

AAS Direct Signaling Methodologies to Support High Capacity MMR-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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Motivation:

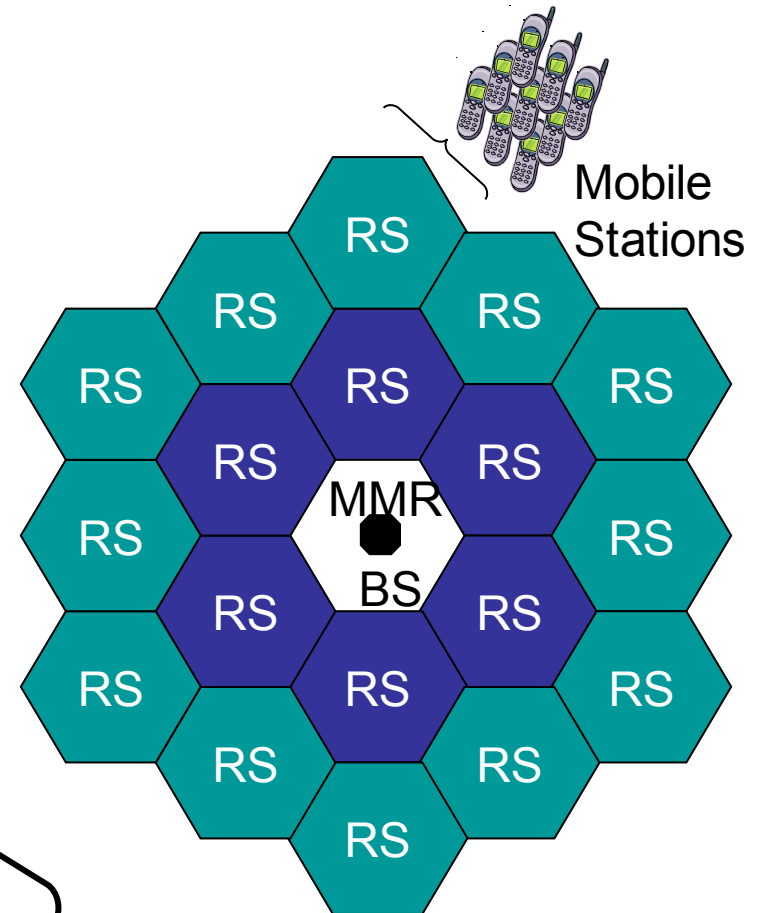
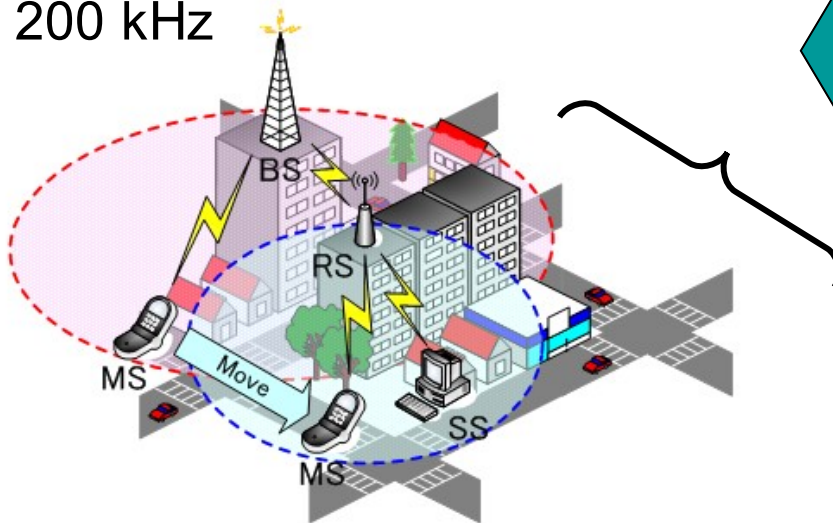
MMR-BS w/ 18 RS nodes

- Relay Nodes

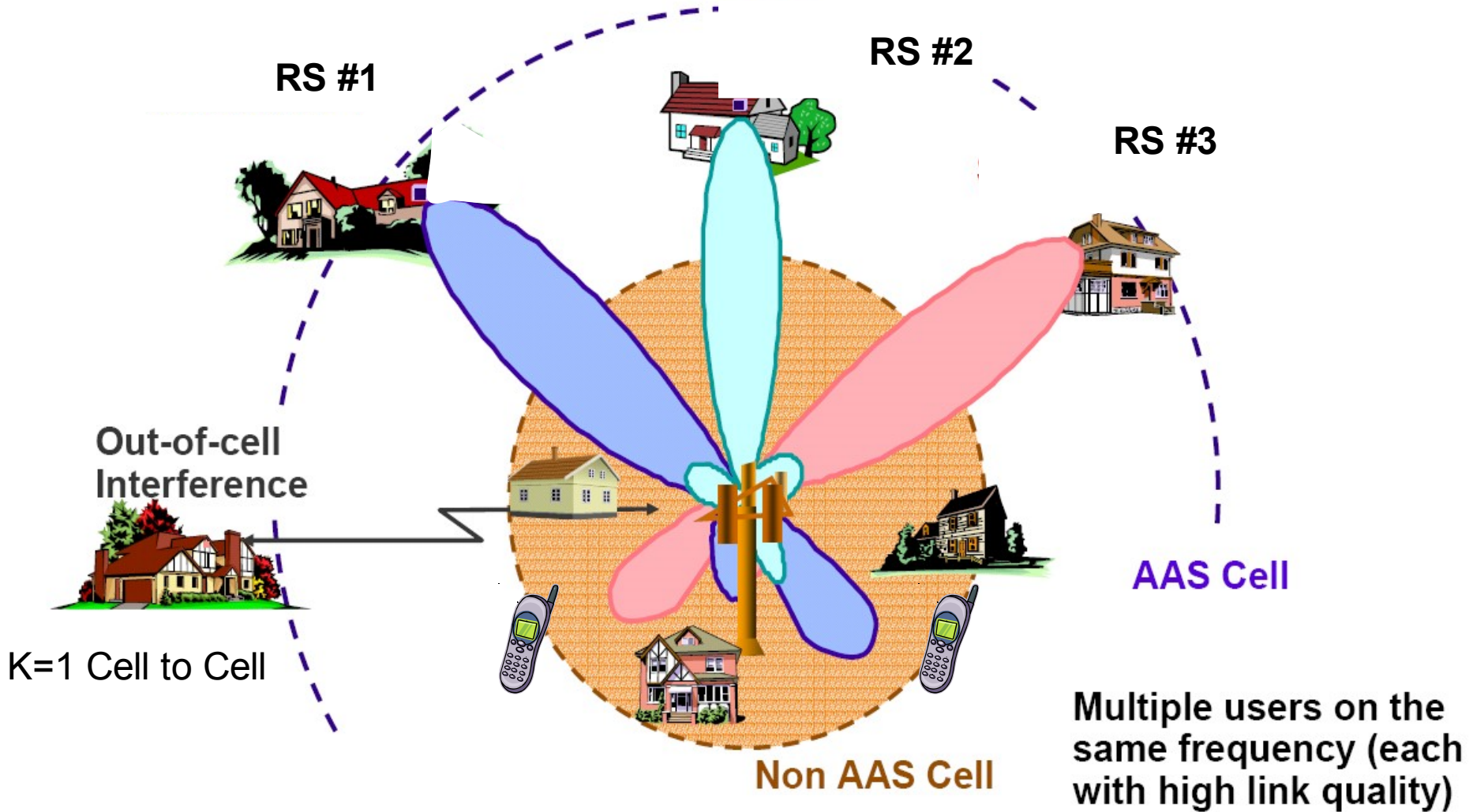
- DL spectral efficiency
~ 1 bps/Hz
- 18 nodes, 50% Loading

- MMR-BS

- DL spectral efficiency
required ~ 9 bps/Hz
- Coherence BW of Relay Link
~ 200 kHz

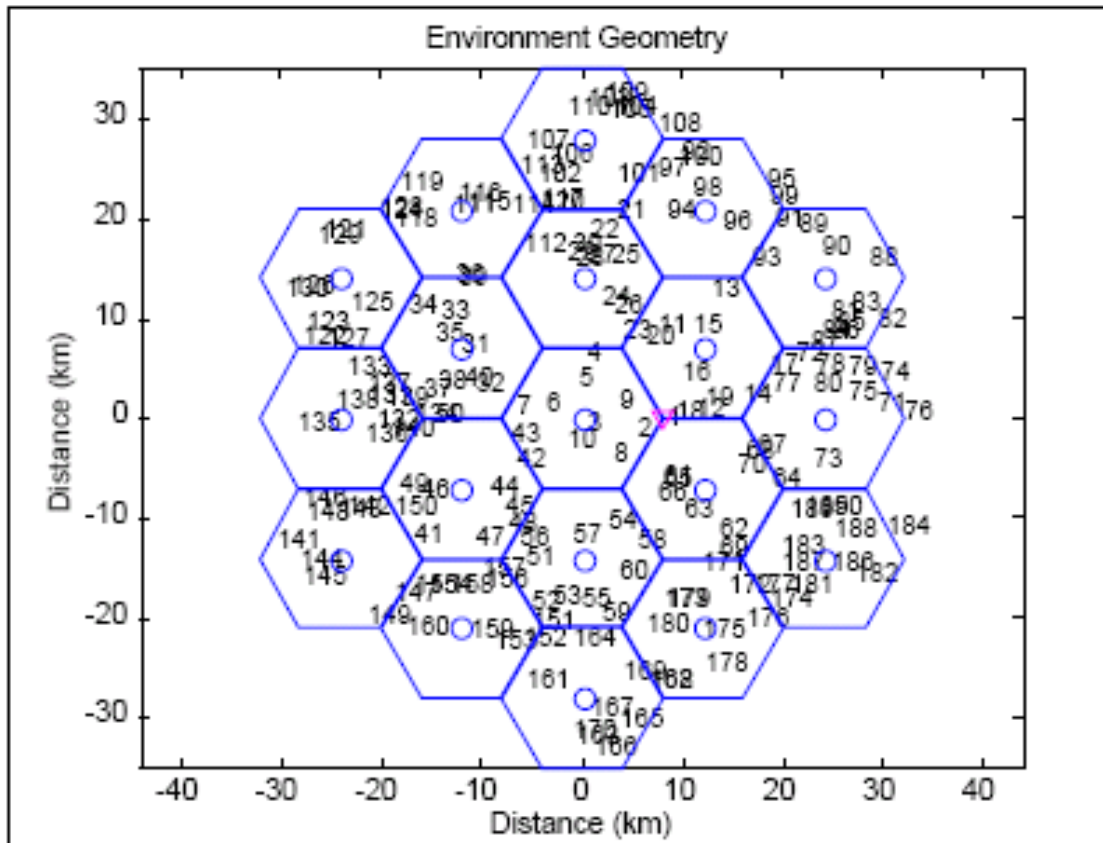


Multi-user Beamforming, Relay Link



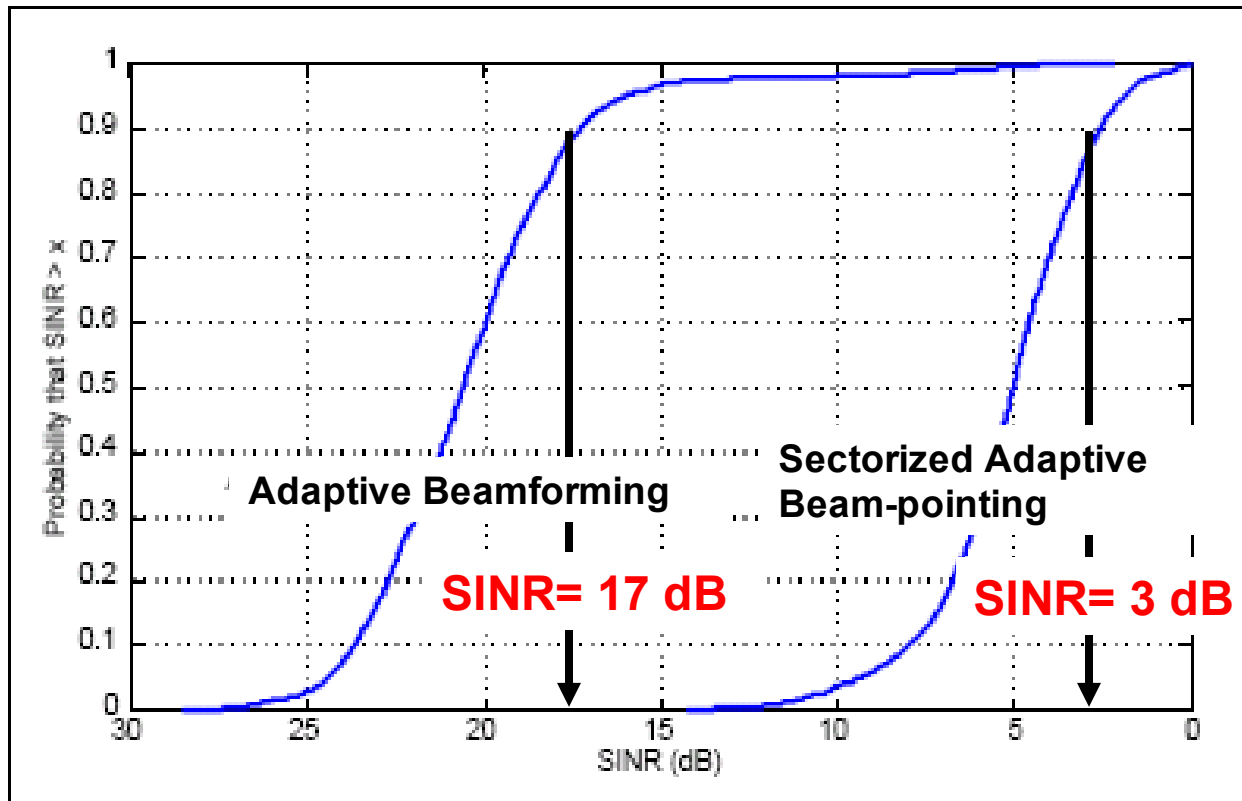
Multiple "Spatial Planes" -> Higher Spectral Efficiency

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



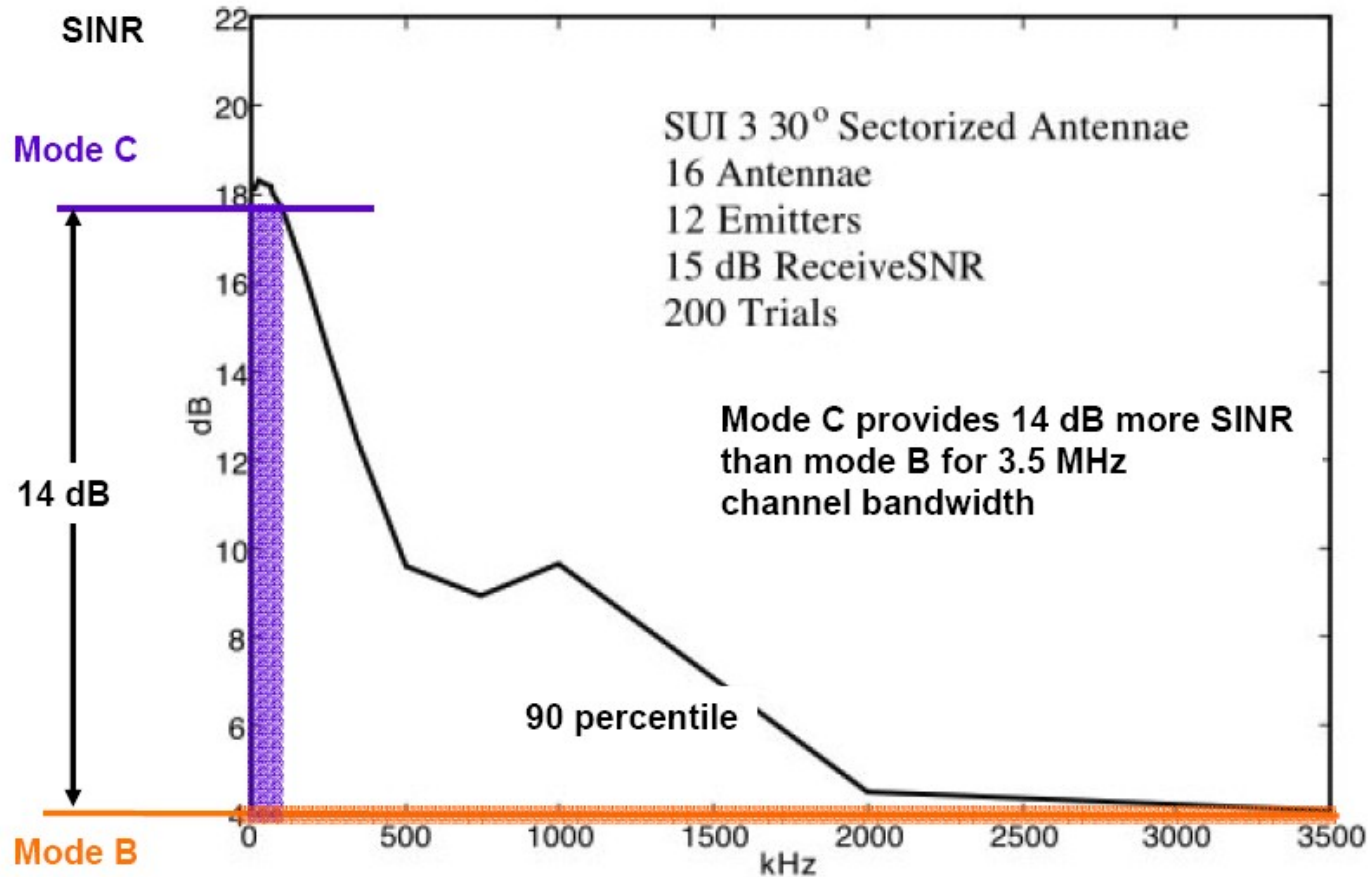
- 200 Monte Carlo Trials
- 190 co-channel links
- Random RS selection from uniform distribution
- Propagation: Geometric Elliptical Model w/ angle spread
- SUI-3s w/ Erceg B
- Log Normal Fading
- 16 antennas at MMR-BS
- 1 antenna at RS
- Preamble Length = 64

Simulation Results: SINR w/ 10 Co-channel RS



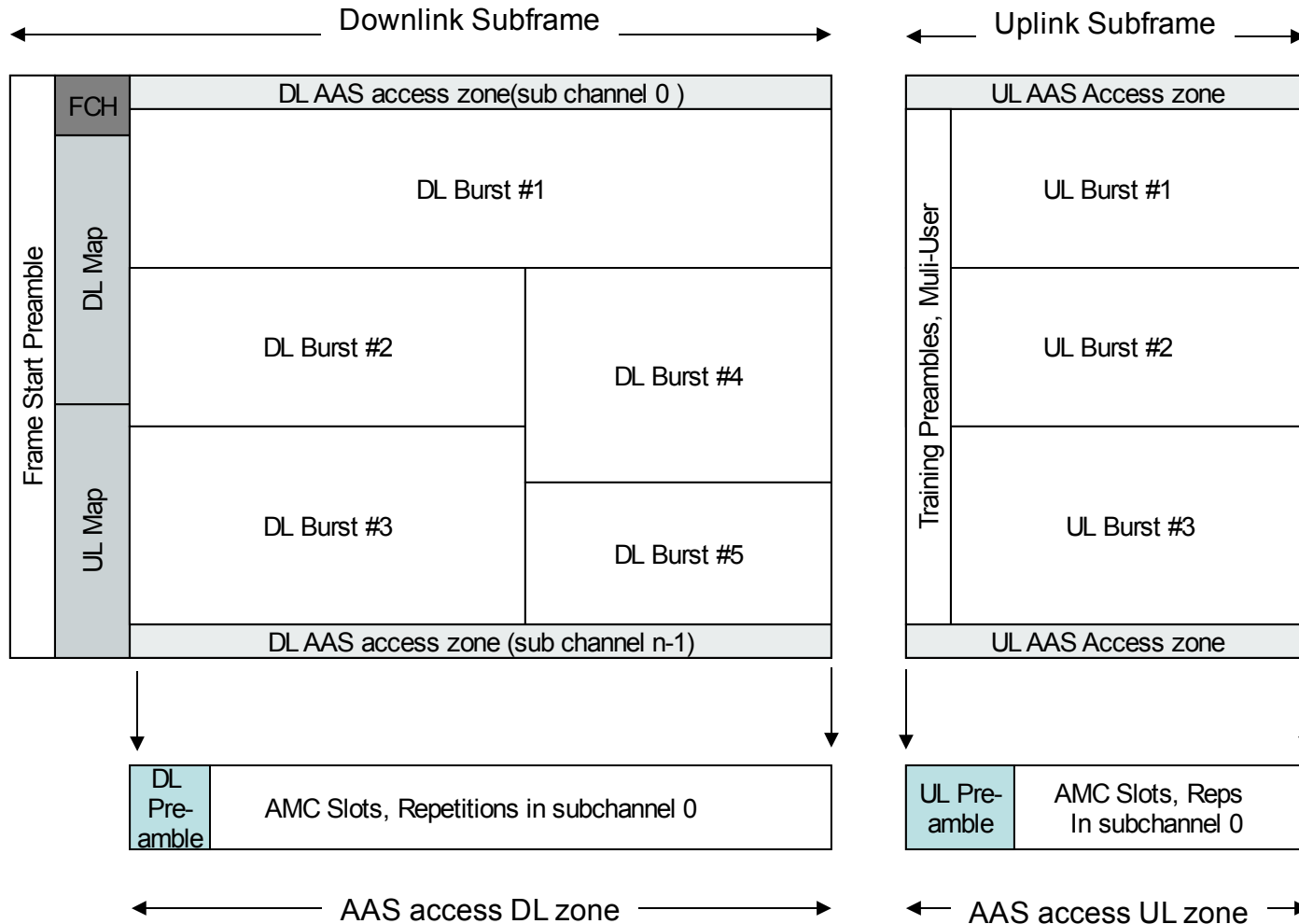
Adequate SINR for 10 Simultaneous Link at $\frac{3}{4}$ rate 64 QAM

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



Recommend 1 bin x 8 sym. or 2 bin x 4 sym preamble training

AAS Zone Construction



Conclusion

- MMR-BS to RS Link Requirements
 - O9, Multiple Antenna Support, Technical Requirements Guideline for Relay TG
 - Bandwidth concentration property of MMR-BS
 - High Spectral Efficiency Required
 - High Bandwidth Request Activity
 - Low Coherence Bandwidth, 100 to 200 kHz
- Multi-user AAS Option proposed for MMR-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 MMR-BS to RS link
 - Augment AAS_Zone definition & add preamble definition in section 8.4.4.8
 - Modify AAS_UL_IE