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Re:	IEEE P802.16j/D1: IEEE 802.16j working group letter ballot #28	
Abstract	MS Network entry procedures through RS group are proposed	
Purpose	To incorporate the proposed text into the P802.16j/D1 Baseline Document	
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MS Network Entry for RS Groups

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Introduction

Network entry procedures for an MS through a virtual RS group are described. The properties of virtual RS groups are provided in [P802.16j/D1]: (i) The group has a superordinate station, a non-transparent RS or an MR-BS, which is the superordinate station of all members of the group. (ii) All members in the group share the same preamble/FCH/MAP, which is either transmitted by all members, or not-transmitted by any of them. (iii) The superordinate station or MR-BS carry out scheduling/resource control of the group members. (iv) The group can serve only MSs.

If group members do not transmit preamble/FCH/MAP, they monitor the control info as the transparent RSs do; the frame structure is the same as the one for transparent mode described in Section 8.4.4.7.1. If the members transmit the preamble/FCH/MAP, then the frame structure is the same as the one for non-transparent mode described in Section 8.4.4.7.2.

If members do not transmit preamble/FCH/MAP (a transparent RS group), the MSs receive the preamble/FCH/MAP directly from the superordinate station of the group. Note that the members of such a group can also be configured to transmit preamble/FCH/MAP (non-transparent RS group) which is the same as transmitted by the superordinate station. A non-transparent RS group may also be assigned a preamble index that is different from the superordinate station.

We have three cases of an RS group:

1. RS group and the superordinate station of the group transmit different preambles. RS Group members transmit the same preamble/FCH/MAP.
2. The RS group and the superordinate station of the group transmit the same preamble/FCH/MAP.
3. The RS group and the superordinate station of the group share the same preamble but the group members do not transmit preamble/FCH/MAP.

The network entry for Case-3 fits to the procedures in Section 6.3.9.16.1. The first and second cases require additional steps for network entry due to the presence of multiple RSs. The following amendments will enable MS network entry in the presence of an RS group in the multihop relay network.

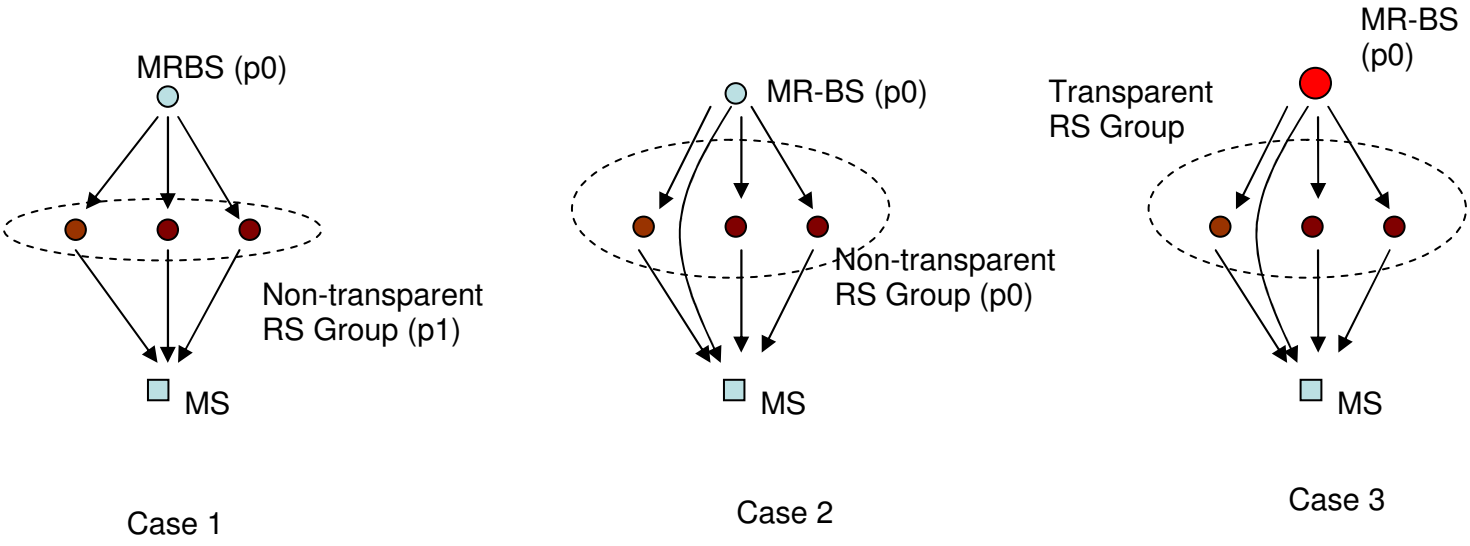

Figure 1 RS group topologies. p0 and p1 refers to the preambles being transmitted by the parent or group.

MS Network Entry with the RS Group

Case 1: Non-transparent RS Group – Parent and group members transmit different preamble/FCH/MAP[1]

The basic difference for MS network entry between the non-transparent RS system with and without the presence RS group is that for the first few CDMA code-based initial ranging attempts, there may be more than one RS involved in the ranging. Depending on the signal measurements and the path selection algorithm, the ranging can continue by enabling the group member with the best signal quality. For example, the MR-BS may select a member RS depending on the first few ranging code transmissions and continue ranging with that member as described in 6.3.9.16.2.1.

Case 2: Non-transparent RS Group – Parent and group members transmit same preamble/FCH/MAP

In this case, the group members transmit the same preamble/FCH/MAP as the parent. The MS receives the MAP also from the parent. This case is similar to the initial ranging with transparent RSs; however, the members are non-transparent, so the parent may need to transmit ranging messages to the members in the relay zone before sending them to the MS when the selected path contains a member of the group.

[1] Members in the same group transmit the same preamble/FCH/MAP which are different from those transmitted by the parent.

Case 3: Transparent RS Group – Group members do not transmit preamble/FCH/MAP

This case is valid if the parent is an MR-BS, and in this case, the MS network entry described in Section 6.3.9.16.1 can be followed.

Proposed Text Changes

++++Begin Text Changes++++++++

[Modify the text in Subclause 6.3.9.16.3.1.1 as following]

6.3.9.16.3.1.1 MS Network entry procedures

Each RS group member shall monitor the CDMA ranging codes from subordinate nodes. If the group is a transparent RS group, then RS group members shall follow the procedures in 6.3.9.16.1. If the group is a non-transparent RS group, then the procedures in 6.3.9.16.3.1.1.1 or 6.3.9.16.3.1.1.2 shall be followed. .

[Insert new Subclause 6.3.9.16.3.1.1.1]

6.3.9.16.3.1.1 .1 Non-transparent RS Group with a parent transmitting different preamble index

In MS network entry of an MS via an RS group, MS scans for downlink channel and establish synchronization with the non-transparent group members, obtains the transmit parameters from UCD message as described in Sections 6.3.9.1-6.3.9.4.

The initial ranging starts with initial-ranging CDMA code transmission from MS on the UL allocation dedicated for that purpose. The code may be received by some or all members of the RS group near the MS. The members that receive the code with sufficient signal quality send a RNG_REQ message to the parent on the RS basic CID setting the MR ranging indicator to 1. When the parent receives a RNG_REQ containing initial ranging code with RS basic CID, it shall wait for the RNG_REQ with the same ranging code attributes from other group members for T57 timer. Once T57 timer expired, the parent, if it is not an MR-BS, shall forward towards the MR-BS a RNG_REQ message consisting of code parameters and adjustments received from the group members. Once MR-BS gathers the signal information from all members, the MR-BS may decide on a path (which amounts to selection of a member in the group) based on these channel measurements. The path selection algorithm is out of the scope of this standard (MR-BS may either select to continue ranging with only one member, or with all members depending on the measurements).

When the ranging status at the selected path is continue, the MR-BS shall send to the MS a RNG_RSP message that contains the adjustment information measured at the selected group member. The parent may use multicast RSID or basic CID to forward the RNG_RSP message. Members receiving the RNG_RSP message shall send the RNG RSP to the MS with the required adjustments on initial ranging CID. If RNG_RSP from the parent is received with multicast RSID with continue status, all members shall continue ranging procedures with this MS, e.g., each member shall send a RNG_REQ to the parent upon reception of the new ranging code on periodic ranging slot. If RNG_RSP from the parent is received with basic CID with continue status, only the member on the selected path shall continue ranging procedures with this MS, e.g., only the selected member shall send a RNG_REQ to the parent upon reception of the new ranging code on periodic ranging slot, and the procedures in 6.3.9.16.2.1 shall be followed.

After MS receives its basic and primary management CIDs, the MS and MR-BS continue network entry process as described in Sections 6.3.9.7 through 6.3.9.13.

[Insert new subclause 6.3.9.16.3.1.1.2]

6.3.9.16.3.1.1.2 Non-transparent RS Group transmitting the same preamble/FCH/MAP as the parent

Upon synchronization with the group members and the parent, the MS receives the DCD/UCD message as described in 6.3.9.1-6.3.9.4.

Initial ranging starts with the transmission of CDMA codes from the MS in the UL allocation indicated in UL MAP. The code may be received by the parent and the members of the group. Members receiving the code with sufficient signal quality shall transmit a RNG_REQ (that contains the code parameters and adjustments, and MS ranging indicator set to 1) to the MR-BS with their basic CIDs.

When the parent receives an initial ranging code or a RNG_REQ containing initial ranging with RS basic CID at the first time, it shall wait for RNG_REQ messages with the same code attributes for T58 timer. Once T58 timer expires, the parent, if not an MR-BS, shall forward an aggregate RNG_REQ message towards the MR-BS (with MS ranging indicator set to 1). After the MR-BS receives the measured signal quality at each station (e.g., at each member RS), it decides on the most appropriate path, e.g., may select the direct path (from parent to the MS) or a member RS (DL and UL relaying from parent to the MS by the group member(s)). When the ranging status in the selected path is continue, the MR-BS shall send a RNG_RSP towards the MS with the adjustments for the access station on the selected path. If the direct path between the MS and the parent is selected, the parent shall forward ranging messages directly to the MS with initial ranging CID. If the selected path contains a group member, the parent shall send ranging messages to the selected member first with its basic CID and the selected member shall send the RNG_RSP message to the MS with initial ranging CID. Once a path is selected, the procedures in 6.3.9.16.2.1 shall be followed.

After MS receives its basic and primary management CIDs, the MS and MR-BS continue network entry process as described in Sections 6.3.9.7 through 6.3.9.13. Depending on the selected path, the messages may be relayed through the group members or directly by the parent. During the network entry process, the members may monitor the management messages to collect signal quality measurements for member list configuration and some other purposes.

[Insert the following rows to Table 583 in subclause 10.1]

System	Name	Time Reference	Minimum value	Default value	Maximum value
MR-BS	T57	Wait for RNG-REQ from the members of a non-transparent group members transmitting different preamble form the parent's	TBD	TBD	TBD
MR-BS	T58	Wait for RNG-REQ from the members of a non-transparent group members transmitting the same preamble as the parent's	TBD	TBD	TBD

++++End Text Changes++++++++