

Classification of RS Type in Mobile Multi-hop Relay System

IEEE 802.16 Presentation Submission Template (Rev. 8.3)

Document Number:

IEEE C802.16mmr-05/002

Date Submitted:

2005-09-09

Source:

Jaeweon Cho, Jungje Son, Panyuh Joo, Hyeonwoo Lee

Samsung Electronics Co., Ltd.

416 Maetan-3, Suwon, 442-600, Korea

Voice: +82-31-279-5796

Fax: +82-31-279-5130

E-mail: jaeweon.cho@samsung.com

Venue:

IEEE 802.16 Session #39, Taipei, Taiwan

Base Document:

None

Purpose:

Information

Notice:

This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.

Release:

The contributor grants a free, irrevocable license to the IEEE to incorporate material contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.

IEEE 802.16 Patent Policy:

The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures <<http://ieee802.org/16/ipr/patents/policy.html>>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, provided the IEEE receives assurance from the patent holder or applicant with respect to patents essential for compliance with both mandatory and optional portions of the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <<mailto:chair@wirelessman.org>> as early as possible, in written or electronic form, if patented technology (or technology under patent application) might be incorporated into a draft standard being developed within the IEEE 802.16 Working Group. The Chair will disclose this notification via the IEEE 802.16 web site <<http://ieee802.org/16/ipr/patents/notices>>.

Classification of RS Type in Mobile Multi-hop Relay System

Jaeweon Cho, Jungje Son, Panyuh Joo, and Hyeonwoo Lee

Samsung Electronics Co., Ltd.

September, 2005

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

Ownership		Topology/Mobility	
		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

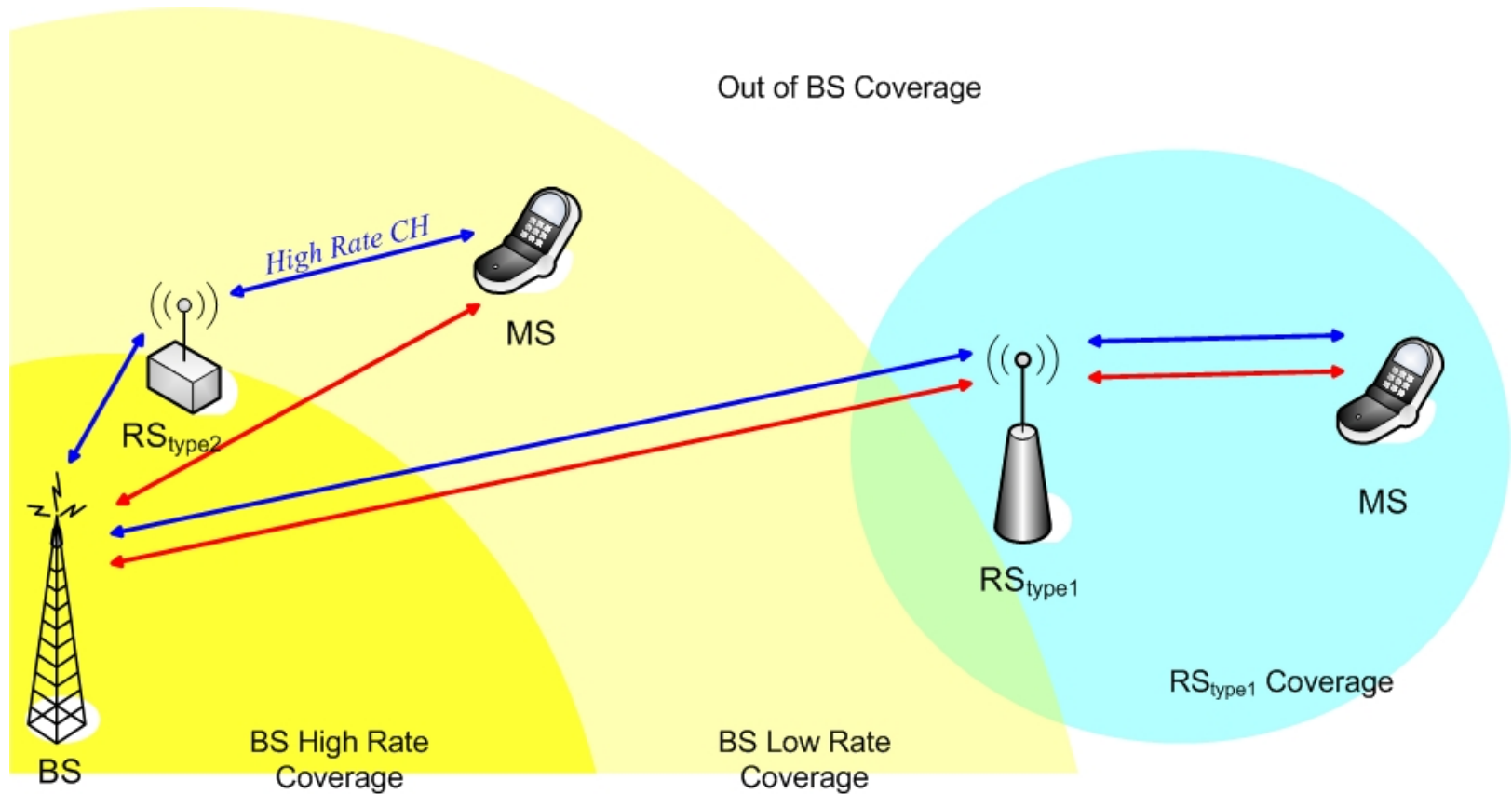
RS Type 1 (High Capability)

- 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



↔ DL Broadcast (MAP Msg, DCD, ...) / UL Random Access (Ranging Code)

↔ DL / UL Unicast Data Traffic & Unicast Control Msg

RS Classification

- Consideration: ownership, mobility, capability

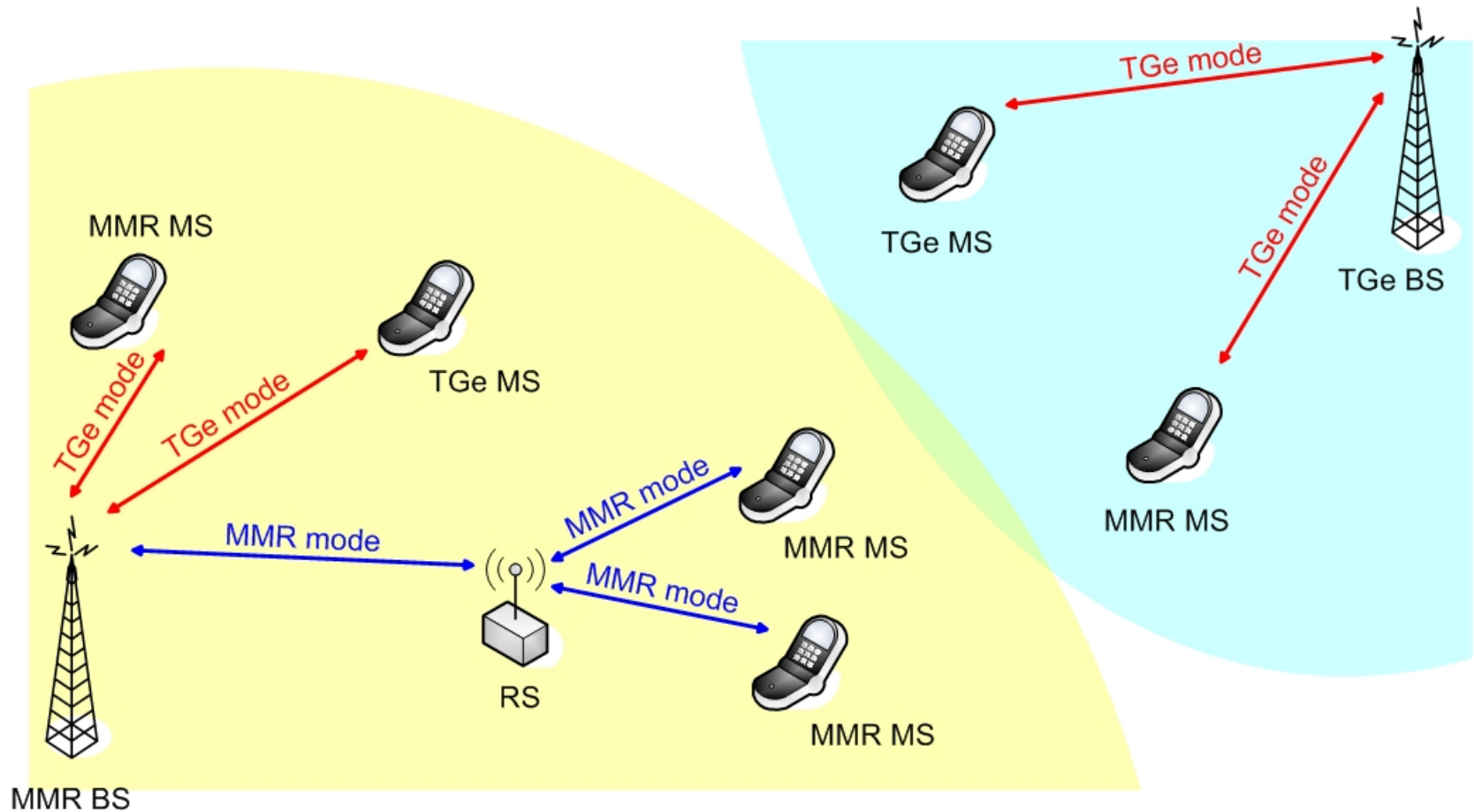
Topology/Mobility \ Ownership		Infrastructure	Client
		Infrastructure	Client
Mesh		No	No
Relay	Fixed	Yes	No
	Nomadic	Yes	Yes
	Mobile	Yes	No

Type 1
High Capability

Type 2
Low 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