Project	**IEEE 802.16 Broadband Wireless Access Working Group** <http://ieee802.org/16>	
Title	**Classification Rules in 802.16m – C80216m-08/1042r1**	
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Re:	MAC Data Plane	
Abstract	This contribution proposes that the classification rules be left to vendors implementation and out of scope of the 802.16m standard.	
Purpose	Discussion and approval by TGm for the 802.16m SDD	
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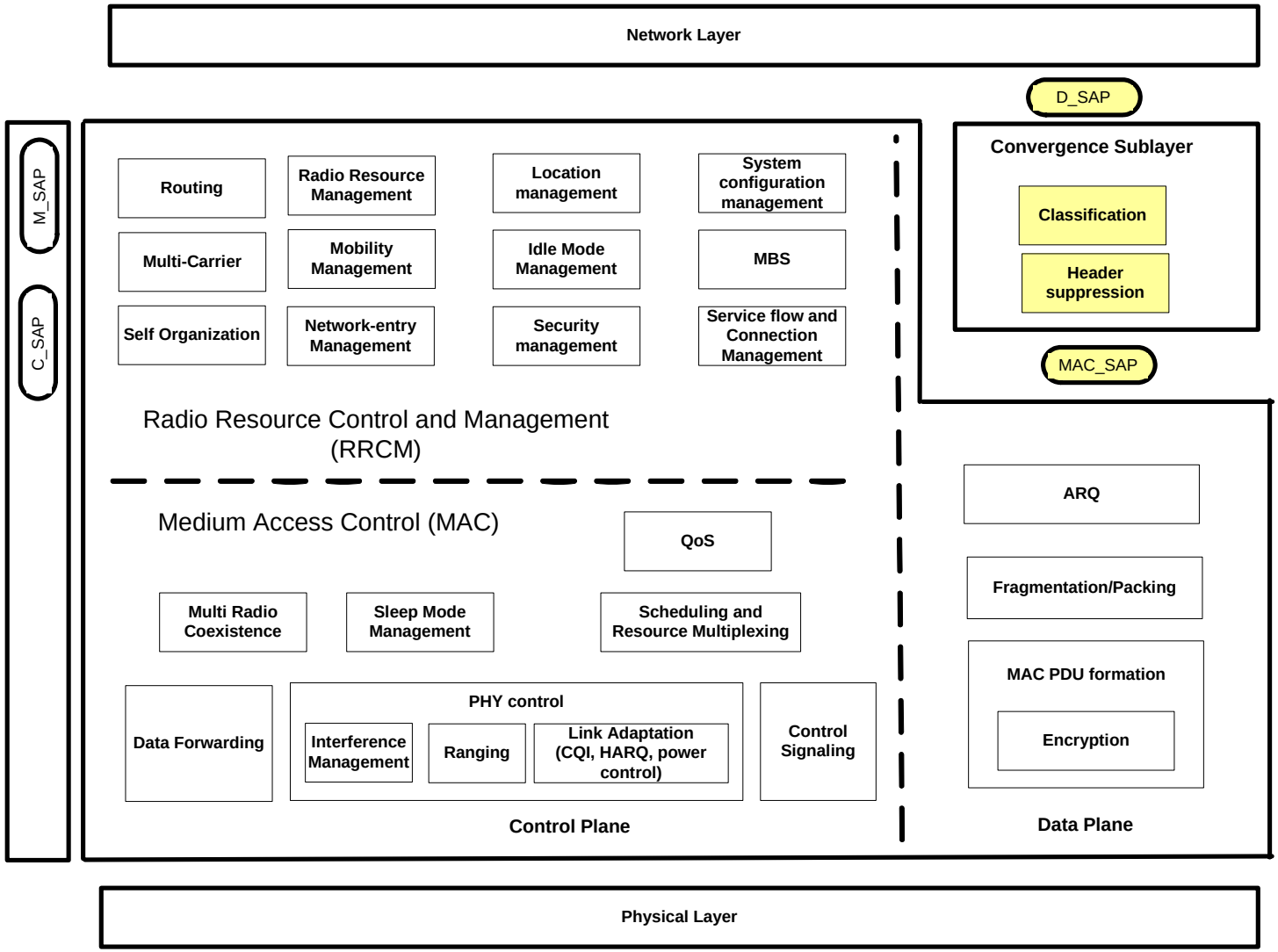
Purpose

- This contribution addresses design issues related to the 802.16m Data Path. It answers the call for contributions at the Denver meeting. Specifically, it proposes that Classification Rules to map packet streams to a MAC flow should be considered out of scope of the 802.16m standard. It should be left to vendors' implementation to determine how to map packet streams to MAC flows.
- IEEE TGm System requirements
  - ***5.2 Complexity***

    IEEE 802.16m should minimize complexity of the architecture and protocols and avoid excessive system complexity. It should enable interoperability of access networks, support low cost devices and minimize total cost of ownership.
- The system complexity is reduced by having the classification outside the cope of the 802.16m standard

Figure 10: The IEEE 802.16m Protocol Structure



Legacy System Classification (1/2)

- The Legacy system defines classification as the process of mapping packet stream to a connection identifier (CID); see 802.16e, section 5.2.2

  "*Classification is the process by which a MAC SDU is mapped onto a particular transport connection for transmission between MAC peers. The mapping process associates a MAC SDU with a transport connection, which also creates an association with the service flow characteristics of that connection. This process facilitates the delivery of MAC SDUs with the appropriate QoS constraints.*"

Legacy System Classification (2/2)

- The classification process can be viewed as a two step process. The first step determines the packet's destination. The second step determines the QoS type of the packet.
- The classification rules of the legacy system do not make a clear distinction between these two steps
- In practice, the destination of an IP packet in the DL, in other words, which MS to send it to, is determined not at the MAC but at the IP layer as part of the routing function. It is, therefore for all intents and purposes, done outside the MAC.
- In the UL, all packets go through the same path, meaning to the Base station. The only distinction between packets is what QoS treatment each packet receives as it is sent over the air interface.

802.16m Classification

- The 802.16m system should consider packet classification rules outside the of scope of the 16m standard and should leave it to the implementation to determine appropriate level of resources that should be committed to classification
- It is noted that classification rules have no impact on interoperability, only on QoS, and can safely be left outside the scope of standardization in much the same way as the scheduler is in the Legacy System
- It is sufficient for the 16m system to ‘expose’ the CS SAP attributes to the upper layers and let the application map packet streams to CS SAP in accordance with these attributes
- Example of CS SAP attributes

  Protocol type, data rate; upper bound error rate, upper bound delay, etc.
- Note that these attribute mostly reflect the QoS properties of the SAP

Proposed SDD Text – Alternative 1

- Add the following to section 9 Convergence Sub-layer

  9.x.y Classification Rules

  Packet classification rules are outside the of scope of the IEEE 802.16m standard and are left to the implementation to determine the appropriate level of resources which are committed to the classification process. The 802.16m MAC 'exposes' to the upper layers the CS SAP attributes which enables the upper layers to map packet streams to CS SAP in accordance with these attributes. The list of CS SAP attributes is FFS. The method of 'exposing' such attributes to the upper layer is outside the scope of the standard.