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Title	Moving Relay Station Preamble/Segment Selection
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Re:	A response to a Call for Technical Proposal, http://wirelessman.org/relay/docs/80216j-07_013r3.pdf
Abstract	In this contribution, a method of preamble selection for a moving RS is proposed.
Purpose	To incorporate the proposed text into the P802.16j Baseline Document (IEEE 802.16j-06/026r3)
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Moving Relay Station Preamble/Segment Selection

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1 Introduction

This contribution was discussed in the session 48 and rejected. The reason for the rejection is “Broadcasting of this message is not required”. The rejection reason is not clear since there are several messages defined in the proposal. In addition, the reason does not really provide any clues on why the message is not required. However, based on some offline discussion with other members, there is a concern that if the reserved preamble pool is too small, then there is a possibility that two MRSs will have preamble collision. This contribution is updated to address this concern and to be aligned with the new baseline document.

2 Problem Statement

A moving RS needs to transmit 802.16e frame start preamble to enable attached MSs to perform DL synchronization. When a moving RS traverses through a network, its cell ID and preamble assignment needs to be updated in order to avoid ID and preamble collision. However, once a preamble re-assignment occurs, its associated MSs are required to do handovers, even in the case where no relative movement between the MRS and MSs. The simultaneous MS handover may cause service interruptions and excess amount of overhead over the MR-BS and MRS link. Therefore, it is desirable to avoid the frequent update of cell ID and preamble.

3 Proposal

We propose that a small set of preamble indexes are reserved (network-wide) for moving relay station. The benefit is the elimination of preamble collision of a moving RS with fixed RS(s) or MR-BS during movement of a moving RS, by which handover of MS(s) caused by preamble change can be fully avoided. The possibility of collision of preambles of two moving RS(s) is very low. When either preamble collision or high co-channel interference events happen, we suggest that two moving RSs form a temporary virtual RS grouping. Once two moving RSs move apart, it can then go back to individual RS station. By doing so, the preamble reassign procedure can be avoid entirely, so does the handover of all associated MSs. The virtual RS grouping forming or deletion process are described in the baseline document

In case that RS or MR-BS do not support virtual RS grouping, then it is desirable to have a mechanism for preamble reselection. When either preamble collision or high co-channel interference events happen, we suggest that a moving RS changes its preamble only when some conditions are met. The strength and the duration of strong interference will be used as the factors for the preamble/segment reselection (i.e., preamble reselection thresholds). By doing so, the possibility of preamble reselection (hence MS handover) during movement of a moving RS can be reduced.

Depending on a deployment scenario, it is not necessary to have moving RS in a network; therefore, we should allow MR-BS to configure these operations.

We propose that MR-BS(s) broadcast the reserved preamble indexes for moving RS(s).

4 Text Proposal

++++++++++++++++ Start Text ++

4.1 3.1 Broadcast of reserved preambles and preamble reselection thresholds for moving RS

[Insert following text into XXX]

11. xxx RS_CD message TLV encoding

11.xxx.1 Preamble indexes reserved for moving relay station

This field may be used by a MR-BS to broadcast to relay stations the preamble indexes reserved for moving relay station.

Type	Length	Value	Scope
1	Variable	Bits#0-#3: number of preamble indexes (N) Bit#4-#(7N+3): List of N preamble indexes (7 bits each)	RS_CD

11.xxx.2 Preamble reselection thresholds

This field may be used by a MR-BS to broadcast the preamble reselection thresholds for moving relay station.

Type	Length	Value	Scope
2	2	Bits #0 -#7: Interference signal strength threshold Bits#8-#11: Interference duration threshold in number of frames Bits #12-#15: Window for reselecting the preamble (segment) in unit of 10 frames	RS_CD

4.2 Moving RS initial network entry

[Insert following text into XXX]

6.3.9.16.3 RS network entry and initialization

6.3.9.16.3.1 Fixed RS Preamble selection

6.3.9.16.3.2 Moving RS preamble selection

During the initial network entry, a moving RS shall obtain parameter “preamble indexes reserved for moving RSs’ from MR-BS broadcast RS_CD message. The moving relay station shall measure the strength of preambles reserved for moving RS and report to MR-BS through RS_NBR-MEAS-REP (see 6.3.2.3.68) message the preamble index with the least signal strength. MR-BS shall assign the preamble index based on the report from the moving RS and any additional available information.

During the movement of a moving RS, if following events happen:
Preamble collision
Co-channel interference strength measured is higher than the preamble(segment)-reselection threshold and the interference lasts longer than the duration threshold
The moving RS may re-select the preamble (segment) within the preamble-reselection window.
The parameters governing the preamble (segment) reselection procedure of moving RSs is broadcasted in the RS configuration description (RS_CD) message as TLV of Preamble (segment) reselection threshold.

++++++++++++++++ End Text ++