Project	IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>
Title	Transmission using Acess RS station CID
Date Submitted	2007-04-25

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Re:	Call for Technical Comments Regarding IEEE 802.16j <http://www.ieee802.org/16/relay/docs/80216j-07_013.pdf>
Abstract	Provide a method for streamlining MPDU transmission and reducing overhead
Purpose	To amend the text of baseline document for Sections 6.3.1.3, 6.3.3.8, and 6.3.14
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Transmission using Access RS station CID

1. Purpose

In this contribution, we proposes the destination/source RS CID based routing scheme. For implementing this scheme, the following concepts are defined:

- Each access RS needs to be assigned only three connections (see Figure 1)
  - Basic connection and primary connections (defined in 16e) carrying MAC management message of an access
  - Forwarding transport connection for relaying all MS related traffic and messages of mobiles attached to this RS
- MS MPDUs of MSs associated with an access RS are relayed on forwarding transport connection between MR-BS and this access RS. The MS MPDUs with the same QoS class can be encapsulated into a R-MAC PDU and the QoS information is included in the R-MAC header in QoS info field.
- QoS info includes the QoS class of a carried R-MAC PDU and the transmission deadline (frame number). One example of QoS info is QoS class ID (3 bits) + deadline (5 bits) = total 8 bits
- The QoS info is inserted into the R-MAC header by the sender which is MR-BS for DL and an access RS for UL
- The intermediate RSs don't need to know any QoS profiles and routing information of MSs that are not directly attached to it and only simply relay traffic based on QoS class and deadline information provided by the sender.

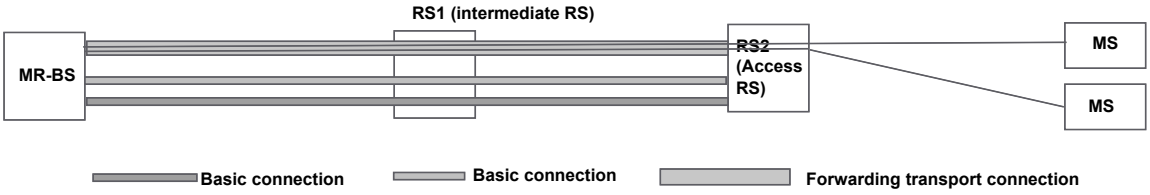

Figure 1. Connections between a RS and MR-BS.

The data forwarding procedure is illustrated in Figure 2.

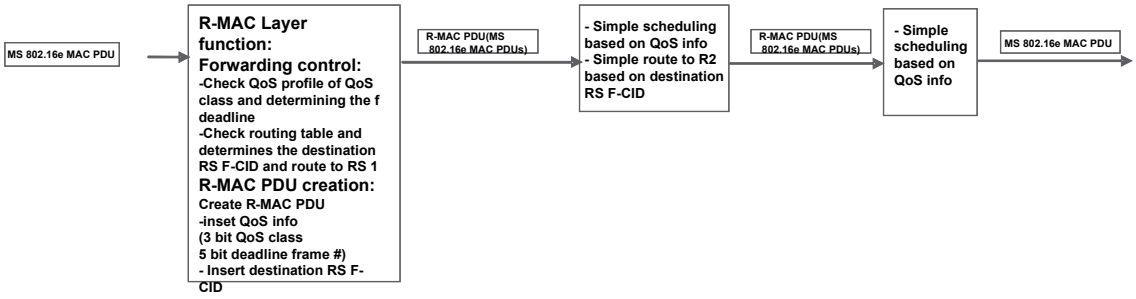

Figure 2. Data forwarding example

The main benefits include:

- Signaling overhead reduction compared with other forwarding scheme
  - No signaling overhead for tunnel setup/maintenance

  - No need for MS CID mapping to tunnel at service setup and re-mapping at MS HO/FBSS
- RS process complexity
  - Move significant R-link scheduling burden from intermediate RS to MR-BS for DL case
  - Each access RS only needs to make scheduling decision for MS attached to it for UL traffic
  - Intermediate RSs don't need to keep lengthy routing table and QoS profiles for each tunnel or connections of MSs that are served by all subordinate RSs
- Reduce # of required CIDs
  - Only need 1 transport connection is needed to support multiple QoS levels.

The above benefits enable a very simple and low-power-consumption RS.

2. Proposed Text Change

[Insert the following text at the end of Section 6.3.1.3]

Another type of connection of a RS is called as Forwarding transport connection which is used for carrying MS MPDUs that need to be relayed for Dl and UL. The corresponding connection CID can be expressed as F-CID. One F-CID of a RS can be used for both DL and UL. For DL case, MR-BS shall map all MPDUs of MSs attached to a RS to the forwarding transport connection of this RS. For UL case, an access RS shall map all MPDUs of MSs attached to it to forwarding transport connection of this RS. The F-CID is assigned by a MR-BS through DSA-REQ/RSP message exchange at path setup phase during a RS initial network entry or network re-entry .

[Insert the following subclause after Section 6.3.3.8.2]

6.3.3.8.3 Transmission using access RS forwarding transport connection and source QoS control information

For this type of data forwarding, each access RS needs to be assigned only three connections:

- Basic connection and primary connections carrying MAC management message of an access
- Forwarding transport connection for relaying all MS related traffic and messages. The corresponding CID is expressed as F-CID.

MAC PDUs of MSs associated with an access RS are relayed on the forwarding transport connection between MR-BS and this access RS.

The MS MPDUs with the same QoS class can be encapsulated into a R-MAC PDU and the QoS info field is included in the R-MAC header. QoS info includes the QoS class of a carried R-MAC PDU and the transmission deadline (frame number). For DL data forwarding, the MR-BS can include the destination RS F-CID and QoS info in the R-MAC header. For UL, the access RS includes its F-CID and QoS information in the R-MAC header The intermediate RS can schedule the transmission of the MS MPDUs carried in a R-MAC PDU based on QoS information along with the received R-MAC PDU and identify the next hop RS based on F-CID using its routing table.

[Insert the following subclause after Section 6.3.14.10]

6.3.14.11 QoS in Transmission Scheme using destination/source RS F-CID and Source QoS Control

When transmission scheme using access RS forwarding transport connection CID and source QoS control information is implemented, the MS service flows are classified into number of QoS classes. MS MAC management messages transmitted on basic connections and primary connections of MSs can be viewed as two types of services and can be classified, for example, as QoS 1 and QoS 2, respectively. For source QoS control purpose, when a new UL service of a MS is established, the QoS class of this service shall be determined by MR-BS and be informed to the access RS of this MS through DSX-X message exchange.

For scheduling purpose, in DL case, MR-BS can encapsulate MS MPDUs having the same QoS class into a R-MAC PDU and calculate the transmission deadline based on QoS profile for this QoS class. The deadline is expressed as 5 LSB of frame number where these MS MPDUs shall be transmitted by the access RS; In UL case, the access RS can encapsulate MS MPDUs having the same QoS class into a R-MAC PDU and calculate the transmission deadline based on QoS profile for this QoS class. The deadline is the 5 LSB of frame number where the these MS MPDUs shall be transmitted to MR-BS.

The QoS class identity and transmission deadline shall be included in the R-MAC header as QoS info field.