

Project	<b>IEEE 802.16 Broadband Wireless Access Working Group</b> < <a href="http://ieee802.org/16">http://ieee802.org/16</a> >	
Title	<b>Service flow management for RS</b>	
Date Submitted	<b>2006-11-7</b>	
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Re:	This contribution is response to call for technical proposal (IEEE 802.16j-06/027).	
Abstract	This document proposes service flow management sequence through RS.	
Purpose	Discuss and adapt proposed text and message format.	
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# Service flow management for RS

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## 1. General

This document presents an amendment for service flow management of RS.

## 2. Background

In centralized scheduling case, BS manages all subordinate nodes. However, in distributed scheduling case, BS does not need to manage all nodes, and RS may be able to manage its subordinate node by itself.

We propose the service flow management sequence through RS for centralized/distributed scheduling case.

## 3. Text to be inserted into standard

### 6.3.14.9.3 DSA

#### 6.3.14.9.3.1 SS-initiated DSA

Insert the following table the end of 6.3.14.9.3.1:

In MMR centralized scheduling case, a RS only forwards each DSA messages from SS to BS and vice versa. The BS checks whether the QoS requirements can be supported both on relay link (BS-RS) and on access link (RS-MS). This process is illustrated in Table 125a.

Table 125a – DSA initiated from SS through RS (Centralized scheduling case)

SS		RS		BS
New service flow needed				
Check if resource are available				
Send DSA-REQ	--DSA-REQ-->	Receive / <u>Send</u> DSA-REQ	--DSA-REQ-->	Receive DSA-REQ
Set Timers T7 and T14				
Timer T14 Stops	<--DSX-RVD--	Receive / <u>Send</u> DSX-RVD	<--DSX-RVD--	DSA-REQ integrity valid
				Check whether SS is authorized for Service
				Check whether service flow QoS can be supported <u>both on relay link and on access link</u>
				Create SFID
				If uplink AdmittedQoSParamSet is non-null, map service flow to CID
				If uplink ActiveQoSParamSet is non-null, Enable reception of data on new uplink service flow
Receive DSA-RSP	<--DSA-RSP--	Receive / <u>Send</u> DSA-RSP	<--DSA-RSP--	Send DSA-RSP
Timer T7 Stops				
If ActiveQoSParamSet is non-null, Enable transmission and/or reception of data on new service flow				
Send DSA-ACK	--DSA-ACK-->	Receive / <u>Send</u> DSA-ACK	--DSA-ACK-->	Receive DSA-ACK
				If downlink ActiveQoSParamSet is non-null, Enable transmission of data on new downlink service flow

<sup>3</sup> Authorization happens prior to the DSA-REQ being received by the BS. The details of BS signaling to anticipate a DSA-REQ are beyond the scope of this standard.

In MMR distributed scheduling case, RS shall check whether the QoS requirements can be supported on access link (RS-SS) and, if it can be supported, transfers a DSA-REQ message to the BS. If not so, RS shall reply a DSX-RVD in order to inform the QoS can be not supported.

The BS checks whether the QoS requirements can be supported on relay link (BS-RS). This process is illustrated in Table 125b.

Table 125b – DSA initiated from SS through RS (Distributed scheduling case)

SS	RS	BS
New service flow needed		
Check if resource are available		
Send DSA-REQ	--DSA-REQ-->	Receive / <u>Send</u> DSA-REQ
Set Timers T7 and T14		<u>Check whether service flow QoS can be supported on access link (RS-SS)</u> <u>If the QoS can not be supported, reply DSX-RVD (CC=reject) to SS</u>
<u>Receive DSX-RVD (CC=reject)</u>	<--DSX-RVD--	<u>Send DSX-RVD (CC=reject)</u>
Timer T14 Stops	<--DSX-RVD--	Receive / <u>Send</u> DSX-RVD
		Receive DSA-REQ DSA-REQ integrity valid Check whether SS is authorized for Service Check whether service flow QoS can be supported <u>on relay link (BS-RS)</u> Create SFID If uplink AdmittedQoSParamSet is non-null, map service flow to CID If uplink ActiveQoSParamSet is non-null, Enable reception of data on new uplink service flow
Receive DSA-RSP	<--DSA-RSP--	Receive / <u>Send</u> DSA-RSP
Timer T7 Stops		Send DSA-RSP
If ActiveQoSParamSet is non-null, Enable transmission and/or reception of data on new service flow		
Send DSA-ACK	--DSA-ACK-->	Receive DSA-ACK
		If downlink ActiveQoSParamSet is non-null, Enable transmission of data on new downlink service flow

<sup>a</sup> Authorization happens prior to the DSA-REQ being received by the BS. The details of BS signaling to anticipate a DSA-REQ are beyond the scope of this standard.

**6.3.14.9.3.2 BS-initiated DSA**

Insert the following table the end of 6.3.14.9.3.2:

In MMR centralized scheduling case, a RS only forwards each DSA messages from BS to SS and vice versa. The BS checks whether the QoS requirements can be supported both on relay link (BS-RS) and on access link (RS-MS). This process is illustrated in Table 126a.

Table 126a – DSA initiated from BS through RS (Centralized scheduling case)

SS	<u>RS</u>	BS
		New service flow required for SS
		Check whether SS is authorized for Service
		Check whether service flow(s) QoS can be supported <u>both on relay link and on access link</u>
		Create SFID
		If AdmittedQoSParamSet is non-null, map service flow to CID
Receive DSA-REQ	<--DSA-REQ--	Receive / <u>Send</u> DSA-REQ
		<--DSA-REQ--
		Send DSA-REQ
		Set Timer T7
Confirm that SS can support service flow		
Add Downlink SFID (if present)		
Enable reception on any new downlink service flow		
Send DSA-RSP	--DSA-RSP-->	Receive / <u>Send</u> DSA-RSP
		--DSA-RSP-->
		Receive DSA-RSP
		Timer T7 Stops
		Enable transmission (downlink) or reception (uplink) of data on new service flow
Receive DSA-ACK	<--DSA-ACK--	Receive / <u>Send</u> DSA-ACK
		<--DSA-ACK--
		Send DSA-ACK
Enable transmission on new uplink service flow		

In MMR distributed scheduling case, the BS only checks whether the QoS requirements can be supported on relay link (BS-RS).

And then the RS shall check whether the QoS requirements can be supported on access link (RS-SS) and, if it can be supported, transfers a DSA-REQ message to the BS. If not so, RS shall reply a DSX-RVD in order to inform the QoS can be not supported. This process is illustrated in Table 126b.

Table 126b – DSA initiated from BS through RS (Distributed scheduling case)

SS		RS		BS
				New service flow required for SS
				Check whether SS is authorized for Service
				Check whether service flow(s) QoS can be supported <u>on relay link (BS~RS)</u>
				Create SFID
				If AdmittedQoSParamSet is non-null, map service flow to CID
				Send DSA-REQ
				Set Timer T7
		Receive / <u>Send</u> DSA-REQ	<--DSA-REQ--	
		<u>Check whether service flow(s) QoS can be supported on access link (RS~SS)</u>		
		<u>If the QoS can not be supported, reply DSA-RSP (CC=reject) to BS</u>		
		<u>Send DSA-RSP (CC=reject)</u>	<u>--DSA-RSP--&gt;</u>	<u>Receive DSA-RSP (CC=reject)</u>
Receive DSA-REQ	<--DSA-REQ--			
Confirm that SS can support service flow				
Add Downlink SFID (if present)				
Enable reception on any new downlink service flow				
Send DSA-RSP	--DSA-RSP-->	Receive / <u>Send</u> DSA-RSP	--DSA-RSP-->	Receive DSA-RSP
				Timer T7 Stops
				Enable transmission (downlink) or reception (uplink) of data on new service flow
Receive DSA-ACK	<--DSA-ACK--	Receive / <u>Send</u> DSA-ACK	<--DSA-ACK--	Send DSA-ACK
Enable transmission on new uplink service flow		<u>Update service flow on access link (RS~SS)</u>		

**6.3.14.9.4 DSC**

**6.3.14.9.4.1 SS-initiated DSC**

Insert the following table the end of 6.3.14.9.4.1:

In MMR centralized scheduling case, a RS only forwards each DSC messages from SS to BS and vice versa. The BS checks whether the modified requirements can be supported both on relay link (BS-RS) and on access link (RS-MS). This process is illustrated in Table 127a.

Table 127a – SS-initiated DSC through RS (Centralized scheduling case)

BS		RS		SS
				Service flow requires modifying
Receive DSC-REQ	<--DSC-REQ--	Receive / <u>Send</u> DSC-REQ	<--DSC-REQ--	Send DSC-REQ
				Set Timers T7 and T14
DSC-REQ integrity valid	--DSX-RVD-->	Receive / <u>Send</u> DSX-RVD	--DSX-RVD-->	Timer T14 Stops
Validate Request <u>both on relay link and on access link</u>				
Modify service flow				
Increase Channel Bandwidth if Required				
Send DSC-RSP	--DSC-RSP-->	Receive / <u>Send</u> DSC-RSP	--DSC-RSP-->	Receive DSC-RSP
				Timer T7 Stops
				Modify service flow

Receive DSC-ACK	<--DSC-ACK--	Receive / <b>Send</b> DSC-ACK	<--DSC-ACK--	Adjust Payload Bandwidth
Decrease Channel Bandwidth if Required				Send DSC-ACK

In MMR distributed scheduling case, RS shall check whether the modified requirements can be supported on access link (RS-SS) and, if it can be supported, transfers a DSC-REQ message to the BS. If not so, RS shall reply a DSX-RVD in order to inform the requirements can be not supported.

The BS checks whether the modified requirements can be supported on relay link (BS-RS). This process is illustrated in Table 127b.

Table 127b – SS-initiated DSC through RS (Distributed scheduling case)

BS		RS		SS
				Service flow requires modifying
		Receive / <b>Send</b> DSC-REQ	<--DSC-REQ--	Send DSC-REQ Set Timers T7 and T14
		<b>Check whether required service flow QoS can be supported on access link (RS-SS)</b>		
		<b>If the QoS can not be supported, reply DSX-RVD (CC=reject) to SS</b>		
		<b>Send DSX-RVD (CC=reject)</b>	<b>--DSX-RVD--&gt;</b>	<b>Receive DSX-RVD (CC=reject)</b>
Receive DSC-REQ	<--DSC-REQ--			
DSC-REQ integrity valid	--DSX-RVD-->	Receive / <b>Send</b> DSX-RVD	--DSX-RVD-->	Timer T14 Stops
Validate Request <b>on relay link (BS~RS)</b>				
Modify service flow				
Increase Channel Bandwidth if Required				
Send DSC-RSP	--DSC-RSP-->	Receive / <b>Send</b> DSC-RSP	--DSC-RSP-->	Receive DSC-RSP Timer T7 Stops
				Modify service flow
				Adjust Payload Bandwidth
Receive DSC-ACK	<--DSC-ACK--	Receive / <b>Send</b> DSC-ACK	<--DSC-ACK--	Send DSC-ACK
Decrease Channel Bandwidth if Required		<b>Update service flow on access link (RS-SS)</b>		

**6.3.14.9.4.2 BS-initiated DSC**

*Insert the following table the end of 6.3.14.9.4.2:*

In MMR centralized scheduling case, a RS only forwards each DSC messages from BS to SS and vice versa. The BS checks whether the modified requirements can be supported both on relay link (BS-RS) and on access link (RS-MS). This process is illustrated in Table 128a.

Table 128a – BS-initiated DSC through RS (Centralized scheduling case)

BS		RS		SS
				Service flow requires modifying
				<b>Validate the modifying both on relay link and on access link</b>
Send DSC-REQ	--DSC-REQ-->	Receive / <b>Send</b> DSC-REQ	--DSC-REQ-->	Receive DSC-REQ
Set Timers T7				Validate Request
				Modify service flow
				Decrease Payload Bandwidth if Required
Receive DSC-RSP	<--DSC-RSP--	Receive / <b>Send</b> DSC-RSP	<--DSC-RSP--	Send DSC-RSP

Timer T7 Stops				
Modify service flow				
Adjust Payload Bandwidth				
Send DSC-ACK	--DSC-ACK-->	Receive / <u>Send</u> DSC-ACK	--DSC-ACK-->	Receive DSC-ACK
				Increase Payload Bandwidth if Required

In MMR distributed scheduling case, the BS only checks whether the modified requirements can be supported on relay link (BS-RS).

And then the RS shall check whether the modified requirements can be supported on access link (RS-SS) and, if it can be supported, transfers a DSC-REQ message to the SS. If not so, RS shall reply a DSA-RSP in order to inform the requirements can be not supported. This process is illustrated in Table 128b.

**Table 128b – BS-initiated DSC through RS (Distributed scheduling case)**

BS	<u>RS</u>	SS
Service flow requires modifying		
<u>Validate the modifying on relay link (BS-RS)</u>		
Send DSC-REQ Set Timers T7	--DSC-REQ-->	Receive / <u>Send</u> DSC-REQ
	<u>Check whether required service flow QoS can be supported on access link (RS-SS)</u>	
	<u>If the QoS can not be supported, reply DSC-RSP (CC=reject) to BS</u>	
<u>Receive DSA-RSP (CC=reject)</u>	<--DSC-RSP--	<u>Send DSA-RSP (CC=reject)</u>
		--DSC-REQ-->
		Receive DSC-REQ
		Validate Request
		Modify service flow
		Decrease Payload Bandwidth if Required
Receive DSC-RSP Timer T7 Stops	<--DSC-RSP--	Receive / <u>Send</u> DSC-RSP
Modify service flow		<--DSC-RSP--
Adjust Payload Bandwidth		Send DSC-RSP
Send DSC-ACK	--DSC-ACK-->	Receive / <u>Send</u> DSC-ACK
		<u>Update service flow on access link (RS-SS)</u>
		Receive DSC-ACK
		Increase Payload Bandwidth if Required

**6.3.14.9.5 Connection release**

**6.3.14.9.5.1 SS-initiated DSD**

*Insert the following table the end of 6.3.14.9.5.1:*

In MMR centralized scheduling case, the BS shall delete the service flow both on relay link (BS-RS) and on access link (RS-SS). This process is illustrated in Table 129b.

**Table 129a – DSD-initiated from SS through RS (Centralized scheduling case)**

SS	<u>RS</u>	BS
Service flow no longer needed		
Delete service flow		
Send DSD-REQ	--DSD-REQ-->	Receive / <u>Send</u> DSD-REQ
		--DSD-REQ-->
		Receive DSD-REQ
		Verify SS is service flow "owner"

Receive DSD-RSP	<--DSD-RSP--	Receive / <b>Send</b> DSD-RSP	<--DSD-RSP--	Delete service flow <b>both on relay link and on access link</b> Send DSD-RSP
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In MMR distributed scheduling case, the BS shall delete the service flow on relay link (BS-RS). And then the RS shall delete the service flow on access link (RS-SS). This process is illustrated in Table 128b.

Table 129b – DSD-initiated from SS through RS (Distributed scheduling case)

SS		<b>RS</b>		BS
Service flow no longer needed				
Delete service flow				
Send DSD-REQ	--DSD-REQ-->	Receive / <b>Send</b> DSD-REQ	--DSD-REQ-->	Receive DSD-REQ Verify SS is service flow "owner" Delete service flow <b>on relay link (BS-RS)</b>
Receive DSD-RSP	<--DSD-RSP--	Receive / <b>Send</b> DSD-RSP <b>Delete service flow on access link (RS-SS)</b>	<--DSD-RSP--	Send DSD-RSP

**6.3.14.9.5.2 BS-initiated DSD**

*Insert the following table the end of 6.3.14.9.5.2:*

In MMR centralized scheduling case, the BS shall delete the service flow both on relay link (BS-RS) and on access link (RS-SS). This process is illustrated in Table 130b.

Table 130a – DSD-initiated from BS through RS (Centralized scheduling case)

SS		<b>RS</b>		BS
Service flow no longer needed				
Delete service flow <b>both on relay link and on access link</b>				
Determine associated SS for this service flow				
Receive DSD-REQ	<--DSD-REQ--	Receive / <b>Send</b> DSD-REQ	<--DSD-REQ--	Send DSD-REQ
Delete service flow				
Send DSD-RSP	--DSD-RSP-->	Receive / <b>Send</b> DSD-RSP	--DSD-RSP-->	Receive DSD-RSP

In MMR distributed scheduling case, the BS shall delete the service flow on relay link (BS-RS). And then the RS shall delete the service flow on access link (RS-SS). This process is illustrated in Table 130b.

Table 130b – DSD-initiated from BS through RS (Distributed scheduling case)

SS		<b>RS</b>		BS
Service flow no longer needed				
Delete service flow <b>on relay link (BS-RS)</b>				
Determine associated SS for this service flow				
Receive DSD-REQ	<--DSD-REQ--	Receive / <b>Send</b> DSD-REQ	<--DSD-REQ--	Send DSD-REQ
Delete service flow				
Send DSD-RSP	--DSD-RSP-->	Receive / <b>Send</b> DSD-RSP <b>Delete service flow on access link (RS-SS)</b>	--DSD-RSP-->	Receive DSD-RSP