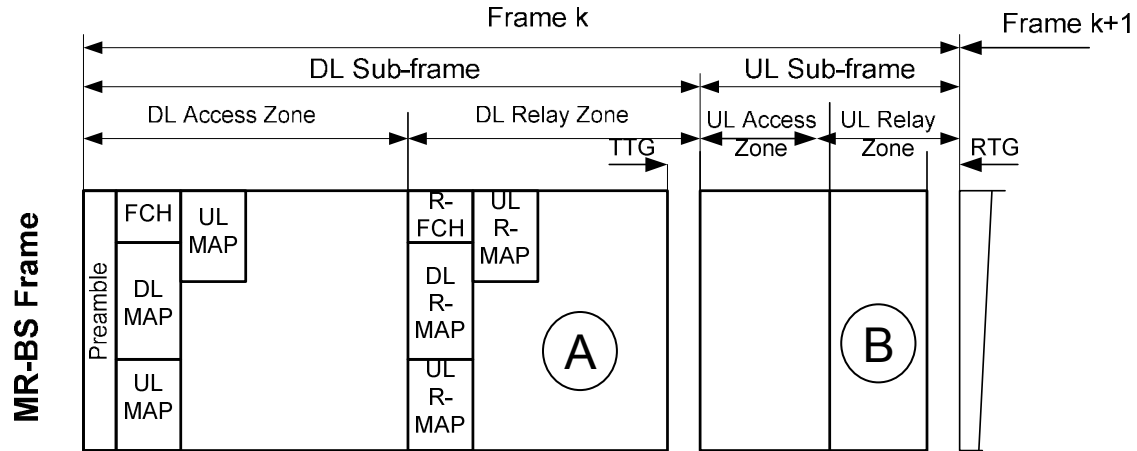


Recommend 1 bin x 8 symbol or 2 bin x 4 symbol preamble training

AAS Relay Zone Construction



Frame Structure Reference



Conclusion

- MR-BS to RS Link Requirements
 - O9, Multiple Antenna Support, Technical Requirements Guideline for Relay TG
 - Bandwidth concentration property of MR-BS
 - High Spectral Efficiency Required
 - High Bandwidth Request Activity
 - Low Coherence Bandwidth, 100 to 200 kHz
- Multi-user AAS Option proposed for MR-BS <-> RS Link
 - Longer UL training preambles to adapt larger arrays
 - Multiple “spatial planes” for payload transport
 - Multiple “spatial planes” for bandwidth request/ranging
 - Spectral efficiency ~ 9 bps/Hz with 16 antennas
- Proposed Text
 - Applies to MR-BS to RS link
 - Augment AAS_Zone definition & add preamble definition in section 8.4.4.8
 - Modify AAS_UL_IE