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Title	Forwarding of Traffic of MSs served by RS in Moving BS mode	
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Re:	IEEE 802.16j-07/019: "Call for Technical Comments Regarding IEEE Project 802.16j"	
Abstract	For a RS operates on this moving BS mode, the connections between MR-BS and the moving RS is managed by MR-BS. The connections of MSs associated with a RS in moving BS mode are managed by the RS and informed to the MR-BS.	
Purpose	To incorporate the proposed text into the P802.16j Baseline Document (IEEE 802.16j-06/026r4)	
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Forwarding of Traffic of MSs served by RS in Moving BS mode

Hang Zhang, Peiyong Zhu, Mo-Han Fong, Wen Tong, David Steer, Gamini Senarath, G.Q. Wang,
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Nortel

1. Introduction

In current baseline document, a moving RS can work in moving RS mode or in a moving BS mode (refer to 6.3.22.4.1.1). The corresponding data forwarding protocol is described in section 1.4.3. In this contribution, the forwarding of traffic of MSs served by a RS in moving BS mode is described.

2. Proposal

When a RS operates on this moving BS mode, the connections between MR-BS and the moving RS is managed by MR-BS. The connections of MSs associated with a RS in moving BS mode are managed by the RS and informed to the MR-BS.

The transport connections of a RS in this mode are established during RS initial network entry (refer to contribution “MS addressing and connection management by a moving RS in moving BS mode”) and used to forward the traffic of MSs served by the RS. On such a connection, the upper layer SDUs to/from one or more service flows of same or different MSs can be packed together if they possess the similar QoS profile or are with the same QoS class.

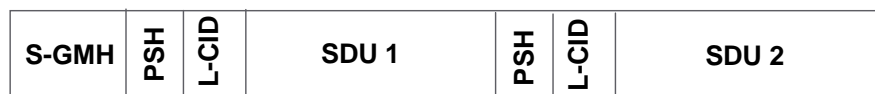
The MAC PDU construction on such a transport connection is illustrated by Figure 1.



(a) Format of MAC PDU on forwarding transport connection between MR-BS and RS in BS mode (no fragmentation/packing)



(b) Format of MAC PDU on forwarding transport connection between MR-BS and RS in BS mode (fragmentation case)



(c) Format of MAC PDU on forwarding transport connection between MR-BS and RS in BS mode (packing case)

In principle, the GMH format can be used where the CID field includes the Forwarding connection CID. However, since the MAC PDU, at the sender side (MR-BS CPS or RS CPS), is further encapsulated in a R-MAC PDU where the Forwarding connection CID or the reduced CID filed is included. In order to avoid this redundant part, the short-version of conventional GMH (S-GMH) is introduced where only first 3 bytes of GMH are included. The corresponding MAC PDU is called as short-version MAC PDU.

Since SDUs from more than one service flow can be encapsulated into a MAC PDU on a forwarding connection, an L-CID sub-header associated with each SDU is used to identify the corresponding a service flow (MR-BS has the bonding between a SFID and a L-CID).

A MAC PDU on a forward connection between a MR-BS and a RS in moving BS mode will always use this format. The L_CID sub-header will always present immediately after a fragmentation sub-header or a packing sub-header whichever presents. When neither of these two sub-headers presents, the L-CID sub-header will present as the last sub-header.

For DL traffic forwarding, a MR-BS CPS sub-layer encapsulates upper layer SDUs into the short-version MAC PDU with the L-CID sub-header(s) inserted. The payload may be encrypted using the TEK of the access RS in moving BS mode. The CPS sub-layer on the R-link at the other side of this connection which is the RS shall decrypt the payload of the received short-version MAC PDU and de-capsulate those SDUs. The CS sub-layer of the RS on the access link maps each SDU onto the corresponding local connection and delivery the tuple {SDU, CID} to the CPS sub-layer on access link of the RS. The CPS sub-layer on access link CPS sub-layer creates corresponding MAC PDU to MS. The payload of MAC PDU may be encrypted using the corresponding TEK of the targeted MS.

For UL traffic forwarding, the CPS sub-layer on R-link link of access RS in moving BS mode encapsulates SDUs of one or more service flows from the same or different MSs into a short-version MAC PDU. The payload may be encrypted using the TEK of the RS. The CPS sub-layer on the R-link of the MR-BS shall decrypt the payload of the received short-version MAC PDU and de-capsulate those SDUs. The CS sub-layer shall map each received SDU and L-CID to corresponding SFID.

3. Proposed text change

[Add the following section 6.3.3.8.3 as indicated]

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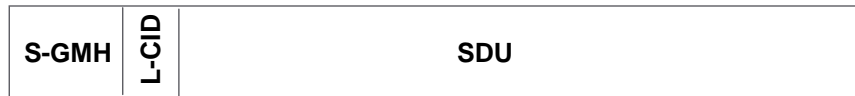
6.3.3.8.3 MAC PDU construction and transmission using forwarding connection

When a RS operates on this moving BS mode, the connections between MR-BS and the moving RS is managed by MR-BS. The connections of MSs associated with a RS in moving BS mode are managed by the RS and informed to the MR-BS.

The transport connection of a RS in this mode are established during RS initial network entry and used to forward the traffic of MSs served by the RS. On such a connection, the upper layer SDUs of one or more service flows of same or different MSs can be packed together if they possess the similar QoS profile or are with the same QoS class.

6.3.3.8.3.1. MAC PDU construction

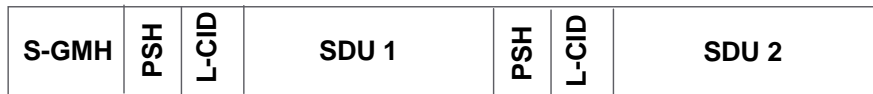
The MAC PDU construction on such a transport connection is illustrated by Figure XXX.



(a) Format of MAC PDU on forwarding transport connection between MR-BS and RS in BS mode (no fragmentation/packing)



(b) Format of MAC PDU on forwarding transport connection between MR-BS and RS in BS mode (fragmentation case)



(c) Format of MAC PDU on forwarding transport connection between MR-BS and RS in BS mode (packing case)

Figure XXX. Short-version MAC PDU transmitted on forwarding connection between MR-BS and an access RS in moving BS mode.

In principle, the GMH format can be used where the CID field includes the Forwarding connection CID. However, since the MAC PDU, at the sender side (MR-BS CPS or RS CPS), is further encapsulated in a R-MAC PDU where the Forwarding connection CID or the reduced CID field is included. In order to avoid this redundant part, the short-version of conventional GMH (S-GMH) is introduced where only first 3 bytes of GMH are included. The corresponding MAC PDU is called as short-version MAC PDU.

Since SDUs from more than one service flow can be encapsulated into a MAC PDU on a forwarding connection, an L-CID sub-header associated with each SDU is used to identify the corresponding service flow.

A MAC PDU on a forward connection between a MR-BS and a RS in moving BS mode will always use this format. The L-CID sub-header will always present immediately after a fragmentation sub-header or a packing sub-header whichever presents. When neither of these two sub-headers present, the L-CID sub-header will present as the last sub-header.

6.3.3.8.3.2 MAC PDU transmission using forwarding connection

For DL traffic forwarding, a MR-BS CPS sub-layer encapsulates upper layer SDUs into the short-version MAC PDU with the L-CID sub-header(s) inserted. The payload may be encrypted using the TEK of the RS in moving BS mode. The CPS sub-layer on the R-link at the other side of this connection which is the RS in moving BS mode shall decrypt the payload of the received short-version MAC PDU and de-encapsulate those SDUs. The CS sub-layer of the RS on the access link maps each SDU onto the corresponding local connection and the CPS sub-layer creates corresponding MAC PDU to MS. The payload of MAC PDU may be encrypted using the corresponding TEK of the targeted MS.

For UL traffic forwarding, the CPS sub-layer on R-link link of access RS in moving BS mode encapsulates SDUs of one or more service flows from the same or different MSs into a short-version MAC PDU. The

payload may be encrypted using the TEK of the RS. The CPS sub-layer on the R-link of the MR-BS shall decrypt the payload of the received short-version MAC PDU and de-capsulate those SDUs. The CS sub-layer shall map each received SDU and L-CID to corresponding SFID.

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

[Add the section 6.3.2.2.8 as indicated]

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6.3.2.2.8 Local CID sub header

The local CID sub-header is used to indicate the local CID of a SDU in a short-version of MAC PDU transmitted over a forwarding connection between a MR-BS and an access RS in moving BS mode. The local CID is assigned by an access RS in moving BS mode to a MS's service flow. This local CID is assigned at the establishment of a service flow of a MS and is informed to the MR-BS to enable the MR-BS create a binding between a SFID and a MS's service flow. This sub-header will always present in a short-version MAC PDU and immediately follows either the fragmentation sub-header or packing sub-header whichever presents, or presents as the last sub-header if neither fragmentation sub-header nor packing sub-header presents.

The Local CID sub-header field encoding is show in Table xxx.

Table xxx. Local CID sub-header field encoding

<u>Name</u>	<u>Length (bits)</u>	<u>Description</u>
<u>Local CID</u>	<u>16</u>	<u>CID locally assigned by an access RS in moving BS mode</u>

+++++++ End text ++++++