Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>
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Re:	IEEE 802.16j-07/007r2:"Call for Technical comments and contributions regarding IEEE Project P802.16j"
Abstract	This document presents a relay MAC PDU format for IEEE 802.16j.
Purpose	Propose the sleep mode operations for IEEE 802.16j
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A Proposal for Relay MAC PDU Format in 16j Network

Introduction

As described in current 16j baseline, relay MAC PDU can be transmitted by using the tunnel or station ID. Here we propose a relay MAC PDU format which is transmitted on relay link. The relay MAC PDU format proposed here is used for multihop relay network without using the tunnel.

A multihop relay network is illustrated as Figure 1. MR-BS receives PDUs from the network for mobile stations. MR-BS shall creating relay MAC PDUs (R-PDUs) for transmission on relay link to the designated RS by encapsulating MS's MAC PDUs to a relay MAC PDU (R-PDU). RS receives the relay MAC PDU and decodes it to regular MAC PDU for its MS.

For multihop relay network, MR-BS encapsulates subordinate R-PDU and MS MAC PDU into a superordinate R-PDU. MR-BS always first create R-PDUs for RS of the last hop and encapsulates the created R-PDU and MS MAC PDUs, if exist and necessary, into a superordinate R-PDU. The above process is repeated until the R-PDU for the RS of the first hop is created. RS of the first hop receives and decodes the R-PDU into regular MS MAC PDUs and R-PDUs, and transmits them to MS and its subordinate RS on access link and relay link respectively.
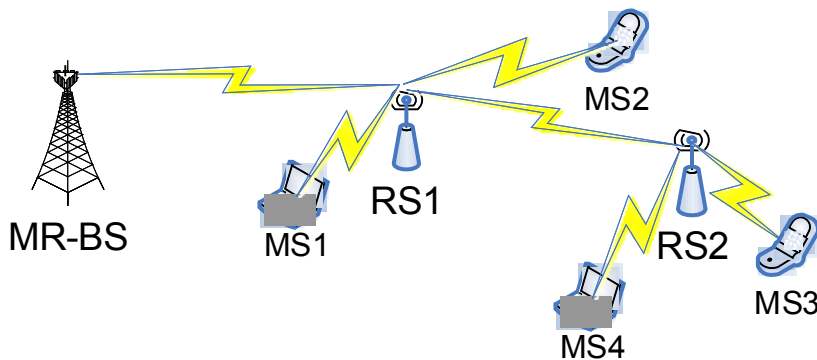

Figure 1

The exemplary format of relay MAC PDU (R-PDU) is illustrated in Figure 2. The R-PDU for RS1 is created by MR-BS and transmitted on relay link to RS1. After RS1 receives this R-PDU, RS1 decodes the R-PDU to R-PDU for RS2 and MAC PDUs for MS1 and MS2. RS1 transmits MAC PDUs for MS on access link and transmits R-PDU to RS2 on relay link. CRC fields can be included in R-PDUs. The PHY burst allocation on which R-PDU is transmitted is addressed to the designated RS which is respected to receive the R-PDU.
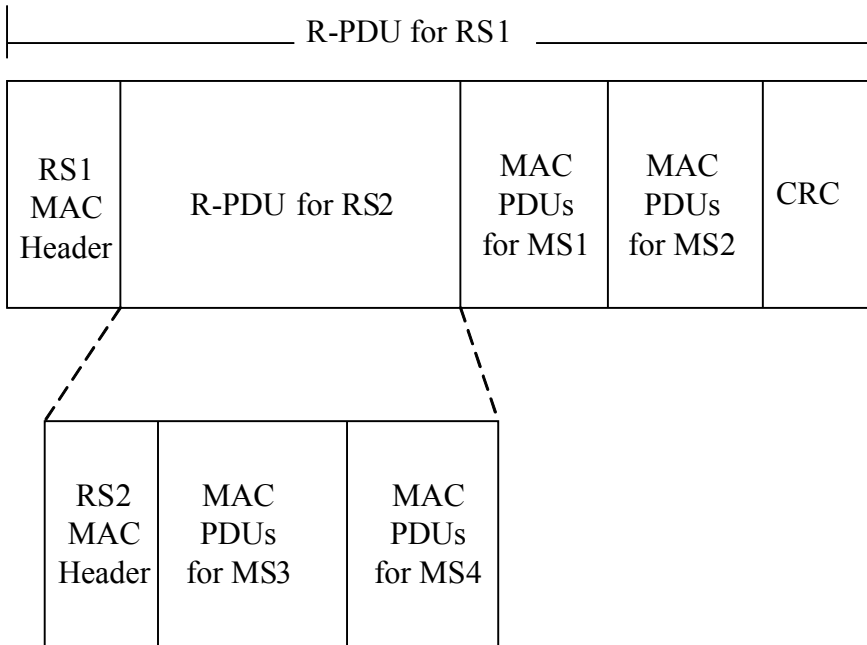
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|———————————————— R-PDU for RS1 ————————————————|

| RS1    |                     | MAC    | MAC    |      |
| MAC    | R-PDU  for RS2      | PDUs   | PDUs   | CRC  |
| Header |                     | for MS1| for MS2|      |

              | RS2    | MAC    | MAC    |
              | MAC    | PDUs   | PDUs   |
              | Header | for MS3| for MS4|
```

Figure 2

Specific Text change

[~~Insert the following sentence at the end of the section 6.3.3.8.2~~Add new section 6.3.3.8.3]
6.3.3.8.3 construction and transmission of Relay MAC PDU

MR-BS receives PDUs for MS from networks and groups these PDUs based on the designated RSs. MR-BS creates relay MAC PDUs (R-PDU) by encapsulating MS MAC PDUs from the corresponding grouped PDUs. MR-BS creates multi-hop relay MAC PDUs by encapsulating subordinate R-PDUs and the corresponding gourped PDUs . The PHY burst on which R-PDUs are transmitted is addressed to the designated RS.

RS receives the multi-hop relay PDUs from MR-BS or superordinate RS. Then RS decodes the R-PDUs into MS MAC PDUs and/or subordinate R-PDUs. RS transmits MS MAC PDU on access link to its MS. RS transmits subordinate R-PDU on relay link to its subordinate RS.

The following figure illustrates the process of creating the multi-hop relay MAC PDUs by MR-BS.
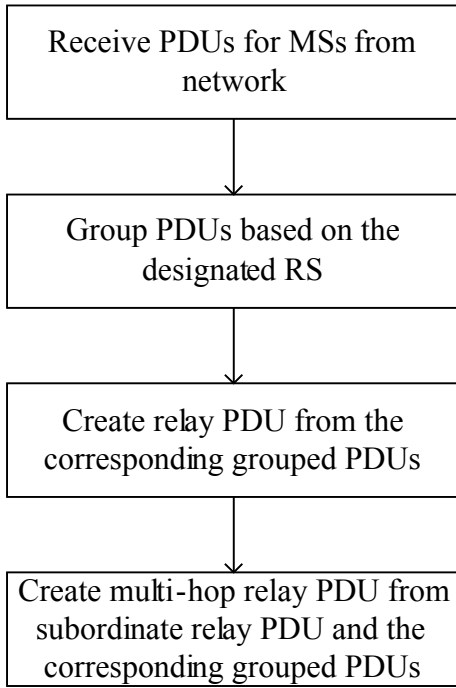
```
┌─────────────────────────────┐
│  Receive PDUs for MSs from  │
│          network            │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│   Group PDUs based on the   │
│        designated RS        │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│   Create relay PDU from the │
│  corresponding grouped PDUs │
└─────────────────────────────┘
               │
               ▼
┌─────────────────────────────┐
│ Create multi-hop relay PDU  │
│  from subordinate relay PDU │
│   and the corresponding     │
│        grouped PDUs         │
└─────────────────────────────┘
```

Figure xxx the process of creating multi-hop relay PDU by MR-BS

References

[1] IEEE802.16j-06/026r2 Baseline Document for Draft Standard for 16j