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| Re: | A response to a Call for Technical Proposal, http://wirelessman.org/relay/docs/80216j-06_034.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-06/026r1) | |
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# Moving Relay Station Preamble/Segment Selection

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## 1 Introduction

A moving RS needs to transmit 802.16e frame start preamble to enable attached MSs to perform DL synchronization. In this contribution, a method of preamble selection for a moving RS is proposed.

## 2 Problem Statement

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. 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 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 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) and preamble reselection thresholds in a broadcast message → RS Configuration Description message (RS_CD, refer to IEEEC802.16j_242).

## 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. During network entry, a moving relay station shall measure the strength of preambles reserved for moving RS and report to MR-BS through RS_Config-REQ message the preamble index whose strength is lowest. MR-BS shall assign the preamble index based on the report from the moving RS and any additional available information.

| Type | Length | Value | Scope |
|---|---|---|---|
| 1 | Variable | Bits#0-#3: number of preamble indexes (N)<br>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<br>Bits#8-#11: Interference duration threshold in number of frames<br>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 Network entry and initialization**

**6.3.9.16.1 RS network entry and initialization**

**6.3.9.16.1.1 Fixed RS Preamble selection**

**6.3.9.16.1.2 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 RS shall shall measure the strength of preambles reserved for moving RS and report to MR-BS through RS_Config-REQ message the preamble index whose strength is lowest.

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.

## 4.3 Indication of preamble selection by a moving RS

RS_Config messages are used for moving RS preamble selection.

[Add two new section 6.3.2.3.62 and 6.3.2.3.63 as described]

### 6.3.2.3.62 RS configuration request message

This message may be transmitted by a RS to request some physical layer operation parameters. A RS may use this message to report information to MR-BS to facilitate the determination on the configuration of RS operation parameters.

Table XXX. RS_Config-REQ message format.

| Syntax | Size | Notes |
|---|---|---|
| RS_Config-REQ format { | | |
| Management message type = 67 | 8 bits | |
| Configuration_para_type | 8 bits | b0 = 1: preamble configuration is included;<br>b1 – b7: reserved |
| If (b0 of Configured_para_type == 1 ) { | | |
| Number of preamble index | 3 bits | |
| For (I = 0; i++; I<Number of preamble index) { | | |
| Preamble_index } | 7 bits | Preamble index |
| } | | |
| } | | |

**Configuration_para_type**
The first bit is used as preamble index indicator to indicate the preamble_index field appearance in this message
**Number of preamble index**
This field is used to indicate the number of preamble index which present in this messae

**Preamble_index**
This field is used to indicate the preamble index

### 6.3.2.3.63 MR-BS configuration response message

This message may be transmitted by a MR-BS for the purpose of RS configuration. A MR-BS can use this message to set operation parameters for a RS. MR-BS can transmit this message as a response to RS_Config-REQ or as an unsolicited message.

| Syntax | Size | Notes |
|---|---|---|
| RS_Config-RSP format { | | |
| Management message type = 68 | 8 bits | |
| Configured_para_type | 8 bits | b0 = 1: preamble configuration is included;<br>b1 – b7: reserved |
| If (b0 of Configured_para_type == 1 ) { | | |
| Preamble_index } | 7 bits | Preamble index |
| } | | |

**Configuration_para_type**
The first bit is used as preamble index indicator to indicate the preamble_index field appearance in this message

**Preamble_index**

This field is used to indicate the preamble index

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