

Macro Diversity Handover and Fast Access Station Switching for MMR Network

Document Number:

IEEE S802.16j-07/119r1

Date Submitted:

2007-01-16

Source(s):

Shengjie Zhao, Koon Hoo Teo, Jeffrey Z. Tao, Jinyun Zhang

Mitsubishi Electric Research Lab

201 Broadway, Cambridge, MA 02139, USA

Voice: 617-621-{7545, 7527, 7557, 7595}

Fax: 617-621-7550

Email: {tao, teo, jzhang}@merl.com

Toshiyuki Kuze

Mitsubishi Electric Corp.

5-1-1 Ofuna Kamakura, Kanagawa 2478501, JAPAN

Voice: +81-467-41-2885

Fax: +81-467-41-2486

Email: kuze.toshiyuki@ah.MitsubishiElectric.co.jp

Venue:

IEEE 802.16 Session #47, London, UK

Base Document:

None

Purpose:

Propose new MAC management messages for MDHO and FASS for a mobile multi-hop relay network

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>>.

Macro Diversity Handover and Fast Access Station Switching for MMR Network

Authors:

*Shengjie Zhao, Koon Hoo Teo, Jeffrey Z. Tao,
Jinyun Zhang*

Mitsubishi Electric Research Lab
201 Broadway
Cambridge, MA 02139

Toshiyuki Kuze

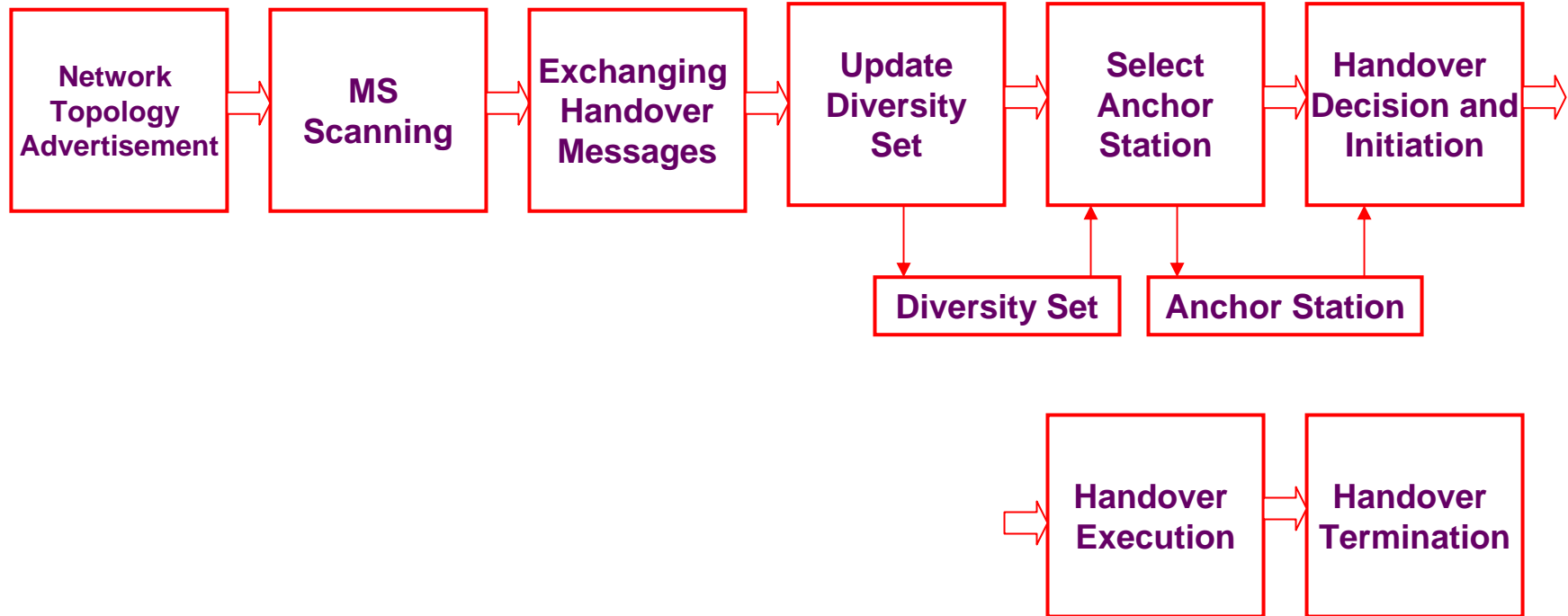
Mitsubishi Electric Corp
5-1-1 Ofuna Kamakura, Kanagawa
2478501, Japan

Introduction

- MDHO and FASS provides seamless and better handover performance for MS with higher speed mobility
- MDHO and FASS handover procedures are described for nine main classes of topology
- New MAC management messages over relay links are introduced
- Handover procedures are backward compatible to an IEEE802.16e compliant MS

- Note:
- MDHO (macro diversity handover): MS can communicate simultaneously with all active stations in diversity active set. In uplink (downlink), active stations (MS) are capable of diversity combining of received signals
- FASS (fast access station switching): The data are sent to all active stations in diversity active set but without diversity combining.

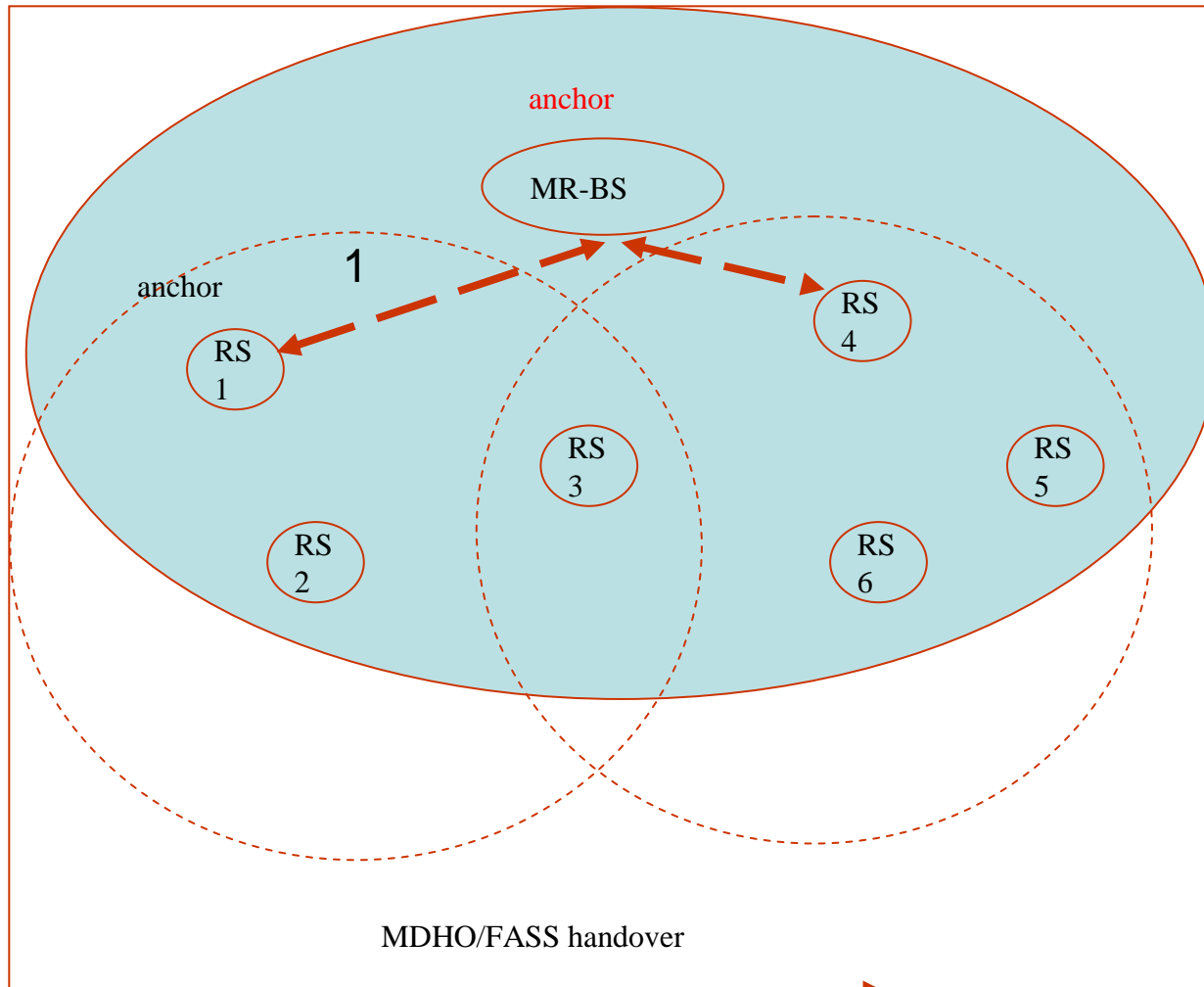
HO Procedures



- Anchored station: provide DL and UL maps, FCH and DL broadcast messages. map may consists of burst allocation info for the non anchored active stations
- Diversity set: consists of a list of BSs and/or RSs that are involved in MDHO/FASS

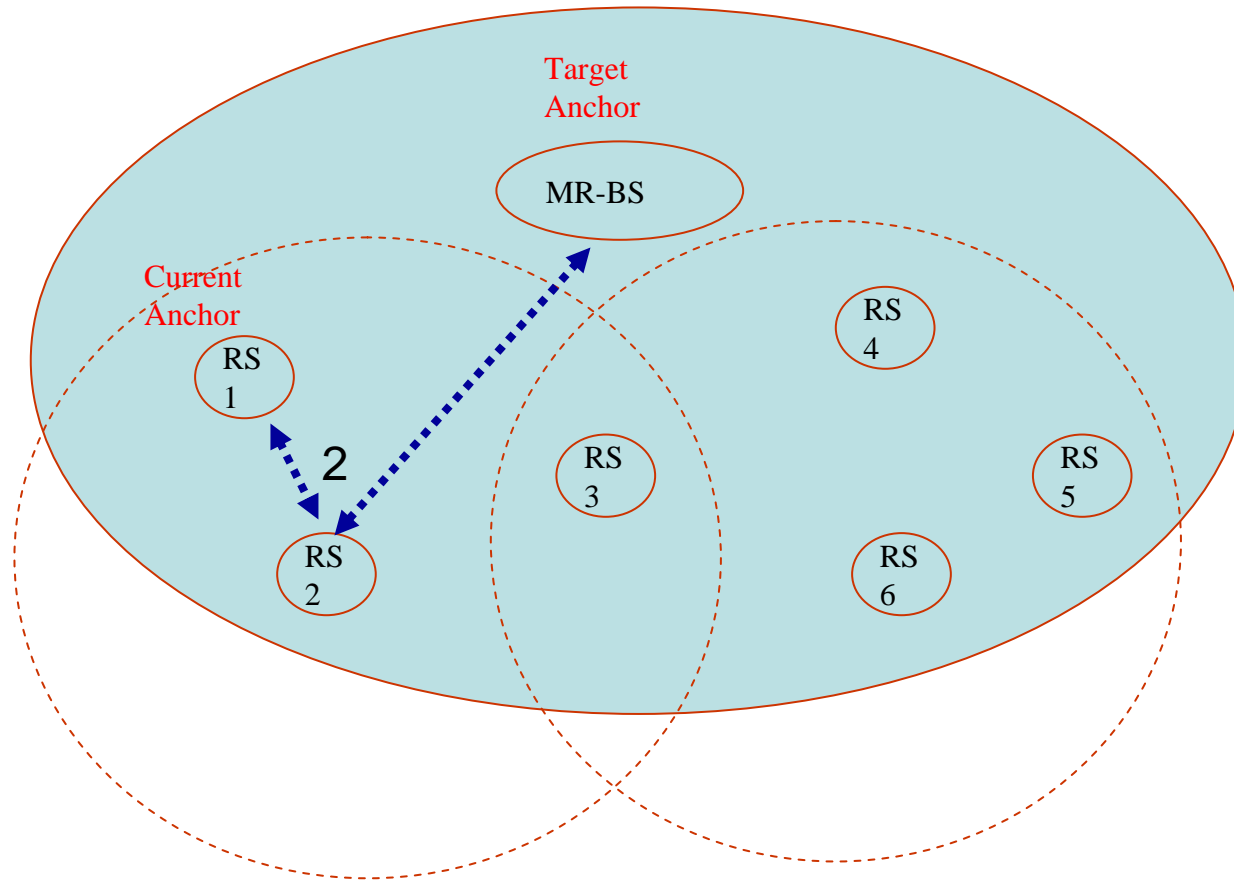
Intra MR-BS handover

Case 1: the current anchor station and target anchor station is MR-BS



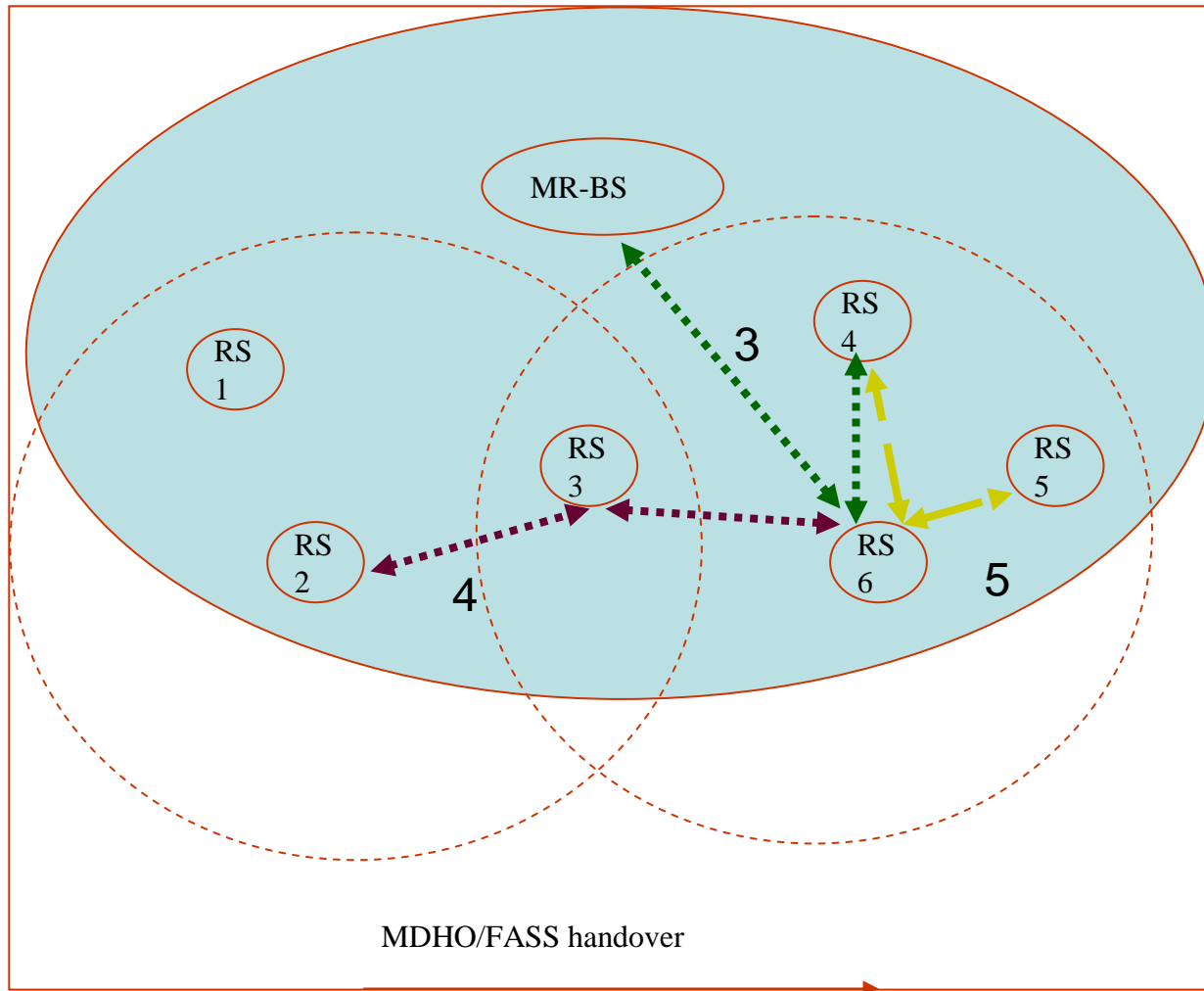
Intra MR-BS handover (case 2)

Case 2: the current anchor station is RS and target anchor station is MR-BS



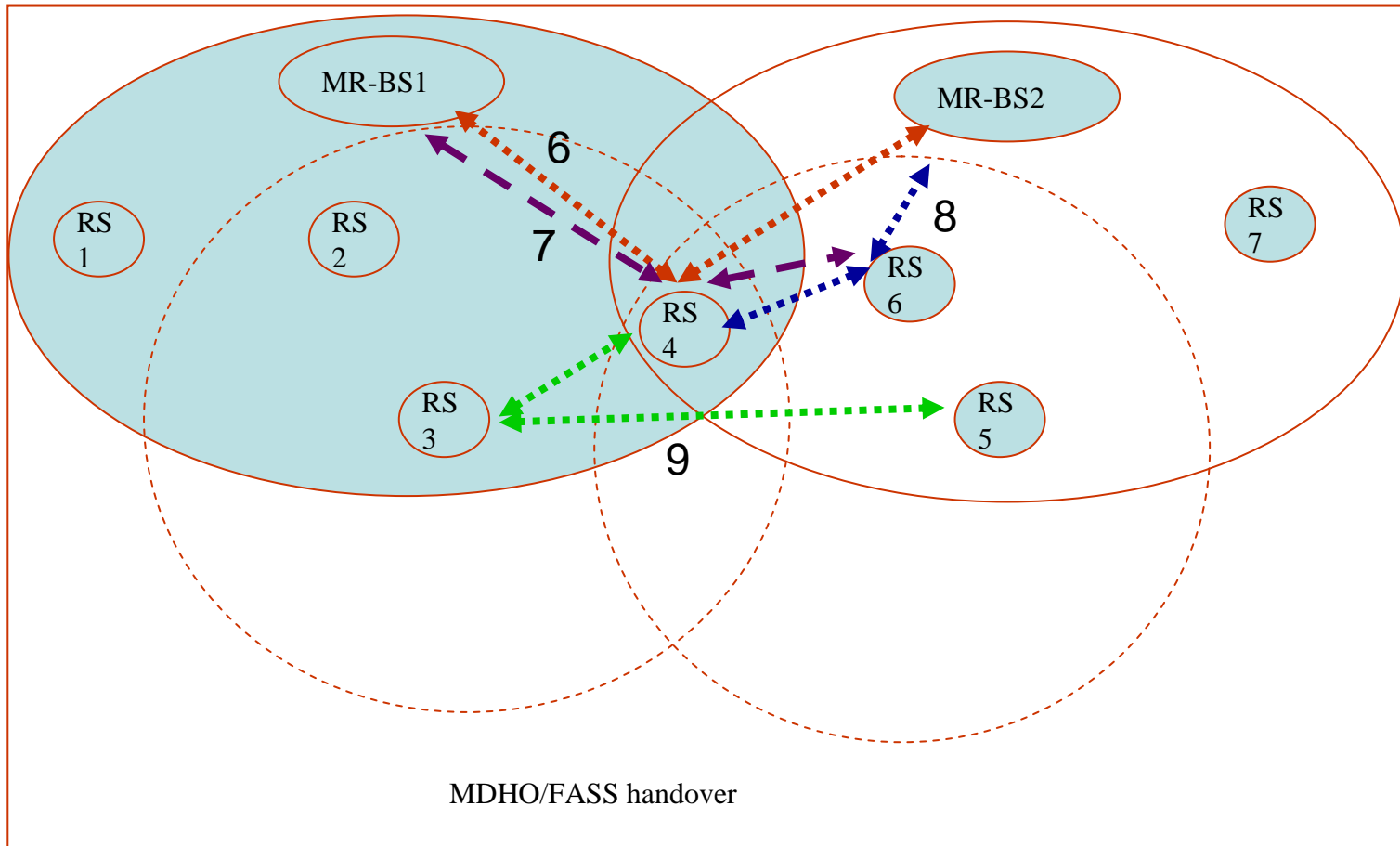
MDHO/FASS handover

Intra MR-BS handover



- Case 3: the current anchor station is MR-BS and target anchor station is RS
- Case 4: the current anchor station and target anchor station is the same RS
- Case 5: the current anchor station and target anchor station is the different RSs

Inter MR-BS handover

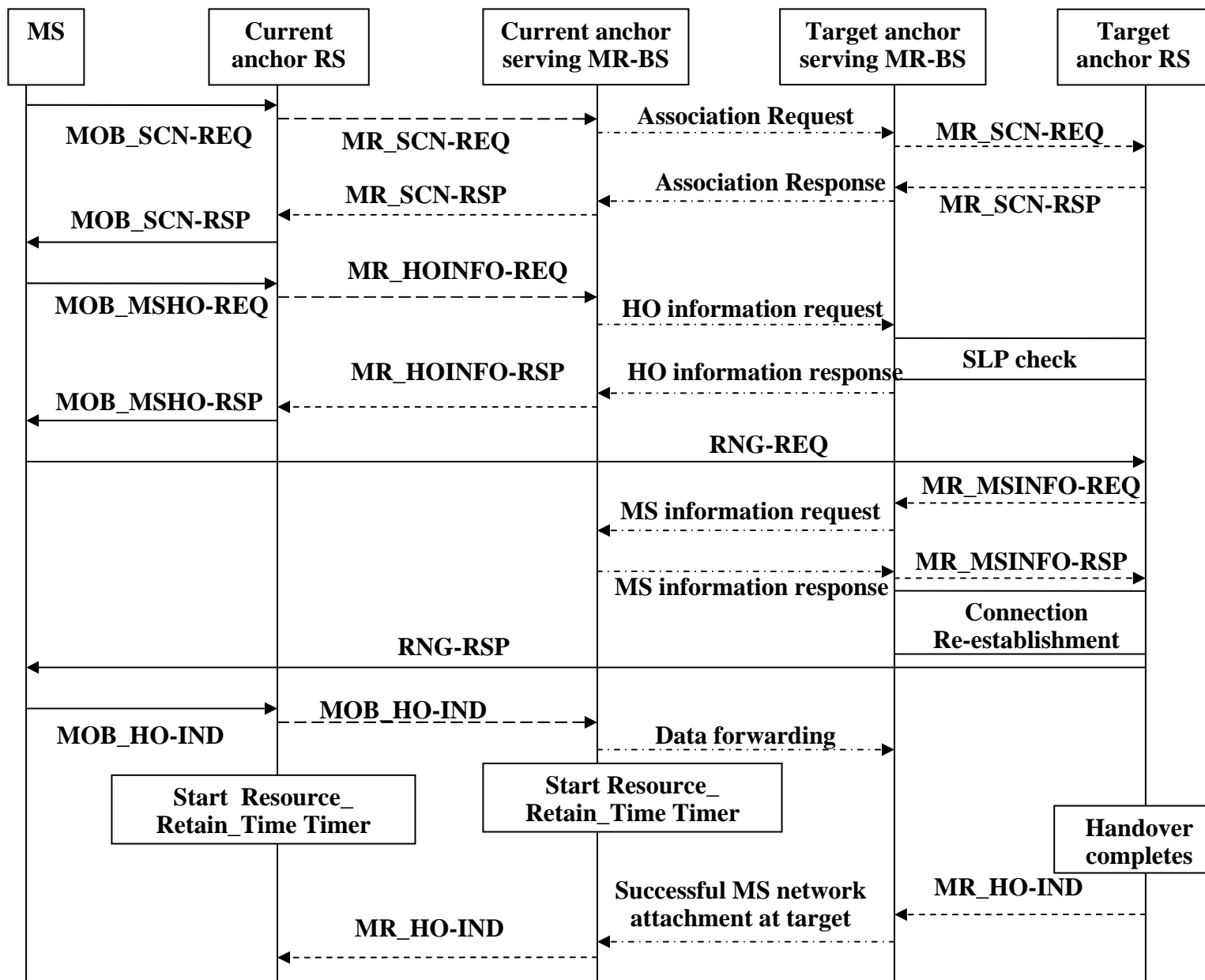


- Case 6: the current anchor station and target anchor station is the different MR-BSs
- Case 7: the current anchor station is MR-BS and target anchor station is RS controlled by the different MR-BS
- Case 8: the current anchor station is RS and target anchor station is MR-BS in a different MR-cell
- Case 9: the current anchor station and target anchor station are the different RSs and also they are located in different MR-cells

Summary

- Handover procedures for MDHO and FASS
- New MAC management messages to support MDHO/FASS for nine main classes of topology
- New MAC messages are used for handover messages over the relay link

Case 9 Handover Procedures and New MAC Messages



MAC management messages over relay links

New MAC messages	MS handover phase	Descriptions
MR_NBR-REQ MR_NBR-RSP	Network Topology Advertisement	The legacy MOB_NBR-ADV message is used to inform stations' access link channel information over relay links. A MR_NBR-REQ/RSP message is used by RSs to request access link channel information of other stations of interest
MR_SCN-REQ MR_SCN-RSP	MS scanning	These two messages are used to coordinate an association for an MS at target anchor station
MR_HOINFO-REQ MR_HOINFO-RSP	MDHO/FASS decision and initiation	These two messages are used to pass the handover related information of potential target anchor station to the current anchor station over relay links
MR_MSINFO-REQ MR_MSINFO-RSP	Handover execution	These messages are used to pass MS information to new anchor and target anchor station when actual handover is performed
MR_HO-IND	Handover termination	This message is used to notify successful handover to the current anchor station and to the target anchor station

Topology of MDHO and FASS

- Nine cases and classified into two categories:
 - (1) Intra MR-BS handover
 - Case 1: the current anchor station and target anchor station is MR-BS
 - Case 2: the current anchor station is RS and target anchor station is MR-BS
 - Case 3: the current anchor station is MR-BS and target anchor station is RS
 - Case 4: the current anchor station and target anchor station is the same RS
 - Case 5: the current anchor station and target anchor station is the different RSs
 - (2) Inter MR-BS handover
 - Case 6: the current anchor station and target anchor station is the different MR-BSs
 - Case 7: the current anchor station is MR-BS and target anchor station is RS controlled by the different MR-BS
 - Case 8: the current anchor station is RS and target anchor station is MR-BS in a different MR-cell
 - Case 9: the current anchor station and target anchor station are the different RSs and also they are located in different MR-cells

- Note:
 - Intra MR-BS HO: handover among group of RSs or the MR-BS controlled by the same serving MR-BS
 - Inter MR-BS HO: handover among group of RSs and two or more MR-BSs controlled by the two or more MR-BSs