Classfication of RS Type in Mobile Multi-hop Relay System

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Information

Classification of RS Type in Mobile Multi-hop Relay System

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Outline

- RS Types in MMR SG
- Strategy of Multi-hop Relay
- RS Capability
- Operating Scenario
- Backward Compatibility
- Summary

RS Types in MMR SG

- Refer to C802.16-05/013

Topology/Mobility \ Ownership		Infrastructure	Client
Mesh		No	No
Relay	Fixed	**Yes**	No
	Nomadic	**Yes**	**Yes**
	Mobile	**Yes**	No

- *MMR* stands for Mobile Multi-hop Relay.
- Inter-SS/MS communication like ad-hoc network is out of scope.

Strategy of Multi-hop Relay

- For coverage extension
  - Target MS being located out-of BS coverage
  - Hence, all types of cell coverage shall be extended
    - DL: preamble, broadcast channel, and unicast channel coverages
    - UL: ranging channel, and unicast channel coverages
- For throughput enhancement
  - Target MS being located inside BS coverage
  - Increase channel data rate rather than extend any type of coverage
  - Provide a higher rate channel to MS through multi-hop path

RS Capability

- For coverage extension
  - RS shall relay Broadcast Channel as well as Unicast Channel
  - On downlink,
    - Shall relay control messages such as MAP Msg, DCD, and UCD
  - On uplink,
    - Shall provide MS with Network Entry procedure including Ranging process with the help of BS
- For throughput enhancement
  - RS has only to relay DL/UL unicast messages (for data traffic)
  - All control messages should be delivered on direct single-hop path

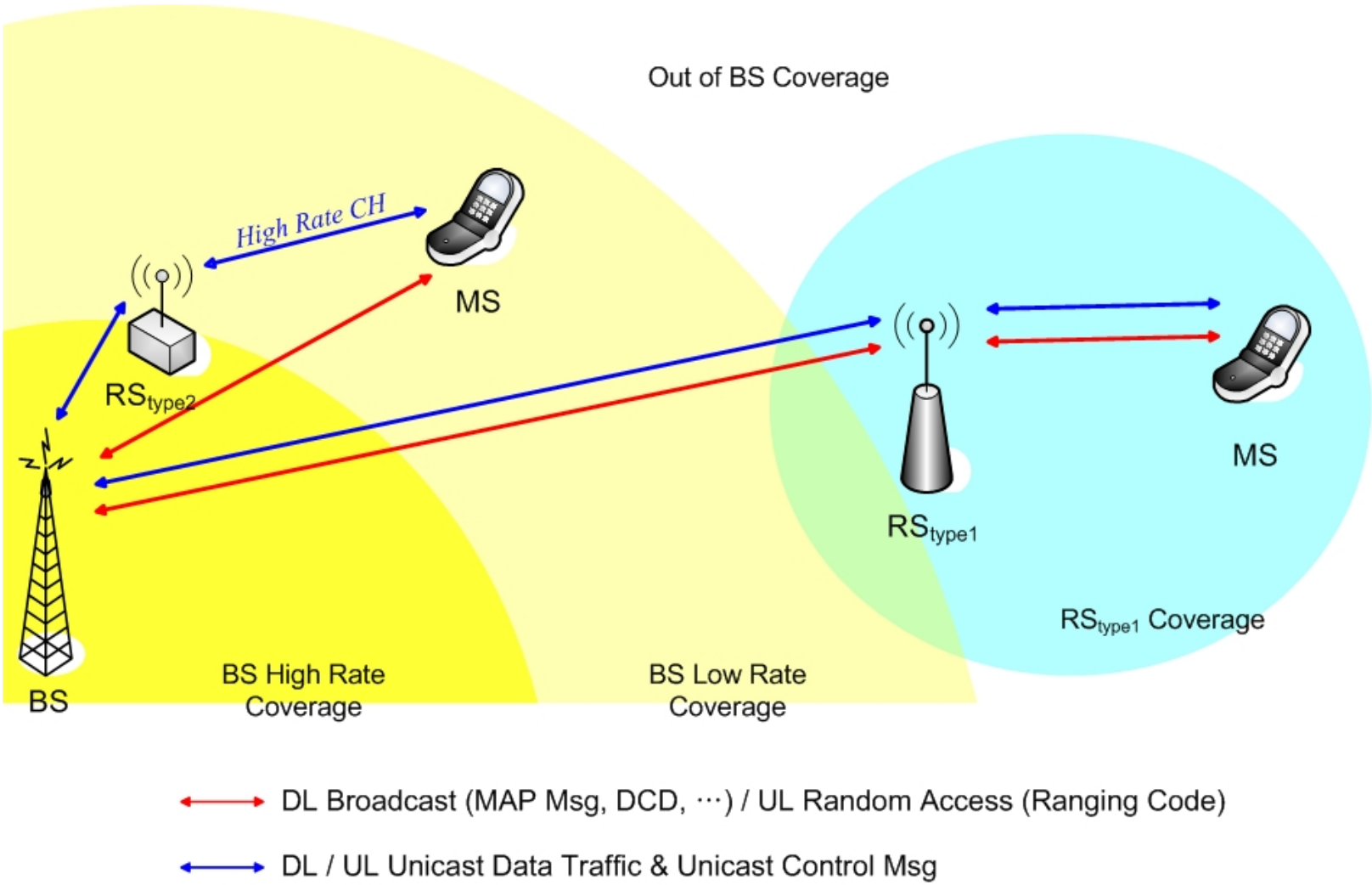
RS Type 1 (High Capability)

- Purpose: Extend cell coverage (BS cell edge, dead spot)
- Required capability
  - Transmitting RS own preamble and relaying DL control messages
  - Providing MS with Network Entry procedure
    - Keep monitoring and detect UL Ranging code from MS
- Considered features
  - TX power Amp: smaller than BS, but higher than MS
  - A directional antenna as well as omni antenna can be considered for RS on BS-RS_{type1} link
  - RS_{type1} may have a limited authority to control MS (e.g., scheduling)
- RS_{type1} $\Leftrightarrow$ Fixed / Nomadic / Mobile Infrastructure RS

RS Type 2 (Low Capability)

- Purpose: Enhance capacity (no coverage extension)
  - Provide higher throughput to MS having low SINR
  - Relay unicast message (for data traffic) only
  - All DL/UL Control messages are provided through a direct single-hop path from BS
- Considered features
  - TX power Amp: equal to or higher than MS
  - RS antenna type: omni
  - BS direct controls MS whose data traffic is relayed by RS_{type2}
- RS_{type2} $\Leftrightarrow$ Nomadic Infrastructure / Client RS

Example: Operating Scenario



RS Classification

- Consideration: ownership, mobility, capability

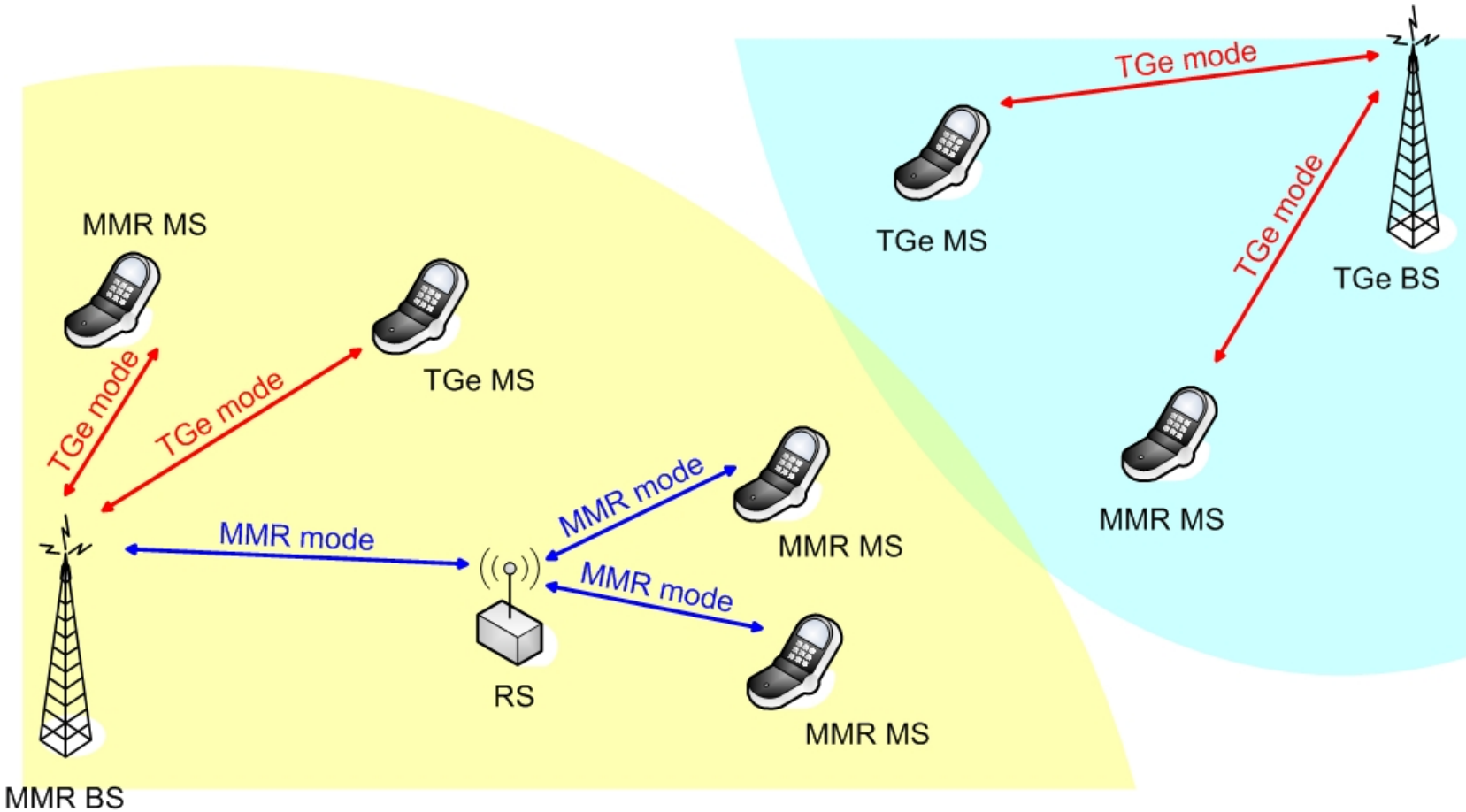
Topology/Mobility \ Ownership		Infrastructure	Client
Mesh		No	No
Relay	Fixed	**Yes**	No
	Nomadic	**Yes**	**Yes**
	Mobile	**Yes**	No

Type 2
Low Capability

Type 1
High Capability

Backward Compatibility

- With PMP Mode in IEEE TGe



Summary

- Simple classification of RS capability

RS	Purpose	Handling & Relaying capability of DL Broadcast / UL Ranging
Type 1	Coverage	Yes
Type 2	Capacity	No

- Backward compatibility with PMP Mode in IEEE TGe
  - MMR BS should be able to accommodate TGe MS's
  - MMR MS should be able to be connected to TGe BS