

## Handover Issues in IEEE 802.16m/e Co-existing Systems

Document Number: IEEE C802.16m-08/586r3

Date Submitted: 2008-07-11

Source:

Yung-Han Chen, Fang-Ching (Frank) Ren, Richard Li  
ITRI

Voice:

E-mail:

chenyunghan@itri.org.tw

richard929@itri.org.tw

Wern-Ho Sheen  
NCTU/ITRI

Re:

IEEE 802.16m-08/024 - Call for Contributions on Project 802.16m System Description Document (SDD), on the topic of “Upper MAC concepts and methods (limited to addressing, mobility and power management)”

Venue:

IEEE Session #56, Denver, USA

Base Contribution:

N/A

Purpose:

For discussion on the handover issues among 16m and 16e systems

Notice:

*This document does not represent the agreed views of the IEEE 802.16 Working Group or any of its subgroups.* It represents only the views of the participants listed in the “Source(s)” field above. It is offered as a basis for discussion. It is not binding on the contributor(s), who 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.

Patent Policy:

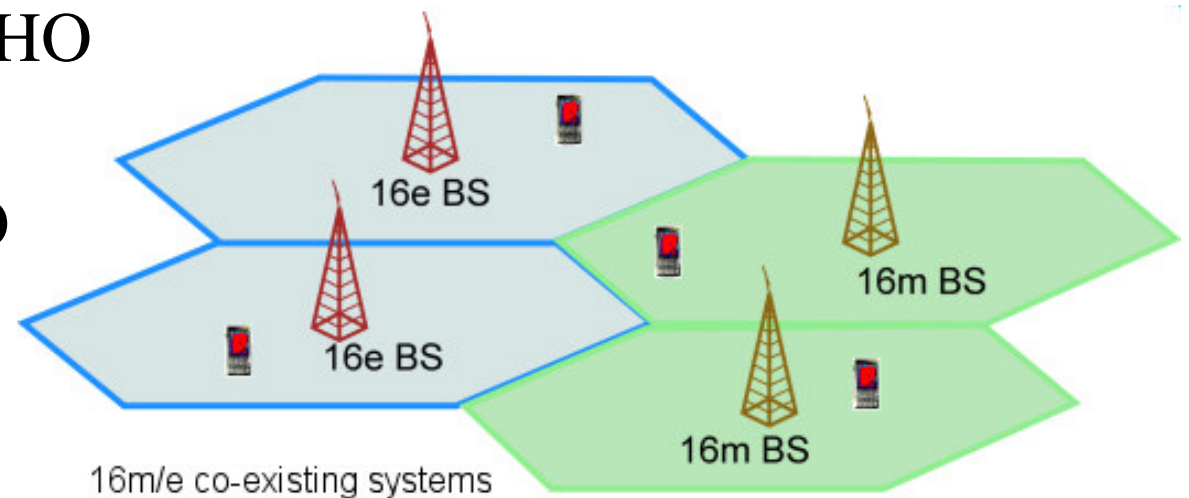
The contributor is familiar with the IEEE-SA Patent Policy and Procedures:

<<http://standards.ieee.org/guides/bylaws/sect6-7.html#6>> and <<http://standards.ieee.org/guides/opman/sect6.html#6.3>>.

Further information is located at <<http://standards.ieee.org/board/pat/pat-material.html>> and <<http://standards.ieee.org/board/pat>>.

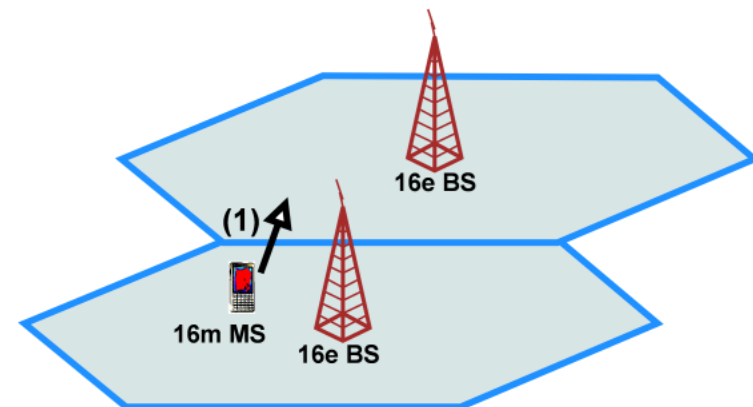
# HO Cases in 16m/e Co-existing Systems

- In 16m/e co-existing systems, there are 4 HO cases for a 16m or a 16e MS:
  - Case (1): HO from a 16e cell/sector to another 16e cell/sector
  - Case (2): HO from a 16m cell/sector to another 16e cell/sector
  - Case (3): HO from a 16e cell/sector to another 16m cell/sector
  - Case (4): HO from a 16m cell/sector to another 16m cell/sector
- For a 16e MS, only 16e HO procedures can be used.
- For a 16m MS, the 4 HO cases need to be re-investigated.



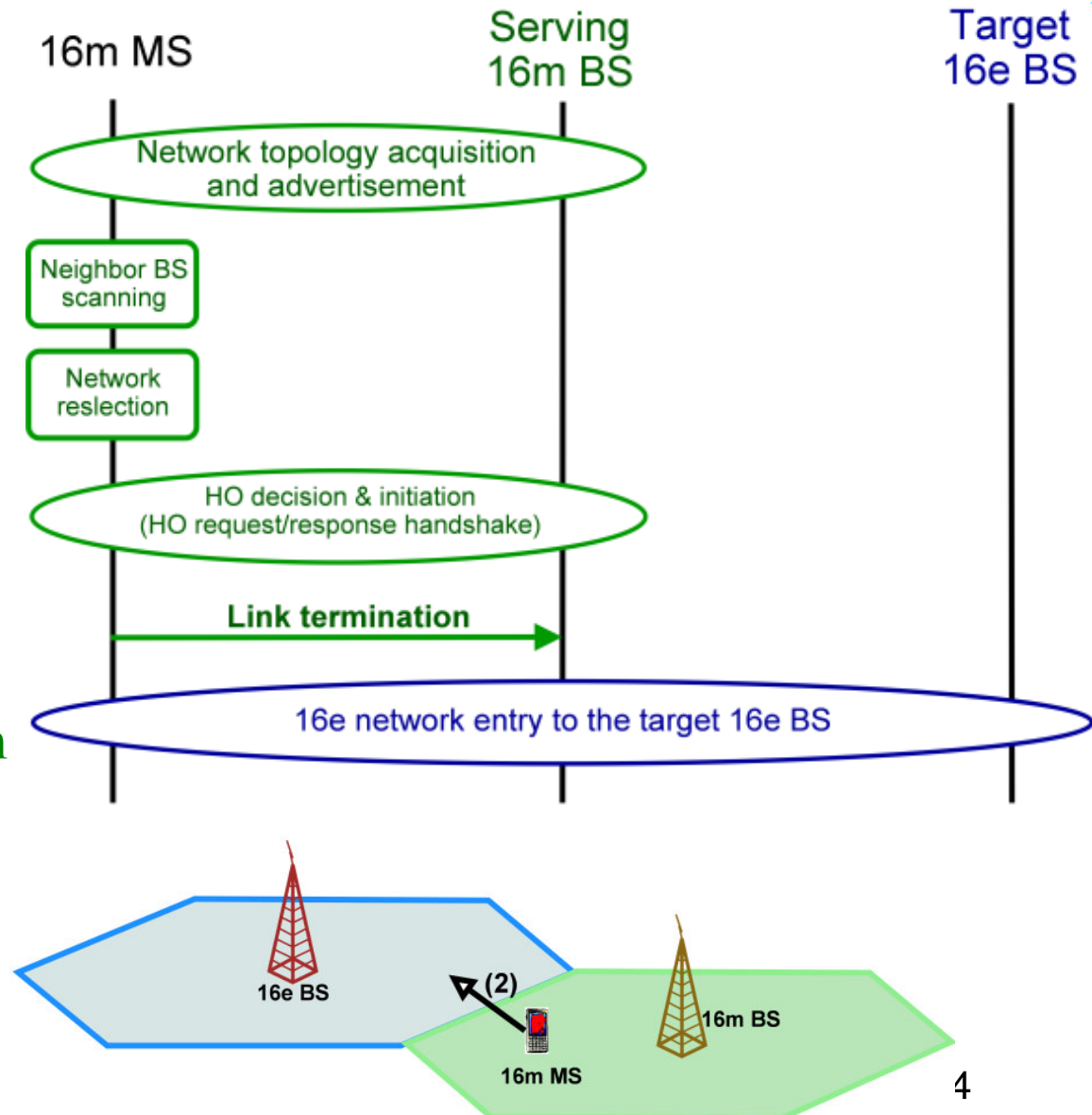
# 16m MS HO Case (1)

- The 16e MS HO is from a 16e cell/sector to another 16e cell/sector.
- The 16m MS can only use 16e HO procedures.



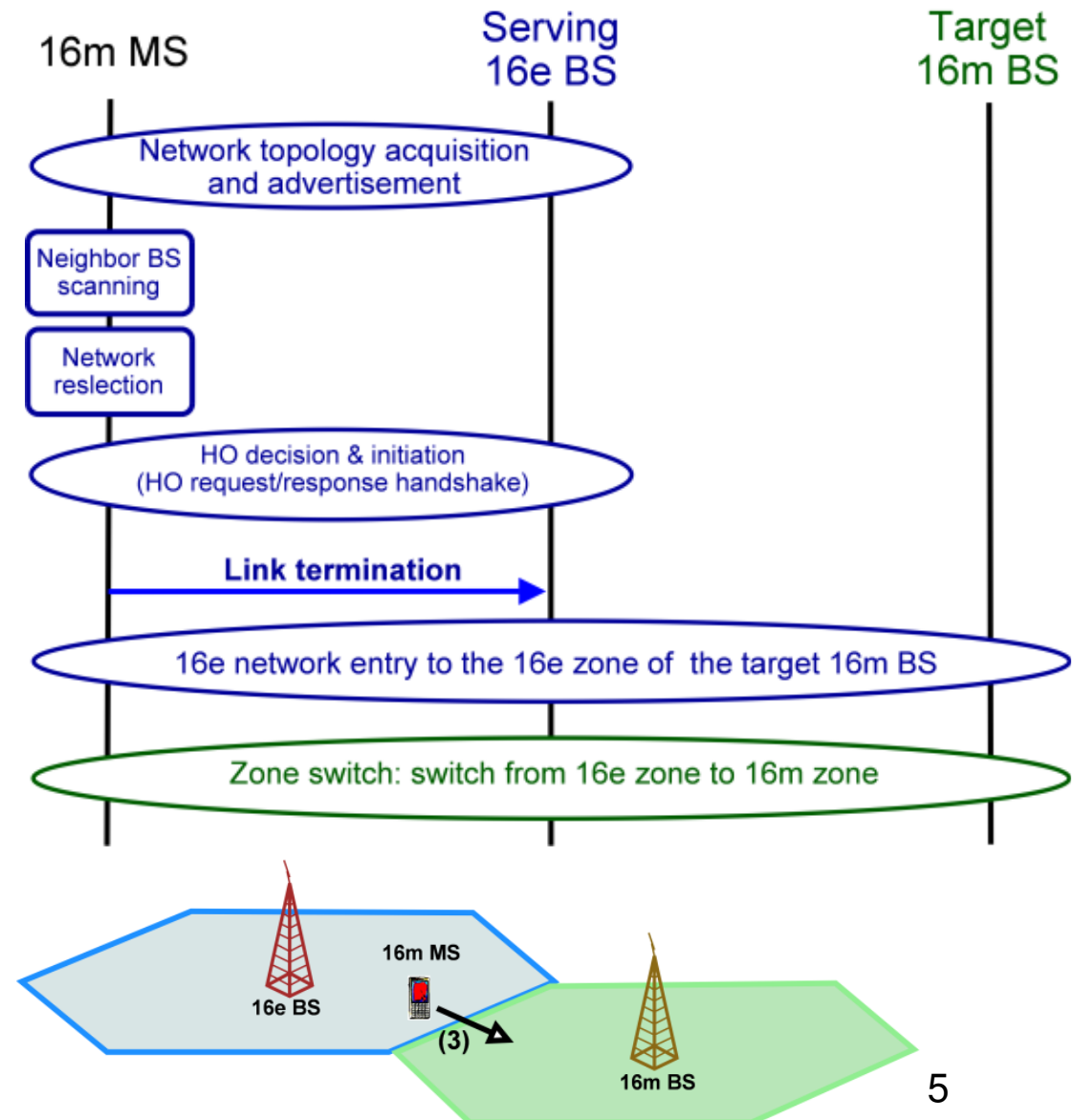
# 16m MS HO Case (2)

- The 16e MS HO is from a 16m cell/sector to another 16e cell/sector.
- The serving 16m BS can collect the information of its neighbor 16m and 16e cells/sectors.
- Network topology acquisition and advertisement, neighbor BS scanning, network reselection, HO decision & initiation, and link termination are through 16m HO procedures.
- The network entry to the target 16e BS is through 16e network entry procedures.



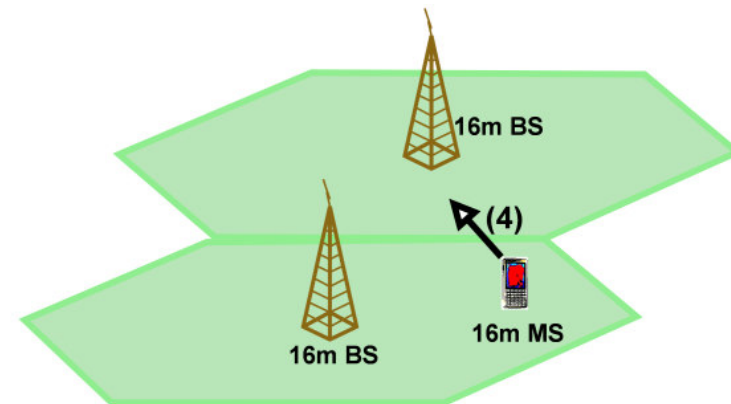
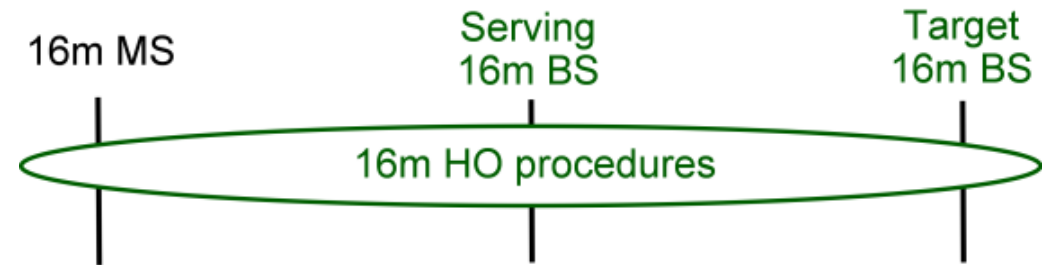
# 16m MS HO Case (3)

- The 16e MS HO is from a 16e cell/sector to another 16m cell/sector.
- The serving 16e BS cannot know whether the neighbor cell/sector is 16m or not.
- One feasible way in this case is that the 16m MS may use 16e HO procedures firstly to handover to the 16e zone of the target 16m BS.
- Then the 16m MS can detect that it is a 16m cell/sector through some indicator (e.g. a new value in 'HO type support' in DCD TLV) and send the request to switch to 16m zone.
- On the other hand, the direct HO from a 16e cell/sector to a 16m cell/sector is FFS.



# 16m MS HO Case (4)

- The 16e MS HO is from a 16m cell/sector to another 16m cell/sector.
- The 16m MS can use 16m HO procedures.



# HO Cases Summary

	Serving BS \ Target BS	16e	16m
	16e MS	16e	16e HO Procedures
16m			
16m MS	16e	16e HO Procedures	<ul style="list-style-type: none"> <li>- 16e HO Procedures with zone switch (16e to 16m)</li> <li>- Direct HO from 16e to 16m (FFS)</li> </ul>
	16m	16m: <ul style="list-style-type: none"> <li>- Network topology acquisition and advertisement</li> <li>- Neighbor BS scanning</li> <li>- Network reselection</li> <li>- HO decision &amp; initiation</li> <li>- Link termination</li> </ul> 16e: <ul style="list-style-type: none"> <li>- Network entry to the target 16e BS</li> </ul>	16m HO Procedures

# Proposed Text for SDD (1/4)

## **10 Media Access Control Sub-Layer**

### *10.x Handover in 16m/e co-existing systems*

The 16m/e co-existing systems consist of 16m and 16e cells/sectors. The 16m MS and BS should support both 16m and 16e handover (HO) procedures. Therefore every 16m or 16e MS can HO among 16m and 16e cells/sectors.

#### *10.x.1 Neighbor Cells/Sectors Information*

The 16m BS should be able to collect the information of its neighbor 16m and 16e cells/sectors. The 16m BS should provide its cell/sector information of 16e zone to the neighbor 16e BSs. The information of the a neighbor 16m cell/sector includes its 16m and 16e zones. Through neighbor cells/sectors information advertisement, a 16m MS can use both 16m and 16e information, but a 16e MS can only use the 16e information.



# Proposed Text for SDD (2/4)

## *10.x.2 Handover Cases*

In 16m/e co-existing systems, there are 4 HO cases for a 16m or a 16e MS:

Case (1): HO from a 16e cell/sector to another 16e cell/sector

Case (2): HO from a 16m cell/sector to another 16e cell/sector

Case (3): HO from a 16e cell/sector to another 16m cell/sector

Case (4): HO from a 16m cell/sector to another 16m cell /sector

### *10.x.2.1 16e MS Handover*

For a 16e MS, only 16e HO procedures can be used.

# Proposed Text for SDD (3/4)

## *10.x.2.2 16m MS Handover*

### *10.x.2.2.1 Case (1)*

The 16e MS HO is from a 16e cell/sector to another 16e cell/sector. The 16m MS can only use 16e HO procedures.

### *10.x.2.2.2 Case (2)*

The 16e MS HO is from a 16m cell/sector to another 16e cell/sector. The serving 16m BS can collect the information of its neighbor 16m and 16e cells/sectors. Network topology acquisition and advertisement, neighbor BS scanning, network reselection, HO decision and initiation, and link termination are through 16m HO procedures. The network entry to the target 16e BS is through 16e network entry procedures.

# Proposed Text for SDD (4/4)

## *10.x.2.2.3 Case (3)*

The 16e MS HO is from a 16e cell/sector to another 16m cell/sector. The serving 16e BS cannot know whether the neighbor cell/sector is 16m or not. There are two possible ways of HO in this case. One feasible way is that the 16m MS may use 16e HO procedures to handover to the 16e zone of the target 16m BS. Then the 16m MS can detect that it is a 16m cell/sector through some indicator (e.g. a new value in 'HO type support' in DCD TLV) and send the request to switch to 16m zone. Another way of HO is the direct HO from a 16e cell/sector to another 16m cell/sector, which is FFS.

## *10.x.2.2.4 Case (4)*

The 16e MS HO is from a 16m cell/sector to another 16m cell/sector. The 16m MS can use 16m HO procedures.