Title	Mobile Relay Station Preamble Segment Re-Assignment Scheme [New version pending on co-authors approval]
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Re:	Call for Technical Proposals regarding IEEE Project P802.16j (IEEE 802.16j-07/007r2)
Abstract	This contribution proposes mobile relay-station preamble and segment re-assignment scheme that mitigates system interference during mobility MRS handover.
Purpose	Propose the text regarding mobile relay-station preamble segment re-assignment for multi-hop relay systems
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Mobile Relay-Station Preamble Segment Re-Assignment Scheme

1. INTRODUCTION

The initial network entry process for MS is defined in IEEE Std. 802.16-2004 & 802.16e-2005, Section 6.3.9. In the DL PUSC mode, any segment used in the preamble shall be allocated at least one group (default is 12 subchannels in case of OFDM-2048) in the DL First Zone that contains FCH and DL-MAP. The default allocated subchannel sets for segments 0, 1, 2 are subchannels 0-11, 20-31, and 40-51, respectively. For example, when segment 0 is detected in the DL preamble of the frame structure, the immediately followed First Zone PUSC (i.e., FCH and DL-MAP) messages shall use at least 12 subchannels 0-11 to encode the FCH and DL-MAP control signaling. Note that the First Zone PUSC subchannel can cause interference with the same segment value.

In the relay enabled system, a Mobile RS (MRS) can be turned on at anytime and anywhere. If the MRS coverage area overlaps its neighbors RSs/BSs coverage areas and the same segment values are used, then in this situation co-channel interference may arise and MS/SS (mobile station/subscriber station) may not decode Cell IDs and control messages such as FCH and DL-MAP signals. In order to mitigate interference, we propose MRS preamble and segment re-assignment methods used as the MRS moves.

2. MOBILE RS PREAMBLE SEGMENT CONFIGURATION

After the mobile RS has registered with the MR-BS, it may move. In this case, two RSs (nomadic/mobile/fixed RS) or BS may end up geographically close to one another and they may interfere with each other if they have the same segment value. In order to mitigate co-channel interference due to the RS mobility, we propose a preamble segment re-assignment method associated with mobility handover

2.1 Mobile RS Preamble Segment Re-Assignment

During the initial network entry procedure, the MR-BS has assigned a segment “0”, “1”, or “2” to each RS in its coverage area. MR-BS can simply re-assign a different segment value to mobile RS that is interfering with other fixed/nomadic RSs. If both RSs are mobile RS, than we can re-assign one of them. Before the mobile RS segment reassignment, the BS/RS will command all the MSs within the mobile RS’s serving coverage area to switch to the newly assigned preamble segment at pre-determined action time via MOB_BSHO_REQ and MOB_HO_IND handover procedure as shown in Figure 1. With this virtual handover process, all the MSs do not really handover to a different RS. The targeted RS is the same as the previous serving RS but re-assigned a new RS preamble segment value and all the MSs controlled by this RS switch to this newly re-assigned RS preamble segment value with the same or different IDCell. The message signaling of mobile RS preamble segment re-assignment method is shown in Figure 1.

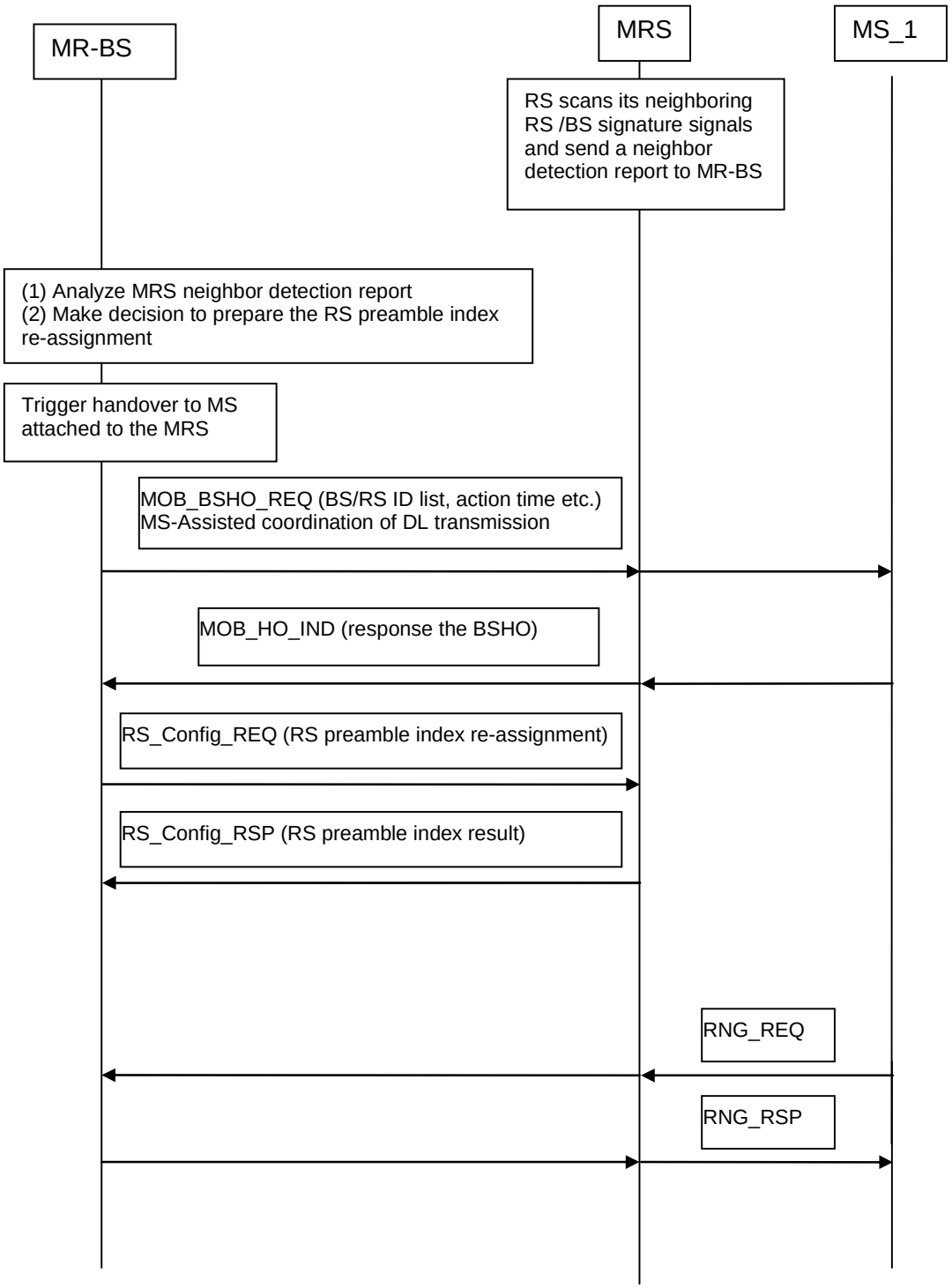

Figure 1. The message signaling for the mobile RS preamble segment re-assignment.

3. CHANGES TO THE SPECIFICATION

[Insert new subclause (6.3.22.4.4)]

6.3.22.4.4 MRS handover with preamble index changes (Intra MR-BS)

When MRS coverage area overlaps with another ISs coverage area, MR-BS may initiate MRS preamble reassignment procedures as define in section 9.4, using RS_Config_REQ/RSP. If MRS preamble is changed then all the active MS connections are handed over to the same physical MRS using procedures in 6.3.22. All the associated MSs within the MRS's serving coverage are switched to the newly assigned preamble segment at pre-determined action time via MOB_BSHO_REQ. The action time allows MRS time to switch newly assigned preamble index.
The MOB_BSHO-REQ message carries the same BSID as the serving BS ID in the "Neighbor BSID" field while the "Preamble index/Subchannel index" field is changed to the newly preamble index, under mode=0b000 .

After sending out MOB_BSHO-REQ message, the MRS segment reassignment procedure is executed using RS_CONFIG-REQ/RSP messages.

[Add the following text at the end of subclause 9.4 RS Configuration]

When MRS moves to another segment, its essential control information such as FCH and MAP may interfere with the MR-BS or RS allocated the same segment. In order to mitigate co-channel interference due to the RS mobility, the MRS is configured with a new preamble.