Proposed SDD Text Changes on Relay Frame Structure - Clarifications on Open Items of Option 2

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Venue:

SDD, in response to Call for Comments/Contributions (IEEE 802.16 #57 Kobe, Japan)

Re:

IEEE 802.16m-08/033: Call for Contributions and Comments on Project 802.16m System Description Document (SDD), Target topic: “SDD Session 56 Cleanup, Call for PHY details”.

Base Contribution:

Purpose:

For discussion and adoption of Option 2 for Relay Frame Structure in 16m SDD

Clarifications on Open Items of Option 2 in Relay Frame Structure

LG Electronics

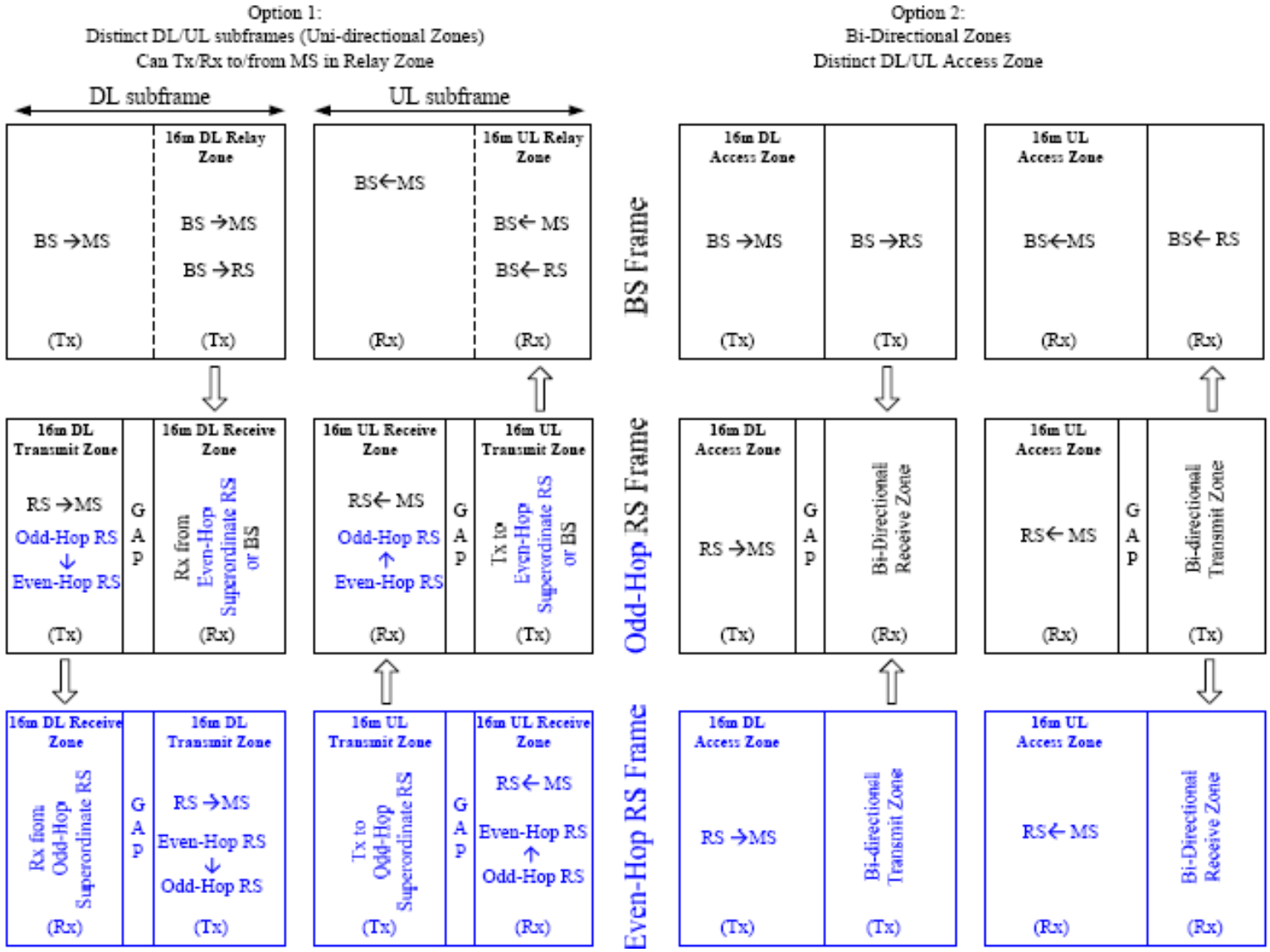
Outline

- Quick Summary from #56 Meeting, Denver, CO
  - Two major Options for 16m relay FS
  - Open items for Options 1 and 2
- Clarifications of Open Items in Option 2

Relay FS Options

- C80216m-003r4
  - Three options for 16m relay frame structure (FS) were introduced and discussed during #56 meeting
  - Option 1: Uni-directional
  - Option 2: Bi-directional

Relay FS: Option 1 and Option 2

- 

Open Items for Option 2

- C80216m-08_848r2 (Relay AHG report #56, Denver)
- 1. How would you do distributed scheduling
- 2. Control signaling
- 3. How would you do Power control
- 4. Need to investigate Interference DL to UL
- 5. Latency
- 6. Subchannelization scheme (DL/UL compatible)
- 7. Synchronization

Clarification on “Distributed scheduling”

- “coordination” by superordinate node

Clarification on “Control signaling”

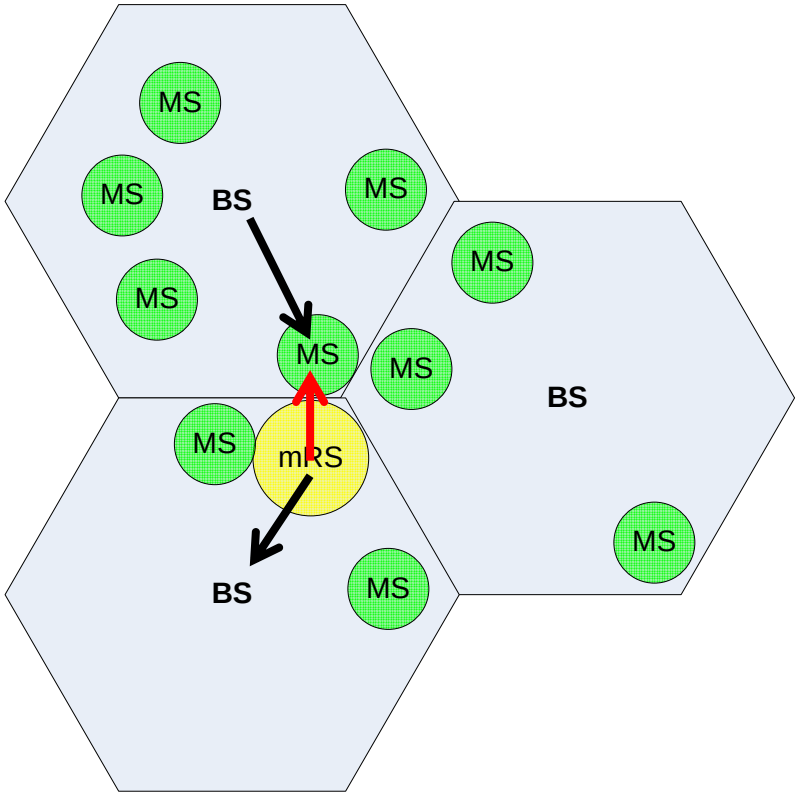
- “coordination” by superordinate node

Clarification on “Power control”

- Simultaneous transmission to both superordinate and subordinate nodes, which have different distances from the transmitter node: this is not a new problem since this is often the case in typical DL transmission where one transmitter and multiple receiver nodes are existent.
- The intermediate station receiving from both superordinate and subordinate nodes simultaneously should feedback channel condition on the respective relay links to the transmitter nodes.

Clarification on “Interference DL to UL” (1/2)

- **Case 1**: Both Options 1 and 2 have the same level of interference. When mRS transmits, it doesn’t matter whether the direction is UL or DL.
- If the signal for MS in DL (from serving BS or RS) is weaker than the interference from mRS in the neighboring cell, the MS should be attached to the mRS instead of the BS/RS.

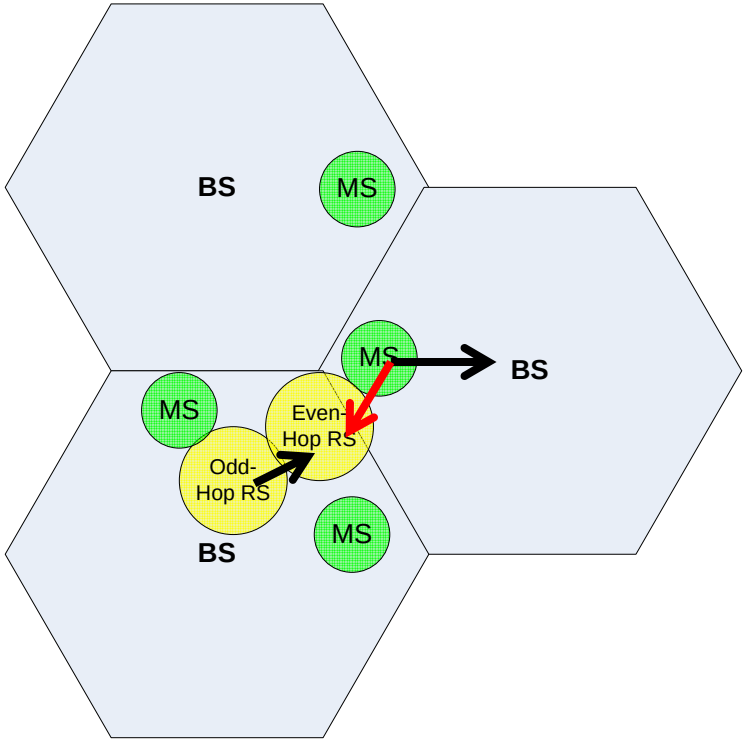


Interference

Communication

Clarification on “Interference DL to UL” (2/2)

- **Case 2**: Consider a case that the MS is so close to the mRS in the neighboring cell that the interference from the mRS is too strong. In this case, the MS can be attached to the mRS (in the neighboring cell) instead of being attached to the serving BS/RS.
- If mRS2 transmits at a weaker DL pilot power than the serving BS, the MS can be attached to the BS. mRS2 is very close to MS. In this case, the “*MS will transmit at a higher Tx power level so that the mRS2 can hardly listen to another RS*”. This is the same for Option 1, where the only difference is “*MS will transmit at a higher Tx power level so that the mRS2 can hardly listen to another MS*”.



Clarification on “Latency”

- Latency comparison example:
  - Setups:
    - 5 subframes for DL : 3 subframes for UL
    - Legacy zones come first, followed by 16m zones
  - Result:
    - The latency in Option 2 is smaller than that of Option 1.

<source: IEEE C802.16m_08-926, LGE>

	# hop	Option 1		Option 2	
		Access/Relay	**Relay/Access**	**MS use access zone**	**MS use Bi-D zone**
DL	2	2-frame(8-subframe)	2-frame(10-subframe)	2-frame(8-subframe)	1-frame(4-subframe)
	3	3-frame(17-subframe)	3-frame(17-subframe)	2-frame(8-subframe)	2-frame(8-subframe)
	4	4-frame(24-subframe)	4-frame(26-subframe)	3-frame(16-subframe)	2-frame(12-subframe)
UL	2	2-frame(10-subframe)	2-frame(10-subframe)	2-frame(10-subframe)	2-frame(10-subframe)
	3	3-frame(17-subframe)	3-frame(17-subframe)	2-frame(10-subframe)	2-frame(10-subframe)
	4	4-frame(26-subframe)	4-frame(26-subframe)	3-frame(18-subframe)	3-frame(18-subframe)

Clarification on “Subchannelization”

- In sect. 11.5.1.2 and 11.6.1.2 in SDD (r4), the LLRU can be used for both UL and DL.
- “coordination”: e.g., odd hop RS’s use the same hopping pattern and even hop RS’s use the same pattern, respectively.

Clarification on “Synchronization”

- Problem or Example: Simultaneous reception from two neighboring nodes
- Comment: if there is centralized synchronization (e.g., by BS), then there are no concerns about synchronization at simultaneous reception from parent and child.
- RS can use superordinate node’s signal arrival time to adjust subordinate delay (timing advance).

Proposed SDD Text Changes

- [Delete the text and figure from line 7 of page 39 to line 7 of page 41]
- [Delete the top three lines of Figure 24 in the subclause 11.4.4, accordingly]
- [Change the caption of Figure 24 in the subclause 11.4.4 (Relay Support in Frame Structure) as indicated]
- Figure 24 Relay Frame structure
- [Delete the following text at the line 3 the page 42 in the subclause 11.4.4 (Relay Support in Frame Structure)]
- [Change the text on line 5 of page 42 in the subclause 11.4.4 (Relay Support in Frame Structure) as indicated]
- Definitions of zones shown in Figure 24.