Project	**IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>**	
Title	**RS with Several Functional Modes**	
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Re:	IEEE 802.16j working group letter ballot #28	
Abstract	This contribution proposes context updates to clarify RS functional mode under various protocol implementation.	
Purpose	To incorporate the proposed text into the P802.16j Baseline Document (P802.16j/D1)	
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RS with Several Functional Modes

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Nortel

1. Introduction

P802.16j/D1 has defined the two functional modes for RS (6.3.22.4.1) with different protocol stack implementation (1.4.3). These functional modes relay on how RS connection management and relay security mode to be implemented over R-link and access links.
This proposal suggests the context updates related to RS connection/security implementation with various functional modes. These updates does not introduce any new feature/concept, rather it provides more details to clarify the operational semantic of RS with connection management, security management and mobility processing. The suggested changes are relevant to RS operation mode (6.3.22.4.1) and distributed security control (7.1.6, 7.1.7).

Current P802.16j/D1 defined certain functions related to RS connection management and security management for both R-link and the access link with various protocol implementations (1.4.3). These functions can be defined as two categories: Functional Mode-1 (FM-1) and the Functional Mode-2 (FM-2), over R-link and access links. In FM-1 mode, the per-flow transport connection and related security material (i.e., TEK) are managed and maintained uniformly and globally between MR-BS and MS over both R-link and access link end-to-end, which is similar to 802.16e. Under this mode, the access RS is implemented with restricted MAC-CPS which may provide bandwidth allocation with distributed scheduling, and the assistance to system access process. In FM-1 mode, access RS does not provide MAC-SS sub-layer functions.
While in FM-2 mode, the MAC-CPS shall provide system access, distributed bandwidth allocation, and connection management over R-link and access link separately. In FM-2 mode, access RS shall provide MAC-SS sub-layer functions.

With the various functional modes, the access RS, wherever it is mobile, nomadic, or fixed, could support different operations for connection mgmt, security mgmt and handover process over both R-link and access links.

2. Proposed text change

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[Remove 6.3.22.4.1 and insert following context after1.4.3]
1.4.4 Functional modes of relay station ~~6.3.22.4.1 Operation modes of mobile relay station~~
A RS can operate in two different modes: Functional Mode-1 (FM-1) and Functional Mode (FM-1). Relying on various protocol layer and entities specified in Figure 2a/2b, a RS would implement different MAC-CPS functions and MAS-SS functions accordingly over R-link and access links for service flow data relay. ~~moving RS mode and moving BS mode~~

[Remove 6.3.22.4.1.1and insert following context after 1.4.4]
1.4.4.1 RS with FM-1 mode ~~6.3.22.4.1.1Moving RS mode~~

~~An RS, when operating in moving mode, this RS may implement only a subset of physical layer and MAC layer functions defined in IEEE802.16e-2005. No MAC convergence sub-layer function is implemented.~~

A RS, no matter it is fixed, nomadic, or mobile, when operating in FM-1 mode, is implemented with restricted MAC-CPS sub-layer functions. Under FM-1 mode, the MAC-CPS may provide bandwidth allocation with distributed scheduling, and the assistance to system access process. In FM-1 mode, access RS does not provide MAC-SS sub-layer functions. No MAC convergence sub-layer is implemented. For a MS who selects a RS in FM-1 as its access station, the connection and privacy of this MS shall be established and maintained by the serving MR-BS and this MS end-to-end.

~~Most of the operations of a mobile RS mode are similar to those of a fixed RS, except the handover operation. During a handover, a mobile RS in CFM moving RS mode may need to initiate handover procedure of all attached MSs.~~

Comment [MO1]: No new information.

[Remove 6.3.22.4.1.2 and insert following context after 1.4.4.1]

1.4.4.2 RS with FM-2 mode ~~6.3.22.4.1.2 Moving BS mode~~

~~An RS, when operating in moving BS mode, the RS shall implement a full set of physical layer and MAC layer functions defined in IEEE802.16e-2005 excluding the convergence sublayer. The mobile RS is also the saving station of the MS. The mobile RS shall perform handover per 6.3.22.2. After the mobile RS handover to a new target MR-BS, if the mobile RS enters into a new IP subnet, the IP address of all the MS servered by this mobile RS may need to be eatablished. A dedicated transport connection may be established between the mobile RS and its serving MR-BS to relay the IP address re-establishment related signaling between the MS and the MR-BS.~~

A RS, when operating in FM-2 mode, the MAC-CPS shall provide system access, distributed bandwidth allocation, and connection management over R-link and access link separately. In FM-2 mode, access RS shall provide MAC-SS sub-layer functions. No MAC convergence sub-layer is implemented.

The functional mode of a RS can be negotiated through basic capability messages exchange at RS initial network entry and re-entry.

At RS initial network entry, during the basic capability negotiation, the RS uses SBC-REQ message to indicates to the associated MR-BS the functional mode of this RS. The MR-BS uses SBC-RSP to confirm the functional mode.

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