

Multihop Relay Frame Structure Proposal

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Purpose:

To propose a multihop relay frame structure to support throughput enhancement and coverage extension relaying

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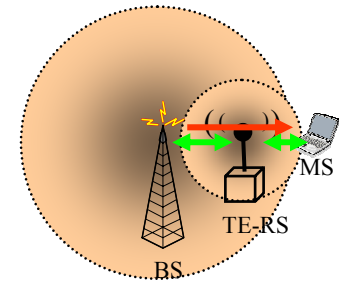
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Outline

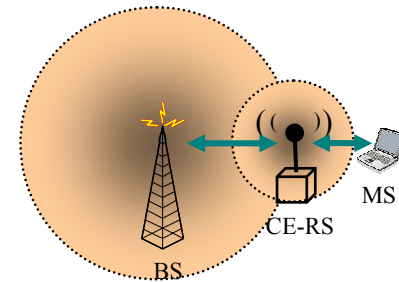
- Introduction
- Frame structure definition
- Example cases analysis
- Summary

Introduction

- Requirement to frame structure
 - One frame structure to support two performance objectives – throughput enhancement & coverage extension
 - Backward compatible with IEEE802.16e
- Two sorts of relay mode introduced
 - Throughput Enhancement (TE)
 - Improve the throughput of MS located inside BS coverage
 - Coverage Extension (CE)
 - Provide access to MS in coverage hole or isolated areas
 - MS gets preamble and MAPs from RS

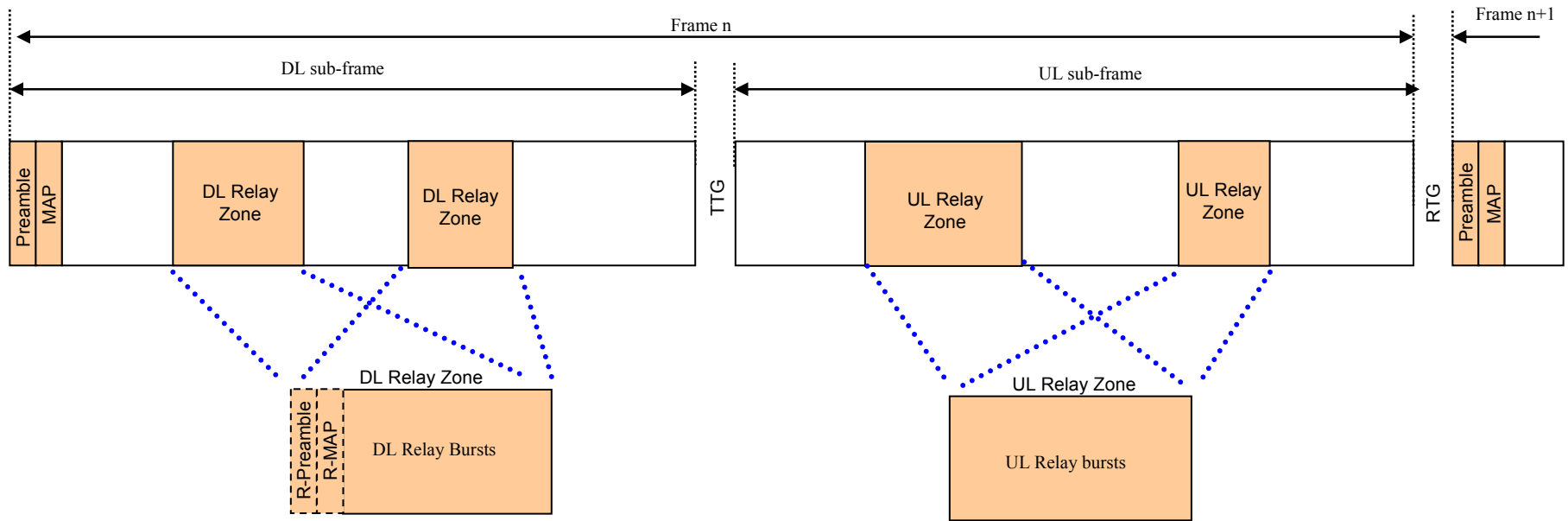


→ : DL broadcast control path
↔ : Data path



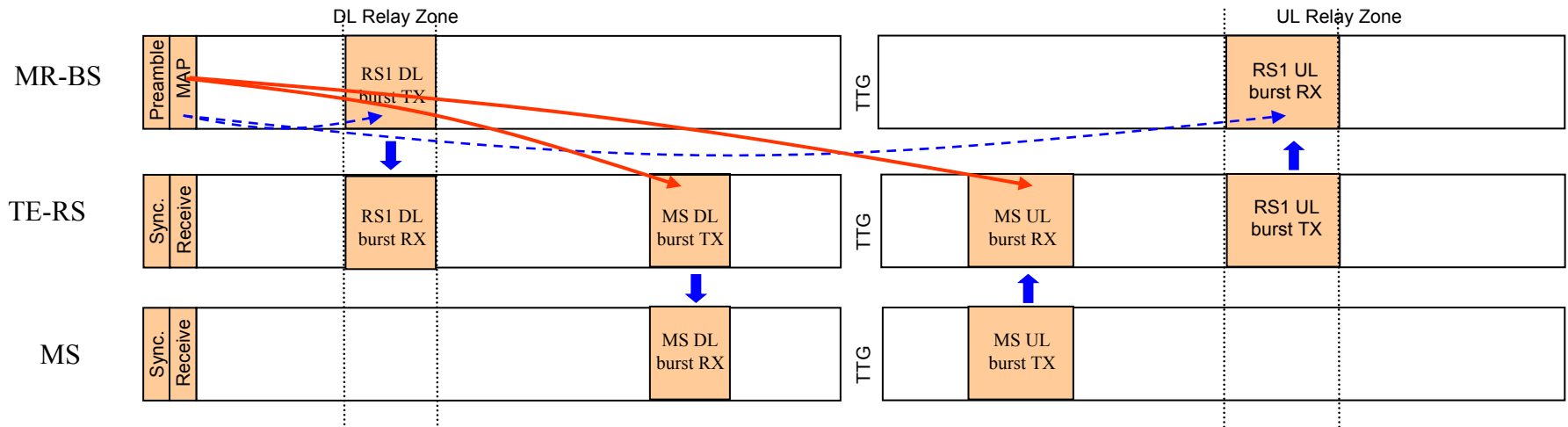
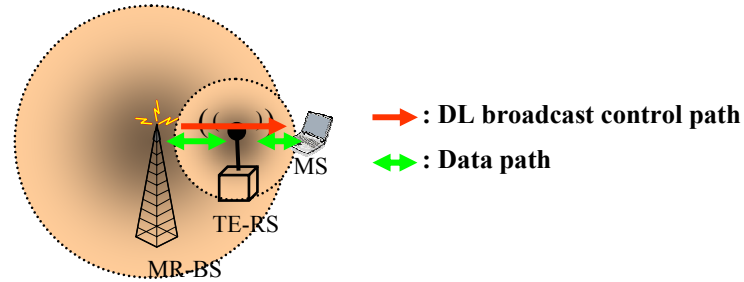
↔ : Data & control path

Frame structure for Multi-hop relay



- **Relay zones for traffic forwarding between BS and RS, or between two RSs**
 - Optional relay preamble (R-Preamble) and relay MAP (R-MAP)
 - For CE-RS synchronized with its access station
- **Preamble and MAP at the beginning of frame**
 - TE-RS and MS use it to get synchronization and MAP
 - BS and CE-RS simulcast same preamble and MAP when they work at same radio channel

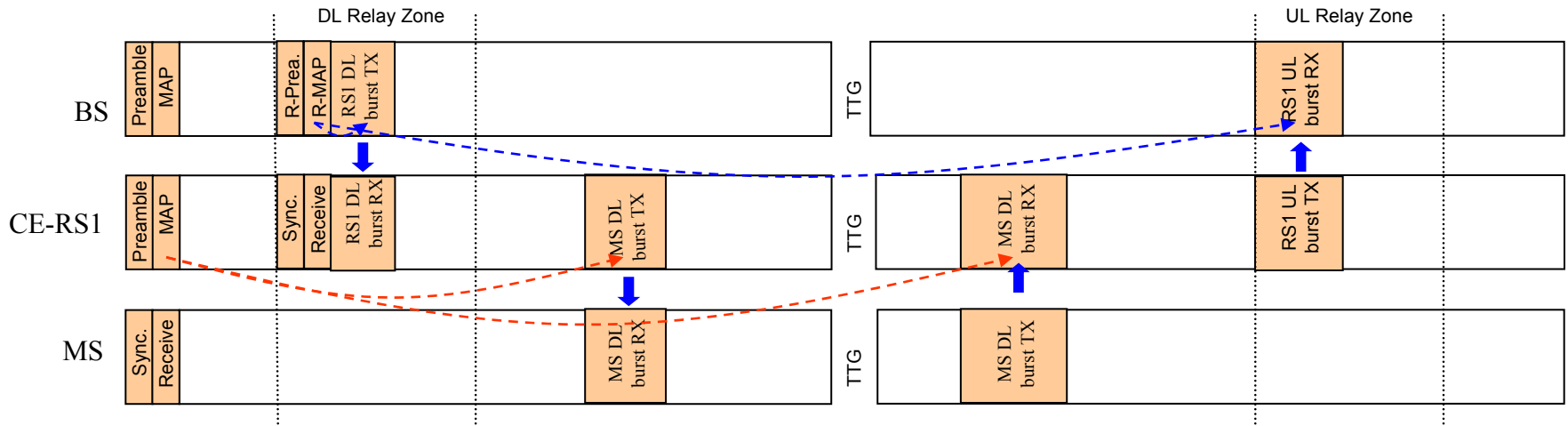
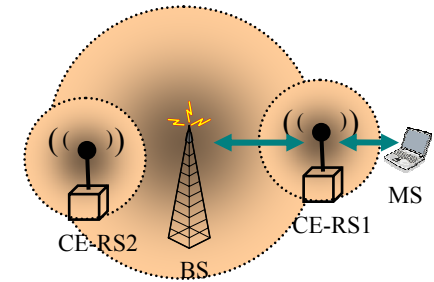
Relaying frame structure for throughput enhancement



- Both TE-RS and MS synchronize with MR-BS via frame preamble
- Both TE-RS bursts and MS bursts are allocated in the MAP of BS
- Ranging channel is shared by MS and TE-RS
 - TE-RS perform initialization ranging via it
 - Also receive and measure the ranging signal from MS

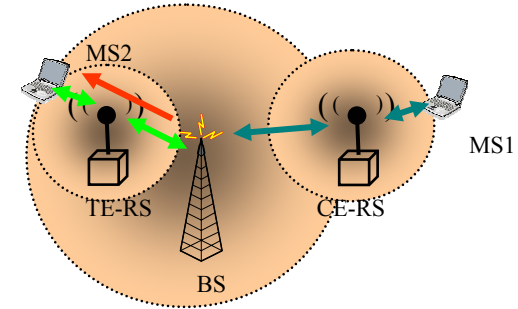
Relaying frame structure for coverage extension

- Dedicated R-Preamble and R-MAP at the beginning of the DL relay zone
 - For subordinate RS operations (Synchronization and relay bursts)
 - R-preamble is transparent to MS
- BS and CE-RSs simulcast same frame preamble and frame MAP
 - MS synchronize with CE-RS and get MAP
- Ranging channel is shared by MS and CE-RS
- Easily extended to multihop

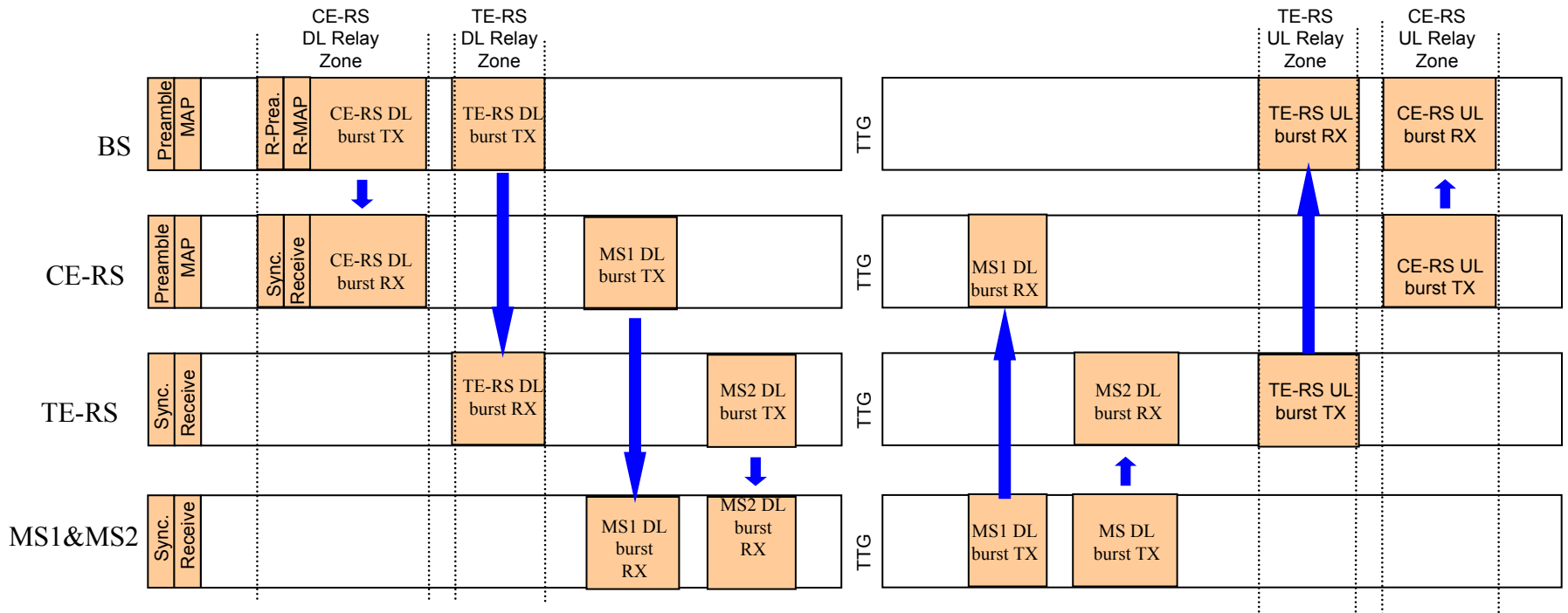


Relaying frame structure for coexistence of CE-RS and TE-RS

- CE-RS and TE-RS have different relay zones
- TE-RS and CE-RS can cascade



→ : DL broadcast control path
↔ : Data path
↔ : Control & Data path



Summary

- One TDD relaying frame structure for CE-RS and TE-RS
 - CE-RS synchronize to its access station by using dedicated R-Preamble in DL relay zone
 - TE-RS synchronize with MR-BS as the same as MS does
- All MSs of one MMR cell synchronize to the same frame preamble
- Common ranging channel shared by MS and RS