

An Adaptive Frame Structure for OFDMA-based Mobile Multihop Relay Networks

Document Number:

IEEE S802.16j-07/117

Date Submitted:

2007-01-08

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Venue:

IEEE 802.16 Session #47, London, UK

Base Document:

None

Purpose:

Propose extension and enhancement to the current frame structure in order to support OFDMA-based multihop relay networks.

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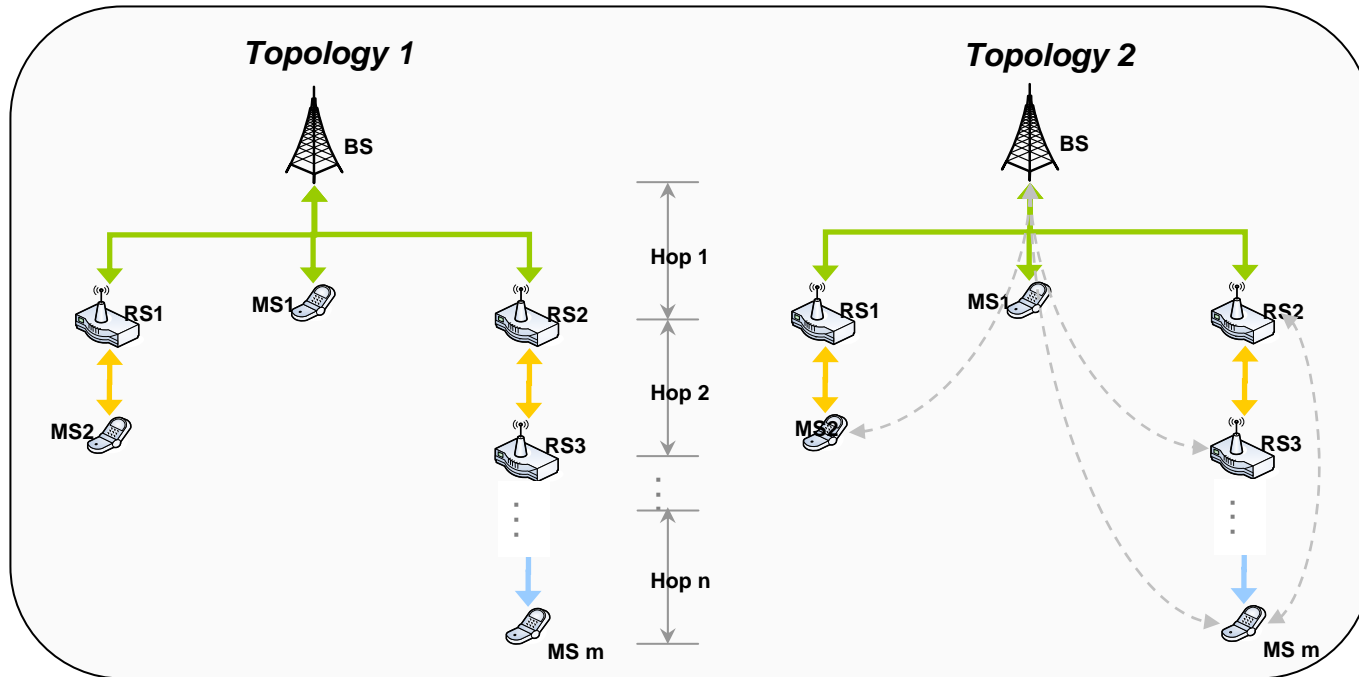
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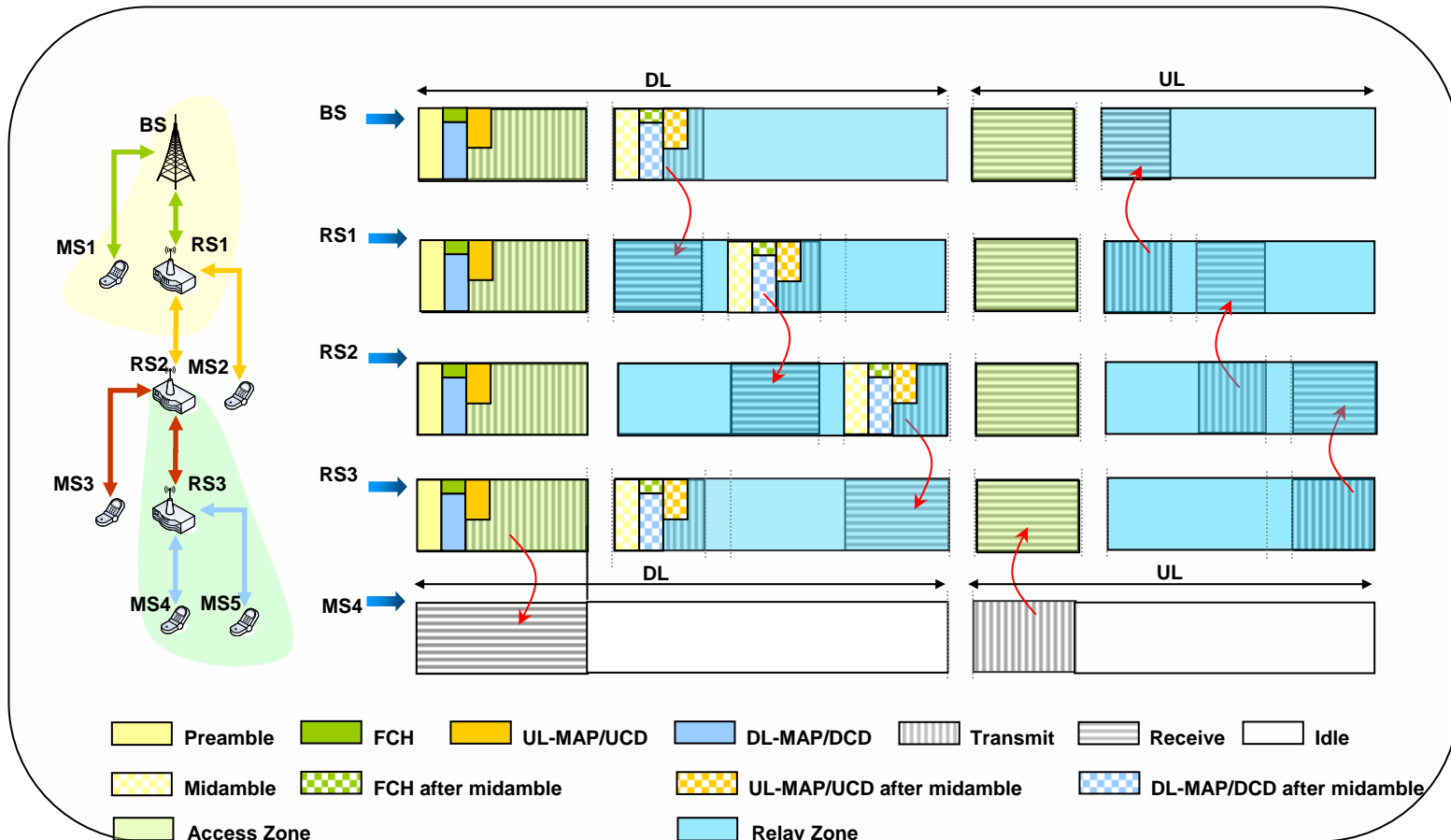
Requirements

- A general multihop relay network may assume two possible basic topologies:
 - Range extension is the primary function of relay in topology 1.
 - Relay helps improve capacity in topology 2.



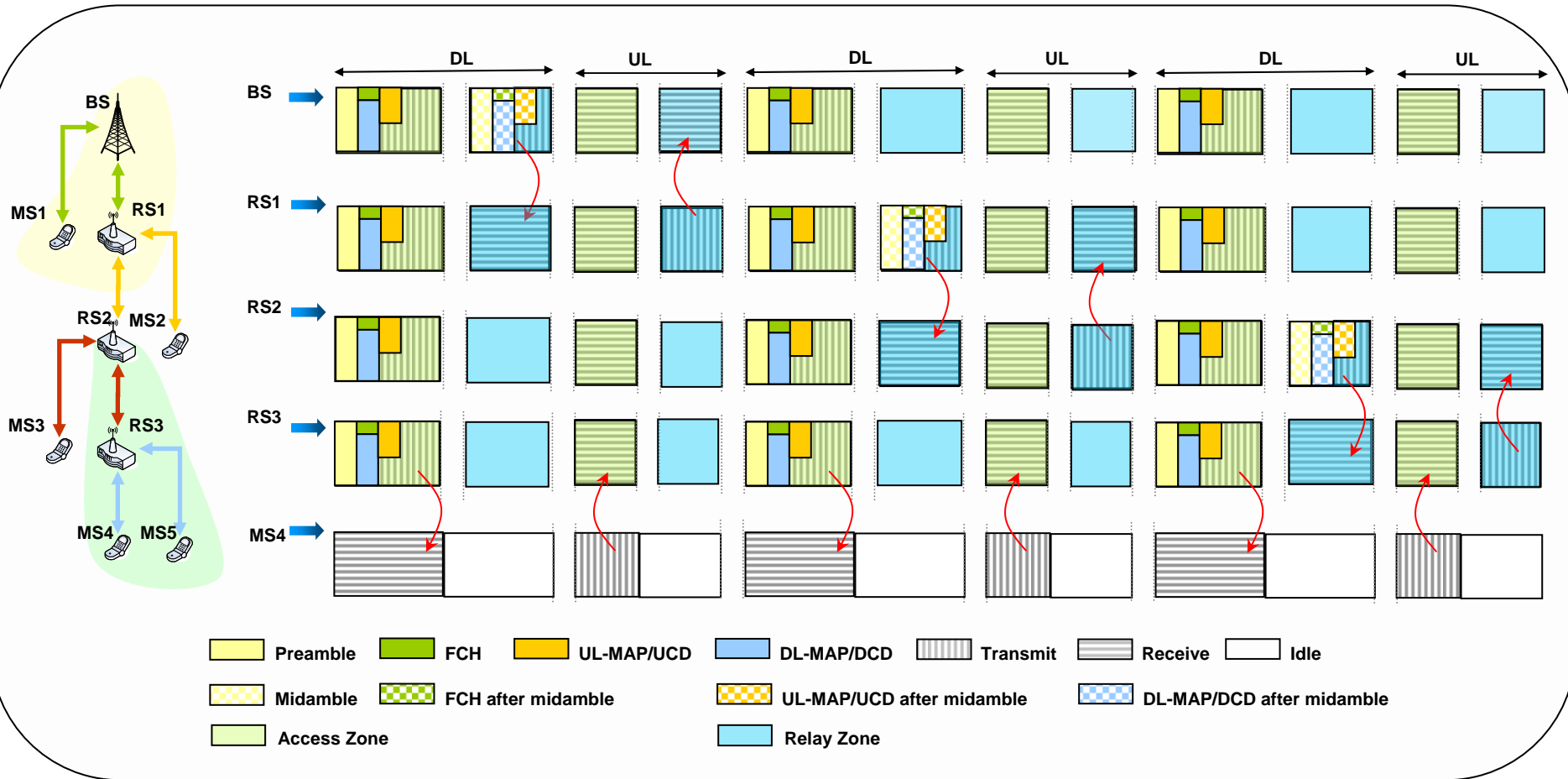
- The extended/enhanced frame structure should support following features
 - Support various network topologies
 - *Backward compatibility* with legacy MSs/SSs
 - *Flexibility* and *extensibility*
 - *Simplicity* and *efficiency*

Intra-frame mid-amble transmission



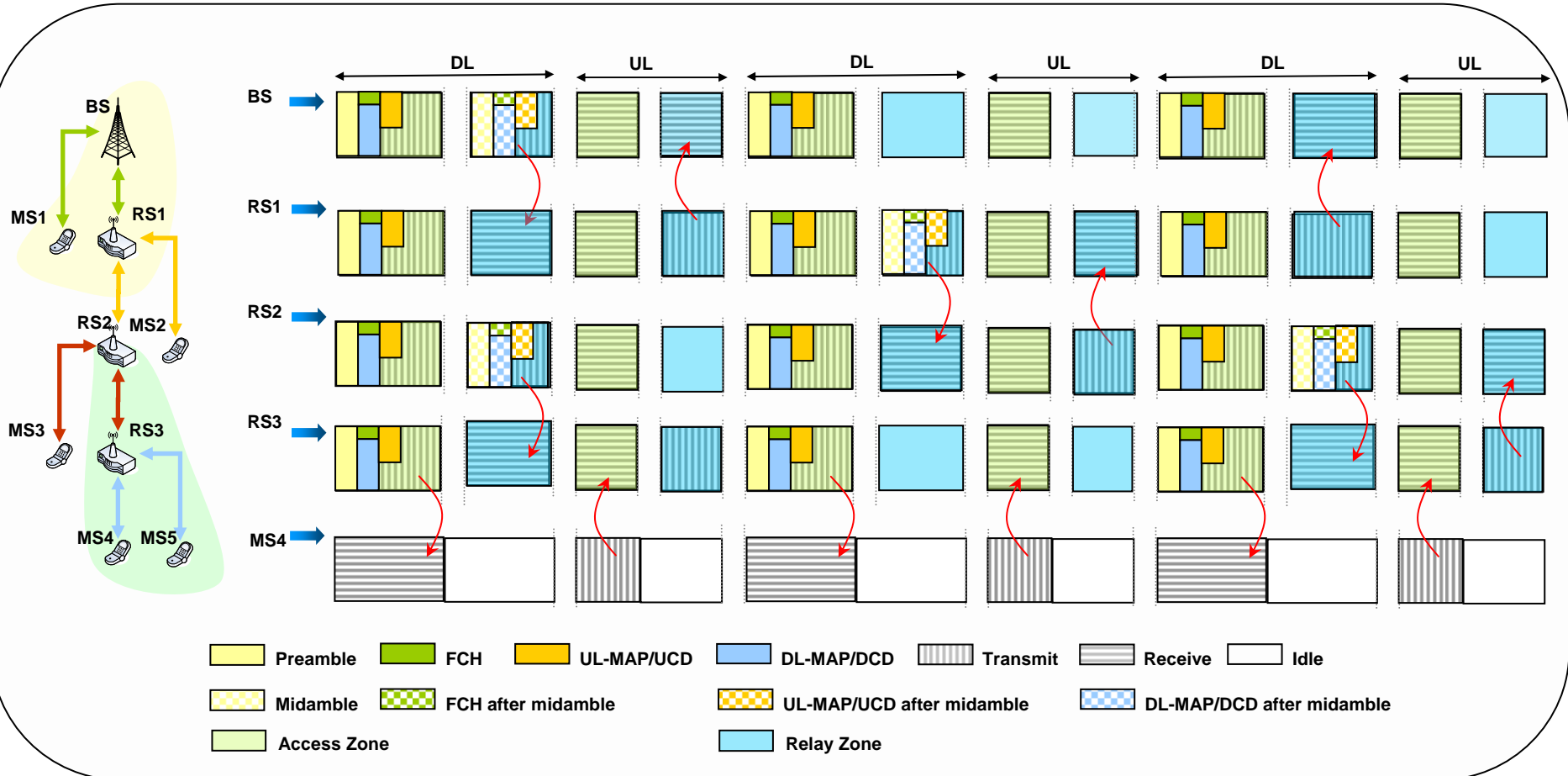
- The frame structure consists of access and relay zones
- In the access zone, the format of *preamble* and key management messages (e.g., *FCH*, *DL-MAP*, *DCD*, *UL-MAP*, *UCD*) should be understood by the legacy MSs/SSs
- Relay zones contain the mid-amble and relay mapping information
- Sub-frame consists of more than one relay zones for low latency applications

Inter-frame mid-amble transmission



Each sub-frame consists of one relay zone only. This is the extended version of the intra-frame frame structure where interference among the MR-BS and RS can be avoided

Inter-frame mid-amble transmission



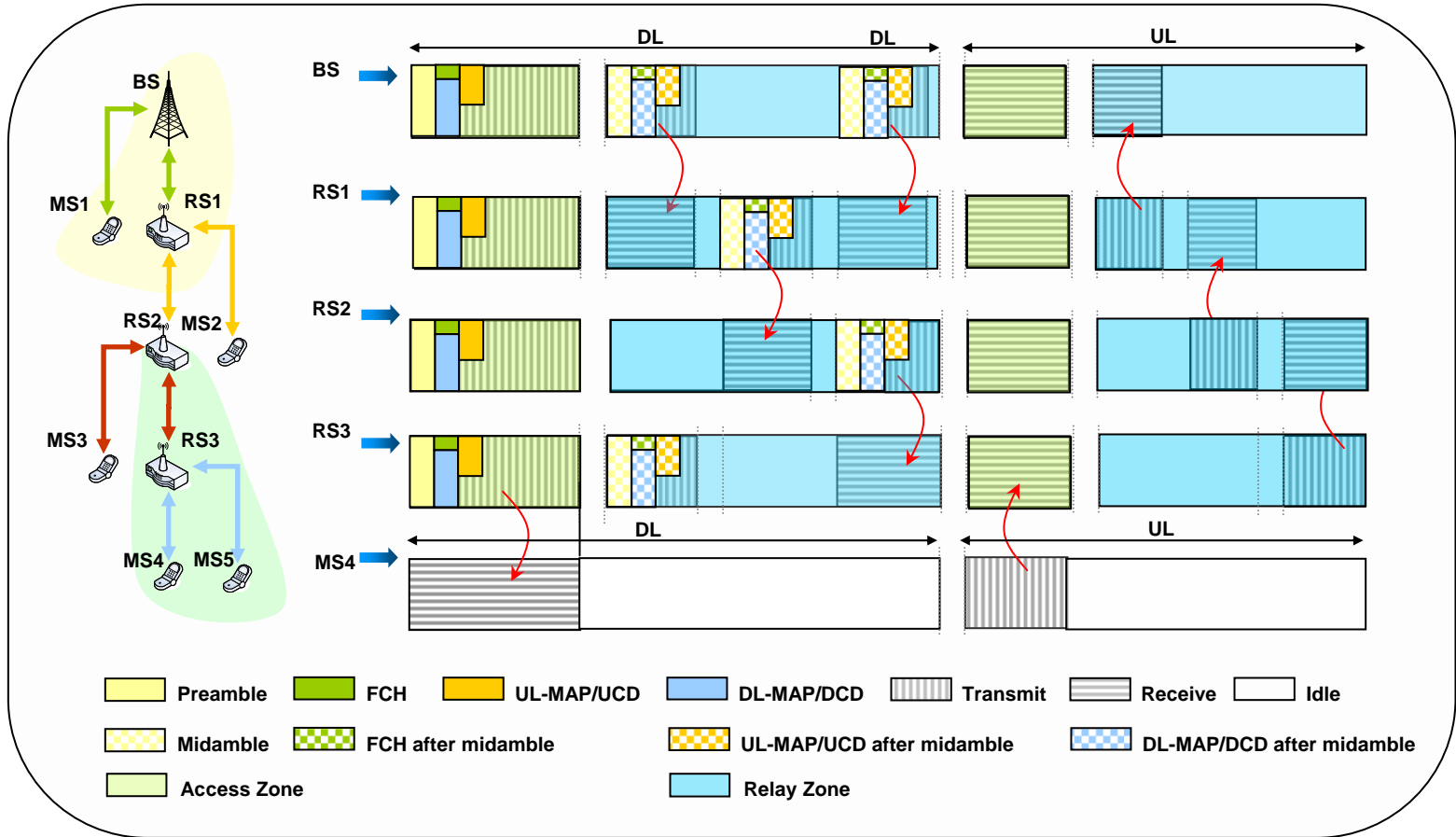
This frame structure illustrate the frequency reuse and flexibility of the zonings

Summary

- Backward compatible to 802.16e, simple and flexible
- Frame structure consists of Access and Relay zones
- In band and out of band relay operation
- Number of relay zones per sub-frame depends on latency requirements
- Frequency reuse depends on levels of RF interference
- Frame structure serves various topology and communication needs
- Cater both centralized and distributed schedulers

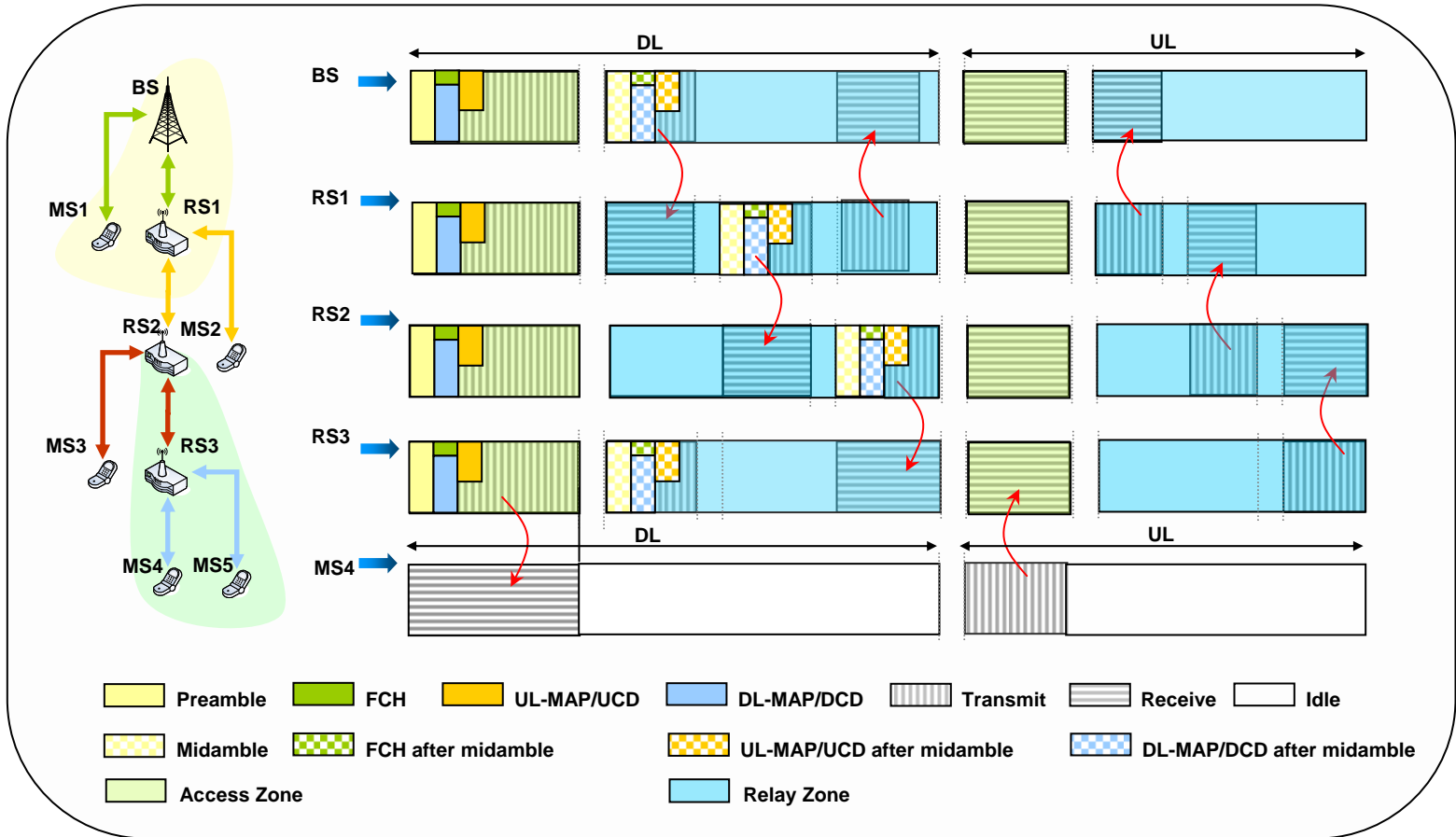
- The minor revisions/extensions of the zone concept, and the information elements described above enable the frame structure to support wide variety of communication needs and network topology/scenarios.

Intra-frame midamble transmission



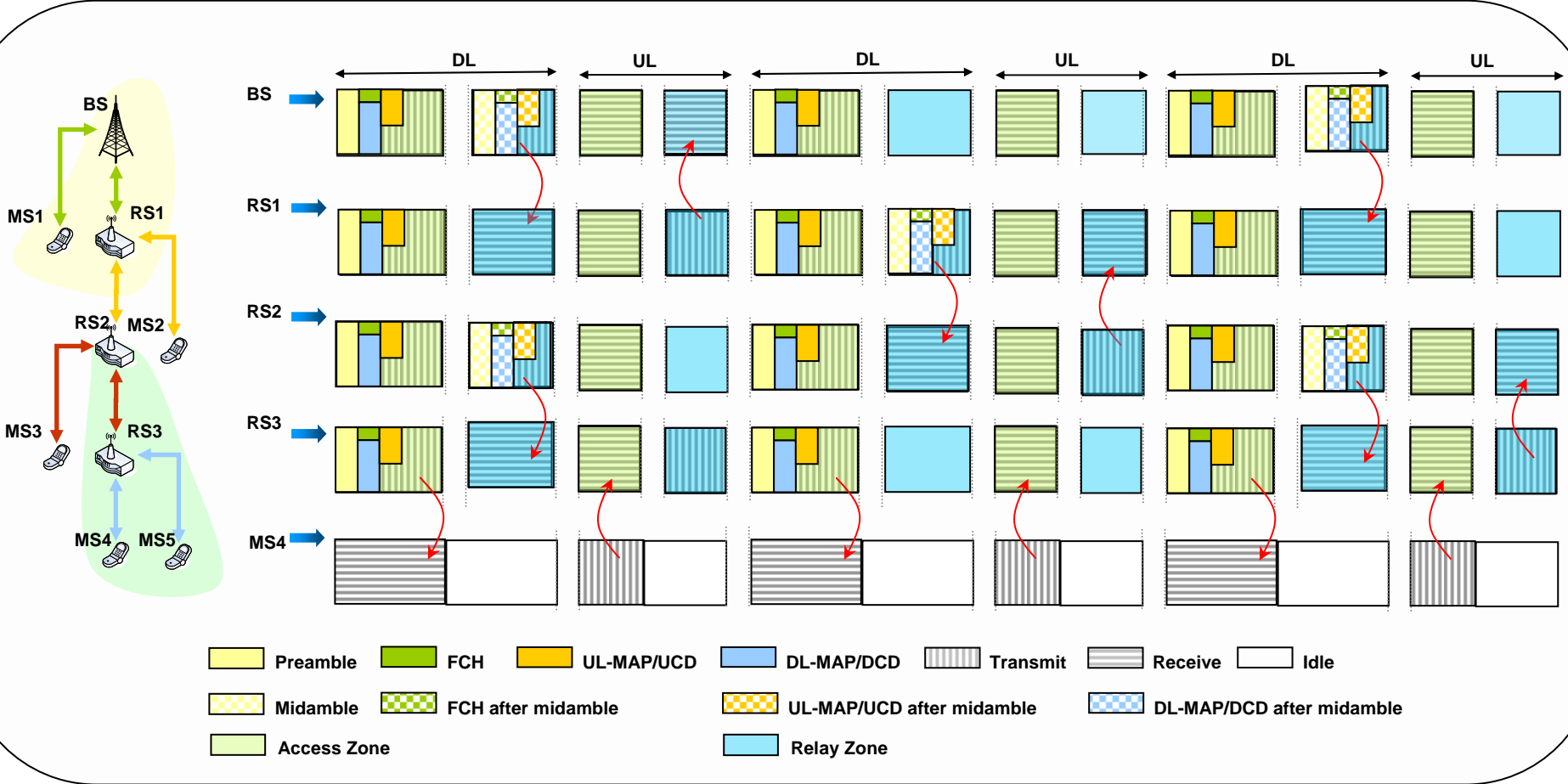
With frequency reuse

Intra-frame midamble transmission



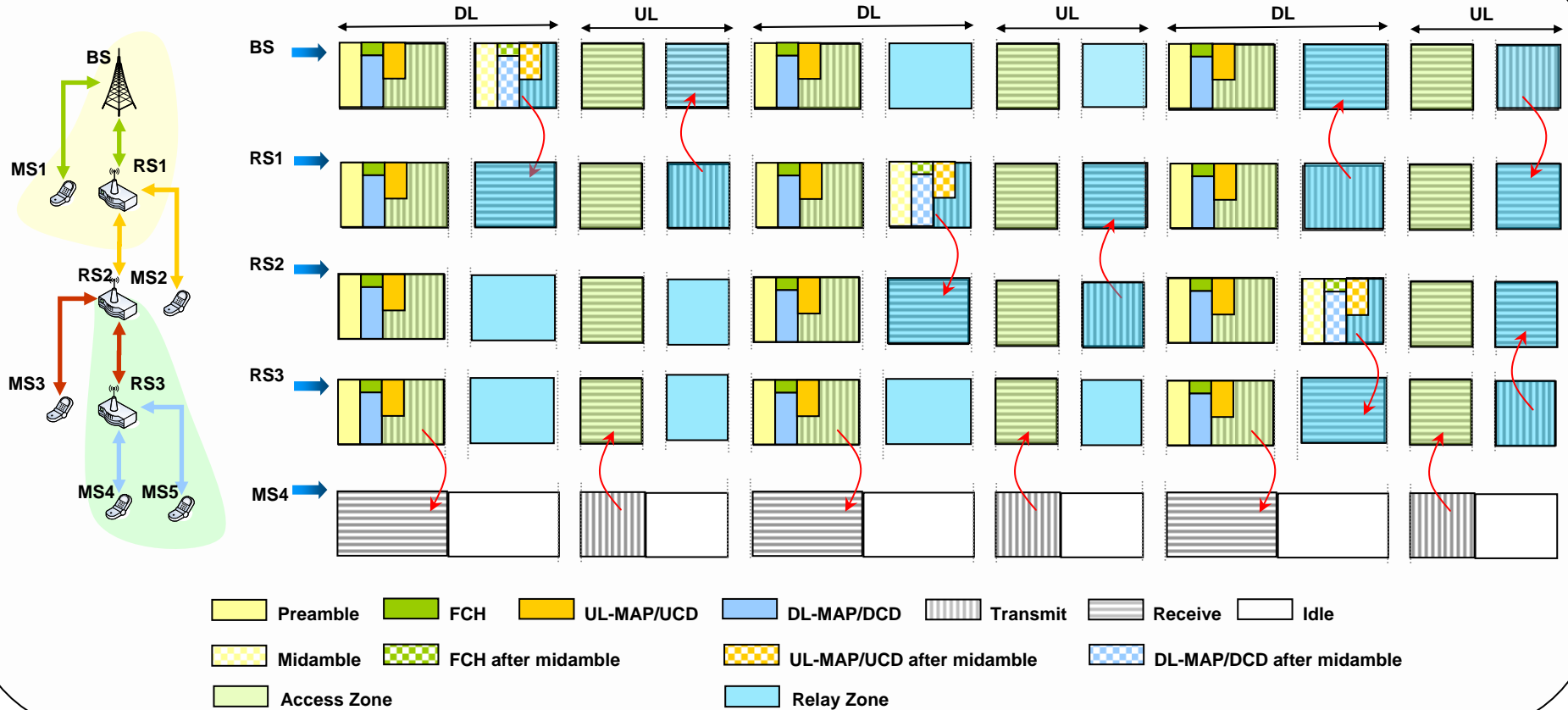
With frequency reuse

Inter-frame midamble transmission



With frequency reuse

Inter-frame midamble transmission



With frequency reuse