Project	**IEEE 802.16 Broadband Wireless Access Working Group <http://ieee802.org/16>**	
Title	**Modification of QoS Primitives**	
Date Submitted	**2006-11-12~~01~~**	
http://wirelessman.org /Source(s)	ZTE corporation	xu.ling@zte.com.cn jqian@zte.usa.com chuang@zte.usa.com

Re:	Contribution on comments to P802.16g-D5
Abstract	In this contribution, we propose to add Data Path Information Attribution into SFM primitives about QoS to support Data Path Management service and MBS service
Purpose	Adoption
Notice	This document has been prepared to assist IEEE 802.16. It is offered as a basis for discussion and is not binding on the contributing individual(s) or organization(s). The material in this document is subject to change in form and content after further study. The contributor(s) reserve(s) the right to add, amend or withdraw material contained herein.
Release	The contributor grants a free, irrevocable license to the IEEE to incorporate text contained in this contribution, and any modifications thereof, in the creation of an IEEE Standards publication; to copyright in the IEEE's name any IEEE Standards publication even though it may include portions of this contribution; and at the IEEE's sole discretion to permit others to reproduce in whole or in part the resulting IEEE Standards publication. The contributor also acknowledges and accepts that this contribution may be made public by IEEE 802.16.
Patent Policy and Procedures	The contributor is familiar with the IEEE 802.16 Patent Policy and Procedures (Version 1.0) <http://ieee802.org/16/ipr/patents/policy.html>, including the statement "IEEE standards may include the known use of patent(s), including patent applications, if there is technical justification in the opinion of the standards-developing committee and provided the IEEE receives assurance from the patent holder that it will license applicants under reasonable terms and conditions for the purpose of implementing the standard." Early disclosure to the Working Group of patent information that might be relevant to the standard is essential to reduce the possibility for delays in the development process and increase the likelihood that the draft publication will be approved for publication. Please notify the Chair <mailto:r.b.marks@ieee.org> as early as possible, in written or electronic form, of any patents (granted or under application) that may cover technology that is under consideration by or has been approved by IEEE 802.16. The Chair will disclose this notification via the IEEE 802.16 web site <http://ieee802.org/16/ipr/patents/notices>.

Amendment for QoS primitives

1. Introduction

In the current baseline document, there has a QoS section and the SFM primitives have been defined. This contribution has added necessary Data Path Information attribute to these primitives to support Data Path management service and MBS service.

2. Proposed Text Changes

14.2.11.1 C-SFM-REQ

This primitive is used by an 802.16 entity or NCMS to trigger a service flow management procedure. The Operation Type included in this primitive defines the type of service flow management procedure to be performed. The possible Operation Types for this primitive are listed in Table below.

Operation Type	Description
Create	Create a new service flow
Set	Change parameters of existing service flow
Delete	Deletion of an existing service flow

The following sub-sections define the primitive when its operation type is set to a specific operation.

14.2.11.1.1 C-SFM-REQ (Operation_Type==Create)

Function:

When Operation Type is set to Create, this primitive shall be used to initiate a new service flow creation by either an 802.16 entity or NCMS. This primitive shall contain QoS information for the new service flow.

Semantics of the service primitive:

The parameters of the primitives are as follows:

C-SFM-REQ
(
Message_id,
Operation_Type(Create),
Action_Type(Null),
Object_id(MS MAC Address, or BSID, or NCMS),
Attribute _list:
Transaction ID

MS MAC Address
Service flow ID
Service flow descriptor
Service flow information
Data Path Information
CS parameter information
)

Transaction ID
A unique sequential identifier of the transaction set by the sender

MS MAC Address
48-bit unique identifier used by MS. MS MAC Address is used for user authorization

Service flow ID
Unique identifier to identify a unidirectional service flow, included in the primitive for NCMS initiated service flow creation.

Service flow descriptor
Information regarding the attribute an uplink or downlink service flow

Service flow information
Required QoS information of a service flow include traffic characteristics and a scheduling type such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, service flow scheduling type, tolerate jitter and maximum latency. In case of MBS flow creation originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association.

Data Path Information

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.
- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.
- **Data Integrity informaton:** data integrity related information for this data path

CS parameter information
Required CS information for classification and handling of the service flow.

When generated:

- 802.16 entity to NCMS:

This primitive is generated when the 802.16 entity creates a service flow (i.e. a BS receives a DSA-REQ message.).

- NCMS to 802.16 entity:

This primitive is used when the QoS management entity in NCMS triggers the creation of a new service flow.

Effect of receipt:

- 802.16 entity to NCMS:

The QoS management entity in NCMS shall respond to this primitive busing C-SFM-RSP(Create). The management entity for service flows checks the validity of the request from the point of view of its own resources. If the request is accepted, the QoS management entity in NCMS creates unique service flow ID for the request.

- NCMS to 802.16 entity:

The 802.16 entity receiving the primitive shall trigger transmitting the DSA-REQ message following the information provided by this primitive.

14.2.11.1.2 C-SFM-REQ (Operation_Type==Set)

Function:

When Operation Type is set to Set, this primitive shall be used to initiate the modification of an existing service flow parameters by either an 802.16 entity or NCMS. This primitive shall contain the new information for the modifying service flow.

Semantics of the service primitive:

The parameters of the primitive are as follows:

C-SFM-REQ
(
Message_id,
Operation_Type(Set),
Action_Type(Null),
Object_id (MS MAC Address, or BSID, or NCMS),
Attribute _list:
Transaction ID,
Service flow ID,
MS MAC Address,
Service flow descriptor,
Service flow information,
Data Path Information,
CS parameter information
)

Transaction ID
A unique sequential identifier of the transaction set by the sender
Service flow ID
Unique identifier to identify a service flow.

MS MAC Address
48-bit unique identifier used by MS. MS MAC Address is used for user authorization
Service flow descriptor
Information regarding the attribute of an uplink or downlink service flow
Service flow information
Required QoS information of a service flow include traffic characteristics and a

scheduling type such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, service flow scheduling type, tolerate jitter and maximum latency. In case of MBS flow set originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association.

Data Path Information

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.
- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.
- **Data Integrity informaton:** data integrity related information for this data path

CS parameter information

Required IP filter rules of a service flow such as packet classification rule and IPv6 flow label

When generated:

- 802.16 entity to NCMS:

This primitive is generated when the 802.16 entity change the parameters of an existing service flow(BS receives a DSC-REQ message).

- NCMS to 802.16 entity:

This primitive is generated when the QoS management entity in NCMS informs the 802.16 entity of the QoS information modification.

Effect of receipt:

- 802.16 entity to NCMS:

The QoS management entity in NCMS shall respond to this primitive by sending C-SFM-RSP(Set). The management entity for service flows checks the validity of the request from the point of view of its own resources.

- NCMS to 802.16 entity:

The 802.16 entity receiving the primitive shall trigger transmitting the DSC-REQ message following the information provided by this primitive.

14.2.11.1.3 C-SFM-REQ (Operation_Type==Delete)

Function:

When Operation Type is set to Delete, this primitive shall be used to initiate an existing service flow deletion by either an 802.16 entity or NCMS.

Semantics of the service primitive:

The parameters of the primitive are as follows:

C-SFM-REQ
(
Message_id,
Operation_Type(Delete),
Action_Type(Null),
Object_id(MS MAC Address, or BSID, or NCMS),
Attribute _list:
Transaction ID,
Service flow ID,
Data Path ID
)

Transaction ID
A unique sequential identifier of the transaction set by the sender
Service flow ID
Unique identifier to identify a service flow.
Data Path ID
specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.

When generated:

- 802.16 entity to NCMS:

This primitive is generated when the 802.16 entity delete an existing service flow(BS receives a DSD-REQ message).

- NCMS to 802.16 entity:

This primitive is generated when the QoS management entity in NCMS informs the 802.16 entity of the deletion of an existing service flow.

Effect of receipt:

- 802.16 entity to NCMS:

The QoS management entity in NCMS shall respond to this primitive by sending C-SFM-RSP(Delete). The management entity for service flows release assigned resources for the service flow ID.

- NCMS to 802.16 entity:

The 802.16 entity receiving the primitive shall transmit the DSD-REQ message including the information provided by this primitive.

14.2.11.2 C-SFM-RSP

This primitive is used by an 802.16 entity or NCMS to respond to the request to begin a service flow management procedure. The Operation Type included in this primitive defines the type of service flow management procedure to be performed. The possible Operation Types for this primitive are listed in Table below:

Operation Type	Description
Create	Create a new service flow
Set	Change parameters of existing service flow
Delete	Deletion of an existing service flow

The following sub-sections define the primitive when its operation type is set to a specific operation.

14.2.11.2.1 C-SFM-RSP (Operation_Type==Create)

Function:

This primitive is used by the 802.16 entity or the QoS management entity in NCMS to respond to the C-SFM-REQ for a service flow creation. Service flow information in this primitive contains approved QoS information if the.request is accepted.

Semantics of the service primitive:

The parameters of the primitives are as follows:

C-SFM-RSP
(
Message_id,
Operation_Type(Create),
Action_Type(Null),
Object_id(MS MAC Address, or BSID, or NCMS),
Attribute _list:
Transaction ID
MS MAC Address
Service flow ID
Service flow descriptor
Service flow information
Data Path Information,
CS parameter information
Service flow error parameter information
)

Transaction ID
A unique sequential identifier of the transaction set by the sender
MS MAC Address
48-bit unique identifier used by MS. MS MAC Address is used for user identification
Service flow ID
Unique identifier to identify a service flow
Service flow descriptor
Information regarding the attribute an uplink or downlink service flow

Service flow information

Approved complete QoS information of a service flow such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, service flow scheduling type, tolerate jitter and maximum latency, target Packet Error Rate. In case of MBS flow creation originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association.

Data Path Information

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.
- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.
- **Data Integrity informaton:** data integrity related information for this data path

CS parameter information

Approved packet filter rules of a service flow such as packet classification rule and IPv6 flow label

Service flow error parameter information

Failed reason and every specific failed QoS parameter if a C-SFM-REQ is rejected

When generated:

- 802.16 entity to NCMS:

This primitive is generated when an 802.16 entity receives a DSA-RSP message.

- NCMS to 802.16 entity:

This primitive is generated when the QoS management entity in NCMS responds to C-SFM-REQ(Create) primitive.

Effect of receipt:

- 802.16 entity to NCMS:

This primitive informs the result of the service flow creation to the QoS management entity in NCMS.

- NCMS to 802.16 entity:

This primitive informs the result of the service flow creation to an 802.16 entity. An 802.16 entity receiving the primitive shall transmit DSA-RSP message based on the information provided by thisprimitive.

14.2.11.2.2 C-SFM-RSP (Operation_Type==Set)

Function:

This primitive is used by the 802.16 entity or the QoS management entity in NCMS to respond to the C-SFM-REQ(Set) for a change in an existing service flow. Service flow information in this primitive contains approved QoS information if the request is accepted.

Semantics of the service primitive:

The parameters of the primitives are as follows:

C-SFM-RSP
(
Message_id,
Operation_Type(Set),
Action_Type(Null),
Object_id(MS MAC Address, or BSID, or NCMS),
Attribute _list:
Transaction ID
Service flow ID
Service flow information
Data Path Information,
CS parameter information
Service flow error parameter information
)

Transaction ID
A unique sequential identifier of the transaction set by the BS
Service flow ID
Unique identifier to identify a service flow
Service flow information
Approved complete QoS information of a service flow such as service class name, QoS parameter set type, maximum sustained traffic rate, maximum traffic burst, minimum reserved traffic rate, minimum tolerable traffic rate, tolerate jitter and maximum latency. In case of MBS flow set originated by NCMS, the service flow information shall additionally contain the connection identifier CID, Logical Channel ID and security association.
Data Path Information

It describes the Data Path in the direction opposite to that in which the primitive is sent. It potentially includes:

- **Data Path Type** specifies the type of the Data Path (e.g. GRE, MPLS, VLAN, etc.)
- **Data Path ID** specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.
- **List of Classifiers** that identify what data SHOULD be classified onto the Data Path and allows optional negotiating Data Path IDs on per flow (IEEE 802.16 Connection) basis.
- **Multicast Info**. Specifies relation of the Data Path to the IP Multicast Group.
- **Endpoint Identifier.** Specifies the addressable subscriber-side endpoint for which the Data Path is being established or maintained.

- **Data Integrity informaton:** data integrity related information for this data path

CS parameter information

Approved IP filter rules of a service flow such as packet classification rule and IPv6 flow label

Service flow error parameter information

Failed reason and every specific failed QoS parameter if the request is rejected

When generated:

- 802.16 entity to NCMS:

This primitive is generated when an 802.16 entity receives a DSC-RSP message.

- NCMS to 802.16 entity:

This primitive is generated when the QoS management entity in NCMS responds to C-SFM-RSP(Set) primitive.

Effect of receipt:

- 802.16 entity to NCMS:

This primitive informs the result of the service flow modification to the QoS management entity in NCMS.

- NCMS to 802.16 entity:

This primitive informs the result of the service flow modification to an 802.16 entity. An 802.16 entity receiving the primitive shall transmit DSC-RSP message based on the information provided by this primitive.

14.2.11.2.3 C-SFM-RSP(Operation_Type==Delete)

Function:

This primitive is used by the 802.16 entity or the QoS management entity in NCMS to respond to the service flow deletion request.

Semantics of the service primitive:

The parameters of the primitives are as follows:

C-SFM-RSP

(
Message_id,
Operation_Type(Delete),
Action_Type(Null),
Object_id(MS MAC Address, or BSID, or NCMS),
Attribute _list:
Transaction ID
Service flow ID
Data Path ID
Service flow error parameter information
)

Transaction ID

A unique sequential identifier of the transaction set by the BS

Service flow ID

Unique identifier to identify a service flow

Data Path ID

Specifies Data Path ID (e.g. LSP identification for MPLS, GRE Key for GRE, LAN ID for VLAN, etc.). This ID can be used as unique idendifier to identify a single data path between BS and NCMS or can be used as MBSZoneID to identify multiple data paths for this MBSZone.

Service flow error parameter information

Failed reason and every specific failed QoS parameter if a DSF request is rejected

When generated:

- 802.16 entity to NCMS:

This primitive is generated when an 802.16 entity receives a DSD-RSP message.

- NCMS to 802.16 entity:

This primitive is generated when the QoS management entity in NCMS responds to C-SFM-REQ(Delete) primitive.

Effect of receipt:

- 802.16 entity to NCMS:

This primitive informs the result of the service flow deletion of the QoS management entity in NCMS. The QoS management entity in NCMS deletes assigned resources for service flow ID.

- NCMS to 802.16 entity:

This primitive informs the result of the service flow deletion to an 802.16 entity. An 802.16 entity receiving the primitive shall transmit DSD-RSP message based on the information provided by this primitive.