

Project	IEEE 802.16 Broadband Wireless Access Working Group < http://ieee802.org/16 >	
Title	Path selection for RS initial network entry	
Date Submitted	2006-11-7	
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Re:	This contribution is response to call for technical proposal (IEEE 802.16j-06/027).	
Abstract	This document proposes path selection scheme at RS initial network entry.	
Purpose	Discuss and adapt proposed text and message format.	
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Path selection for RS initial network entry

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1. General

This document presents the needed amendments in order to support path selection for Relay Station (RS) initial network entry.

2. Background

In generally, when a MS tries network entry to a BS, the MS may connect with a BS of the highest RSSI or CINR level in order to choose the best link quality, as shown figure 1.

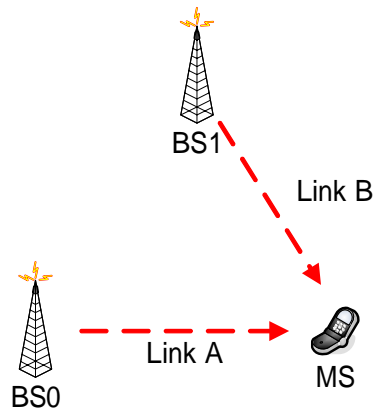


Figure 1

3. Proposed method

When a RS tries network entry to a superordinate node (BS or other RS which has already done network entry), RS should not decide the destination node (BS or RS) based on only link quality. RS can choose an optimal path using the following information.

- Number of hops
- Burst profile of each relay link

For instance, in Figure 2, RS2 compares the following parameters and can choose the optimal path.

- BS0~RS2
 - ✓ Number of hops : 1
 - ✓ Link quality (modulation type and coding rate) which is assumed based on RSSI or CINR level between BS0 and RS2
- BS0~RS1~RS2
 - ✓ Number of hops : 2
 - ✓ Link quality of the end-to-end (BS0-RS1-RS2)

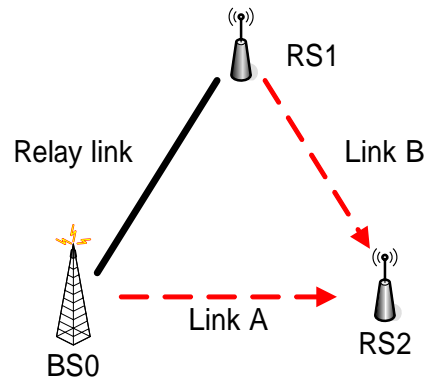


Figure 2

4. Text to be inserted into standard

6.3.2.3.1 Downlink Channel Descriptor (DCD) message

Insert the following text at the end of the 6.3.2.3.1:

The following parameters, which are coded as TLV tuples as defined in 11.4, shall be included in the DCD message.

Number of hops

The number of hops to RS which transmits the DCD from BS.

DIUCs of relay link

Consecutive DIUCs of each relay link to RS from BS which is the starting point.

6.3.2.3.3 Uplink Channel Descriptor (UCD) message

Insert the following text at the end of the 6.3.2.3.3:

The following parameters which are coded as TLV tuples as defined in 11.3 shall be included in the UCD message.

UIUCs of relay link

Consecutive UIUCs of each relay link to RS from BS which is the starting point.

6.3.9 Network entry and initialization

Insert the following text at the end of the 6.3.9:

The RS initial network entry procedure can be divided into the following phases:

- a) Scan for downlink channel and obtain path selection parameters
- b) Obtain transmit parameters (from UCD message)
- c) Decide a desired path and establish synchronization with the superordinate node (BS or RS)
- d) Perform ranging
- e) Negotiate basic capabilities
- f) Authorization RS and perform key exchange
- g) Perform registration
- h) Set up connections

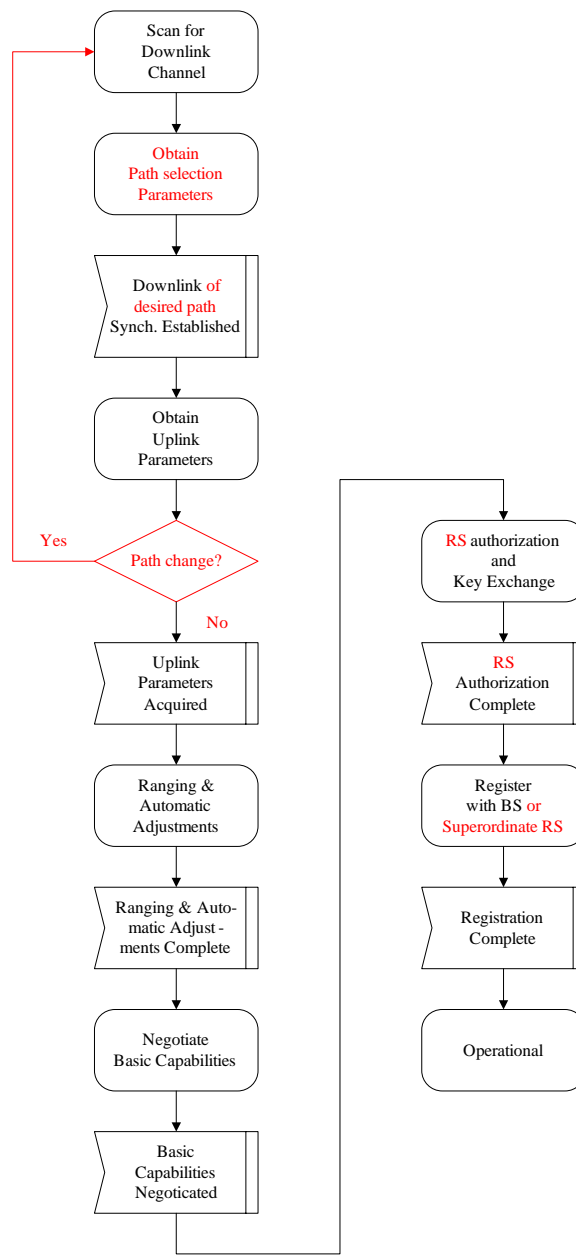


Figure 55a – RS Initialization overview

10. Parameters and constants

10.1 Global values

Insert the following entries into Table 342:

Table 342 – Parameters and constants

System	Name	Time reference	Minimum value	Default value	Maximum value
RS	<u>Searching time for path selection</u>	<u>Time the RS searches path information in order to select suitable path in initial network entry process</u>	<u>T.B.D</u>	<u>T.B.D</u>	<u>T.B.D</u>

11.3 UCD management message encodings

Insert the following entries into Table 353:

Table 353 – UCD PHY specific channel encodings – WirelessMAN-OFDMA (continued)

Name	Type (1 byte)	Length	Value (variable length)	Notes
<u>UIUCs of relay links</u>	<u>204</u>	<u>variable</u>	<u>UIUC of 1st hop - UIUC of 2nd hop - UIUC of 3rd hop - ...</u>	<u>OFDMA</u>

11.4 DCD management message encodings

Insert the following entries into Table 385:

Table 385 – DCD channel encoding (continued)

Name	Type (1 byte)	Length	Value (variable length)	Notes
<u>Number of hops</u>	<u>61</u>	<u>variable</u>	<u>1=one hop 2=two hops ...</u>	<u>OFDMA</u>
<u>DIUCs of relay links</u>	<u>62</u>	<u>variable</u>	<u>DIUC of 1st hop - DIUC of 2nd hop - DIUC of 3rd hop - ...</u>	<u>OFDMA</u>