Project	IEEE 802.16 Broadband Wireless Access Working Group <**http://ieee802.org/16**>	
Title	Management CID allocation	
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Re:	This contribution is response to call for technical proposal (IEEE 802.16j-06/034).
Abstract	This document proposes how to assign Management CID to RS and relayed MS.
Purpose	Discuss and adapt proposed text and message format.
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Management CID allocation

Introduction

This contribution proposes a method of management CID assignment for mobile station (MS) through an RS in a mobile multihop relay (MMR) network.

Background

Figure 1 shows reference model of IEEE802.16j.

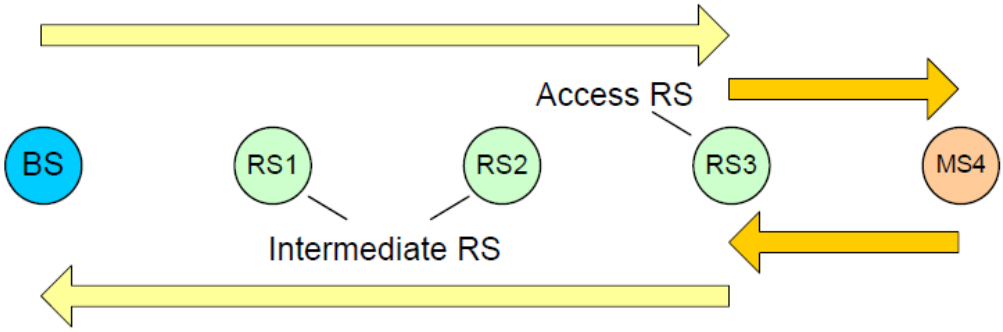

Figure 1 Reference Model of Network Entry for IEEE802.16j

Base station (MR-BS) and mobile station (MS) communicate through one or more relay stations (RSs). All RSs are assumed to transmit preamble and control messages.

In a simple (lack of local decision) RS case, in order to assign a management CIDs (Basic CID and Primary Management CID), RS needs to transfer RNG-REQ/RSP message between BS and MS. In this case, since the number of these sequences is at least $2 \quad n \quad 1$ hops number of MS, the usage of network resource is wasteful.

Proposed method

We propose the following;
BS can assign a part of management CID range systematically or non-systematically to its subordinate RS during ranging process or at any time whenever needed. Systematic range assignment means each superordinate RS has a range as the superset of the union of CIDs of all its subordinate RSs. Systematical CID allocation could embed network topology into CIDs to help RSs to find routing paths without storing all CIDs of subordinate RSs in the routing table.

The management CID shall be divided into two ranges as follows;

- ✓ Management CID range for MS

  The management CID range which is defined in IEEE Std 802.16-2004 (Table 345) except assigned management CID range for RS.

- ✓ Management CID range for RS

  The management CID range which is defined in IEEE Std 802.16-2004 (Table 345) except assigned management CID range for MS.

The RS also can assign these CID range to its subordinate node (MS or RS) on behalf of superordinate node (BS or RS) during ranging process or at any time whenever needed. Example of these sequences is shown in figure 2. Since the number of these sequence is 2 *n* hops number of MS , this method contributes to effective use of network resource. In fixed relay case, these management CID range for RS can be made into a layered structure according to tree network topology.

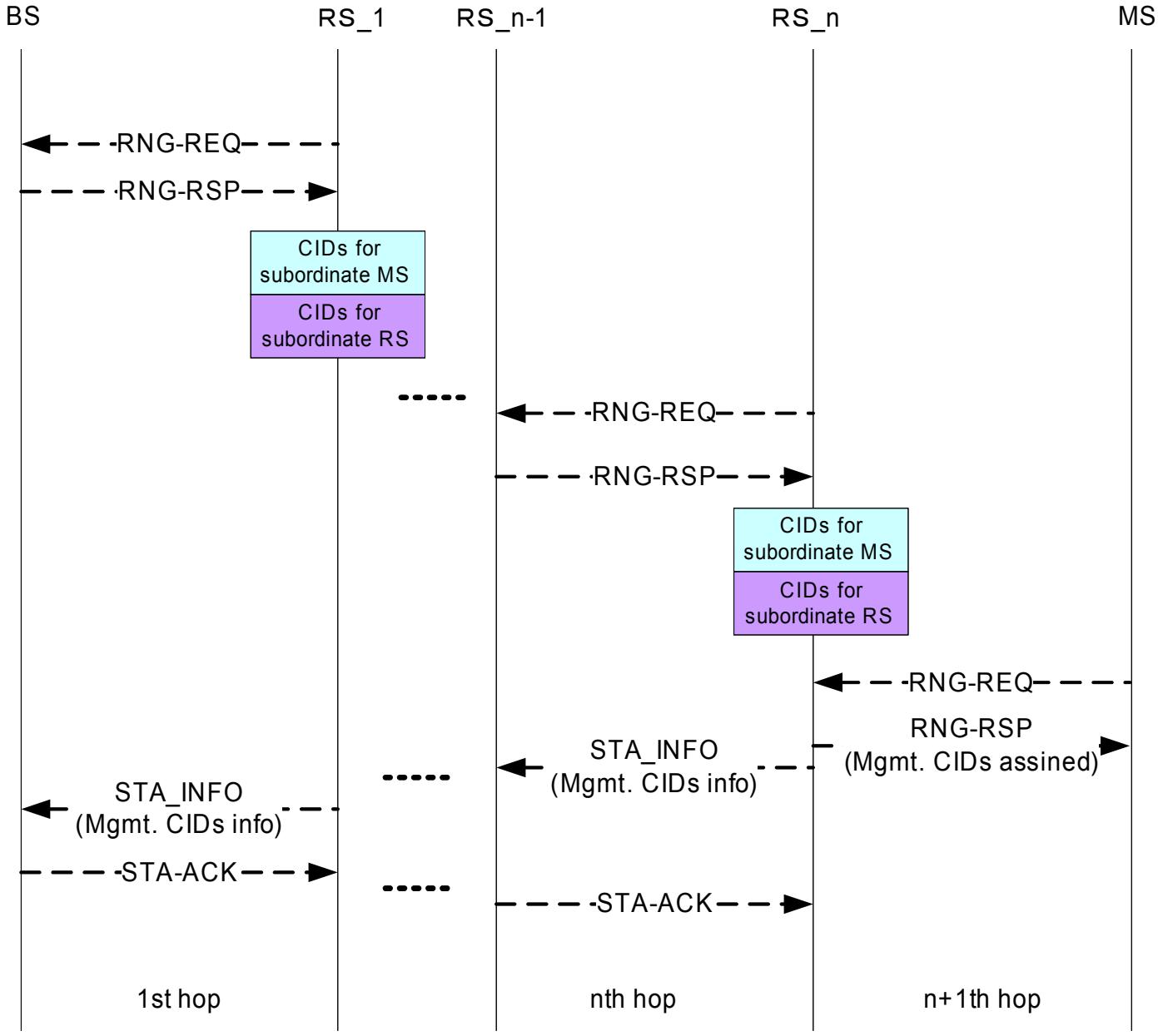

Figure 2 Management CIDs allocation and assignment

Text to be inserted into standard

6.3.2.3.5 Ranging request (RNG-REQ) message

Insert the following text at the end of the 6.3.2.3.5:

The following TLV parameter shall be included in the RNG-REQ message when transmitted during RS initial entry to the network. Conventional MS ignores the parameter.

Requested number of management CID for MS
Requested number of management CID for RS

6.3.2.3.6 Ranging response (RNG-RSP) message
Insert the following text at the end of the 6.3.2.3.6:

The following TLV parameter shall be included in the RNG-RSP message when transmitted during RS initial entry to the network. The MR-BS could assign the range of RSs and MSs systematically or non-systematically. Conventional MS ignores the parameter.

Start number of management CID for MS
End number of management CID for MS
Start number of management CID for RS
End number of management CID for RS

6.3.2.3.5.XX Station Information (STA-INFO) message

The STA-INFO message shall be transmitted by the RS to identify a new station (MS or RS) is ready to enter to the network. RS shall include MS's information along with assigned primary and basic CIDs. The message format is shown in Table XX.

Table XX: STA_INFO message format

Syntax	Size	Note
STA-INFO_Message_Format() {		
Management Message Type (TBD)	8 bits	
MAC ID	48 bit	Station's MAC address
Primary management CID	16 bits	Primary management CID assigned from RS to the network entering station (MS/RS)
Basic CID	16 bits	Basic CID assigned from RS to the station (MS/RS)
}		
TLV Encoded Information	variable	
}		

Basic CID (in the MAC header)
The CID in the MAC header is the Basic CID for this RS, as assigned in the RNG-RSP message.

6.3.2.3.XY Station Information Acknowledge (MS-ACK) message

The STA-ACK message shall be transmitted in response to STA-INFO by the MR-BS to notify the RS that new station's (MS/RS) information is received successfully. The message format is shown in Table XY.

Table XY MS-ACK message format

Syntax	Size	Note
STA-ACK_Message_Format() {		
Management Message Type (TBD)	8 bits	

TLV Encoded Information	variable	
}		

Basic CID (in the MAC header)
The CID in the MAC header is the Basic CID for this RS, as appears in the STA-INFO message

10.4 Well-known addresses and identifiers
Insert the following text at the end of the 6.3.2.3:

Table 345 - CIDs

CID	Value	Description
Basic CID	0x0001 ~ x	Basic CID range for MS. The same value is assigned to both the DL and UL connection.
	x+1 ~ m	Basic CID range for RS. The same value is assigned to both the DL and UL connection.
Primary management CID	m+1 ~ m+x	Primary management CID range for MS. The same value is assigned to both the DL and UL connection.
	m+(x+1) ~ 2m	Primary management CID range for RS. The same value is assigned to both the DL and UL connection.

11.5 RNG-REQ message encodings
Insert the following entries into Table 364:

Table 364 – RNG-REQ message encodings

Name	Type (1 byte)	Length	Value (variable-length)	PHY Scope
Requested number of management CID for MS	xx	1	The number of management CID for subordinate MS	OFDMA
Requested number of management CID for RS	xx	1	The number of management CID for subordinate RS	OFDMA

11.6 RNG-RSP management message encodings
Insert the following entries into Table 367:

Table 367 – RNG-RSP message encodings

Name	Type (1 byte)	Length	Value (variable-length)	PHY Scope
Start number of management CID for MS	xx	2		OFDMA
End number of management CID for MS	xx	2		OFDMA
Start number of management CID for RS	xx	2		OFDMA
End number of management CID for RS	xx	2		OFDMA