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Purpose	Review and adopt	
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On the RS Grouping Concept

Adrian Boariu, et al.

NSN

Introduction

During the March 2007 meeting, the concept of virtual relay grouping for centralized scheduler has been introduced in [2], which allows an RS to be part of a group of RSs in order to extend the coverage area of a certain RS, as well as to increase the channel diversity order.

Some clarifications

The current mode of operation as defined in the baseline document is confusing and mixes the operation of transparent with non-transparent relays.

We think that the following clarifications simplify the understanding and the mode of operation for the virtual group relay.

A virtual RS group:

- Shall operate under centralized scheduler, and shall serve only MSs in order to cope with the mobility issues and HARQ that are difficult under centralized scheduling.
 - UL HARQ operation for virtual group is case of more than two hops is not feasible. When MS sends UL HARQ burst in frame N, it expects DL ACK/NAK bitmap IE at-most in the frame N+3. In case of virtual grouping, UL ACK/NAK bitmap IE for MSs has to be generated by MR-BS (status of UL HARQ burst reception at each RS in the group could be different and therefore RS can not generate and transmit DL ACK/NAK bitmap IE to MS). If 1 frame offset is assumed for ACK transmission and HARQ burst relaying then it is not possible to support UL HARQ for more than 2 hops.
- Shall have assigned a BSID value for the entire virtual group, so that the MSs perceives the entire group as a single RS.
- Shall do data forwarding on per CID basis and not on per MS basis. RS does not know which CIDs belongs to which MSs. Even if MR-BS provide this information to RSs, advantages of data forwarding per MS basis are not clear.

Specification changes

[Change the 3rd bullet point in section 6.3.9.16.3.1 RS grouping]

- When the virtual RS group includes an MR-BS, all the RSs in the virtual group shall either transmit the same preamble, FCH and MAP as the MR-BS or they all do not transmit any preamble, FCH or MAP. When an MR-BS is not included in the virtual group, one of the RSs in the virtual group is a non-transparent RS and all the others shall either transmit the preamble, FCH and MAP of the said non-transparent RS or they all do not transmit preamble, FCH and MAP. [The parent RS provides centralized scheduling operation for the RS group. The RS group shall have assigned a BSID value for the entire virtual group. The RS group shall serve only MSs.](#) The radio resources may be shared by these RSs for data burst transmission. The existence of the group is totally transparent to its MS(s).

[Change the 6th bullet point in section 6.3.9.16.3.1 RS grouping]

- Data forwarding within RS group: For DL, the members of an RS group may be configured to forward traffic data for only specific subordinate terminal nodes. This may be done on ~~a per terminal or per transport~~ connection basis. In this way, by specifying scheduling times, two RSs belonging to the same RS group may transmit to two different MSs/SSs at the same time. In addition, transmissions may be scheduled such that multiple RSs in the RS group may transmit to the same MS to exploit macro-diversity. This scheduling may be achieved under a centralized scheduling scheme by keeping an MS list or CID list associated with each RS. Each RS would look for the data bound to its subordinated stations or data coming from the subordinate stations in the uplink and forward in the assigned times indicated in the MAP. The list may be updated by the RS_Member_List_Update message defined in 6.3.2.3.89. If the RS Member List Update message is not provided by the parent RS to RSs in the group, then all RSs in the group shall transmit according to the MAPs received, without using the per CID transmission.

[Change the 8th bullet point in section 6.3.9.16.3.1 RS grouping]

- Each time a handover occurs or a new terminal joins an RS group, the ~~RSs CID/Terminal list of CIDs for RSs in the group is~~ may be updated ~~to keep track of the connections/terminals which are associated with a particular member RS.~~

[In section 6.3.2.3.89 make the following changes]

[Change 1st paragraph as following]

The parent RS of the virtual RS group ~~parent~~ may transmit RS_Member_List_Update message as a multicast message to update the virtual group members with the details of the traffic burst they shall forward. This message is may be transmitted whenever there is a change in the connection list of the RS group members ~~due to their movement or movement of their subordinate nodes.~~

[In Table 183ae change the Notes related to Configured_para_type (4th entry in the table) as following]

b0 = 1: data forwarding on a per CID basis

b0 = 0: RSs in the group shall forward all data ~~forwarding on a per terminal basis~~

b1 – b3: reserved

[In Table 183ae change the Notes related to N_CID (9th entry in the table) as following]

~~If b0 of Configured_para_type=1, number of CIDs whose data is to be forwarded by the RS group member~~
~~If b0 of Configured_para_type=0, number of terminals (the first hop MSs or RSs from the group member) involved with the list update~~

[In Table 183ae change the Notes related to CID (11th entry in the table) as following]

~~If b0 of Configured_para_type = 1, transport CIDs involved with the list update~~
~~If b0 of Configured_para_type = 0, the basic CIDs involved in the list update~~

[In Table 183ae change the Notes related to Add_Remove (12th entry in the table) as following]

- b0 = 1: Add CID/~~terminal~~ to the forwarding list
- b0 = 0: Remove CID/~~terminal~~ from the forwarding ~~the~~-list

[Below Table 183ae delete the description of Config_para_type]

~~Configured_para_type~~

~~The LSB bit indicates whether selective forwarding is enabled on a per CID basis, or on a per terminal basis.~~