

Usage Model Consideration of MMR Networking

Document Number:

IEEE C802.16j-06/028

Date Submitted:

2006-05-01

Source:

Wen Tong, Peiying Zhu, Mo-Han Fong, Mark Naden, David Steer,
Gamini Senarath, Hang Zhang, Jianglei Ma, G.Q Wang and Jose Costa
Nortel
3500 Carling Avenue
Ottawa, Ontario, K2H 8E9

Voice:613-763-1315

Fax:613-765-7723

E-mail: wentong@nortel.com

Base Document: N/A

Purpose:

To further clarify the MMR usage models and scenarios

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>>.

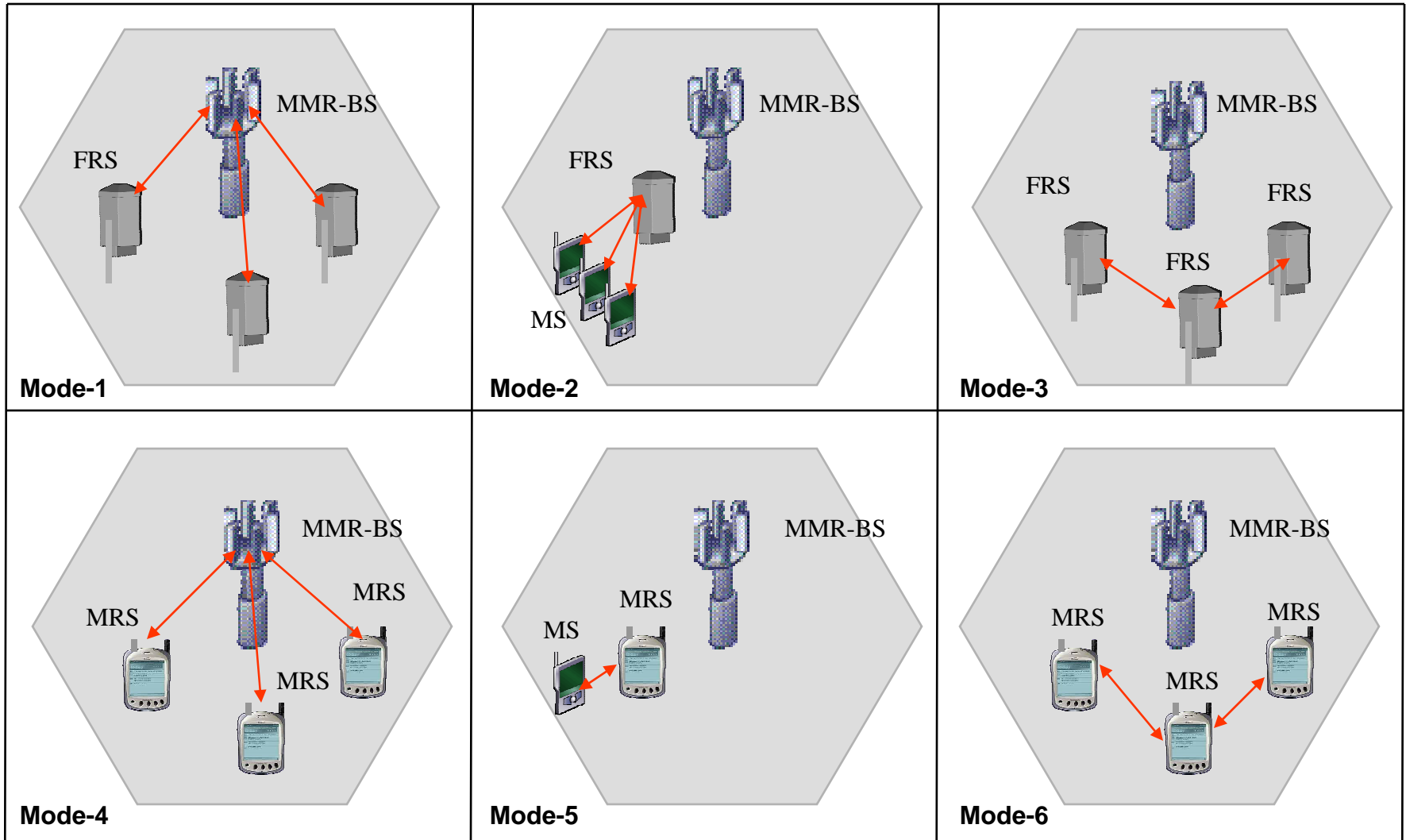
Introduction

- This contribution discusses the usage of MMR modes based on the IEEE802.16j PAR
- The basic link modes for MMR are introduced
- Based on the possible MMR-BS and RS connection topology, several usage scenarios of MMR are discussed
 - To provide different service usage models
- Enable advanced capabilities to enhance the IEEE802.16 network

The Six MMR Link Configurations (1)

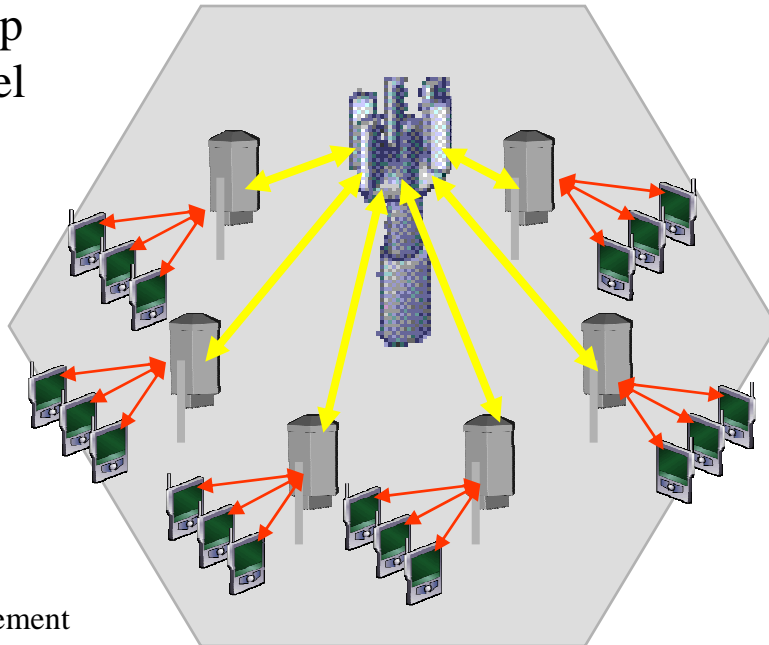
- Mode-0: The BS can associate with several MSs
 - Basic PMP one hop
 - Direct link when the radio condition is good
- Mode-1: The BS can associate with at least one FRS
 - Basic two-hop relay from BS to FRS
- Mode-2: The FRS can associate with several MSs
 - Basic two-hop relay from FRS to MSS
- Mode-3: The FRS can associate at least one FRS
 - Enable multi-hop for the FRS
- Mode-4: The BS can associate with several MRS
 - Enable two-hop from BS to MRS
- Mode-5: The MRS can associate with at most one MS
 - Enable multi-hop from MRS to MS
- Mode-6: The MRS can associate with at most one MRS
 - Enable multi-hop from MRS to MRS

The Six MMR Link Configurations (2)



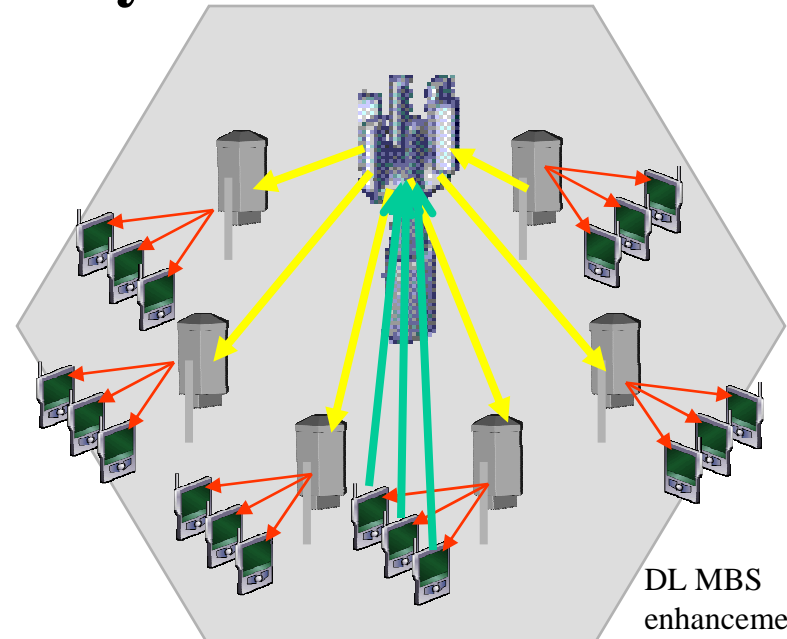
Two Hop Relay

Symmetry
2-Hop
Model



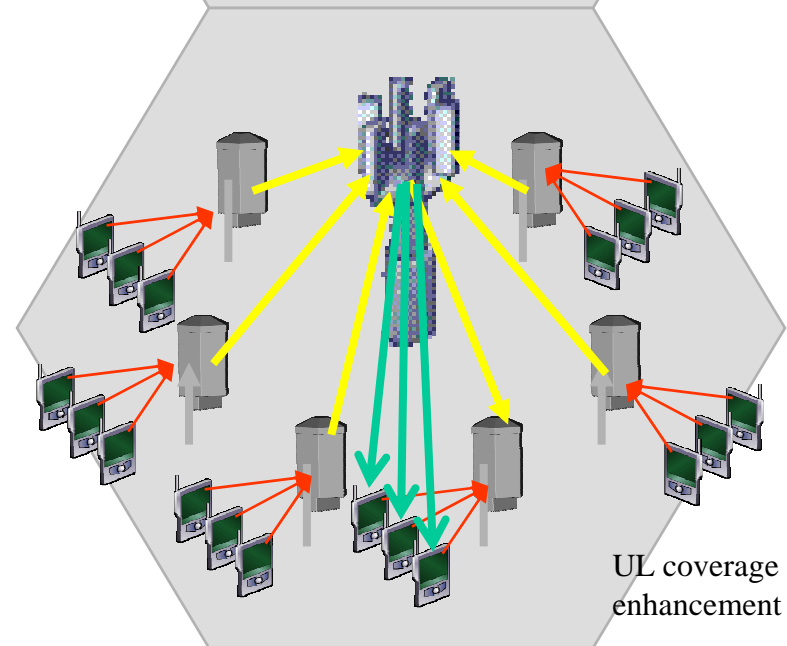
Unicast
enhancement

Asymmetry
2-Hop Model



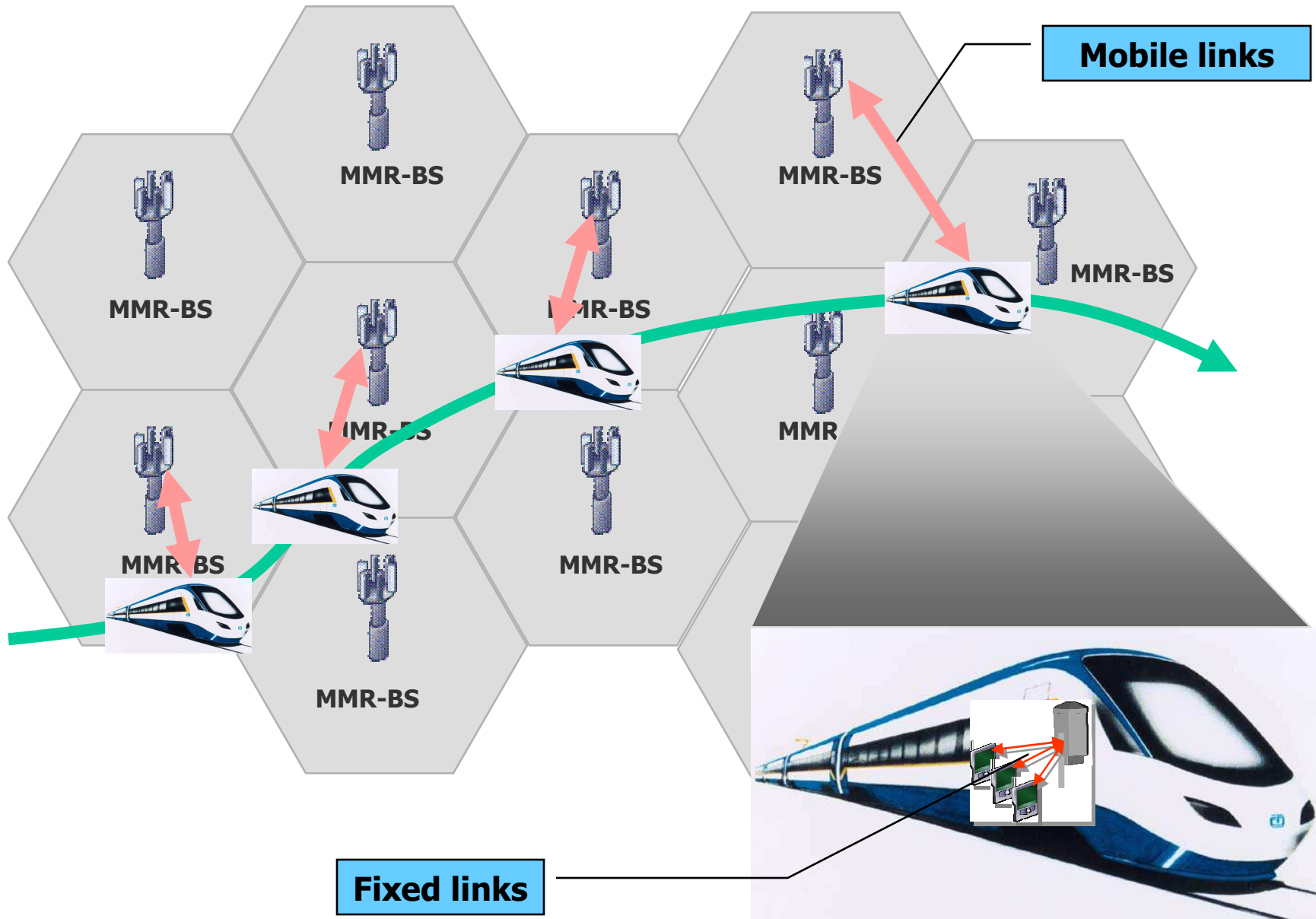
DL MBS
enhancement

Asymmetry
2-Hop Model



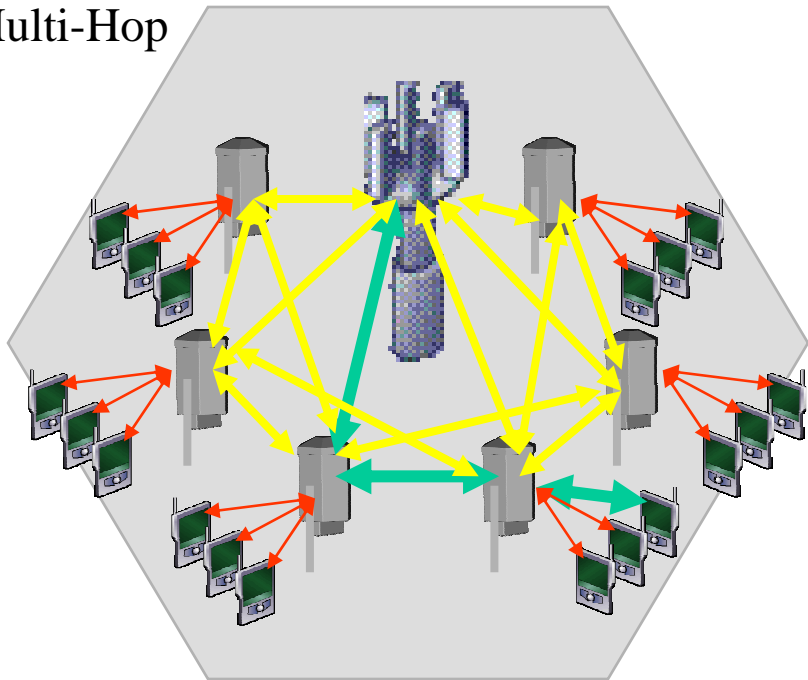
UL coverage
enhancement 5

Two Hop Relay (Mobility Case)

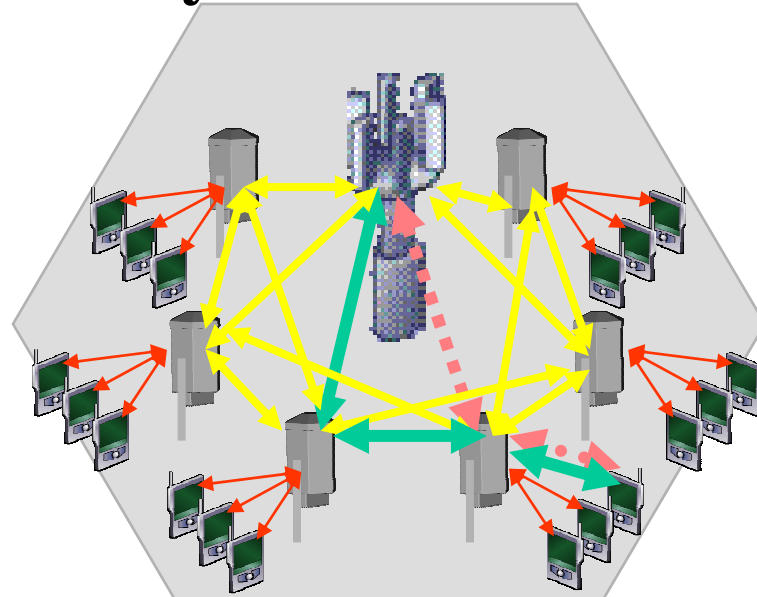


Multi-Hop Relay

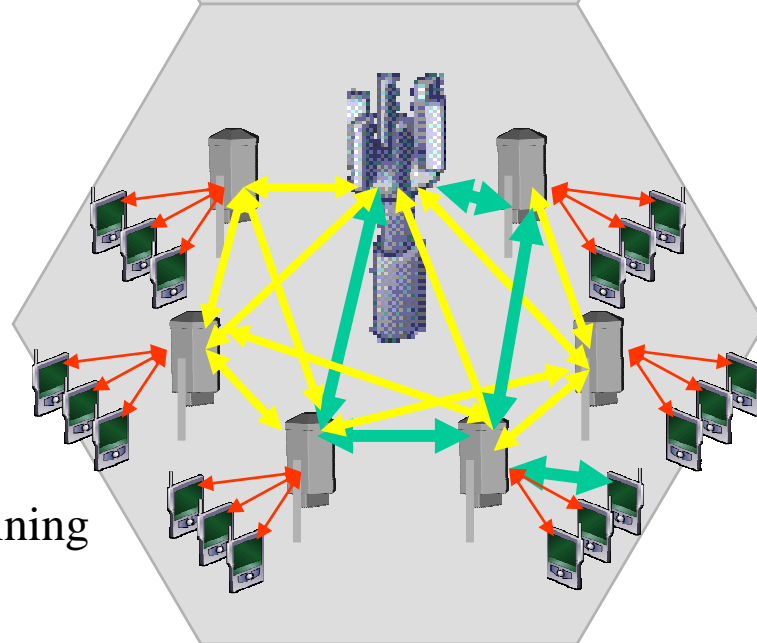
Direct
Multi-Hop



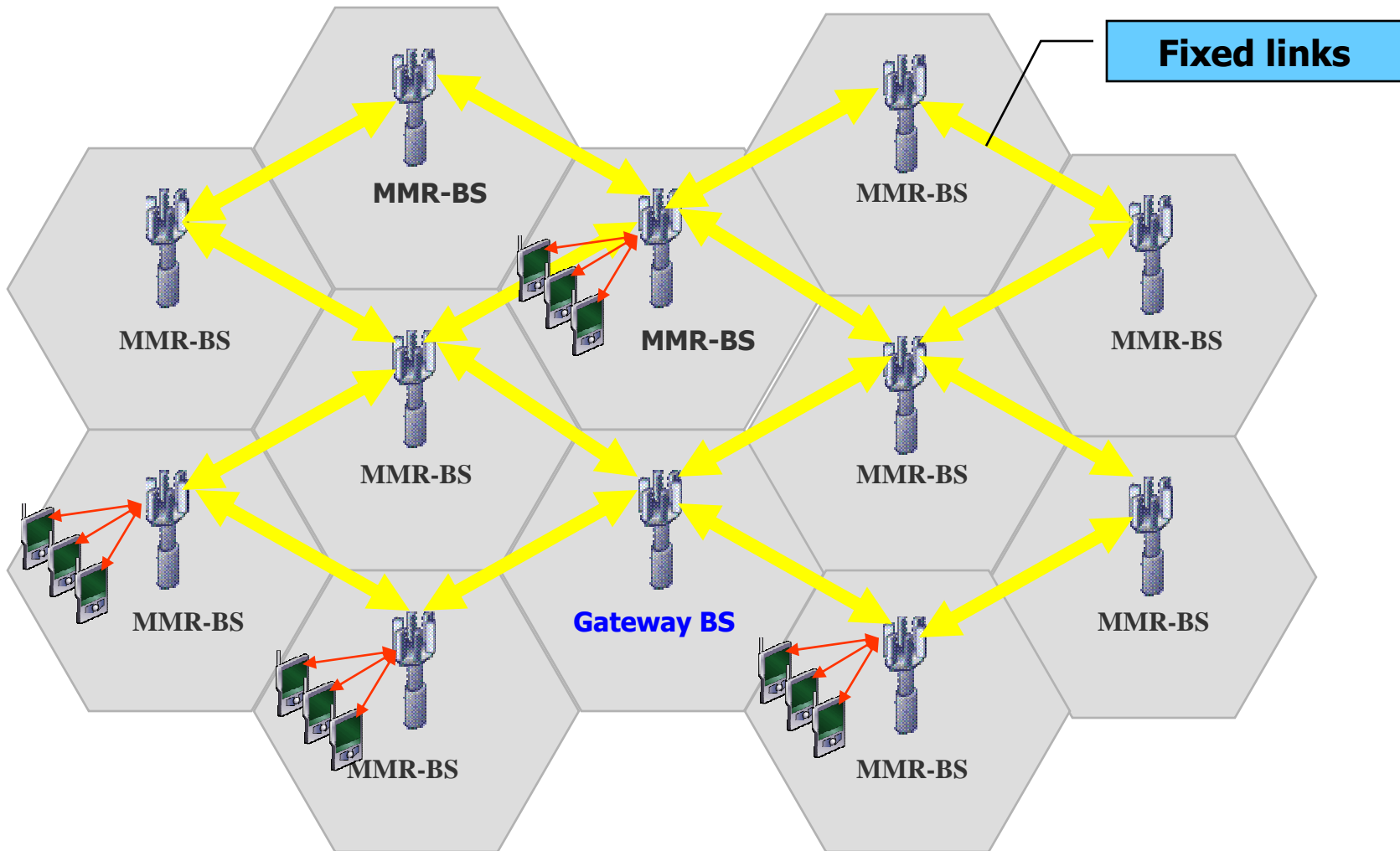
Selective
Multi-Hop



Path Combining
Multi-Hop



BS Backhaul Multi-hop Relay



Discussion and Summary

- Several basic scenarios of MMR networking topology are discussed such as:
 - DL/UL 2-hop fixed relay (with asymmetry)
 - DL/UL 2-hop mobile relay
 - DL/UL direct multi-hop
 - DL/UL path-selective multi-hop
 - DL/UL path-combining multi-hop
 - Enable the mesh networking